

Examining the Efficacy of Online Administration of a Time-Limited School Readiness Intervention in the Face of COVID-19

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Although the efficacy of online administration of behavioral parent training (BPT) programs is well-established, such programs address a single risk factor (behavioral functioning) for school readiness difficulties (comprised of academics, cognitive skills, and social, emotional, and behavioral functioning). The current study aims to examine the feasibility, acceptability, and efficacy of a telemedicine delivery of the School Readiness Parenting Program (SRPP), an integrative adaptation of PCIT designed to address the behavioral and academic domains of school readiness. The present study takes the first step towards validating an online administration of the SRPP as a treatment for early childhood disruptive behavior. Data were collected for 64 children ages 2–6 years ($M^{\text{age}} = 4.63$, $SD = 0.86$; 78.1% Hispanic/Latinx) and their families, who received either in-person administration of time-limited PCIT (PCIT-TL; $n=30$) or online administration of SRPP ($n=34$). A series of repeated measures ANOVAS were conducted to examine within and between group

effects. Results revealed that both SRPP and PCIT-TL significantly reduced inattention ($d's = -0.54$ to -0.88), aggression ($d's = -0.55$ to -1.06), and behavioral symptomology ($d's = -0.55$ to -0.85) and produced significant gains in parental skills ($d's = -1.47$ to 2.99). Notably, online SRPP demonstrated greater improvement in positive parental verbalization, whereas PCIT-TL demonstrated greater reductions in parental stress. Overall, findings support the utility of online SRPP for addressing behavioral school readiness concerns.

Keywords: preschool; early intervention; PCIT; externalizing behavior

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SCHOOL READINESS is a multidimensional construct comprised of academic and cognitive skills and social, emotional, and behavioral functioning (Fantuzzo et al., 2007; Hair et al., 2006). When asked to identify factors associated with a challenging transition to formal education, kindergarten teachers most frequently cite difficulties with academic and social skills and following directions (Rimm-Kaufman et al., 2000). Over the last two decades, there has been a push for early intervention programs to take an integrative multicomponent approach to fostering school readiness (e.g., National Research Council, 2000). However, despite numerous interventions aimed at improving the social, emotional, or behavioral components of school readiness (e.g., Kaminski & Stormshak, 2007; Webster-Stratton et al., 2008), to date, few interventions have taken

an integrative approach. The School Readiness Parenting Program (SRPP; [Graziano et al., 2014](#)) takes an integrative approach to the treatment of school readiness difficulties by utilizing aspects of traditional behavioral parental training and academic skills training to address the behavioral and academic domains of school readiness, respectively. Although SRPP offers a promising approach to school readiness intervention, SRPP has only been validated for use in group-based and in-person formats. In the face of COVID-19 and the associated shifts towards online instruction and intervention ([Daniel, 2020](#); [Winter et al., 2021](#)), examining the efficacy of remote administration of SRPP is an important step to facilitate the continuance of delivery of evidence-based early intervention. The present study takes the first step towards validating an online and individual administration of the SRPP, by examining its efficacy as a treatment for disruptive behaviors.

TELEMEDICINE MENTAL HEALTH SERVICES

The COVID-19 pandemic and associated mandates of social distancing and lockdown measures necessitated a sudden and radical change within the field of mental health from traditional in-person to telemedicine services (e.g., [Imran et al., 2020](#)). As social distancing measures have begun to be lifted, practitioners report that they intend to continue using telemedicine services at a similar rate as was used during the height of the pandemic ([Zhu et al., 2021](#)). With access to the internet steadily increasing over the past few decades (e.g., [Meadan & Daczewitz, 2015](#)) and increased practitioner confidence in the provision of telemedicine care post-COVID-19 ([Pierce et al., 2021](#)), telemedicine-based mental health services offer a viable alternative to in-person care. Further, telemedicine offers the potential to better address concerns of practitioner accessibility and dropout rates, especially when combined with time-limited services.

BEHAVIORAL COMPONENT OF SCHOOL READINESS

Disruptive behaviors, including inattention, hyperactivity, impulsivity, oppositionality, and defiance, represent one of the most pervasive components of school readiness, affecting approximately 2–18% of preschool-age children at clinically significant levels ([DuPaul et al., 2001](#); [Pineda et al., 1999](#); [Wilens et al., 2002](#)). In fact, disruptive behavior is the leading cause of childhood mental health referrals ([Kazdin, 2003](#)). The effects of disruptive behaviors are widespread, resulting in functional impairments within academic, social, and interper-

sonal domains ([Frick et al., 1991](#); [Sibley et al., 2010](#)). Clinically significant disruptive behaviors also commonly result in increased risk for antisocial behaviors, school dropout, familial discord ([Rasmussen & Levander, 2009](#)), and parental stress ([Tzang et al., 2009](#)). Children with disruptive behaviors also perform more poorly academically and require greater school-based intervention services than their typically developing peers ([Loe & Feldman, 2007](#)).

Currently, stimulant medications and behavioral parent training (BPT) programs represent the two front-line treatments for disruptive behaviors. However, within early childhood (≤ 6 years old), the recommended course of treatment, as per the American Academy of Pediatrics, is to begin with BPT prior to initiation of medication ([Wolraich et al., 2019](#)). BPT programs reduce symptoms of disruptive behavior disorders by promoting positive parent-child interactions and parental consistency in the use of non-corporal disciplinary strategies. Commonly used BPT programs include Parent-Child Interaction Therapy (PCIT; [Hembree-Kigin & McNeil, 1995](#)), Incredible Years ([Webster-Stratton, 1997](#)), and Parent Management Training ([Kazdin, 1997](#)). Among these, PCIT has emerged as a gold-standard intervention for early-childhood difficulties in the behavioral domain of school readiness ([Thomas et al., 2017](#)).

PCIT is an evidence-based treatment program designed to address externalizing behavior problems in children ages 3 to 6. PCIT combines two coaching segments, Child-Directed Interaction (CDI) and Parent-Directed Interaction (PDI), during which therapists provide live coaching of parent-child interactions, traditionally via bug-in-the-ear technology and a one-way mirror. During the CDI segment, parents are instructed on play therapy techniques (i.e., praising, imitating, and reflecting) designed to foster better parent-child interactions. During the PDI segment, the focus shifts towards improving child compliance via the implementation of more effective parental commands and the use of behavioral strategies (i.e., planned ignoring, time-outs, and praise for compliance; [Hembree-Kigin & McNeil, 1995](#)). Treatment completion occurs when parents “master” both sets of skills (i.e., CDI and PDI) and children’s behavioral difficulties have substantially reduced ([Hembree-Kigin & McNeil, 1995](#)). PCIT has demonstrated positive outcomes across diverse participant populations ([Cooley et al., 2014](#); [Leung et al., 2009](#); [Matos et al., 2009](#); [McCabe & Yeh, 2009](#)). In addition to the efficacy of PCIT for reducing disruptive behaviors (e.g., [Valero](#)

Aguayo et al., 2021; Ward et al., 2016), PCIT also demonstrates efficacy in reducing parenting stress (Cooley et al., 2014).

ADAPTATIONS OF PCIT

Despite the noteworthy outcomes of PCIT, many families that could benefit from the program do not complete it (Lanier et al., 2011). Factors contributing to treatment utilization rates include the availability and accessibility of therapists trained in BPT (Comer et al., 2015) and stigma associated with seeking treatment (Comer et al., 2015). Further, among treatment-seeking families, high rates of treatment dropout exist, thus limiting length of treatment utilization (Fernandez & Eyberg, 2009). Attrition rates for traditional PCIT specifically, fall consistently between approximately 35% and 50% (Chaffin et al., 2009; Danko et al., 2016; Eyberg et al., 2001), which is often attributed to the extended length of PCIT (Lieneman et al., 2019). Specifically, although PCIT can be completed within 8–12 sessions (Hembree-Kigin & McNeil, 1995), the average length of treatment is approximately 20.5 sessions (Lieneman et al., 2019), placing high demands on parental resources.

In response to the limitations of traditional PCIT, several adapted protocols have recently been developed. Among these, internet-based PCIT is most readily poised to address concerns of availability, accessibility, and stigma (Comer et al., 2015). Internet-based PCIT involves remote administration of live coaching via a telemedicine portal and requires the completion of the same components of treatment (i.e., CDI and PDI) and graduation criteria (Comer et al., 2015). A remote-based service introduces several possible advantages to providers, including improved ecological validity (Comer et al., 2017) and an opportunity to base assessments on in-home observation in addition to parental report (Comer & Barlow, 2014). Findings consistently indicate that internet-based PCIT is an effective intervention for enhancing early child behavior problems (Fleming et al., 2017; Fleming et al., 2021). Further, internet-based PCIT may actually result in greater improvements in behavioral difficulties than traditional in-person administration (Comer et al., 2017). These findings are particularly important in the era of COVID-19, which necessitated a rapid and likely irreversible transition (Thomas et al., 2020; Zhu et al., 2021) toward greater use of telemedicine protocols for the provision of mental health services (e.g., Bashshur et al., 2020; Pierce et al., 2021). However, despite promising results, dropout rates continue to be high within

internet-based adaptations of PCIT (i.e., approximately 35%; Fowles et al., 2018; Galanter et al., 2012), highlighting the importance of additional adaptations that may improve sustained commitment among families.

Abbreviated PCIT protocols, which reduce the number of therapy sessions by relaxing traditional mastery criteria, have demonstrated promising results in comparison to traditional PCIT (e.g., Graziano et al., 2020a, 2020b; Nixon et al., 2003) and offer a viable solution for addressing treatment dropout by reducing parental burden. In fact, abbreviated protocols have demonstrated substantially reduced rates of dropout (13% dropout rate) compared to traditional PCIT (23% dropout rate; Nixon et al., 2003). As such, abbreviated adaptations of PCIT may provide a practical option for high-stress families that require a short-term intervention program (Graziano et al., 2020a, 2020b).

Finally, the School Readiness Parenting Program (SRPP; Graziano et al., 2014) is an adaptation of PCIT, which takes a more integrative approach to the treatment of school readiness difficulties, integrating traditional PCIT skills with parental training in academic domains. Decades of research document rank-order stability of academic achievement (e.g., Crawford et al., 2001; Herbers et al., 2012), such that academic scores at school entry predict scores throughout education, and gaps in academic achievement observed at the end of high school are observable as early as school entry (Knudsen et al., 2006). Positive parent-child interactions offer one mechanism by which academic school readiness can be fostered (Marti et al., 2018). Specifically, greater gains in early literacy, math, and self-regulation are seen when parents are engaged in their children's early education (Marti et al., 2018). The SRPP was designed to effect changes in parent-child interactions and parental engagement in the educational system to leverage changes within the academic and behavioral domains of school readiness.

In the SRPP, parents are provided with an abbreviated eight-session protocol of PCIT. As with other abbreviated PCIT protocols, SRPP relaxes traditional mastery criteria to allow for a limited number of sessions. Each 1.5-to-2-hour session is divided between PCIT-based behavioral management skills and a discussion of academic achievement strategies. Academic strategies include structured homework time, communicating effectively with a teacher (i.e., setting up a daily report card; Volpe & Fabiano, 2013), fostering early literacy (i.e., dialogic reading; Whitehurst & Lonigan, 1998), and math skills (Graziano, &

Hart, 2016). SRPP was originally validated for use in a group-based format and has demonstrated efficacy in improving academic achievement in children with disruptive behavior disorders (Graziano & Hart, 2016). However, to date, no study has examined the utility of SRPP when administered in an individual or internet-based format. Further, no study to date has examined the efficacy of SRPP in comparison to an alternative intervention.

CURRENT STUDY

Taken together, the literature suggests a need for integrative early intervention programs to address school readiness. Assessing the validity and feasibility of online administration of such programs is vital, as telemedicine programs offer the possibility of wider dissemination of intervention services and have proven vital in the era of COVID-19 (e.g., Zhu et al., 2021). The SRPP represents an effective integrative intervention approach to addressing academic and behavioral school readiness difficulties, which, if valid when administered online, has the potential to address school readiness in a more integrative manner. To assess the validity of an online and individual administration of the SRPP, we compared its efficacy to a well validated, time-limited administration of PCIT (PCIT-TL). Given that PCIT focuses exclusively on the treatment of behavioral difficulties, we limited our examination of treatment efficacy in the present study to behavior-related concerns.

The aim of the current study is to (a) examine the feasibility and acceptability of delivering SRPP online via a telemedicine portal, (b) examine the efficacy of SRPP, when delivered via telemedicine, at improving the behavioral and social components of school readiness, parenting behaviors, and parenting stress, and (c) examine the efficacy of SRPP in comparison to a gold standard of in-person administration of PCIT-TL services. Given that the behavioral components of SRPP are largely based upon PCIT, which has been successfully delivered via telemedicine (Comer et al., 2015), we hypothesized good feasibility of online SRPP administration. Further, given the time-limited nature of SRPP and high parental acceptance of previous time-limited adaptations of PCIT (e.g., Graziano et al., 2020a), we anticipated a strong positive parental response to online SRPP. Based on the previously documented efficacy of both PCIT-TL (e.g., Nixon et al., 2003) and SRPP (Graziano & Hart, 2016), we hypothesized substantial reductions in children's externalizing behaviors and parenting stress in both intervention groups. However, given the limited efficacy of BPT

for addressing social skills deficits in children with externalizing behavior problems (Chronis et al., 2004), we hypothesized minimal intervention effects on social skills. Finally, we hypothesized that online SRPP would result in equivalent or better reductions on all child- and parent-level outcomes of interest, as compared to in-person PCIT-TL.

Method

PARTICIPANTS AND RECRUITMENT

The overall sample for the present study consisted of 64 children between the ages of 2 and 6 ($M_{\text{age}} = 4.63$, $SD = 0.86$) whose parent(s) provided consent to participate in the study. The sample was comprised of mostly male (75%), Hispanic/Latinx (78.1%), and White (93.8%) children. Thirty-four children/families ($M_{\text{age}} = 4.98$, $SD = 0.32$), recruited in 2020, received telemedicine administration of SRPP. Thirty children/families ($M_{\text{age}} = 4.25$, $SD = 1.10$), recruited between 2016 and 2017¹, received in-person PCIT-TL. Chi-square difference tests revealed significant differences between intervention groups on child age and sex, such that children who received telemedicine SRPP services were somewhat older (i.e., 28 children in the SRPP and 7 children in the PCIT-TL groups were eligible for kindergarten enrollment at the time of intake) and more likely to be male than children who received in-person PCIT-TL services. At baseline groups differed in severity of some presenting problems (i.e., hyperactivity and parental negative verbalizations; Table 1), but did not differ in familial goals for treatment. Specifically, at baseline degree of hyperactivity and parental use of negative verbalizations were higher amongst the PCIT-TL group. The primary goals for treatment for all families, regardless of group, were behaviorally related (e.g., child non-compliance).

Due to the nature of PCIT, parents also participated in treatment. Although all families were offered the opportunity to include two (or more) caregivers in treatment, one caregiver was required to attend all sessions and complete the intake and post-intervention surveys—referred to hereafter as the target parent. Target parents were predominantly mothers (82.8% biological and adoptive mothers), with only 8 fathers (17.2% serving as

¹ Families in the PCIT-TL group were originally recruited as part of a larger study examining the efficacy of an intensive adaptation of PCIT (Graziano et al., 2020a). For the present study, only those children/families assigned to receive in-person PCIT-TL, and not those assigned to receive intensive PCIT services, were included as part of the present study.

the target parent). Target parents were mostly Hispanic/Latinx (82.8%). Although approximately 83% of parents spoke Spanish or a combination of English and Spanish, only 20.3% reported speaking primarily Spanish with their child and only 13 families requested treatment in Spanish only (although some families requested a mix of Spanish and English). Additional demographic information for children and parents can be found in Table 1.

STUDY DESIGN AND PROCEDURES

This study was approved by the University's Institutional Review Board. Clinicians who delivered

the interventions, in the family's preferred language, were master's-level clinical staff or therapists, who had received training in PCIT in accordance with PCIT International's standards and who were in the process of receiving their certification in PCIT. Clinicians who delivered SRPP received additional training as it relates to the school readiness components of SRPP. Clinicians did not overlap across interventions (i.e., clinicians either were trained in and delivered PCIT or SRPP). Clinicians received weekly supervision by a licensed psychologist who is a PCIT within agency trainer and developer of the SRPP adaptation.

Table 1
Participant Baseline Demographic Variables by Treatment Condition and Baseline Between Group Differences for Outcomes of Interest

	Total Sample (<i>N</i> = 64)	In Person PCIT-TL (<i>n</i> = 30)	Online SRPP (<i>n</i> = 34)	Difference (<i>F</i>)
Child Demographic Variables				
Child sex (% male)	75.0	60.0	88.2	—
Child Mean Age	4.63 (0.86)	4.25 (1.10)	4.98 (0.32)	—
Child Race (%)				
Black	4.7	3.3	5.9	—
White	93.8	96.7	91.2	—
Biracial/other	1.6	0.0	2.9	—
Child Ethnicity (%)				
Hispanic/Latinx	78.1	76.7	79.4	—
Non-Hispanic/Latinx	21.9	23.3	20.6	—
Target Parent Demographic Variables				
Parental Mean Age	36.67 (4.95)	36.33 (5.38)	36.97 (4.60)	—
Parental Education (%)				
High School Diploma/GED	4.7	3.3	5.9	—
Some College	7.8	13.3	2.9	—
Associate's Degree	7.8	3.3	11.8	—
Bachelor's Degree	31.3	40.0	23.5	—
Advanced Degree (e.g., Master's)	48.4	40.0	55.9	—
Languages Spoken (%)				
Monolingual (English only)	12.5	13.3	11.8	—
Monolingual (Spanish only)	6.3	10.0	2.9	—
Bilingual (Spanish/English)	76.6	70.0	82.4	—
Other (Other Language/Multilingual)	4.7	6.7	2.9	—
Preferred Language (%)				
English	74.7	73.3	85.3	—
Spanish	20.3	26.7	14.7	—
Outcomes of Interest				
Hyperactivity	66.66 (10.95)	70.67 (11.31)	63.12 (9.43)	8.48**
Inattention	61.91 (8.28)	61.30 (9.30)	62.44 (7.37)	0.30
Aggression	58.81 (12.05)	58.90 (12.35)	58.74 (11.97)	0.003
Social Skills	46.80 (8.35)	46.80 (9.38)	46.79 (7.47)	0.00
Behavioral Symptoms	60.97 (9.81)	63.57 (9.69)	58.68 (9.46)	4.16
Positive Parent Verbalizations	4.43 (5.44)	3.17 (3.27)	5.61 (6.72)	3.13
Negative Parent Verbalizations	30.33 (16.15)	36.24 (16.84)	24.81 (6.72)	8.47**
Parenting Stress Index Total	84.56 (23.06)	88.17 (19.06)	81.27 (26.24)	1.54

Note. Values enclosed in parentheses represent standard deviations. Between group differences were examined via a series of One Way ANOVAs. PCIT-TL = Parent Child Interaction Therapy Time Limited; SRPP = School Readiness Parenting Program.

** $p < .01$

Clinicians and trained staff administered an assessment protocol that lasted approximately 2 hours and included: (a) a biopsychosocial interview of parents that gathered relevant background information on the child and family, (b) questionnaires on children's externalizing behavior problems and symptomology, (c) questionnaires on parenting stress, and (d) videotaped observations of three 5-minute standard parent-child interaction situations that varied in the degree of parental control expected (child-led play, parent-led play, and clean-up). See below for a description and names of assessments. Families completed a similar post-intervention assessment upon completion of intervention (i.e., 8–10 sessions). Families were given small incentives such as a small toy/sticker to the child, and/or a small gift to the parent upon completion of the assessments, and all interventions were provided at no cost.

INTERVENTION DESCRIPTION AND ADAPTATION

Parent-Child Interaction Therapy (PCIT; Eyberg & Robinson, 1982)

PCIT is a manualized evidence-based BPT program that integrates social learning and attachment theories. In PCIT, parents proceed through two distinct phases: Child-Directed Interaction (CDI), which resembles traditional play therapy, and Parent-Directed Interaction (PDI), which resembles clinical behavior therapy. During CDI, parents follow their child's lead in play by using the nondirective PRIDE skills (i.e., do skills: Praising the child, Reflecting the child's statements, Imitating the child's play, Describing the child's behavior, and using Enjoyment) and learn to apply PRIDE skills to the child's appropriate play, ignore undesirable behaviors, and avoid verbalizations that take the lead away from the child during the play (i.e., don't skills, including questions, commands, and negative statements or criticism). During PDI, parents set limits to reduce child noncompliance and negative behavior. They learn to use effective commands and consistently follow through with timeouts for noncompliance.

The CDI and PDI phases each begin with a didactic teaching session. During all other sessions, the therapist coaches each parent in vivo in their use of the CDI and PDI skills with their child. A combination of the standard time-out procedure along with the swoop-and-go method (used when another room was not available for the time out room or if the parent did not feel comfortable using a time out room) was implemented. For a full detailed description of traditional PCIT, see Zisser and Eyberg (2010).

Time-Limited Adaptation

In traditional PCIT, parents must also meet “mastery” criteria after each phase (CDI and PDI) to progress and complete treatment. Mastery of CDI is met when parents are able to demonstrate a high level of positive parenting skills during a 5-minute observation period. Mastery of PDI consists of limiting negative parenting and successfully implementing appropriate consequences during another 5-minute interaction with their child. Consequently, treatment courses can vary greatly in length, with the largest PCIT study ($n = 1,318$), to our knowledge, averaging 20.5 weekly sessions (Lieneman et al., 2019). The time-limited adaptation of PCIT (PCIT-TL) limits the number of sessions to 8–10 (i.e., 1 CDI teach, 3–4 CDI coach sessions, 1 PDI teach, and 3–4 PDI coach sessions) and removes the requirement that parents meet “mastery” criteria to progress and complete treatment. PCIT-TL has been validated in several studies (e.g., Graziano et al., 2020a, 2020b), with results consistently indicating that PCIT-TL is equally as effective in the reduction of children's externalizing behavior problems as compared to traditional administrations of PCIT. In the present study, half of the sample received the time-limited adaptation of PCIT (i.e., the in-person treatment condition), which included ten, 60 to 90 minute sessions. This treatment condition served as the control/comparison group for the SRPP described below.

School Readiness Parenting Program (SRPP; Graziano et al., 2014)

SRPP is an adaptation of PCIT which integrates traditional PCIT skills with academic school readiness skills. Originally designed as a group-based adaptation of PCIT, SRPP was validated in a group-based delivery format by Graziano and colleagues (2014). For the purposes of this study, SRPP was delivered in an individual format via a telemedicine platform. Parents attended eight sessions of SRPP, with sessions varying in length from 1.5 to 2 hours. Each session was broken into two components. The first half of each session focused on traditional behavior management strategies (e.g., improving the parent-child relationship, use of reinforcement, time-out). Behavioral management content was based on PCIT with four sessions (one teach and three coach sessions) focused on CDI skills and another four sessions (one teach and three coach sessions) focused on PDI skills. During the second half of each SRPP session, parents participated in discussions on several school readiness topics, including how to appropriately manage behavior problems during

homework time and in public settings, how to promote children's social-emotional functioning, how to promote early literacy and math skills, dialogic reading, how to implement a home-school communication plan with teachers (i.e., daily report card), and how to prepare their child for kindergarten. Thus, SRPP in the present study had several marked differences from traditional PCIT: (a) it was time-limited (eight sessions, similar to PCIT-TL intervention), (b) did not require parents to achieve mastery criteria to advance within or graduate from treatment (similar to the PCIT-TL intervention), (c) included additional school readiness components, and (d) was delivered via a telemedicine portal.

MEASURES OF FEASIBILITY AND ACCEPTABILITY

Consumer/Intervention Satisfaction and Completion

Parents provided ratings of satisfaction at post-intervention by completing selected items from the Therapy Attitude Inventory (Brestan et al., 1999). Raters indicated on a 5-point Likert scale their degree of satisfaction of (a) improvements in the parent-child relationship, (b) changes in child's behavior, (c) changes in child's compliance, and (d) parental confidence in discipline. Parents also reported whether they would recommend the program to others. Finally, parents rated the degree to which they enjoyed the intervention format (online/in-person) or would have preferred a different format on a 5-point Likert scale. Session attendance and treatment dropout was assessed based on the therapist's notes. Treatment completion was considered completion of at least 75% of sessions, which, in the case of both interventions in the present study, means completion of at least the completion of all PCIT-related content except public places and graduation sessions.

MEASURES OF PARENT-LEVEL OUTCOMES

Parenting Stress

Parents completed the Parenting Stress Index-Short Form (PSI-SF; Abidin, 1983). The PSI-SF is a widely used 36-item self-report instrument for parents of children ages 1 month to 12 years, which measures parental stress (Abidin, 1983). All scales derived from the PSI-SF have demonstrated strong test-retest reliability in previous studies (e.g., Barroso et al., 2016). In the present study, the PSI-SF total raw score was used to measure overall parenting stress ($\alpha = .93$).

Parenting Skills

The *Dyadic Parent-Child Interaction Coding System-4th Edition* (DPICS-IV; Eyberg et al., 2013), an established behavioral coding system, was used to measure the quality of parent-child interactions during a 5-minute child-led play session that was recorded and transcribed. Consistent with prior research (Bagner et al., 2016; Graziano et al., 2020a), clinicians/staff coded from the video recording and created a composite of positive parenting verbalizations ("do skills"; behavior descriptions, reflections, praises) and negative parenting verbalizations ("don't skills"; questions, commands, and negative talk) used during child-led play. Coders, who were masked to intervention status, were trained to 80% agreement with a criterion tape and 20% of the observations were coded a second time. Reliability for the *positive* and *negative verbalizations* were excellent (r 's range from .96 to .97).

MEASURES OF CHILD-LEVEL OUTCOMES

Externalizing Behavior Symptomology

Parents completed the *Behavior Assessment System for Children* (BASC-3; Reynolds & Kamphaus, 2015), a 139-item (ages 2-5 years) or 175-item (ages 6-11 years) questionnaire designed to assess emotional and behavioral domains such as, aggression, anxiety, attention and hyperactivity in youth ages 2 to 21 years. Items are rated on a 4-point Likert scale (never, sometimes, often and always). For the present study, sex and age normed t-scores for the Inattention ($\alpha = .89$), Hyperactivity ($\alpha = .80$), Aggression ($\alpha = .71$), Social Skills ($\alpha = .76$), and Behavioral Symptomology (index score comprised of the average t-score from the hyperactivity, aggression, depression, attention, atypicality, and withdrawal scales) scales were utilized.

Data Analytic Plan

All analyses were conducted using Statistical Package for the Social Sciences, version 27 (SPSS 27). There was less than 2% missing data for pre-intervention variables. Approximately 23% of post-intervention data were missing due to families who dropped out of intervention and/or did not complete any post-intervention assessments. Families with completed versus partial data at post intervention did not differ on any demographic variables, with the exception of the parenting stress index which was less likely to be completed by parents of older children ($F = 4.06, p = .05$). As recommended in clinical trials, intent to treat analyses with multiple imputation was used (Collins

et al., 2001; Jakobsen et al., 2017; Little & Yau, 1996; Rubin, 1988; Von Hippel, 2020).

Preliminary analyses focused on examining associations between demographic variables and all outcomes of interest as well as between group differences at baseline. Next, we examined differences in intervention satisfaction between the intervention groups. For the primary analyses, a series of repeated measures ANOVAs was conducted to compare families who were randomized to in-person PCIT-TL versus online SRPP in terms of parenting and child outcomes. Cohen's *d* effect size (ES) estimates for within-subjects were calculated for each intervention by comparing pre- and post-intervention scores while a between group effect size (*d*) was also calculated by comparing the pre-post change scores in the two intervention groups (positive scores = a higher effect for online SRPP relative to time-limited in-person PCIT). Finally, visual inspection of the data indicated possible between-group differences at pre-intervention (families were not randomly assigned to groups) for some outcomes of interest. As such, a series of one-way ANOVAs was conducted to examine this possibility. For those outcomes which between group differences were found at pre-intervention, a series of regressions was conducted examining the effect of group controlling for pre-intervention scores.

Results

PRELIMINARY ANALYSES

Means and standard deviations for each intervention group and the overall sample can be seen in Table 1. As can be seen in Table 1, the results of a series of one-way ANOVAs indicated significant between groups differences in hyperactivity and parental negative verbalizations (DPICS), such that children in the online SRPP group had significantly lower parent-reported hyperactivity than children in the in-person PCIT-TL group ($F = 8.48, p = .005$) and parents in the SRPP group demonstrated significantly fewer negative verbalizations than parents in the in-person PCIT-TL group ($F = 8.47, p = .005$) at baseline. Correlations between child age and sex with all outcomes of interest were examined. No demographic variables were significantly correlated with any outcome of interest (notably associations between BASC 3 and age and sex were not examined as *t*-scores which accounted for age and sex were utilized in all analyses).

INTERVENTION

SATISFACTION/COMPLETION RATES

Overall, the majority of parents in both the online SRPP and in-person PCIT-TL groups rated the interventions as resulting in improvements in their child's behavior (96.3% and 100%, respectively) and compliance (100% and 96%, respectively), as well as in their relationship with their child (88.9% and 96%, respectively). Similarly, all parents in both intervention groups rated the interventions as resulting in improvements in their confidence in disciplining their child. With regard to parental satisfaction with the format and delivery mechanism of the programs, 96.3% of parents in the SRPP group and 96% of parents in the PCIT-TL group reported that the intervention they received was adequate for meeting their clinical needs and 100% of parents in both intervention groups reported that they would recommend the program to others and would return to the program if clinic needs arose again. Treatment completion/dropout rates were similar across treatment modalities, with 88% of families completing online SRPP and 83% of families completing in-person PCIT-TL. However, the families who received SRPP completed significantly fewer sessions (7) than did families in PCIT-TL (9), due to the total number of sessions varying across treatment modality ($\chi^2 = 47.81, p < .001$).

INTERVENTION OUTCOMES

As indicated in Table 2, online SRPP resulted in significant improvements across study outcomes, with the exception of hyperactivity, social skills, and parental self-report of stress. In-person PCIT-TL also resulted in significant pre- to post-intervention improvements in all study outcomes, except social skills. Whereby time indicates pre- and post-intervention assessments, a significant time by group interaction was noted for two child-level outcomes: parent-reported hyperactivity ($F = 6.34, p < .05$) and social skills ($F = 3.95, p = .05$). Specifically, families who received in-person PCIT-TL services reported seeing a greater reduction in hyperactivity than did those in the online SRPP group. Families who received in-person PCIT-TL services also reported seeing a greater improvement in children's social skills than those in the online SRPP group; although the improvements in the in-person PCIT-TL group did not reach the level of clinical significance. Because the preliminary analyses indicated between group differences in hyperactivity at baseline, a regression examining the effect of treatment condition on hyperactivity, controlling for pre-intervention hyperactivity was also conducted

Table 2
Repeated Measures ANOVAS for Primary Study Outcomes

	Pre-Intervention <i>M (SD)</i>	Post-Intervention <i>M (SD)</i>	Pre to Post Change <i>M (SD)</i>	Time Effect <i>F</i>	Time X Treatment <i>F</i>	Pre-Post <i>d [95% CI]</i>
Child Outcomes (BASC Parent-report)						
Hyperactivity				32.63***	6.34*	–0.73 [–1.23 to –0.22]
PCIT-TL	70.67 (10.35)	59.16 (8.87)	–11.51 (9.61)	–	–	–1.19 [–1.73 to –0.63]
SRPP	63.12 (10.35)	58.65 (8.87)	–4.47 (9.61)	–	–	–0.46 [–0.94 – 0.02]
Inattention				28.70***	1.60, <i>p</i> = .21	–0.34 [–0.83 – 0.16]
PCIT-TL	61.30 (8.33)	53.80 (8.79)	–7.50 (8.56)	–	–	–0.88 [–1.39 to –0.34]
SRPP	62.44 (8.33)	57.81 (8.78)	–4.63 (8.56)	–	–	–0.54 [–1.02 to –0.05]
Aggression				26.97***	2.66, <i>p</i> = .11	–0.52 [–1.01 – 0.01]
PCIT-TL	58.90 (12.15)	48.02 (7.93)	–10.88 (10.04)	–	–	–1.06 [–1.59 to –0.51]
SRPP	58.74 (12.15)	53.06 (7.92)	–5.68 (10.04)	–	–	–0.55 [–1.04 to –0.04]
Social Skills				6.03*	3.95, <i>p</i> = .05	–0.43 [–0.92 to –0.07]
PCIT-TL	46.80 (8.42)	51.01 (9.07)	4.21 (8.74)	–	–	0.48 [–0.04 – 0.99]
SRPP	46.79 (8.42)	47.24 (9.07)	0.45 (8.75)	–	–	0.05 [–0.42 – 0.53]
Behavioral Symptoms				27.81***	1.31, <i>p</i> = .26	–0.30 [–0.79 – 0.19]
PCIT-TL	63.57 (9.57)	55.46 (9.46)	–8.11 (9.51)	–	–	–0.85 [–1.37 to –0.31]
SRPP	58.68 (9.57)	53.46 (9.46)	–5.22 (9.51)	–	–	–0.55 [–1.03 to –0.06]
Parenting Outcomes						
Positive Parent Verbalizations (DPICS)				206.30***	6.44*	0.96 [0.43 – 1.46]
PCIT-TL	3.17 (4.93)	19.78 (9.42)	16.61 (7.18)	–	–	2.21 [1.54 – 2.82]
SRPP	5.61 (5.60)	29.35 (9.74)	23.74 (7.67)	–	–	2.99 [2.27 – 3.64]
Negative Parent Verbalizations (DPICS)				85.12***	0.37, <i>p</i> = .55	–0.23 [–0.72 – 0.27]
PCIT-TL	36.24 (15.83)	14.08 (9.20)	–22.16 (12.52)	–	–	–1.71 [–2.28 to –1.10]
SRPP	24.81 (15.92)	5.52 (9.45)	–19.29 (12.69)	–	–	–1.47 [–1.99 to –0.92]
Parenting Stress Index Total				13.80***	4.12*	–0.48 [–0.25 to –0.02]
PCIT-TL	88.17 (22.81)	70.79 (28.47)	–17.38 (25.64)	–	–	–0.67 [–1.18 to –0.15]
SRPP	81.09 (22.81)	75.98 (28.47)	–5.11 (25.64)	–	–	–0.20 [–0.67 – 0.28]

Note. PCIT-TL = Parent Child Interaction Therapy - Time Limited (in-person); SRPP = School Readiness Parenting Program (online); BASC = Behavior Assessment System for Children, DPICS = Dyadic Parent-Child Interaction Coding System, Positive Parent Verbalizations = sum of behavior descriptions, reflections, and labelled praises, Negative Parent Verbalizations = sum of questions, commands, and negative talk.

****p* < .01.

**p* < .05.

([Supplementary Table S1](#)). Results indicated that after controlling for pre-intervention scores, treatment condition did not significantly predict post-intervention hyperactivity ($\beta = .09, p = .47$).

Regarding parent-level outcomes, a significant time by group interaction was noted for positive parental verbalizations ($F = 6.44, p < .05$) and self-reported parenting stress ($F = 4.12, p < .05$). Specifically, parents who received in-person PCIT-TL reported greater reductions in parenting stress than those who received online SRPP. In contrast, parents who received online SRPP demonstrated greater improvements in positive verbalizations with their child than did parents in the in-person PCIT-TL group ([Table 2](#)). Because the results of the preliminary analyses indicated between-group differences in negative parental verbalizations, a regression examining the effect of treatment condition on negative parent verbalizations, controlling for pre-intervention frequency of negative parent verbalizations ([Supplementary Table S1](#)) was conducted. Results indicated that after controlling for pre-intervention frequency, treatment condition significantly predicted post-intervention negative parent verbalizations ($\beta = -0.37, p < .001$), such that parents in the online SRPP group demonstrated significantly larger improvements in negative parent verbalizations as compared to parents in the in-person PCIT-TL group.

Discussion

The present study represents both the first study to validate the SRPP in comparison to an alternative intervention and the first study to validate an individual telemedicine administration of SRPP. Both online SRPP and in-person PCIT-TL were successfully implemented with high parental satisfaction ratings. Both interventions resulted in significant decreases in externalizing behaviors and significant improvements in parental skills use. Although online SRPP resulted in greater improvements in positive and negative parental verbalizations than did in-person PCIT-TL, only in-person PCIT-TL resulted in significant reductions in parenting stress. Overall, the findings from this study demonstrate the promise of SRPP, when delivered individually online, as a viable alternative to in-person BPT services for addressing behavioral school readiness difficulties.

INTERVENTION SATISFACTION

The current study takes a crucial step in demonstrating the feasibility and acceptability of the online provision of an integrative time-limited BPT program in comparison to a more traditional

in-person administration of services. Completion rates of PCIT-TL (83%) and online SRPP (88%) were comparable to, if not better than, those of previous university- and community-based trials of similar parenting programs, which typically document dropout rates ranging from 35% to 50% (e.g., [Chaffin et al., 2009](#); [Danko et al., 2016](#); [Eyberg et al., 2001](#)). Notably, the time-limited aspect of both online SRPP and in-person PCIT-TL likely accounted for these reduced drop-out rates. Notably, results of the present study should be interpreted within the context of a possible dosage effect—larger effects seen in families who received PCIT-TL may be partially attributable to having received a greater dose of BPT. Specifically, families in the PCIT-TL group received 60 to 90 minutes of treatment weekly for 10 weeks (approximately 10–12 hours total). In comparison, families in the SRPP group received 90 to 120 minutes of treatment weekly for 8 weeks; however, time in these sessions was split between BPT and discussions of school readiness topics. As a result, approximately 50 to 60 minutes per week was devoted to BPT amongst the SRPP group (approximately 8 hours total).

High rates of parental satisfaction with online administration of SRPP and comparable rates of parental satisfaction across intervention groups, across domains (i.e., child behavior and compliance, relationship with child, parental confidence in discipline, and overall clinical need) offers strong support for the acceptability of telemedicine delivery of BPT. These findings are consistent with previous studies which have demonstrated the feasibility and acceptability of telemedicine administration of traditional PCIT (e.g., [Comer et al., 2017](#); [Garcia et al., 2021](#)). However, they stand in contrast to the general perception that existed prior to COVID-19 that families were unwilling to engage in telemedicine services and/or had a strong preference for in-person services ([Cole et al., 2019](#)). These findings are particularly important given the overwhelming sentiment from mental health practitioners that tele-mental health services are here to stay ([Zhu et al., 2021](#)).

CHILD-LEVEL INTERVENTION OUTCOMES

Overall, the results pertaining to the efficacy of online SRPP at improving children's behavior were consistent with our original hypothesis—SRPP resulted in substantial reductions in almost all behavioral outcomes, which were equivalent to the reductions seen in the in-person PCIT-TL group. These findings offer support for online SRPP as an alternative BPT approach and suggest its efficacy for addressing presenting concerns of

most externalizing behavior disorders. These findings are particularly exciting as SRPP has the potential to offer a more integrative approach to intervention, addressing both the behavioral and academic components of school readiness (Graziano et al., 2014). Given the increased risk of school readiness difficulties seen in children with elevated behavioral concerns (Graziano et al., 2014; Hartman et al., 2017; Webster-Stratton et al., 2008) and the impact of behavioral difficulties on academic activities (e.g., homework completion, Graziano et al., 2014), an integrative intervention program addressing both academic and behavioral concerns is prudent. Although the present study does not address the efficacy of online SRPP for improving academic school readiness, it offers a foundation of support for its use in addressing behavioral difficulties in early childhood on which future studies can build.

Consistent with previous studies demonstrating limited effects of BPT programs on improving social skills among youth with externalizing behavior disorders (Chronis et al., 2004), the results of the present study indicated no significant effect of either intervention for social skills deficits. Although these findings are somewhat disappointing, they offer a level of divergent validity for SRPP as a BPT program. However, given that approximately 50% of children with externalizing behavior disorders demonstrate impairments in social skills (e.g., Kofler et al., 2017), future work would benefit from an exploration of alternative intervention services that may improve social difficulties associated with externalizing behavior disorders. It is also important to note that it is possible that the lack of significant improvement in social skills found in the SRPP group may be partially explained by lack of opportunity to practice/utilize social skills and lack of caregiver opportunity to observe social skill use during the COVID-19 pandemic. As such, it is possible that SRPP could result in some social skills improvements if utilized outside the context of COVID-19.

Contrary to our original hypothesis, only in-person PCIT-TL, and not online SRPP, resulted in substantial reductions in hyperactivity. At first glance, this finding seems to suggest that online SRPP does not offer an efficacious intervention for treating hyperactivity. However, a more detailed examination of the data indicates that this result may be at least partially explained by non-random assignment to groups. In contrast to all other behavioral outcomes that demonstrated equivalency across groups at pre-intervention, families in the online SRPP group reported substantially fewer ($p = .005$) difficulties with hyper-

activity at pre-intervention as compared to families in the in-person PCIT-TL group. As such, it is plausible that children in the in-person PCIT-TL group had greater room for improvement as compared to children in the online SRPP group. This hypothesis is supported by the fact that analyses controlling for pre-intervention hyperactivity scores resulted in a nonsignificant effect of treatment condition. Further, visual inspection of post-intervention hyperactivity scores revealed that across groups parents reported almost identical ratings of hyperactivity (i.e., $M_{\text{hyperactivity}} = 59.16$ and 58.65 for the PCIT-TL and SRPP groups, respectively). In other words, although the reduction of hyperactivity following online SRPP was not significant, in their daily lives' parents observed similar degrees of hyperactivity in children at post-intervention regardless of the intervention received. As such, these findings provide preliminary support for the use of online SRPP as an alternative BPT program for treating hyperactivity. However, future research would benefit from a randomized control trial that would better account for group differences at pre-intervention and provide additional insight into the clinical utility and efficacy of online SRPP in the treatment of hyperactivity.

PARENT-LEVEL INTERVENTION OUTCOMES

With regard to parent-level intervention effects, substantial improvements in parenting skills (i.e., positive and negative parental verbalizations) were found for both intervention groups. These effects were greater for families in the online SRPP group as compared to families in the in-person PCIT-TL group. These results suggest that online SRPP is as, if not more, effective than in-person PCIT-TL at improving parenting behaviors. One possible explanation of these findings is that the telemedicine component of SRPP allowed for greater ecological validity. Specifically, telemedicine likely allowed for more frequent in-vivo coaching of real-world parent-child disagreements, troubleshooting difficulties with timeout locations (e.g., timeout room doubles as a bathroom or when swoop and go is the only option), and greater frequency of in-vivo coaching of siblings and/or family interruptions, within the setting that the child's behavior is most problematic. In sum, more "real-world" in-home coaching may have reduced the burden on parents to generalize therapy skills outside the confines of a clinic-based setting as is required in in-person BPT. This hypothesis is supported by prior work that has demonstrated the improved efficacy of interventions conducted within a home-visit paradigm as

compared to office/clinic-based setting (Fowles et al., 2018; Galanter et al., 2012). However, given that these effects were somewhat complicated by between-group differences in parental skill use at pre-intervention (at least for negative parent verbalizations), additional future research is warranted.

Contrary to prior work, which has demonstrated consistent positive effects of BPT on parenting stress (Cooley et al., 2014), in the present study, online SRPP did not result in substantial improvements in parental stress. It is possible that differences between the SRPP intervention protocols and that of traditional BPT programs resulted in poorer stress reduction for the online SRPP group. For instance, SRPP has slightly shorter BPT components as compared to PCIT-TL (reduced to accommodate the academic school readiness components of the intervention). However, this explanation is somewhat unlikely given that parents in the SRPP group reported high levels of confidence in discipline strategies at post-intervention at degrees comparable to those reported in the in-person PCIT-TL group. It is also possible that the more integrative approach of SRPP was somewhat more overwhelming and/or less stress reducing for parents. However, what seems a more likely explanation is that the between-group differences in parenting stress reduction represent a cohort effect—prior to versus during COVID-19, which brought about substantial additional stressors beyond those typically experienced by parents (Imran et al., 2020; Miller et al., 2020). It is plausible that effects of an intervention on parenting stress associated with children's behavioral problems would be difficult to detect within the presence of increases in parenting stressors associated with COVID-19 (e.g., transition to remote work, increased financial difficulties, loss of childcare, and increased parental responsibilities associated with homeschooling their children; Imran et al., 2020), which are unlikely to be reduced by BPT. Furthermore, although recent research seems to indicate a negative effect of COVID-19 and associated school closures on children's academic performance, in particular among younger children (Hammerstein et al., 2021), the specific impact it may have had on (a) school readiness and (b) parental burden and stress associated with overcoming gaps in early childhood education remains unknown.

LIMITATIONS, FUTURE DIRECTIONS, AND CLINICAL IMPLICATIONS

In terms of our limitations, first, we cannot speak to the long-term maintenance of PCIT-TL and online SRPP without follow-up data. Second, due to the constraints surrounding social distancing during COVID-19, participants were not able to be randomized to in-person versus online services and the comparison group (in-person PCIT-TL group) received intervention prior to the onset of COVID-19. As such, results of the present study are likely to be impacted by cohort effects associated with COVID-19 and COVID-19-related changes in stress, home environment, and social distancing practices (Robinson et al., 2022). Future studies would benefit from a randomized control trial of online versus in-person SRPP to understand the efficacy of SRPP more fully. Finally, although results from the present study offer preliminary support for a more integrative telemedicine intervention program, at least with regards to reducing children's externalizing behaviors, the present study did not examine the potential effects of SRPP at improving academic aspects of school readiness.

With regard to clinical implications, the present study demonstrates the benefits of a telemedicine administration of a time-limited integrative intervention program for not only reducing externalizing behaviors but also teaching parenting strategies. The comparable effects of online SRPP, as compared to a gold-standard in-person administration of PCIT-TL, offer preliminary support for the use of SRPP by practitioners seeing families with behavioral concerns. Further, the greater effects of online SRPP on the use of parenting strategies, as compared to in-person PCIT-TL, build upon previous support for the use of telemedicine administration of BPT (e.g., Comer et al., 2017). This is particularly important as telemedicine administration of SRPP (as well as other time-limited BPT programs) offers the possibility for better meeting the needs of underserved populations, overcoming geographic and stigma-related barriers to receiving/seeking intervention services, and addressing concerns related to parental demands of intervention that often lead to premature treatment termination.

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