



# Effects of the Parental Friendship Coaching Intervention on Parental Emotion Socialization of Children with ADHD

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## Abstract

Parental emotion-related socialization behaviors shape children's socioemotional functioning and appear important for children with attention-deficit/hyperactivity disorder (ADHD). The Parental Friendship Coaching (PFC) intervention teaches parents to coach their children with ADHD in friendship skills, which includes managing emotions. We examined whether PFC, relative to psychoeducation and social support (Coping with ADHD through Relationships and Education; CARE), improved parental emotion-related socialization behaviors, child affect with a friend, and child social behaviors related to emotional difficulties. Participants were 172 families of children with ADHD (ages 6–11, 30% female), randomized to PFC or CARE. At baseline, children and their real-life friends interacted and their affect was coded. Parents coached their child in friendship skills before and after the child-friend interaction, and parents' praise, warmth, criticism, and discussion of emotion-related friendship strategies were coded. Parents and teachers reported children's withdrawn/depressed and aggressive behaviors. Results suggested that PFC (relative to CARE) led to parents providing more emotion strategies and praise at post-treatment and follow-up, and more warmth at follow-up, and to children showing less withdrawn/depressed behavior at follow-up. For bidirectional relationships from baseline to post-treatment, more parental warmth was associated with less child withdrawn/depressed behavior, and more parental criticism with more child aggression. More child withdrawn/depressed behavior and positive affect at post-treatment were associated with more parental criticism at follow-up. After corrections for multiple comparisons, only PFC effects on praise and emotion strategies at post-treatment, and praise and withdrawn/depressed behavior at follow-up, maintained. Implications are discussed for supporting socioemotional functioning in children with ADHD.

**Keywords** ADHD · Emotion socialization · Friendship · Parenting

Emotion socialization is the process through which children come to understand, become aware of, and learn to regulate emotions (Eisenberg et al., 1998). Parents influence this process through emotion-related socialization behaviors, including specific discussions about emotions with children and also the general emotional climate they create in the family (Morris et al., 2007). The ability to regulate and understand

emotions is essential for good social relationships, and emotional difficulties may manifest in social behaviors such as withdrawing from or acting aggressively toward peers (Eisenberg et al., 1998). Emotional difficulties are common in children with attention-deficit/hyperactivity disorder (ADHD; Graziano & Garcia, 2016), and, in part, contribute to their social difficulties (Bunford et al., 2015a, b). As such, parental behaviors may be particularly important for emotion socialization in this population. This study examines the effects of an intervention for parents of children with ADHD on the outcomes of parental emotion-related socialization behaviors and child socioemotional functioning. In the intervention, parents are taught to coach their children in friendship skills, including skills to identify and regulate emotions during peer interactions (Mikami et al., 2020). We also consider the bidirectional relationships between parent and child variables.

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## Emotion Socialization and Children's Socioemotional Functioning

Emotional functioning includes emotional reactivity (intensity in response), regulation (modulating emotions to function optimally), and understanding (ability to identify emotions and empathize; Graziano & Garcia, 2016). Each has implications for children's social relationships with real-life peers (Bunford et al., 2015a, b). Understanding emotions in oneself and in peers may foster prosocial behavior (Graziano & Garcia, 2016), while emotional reactivity and dysregulation can result in aggressive (Calkins et al., 2019) or withdrawn/depressed behaviors around peers (Lindblom et al., 2017). Emotional functioning may be particularly relevant in a friendship, as friendship requires high emotional investment. Indeed, children with better emotion regulation at age 5 had more positive friendship quality at age 10 via the mediator of better social skills at age 7 (Blair et al., 2015). Herein, we refer to emotional functioning in a real-life, social context as "socioemotional functioning," as in Eisenberg et al. (1998).

Two broad ways parents are suggested to support their children's emotional functioning are: (1) emotion-focused practices and (2) the family emotional climate. Eisenberg et al. (1998) emphasizes specific parental emotion-focused practices, such as discussion of emotions with children, reactions to children's emotions, and parents' own emotional expressions. Non-supportive practices (e.g., dismissing emotions) intensify children's negative emotions, while supportive ones (e.g., being responsive, providing coping strategies) increase children's emotional awareness and regulation. Morris et al. (2007, 2017) expand upon Eisenberg et al. (1998) to include the family emotional climate as part of the emotion socialization process. A parenting style with warmth and praise models positive emotion expression and may provide a secure emotional climate that allows children to develop emotion regulation skills, whereas a negative parenting style, such as being critical or harsh, may have the opposite effect.

Given parents' role in children's emotion socialization, and how emotional functioning affects social relationships, the impact of parental emotion-related socialization behaviors is thought to extend to child socioemotional outcomes (Eisenberg et al., 1998). In support of this, parental reactions to child emotions and parenting style have related to children's friendship quality and social functioning (Blair et al., 2014; Perry et al., 2020). Parents' dysregulation and invalidating of child emotions may increase child emotional difficulties in social situations (e.g., internalizing problems such as social withdrawal and externalizing problems such as aggression; Buckholdt et al., 2014). The current study

examines parental emotion-related socialization behaviors (both specific emotion strategies and parenting behaviors that contribute to the family emotional climate), as well as child socioemotional functioning, as outcomes of intervention.

## Socioemotional Functioning in Children with ADHD

A review (Bunford et al., 2015a, b) and meta-analysis (Graziano & Garcia, 2016) both indicate that children with ADHD have more emotional difficulties relative to typically developing children, including problems with emotional reactivity, regulation, and understanding. Further, a recent study found that ADHD symptoms in children were associated with parent reports of more emotional negativity and more physiological manifestations of emotion dysregulation in a social rejection task (McQuade & Breaux, 2017).

Children with ADHD also have substantial social impairment (Mikami et al., 2017), which is posited to relate to their emotional difficulties (Bunford et al., 2015a, b). Among children with ADHD, observations of negative affect or of emotional intensity in frustrating tasks were associated with peer rejection as indicated by peers or parents (Maedgen & Carlson, 2000; Melnick & Hinshaw, 2000). Associations between child ADHD symptoms and lower peer sociometric ratings or self-reported social skills were also found to be mediated by emotion dysregulation (Bunford et al., 2015a; Lee et al., 2018). In the friendship context, children with ADHD display more negative affect with their friends compared to typically developing children, which may relate to worsening friendship quality over time (Normand et al., 2013).

Crucially, parental emotion-related socialization behaviors hold promise for supporting emotional functioning in children with ADHD. Breaux et al. (2018) found that for children with high ADHD symptoms, parents' reported use of supportive reactions to child emotions predicted better parent-rated child emotion regulation, while non-supportive parent reactions predicted parent-rated child emotional lability one year later. In another study, when parents expressed less negativity and provided more advice on handling difficult situations while their child with ADHD engaged in an emotionally challenging task (making a Lego model with a missing piece), children were observed to have fewer emotion regulation difficulties (Melnick & Hinshaw, 2000). However, the ADHD literature on this topic is limited, and has not tested the emotional climate of the family (versus specific emotion socialization efforts) as affecting child socioemotional functioning, nor bidirectional relationships between parent and child behavior.

## Interventions Targeting Parental Emotion Socialization

Scholars have argued for the potential utility of interventions targeting parental emotion-related socialization behaviors to support children's socioemotional functioning (see Havighurst & Kehoe, 2017). In fact, Bunford et al., (2015b) suggest that addressing emotion dysregulation could improve the efficacy of existing interventions for social difficulties in children with ADHD. However, little research exists on this topic, especially in ADHD samples.

Programs such as Parent–Child Interaction Therapy (PCIT) and behavioral parent training aim to increase positive parenting (e.g., warmth, praise) and reduce negative parenting (e.g., criticism; Kaminski & Claussen, 2017). This approach targets the emotional climate of the family highlighted by Morris et al. (2007). Research in non-ADHD samples suggests that PCIT (e.g., Lieneman et al., 2020) as well as behavioral parent training (e.g., Zachary et al., 2019) may improve some parental emotion-related socialization behaviors and child emotion regulation.

Within ADHD samples, Herbert et al. (2013) tested a behavioral parent training program that included emotion socialization strategies for parents of preschoolers with hyperactivity. Compared to parents on a waitlist ( $n = 14$ ), those receiving training ( $n = 17$ ) reported improved child emotion regulation, child ADHD and oppositional defiant disorder (ODD) symptoms, and parenting behavior. Chronis-Tuscano et al. (2016) adapted PCIT to teach parents to be emotion coaches for children with ADHD to address emotion dysregulation. Three case studies indicate that this may be a promising approach. Nonetheless, in clinical samples of children with ADHD, the field is lacking rigorous evaluations of interventions on outcomes of parental emotion-related socialization behaviors that are not self-reported by parents. Nor has it distinguished between intervention effects on specific emotion-focused parental strategies relative to general parenting behaviors that contribute to the family emotional climate. Finally, the field has not examined the effects of such parent-focused intervention on children's socioemotional functioning.

### The Parental Friendship Coaching Program

Parental Friendship Coaching (PFC; Mikami et al., 2020) is a type of behavioral parent training that leverages the ability of parents to support friendships of their children with ADHD. PFC was motivated by findings in ADHD populations that there is poor efficacy of interventions for social difficulties (Mikami et al., 2017), and that having a good friend may buffer the risk for maladjustment (Becker et al., 2013).

In PFC, parents learn to be friendship coaches by teaching their children friendship skills and facilitating opportunities for children to make real-life friends. Because emotional functioning is key for good friendships, PFC includes content encouraging parents to help their children's emotion regulation and understanding, such as coaching in staying calm when losing a game, or noticing when a friend is sad. PFC also encourages parenting that provides a positive emotional climate, such as increasing parent warmth and praise and reducing criticism, which may also support children's socioemotional functioning.

A pilot study involving families of 62 children with ADHD randomized to receive PFC versus no treatment found that PFC resulted in some positive changes in observed parenting behaviors from baseline to post-treatment, such as less criticism and a trend toward more praise; parents in PFC also reported more positive and less negative child friendship behaviors (Mikami et al., 2010). Neither specific parental emotion socialization strategies or other aspects of child socioemotional functioning were assessed. We then undertook a larger randomized trial of PFC compared to an active treatment (Coping with ADHD through Relationships and Education; CARE) containing psychoeducation and social support around friendship difficulties, among 172 families of children with ADHD (Mikami et al., 2020). We built on the pilot study by collecting observations of parents' discussion of friendship strategies related to emotions ("emotion strategies"), in addition to praise, warmth, and criticism which are thought to be general parenting behaviors that contribute to the emotional climate of the family. We also observed children's affect with their friends and solicited parent and teacher report of children's real-life social behaviors related to emotional difficulties (withdrawn/depressed and aggressive behavior). Data were collected at baseline, post-treatment, and an 8-month follow-up. Results from the trial suggested that PFC improved friendship behaviors in children with ADHD, and showed positive effects on friendship quality for subgroups of at-risk families (Mikami et al., 2020).

### Current Study

Parental emotion-related socialization behavior in families of children with ADHD is an understudied area, and intervention efforts targeting this construct are only just beginning. The current study builds on the limited literature thus far with a secondary analysis of the dataset in Mikami et al. (2020). Our primary aim was to examine the effects of PFC on a specific parental emotion-related socialization behavior, general parenting behaviors thought to contribute to the

family’s emotional climate, and child socioemotional functioning in real-life peer contexts. Our primary hypotheses were that being in PFC relative to CARE would be associated with: (1a) parents providing their children with more emotion strategies, as well as more praise, more warmth, and less criticism; and (1b) children showing more positive and less negative affect, and less withdrawn/depressed and aggressive behaviors, at post-treatment and follow-up.

Our secondary aim was to explore the bidirectional pathways between parent and child variables, within the treatment context of our study. Based on the emotion socialization framework, our secondary hypotheses were: (2a) more parental emotion-related socialization behaviors would be associated with better child socioemotional functioning at a subsequent timepoint. Given that parent and child behaviors are likely reciprocal (see the developmental transactional model; Johnston et al., 2015), we also hypothesized: (2b) better child socioemotional functioning would be associated with more positive parental emotion-related socialization behaviors at a subsequent timepoint. Finally, we explored

whether these pathways differed in PFC versus CARE. Perhaps, PFC strengthens pathways between positive parent and child behaviors or disrupts the pathways between negative behaviors.

## Method

### Participants

Participants were 172 families enrolled in the randomized trial of Mikami et al. (2020), testing interventions for friendship problems. All children met criteria for ADHD based on the DSM-5 (American Psychiatric Association, 2013), and each child participated with one parent. Participants were recruited through schools, hospital clinics, and practitioners in Vancouver and in Ottawa/Gatineau, Canada. Each family was also asked to bring a friend of the child’s so that observations of the child and friend could be completed. See Table 1 for demographics.

**Table 1** Baseline Demographics

	PFC ( <i>n</i> = 84)	CARE ( <i>n</i> = 88)	Total ( <i>n</i> = 172)
	<i>n</i>	<i>n</i>	<i>N</i>
<b>Parent</b>			
Gender (Male)	11	5	16
<b>Child</b>			
Gender (Male)	62	59	121
<b>Ethnicity</b>			
Caucasian/White	61	64	125
Afro-Canadian/Black	1	0	1
Asian-Canadian/Asian	5	5	10
Hispanic/Latino	1	1	2
Multi-racial	16	16	32
Decline to State	0	2	2
Current ADHD Medication <sup>a</sup>	51	52	103
Comorbid Externalizing	23	32	55
Comorbid Internalizing	23	24	47
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
<b>Parent</b>			
Age (Years)	42.10 (6.69)	40.06 (5.07)	41.06 (5.99)
Education <sup>b</sup>	5.57 (1.02)	5.40 (1.22)	5.48 (1.13)
Family Income (CAD Annual)	118,614 (71,792)	112,162 (57,283)	115,326 (64,673)
<b>Child</b>			
Age (Years)	8.74 (1.60)	8.35 (1.49)	8.54 (1.55)
Full Scale IQ	102.33 (15.09)	102.94 (15.43)	102.65 (15.22)

CARE Coping with ADHD through Relationships and Education, PFC Parental Friendship Coaching

<sup>a</sup>Five children were also taking psychoactive medication to treat anxiety; all of these children were also taking medication to address ADHD

<sup>b</sup>1 8th grade or less, 2 some high school, 3 high school graduate, 4 some college/university, 5 college or technical degree, 6 university graduate, 7 advanced post-university degree

## Study Eligibility

Full details about participant inclusion/exclusion rates are in Mikami et al. (2020). Parents and teachers rated children on the ADHD module of the Child Symptom Inventory (CSI; Gadow & Sprafkin, 2002). If the child had  $\geq 4$  symptoms of inattention and/or hyperactivity/impulsivity endorsed by both parent and teacher as “often” or “very often”, the family was invited for a lab visit. For 9.3% of children, only parent report of symptoms on the CSI were used as the child was medicated at school ( $n = 13$ ) or the teacher was not an appropriate informant ( $n = 3$ ); these children all had existing diagnoses of ADHD. During the lab visit, the Kiddie-Schedule for Affective Disorders and Schizophrenia (K-SADS; Axelson et al., 2009) was administered to the parent. Final inclusion criteria required children to have  $\geq 6$  symptoms of inattention and/or hyperactivity/impulsivity endorsed by either the parent on the K-SADS or the teacher on the CSI using the “or” algorithm (Lahey et al., 1994). As the interventions addressed social difficulties, children also needed a score of  $\geq 3$  on parent or teacher reports on the Strengths and Difficulties Questionnaire Peer Problems subscale (SDQ; Goodman, 1997), using the “or” algorithm.

Exclusion criteria included an estimated Full Scale IQ  $< 75$  on the Wechsler Abbreviated Scale of Intelligence (Wechsler, 2011) or the short form of the Wechsler Intelligence Scale for Children-IV (Wechsler, 2003), autism spectrum disorder, psychosis, active suicidality, or participation in concurrent behavioral treatment or interventions for child social difficulties. Children with comorbid ODD, conduct disorder, or depressive/anxiety disorders, as well as children taking a stable dose of psychotropic medication for ADHD, were eligible.

## Procedure

### Baseline Assessments

Parents consented and children assented to participate. Procedures were approved by all associated ethics boards (UBC Behavioural Research Ethics Board, Comité d'éthique de la recherche de l'Université du Québec en Outaouais, and school districts and hospitals which supported recruitment or where teachers completed study measures about child participants). At an initial lab visit, parents completed the K-SADS and children completed intelligence testing. Parents and teachers answered questionnaires about children's social behaviors related to emotional difficulties. Study eligible families were then asked to bring the child's closest friend to a second lab visit. In order to participate in the observational tasks (from which parental emotion-related socialization

behaviors and child affect were coded), children had to bring a reciprocated friend, where both the child and friend endorsed they were “best friends”, “close friends”, or “just ok friends”, instead of “occasional companions” or “strangers”, in individual interviews. This procedure allowed for a more inclusive sample than a dichotomous “best friends” versus “not friends at all” conceptualization (Berndt & McCandless, 2009). At baseline, 149 out of the 172 families brought a reciprocated friend. Of these, 126 (85%) mutually rated one another as “best” or “close” friends, and 23 dyads had one child rate the other as a “just ok” friend while the other rated them a “best”, “close”, or “just ok” friend.

The parent, child, and friend completed interactions involving the parent coaching the child to show good friendship behaviors (based on Mikami et al., 2010), and the child and friend engaging in tasks that mirror emotionally and socially challenging real-world interactions between friends (based on Normand et al., 2011). Interactions were videotaped and later coded by observers unaware of intervention condition and assessment timepoint. First, the parent and child were told that the child and friend would play a game where they race and a game where they work as a team to find a solution that makes them both happy. The parent was given 5 min to prepare the child to “do well at working and playing together with the friend” in a private room (prep period). After this, the child and friend began their interaction while the parent observed via a monitor in a separate room. In the car-race task, each child had the goal of being faster than the other child in transporting blocks across a table with a toy car, but only one car could fit in the track at a time. In the toy-sharing task, the child and friend were presented with 15 toys from which they could pick five to take home, and asked to discuss how to share the toys. In both tasks, research assistants gave instructions and were present to enforce rules but did not intervene in the interactions. The order of the two tasks was counterbalanced. After the tasks, the parent was given another 5 min in private with their child to “talk about how the games went and to give feedback to the child that will help the child make friends” (debrief period).

### Intervention Provision

After completion of baseline assessments, families were randomized to PFC or CARE, which are described fully in Mikami et al. (2020). Both interventions are provided to parents in group format, through weekly, 90-min sessions over 10 weeks. There were 28 distinct groups of 6–7 families; 14 PFC and 14 CARE. PFC followed a behavioral parent training model, where parents were encouraged to establish a positive relationship with their child, coach their children in positive friendship behaviors, and arrange playdates to practice these behaviors. A portion of the skills specifically



focused on helping children to identify and regulate their emotions in a friendship context. Sessions consisted of teaching parents the skills, role playing the skills, and planning to use the skills. CARE provided psychoeducation about ADHD, including friendship issues, and encouraged parents to support and share strategies with one another (Power et al., 2012). Attendance, satisfaction, and treatment fidelity were acceptable (see Mikami et al., 2020).

### Post-treatment and Follow-up Assessments

Following an intent-to-treat framework, we asked all 172 families to return to the lab with the child's closest friend at the time. The same questionnaires and tasks were repeated. At post-treatment, 169 families had questionnaire data and 143 families brought a reciprocated friend of the child. Follow-up occurred 8 months after treatment concluded and 158 families had questionnaire data while 113 families brought a reciprocated friend.

## Measures

### Parental Emotion-Related Socialization Behaviors

Four parental behaviors were selected that reflect the emotion socialization frameworks discussed by Eisenberg et al. (1998) and Morris et al. (2007, 2017). The first was specific *emotion strategies* for the child-friend interaction; this reflects parental discussion of emotions and coping strategies for emotionally challenging situations. We recorded the number of times the parent offered a strategy that encouraged the child to cope with their emotions or to consider the friend's emotions. This included not getting unduly emotionally involved in the tasks, practicing good sportsmanship instead of getting upset, and thinking about how the friend feels (e.g., attend to the friend's emotions and show empathy). For each emotion strategy, we assigned an elaboration score (1 = *strategy said quickly in passing*, 2 = *strategy mentioned once in a full sentence*, 3 = *strategy mentioned at least twice with two full sentences*). A total score was created by summing each time the parent mentioned an emotion strategy, multiplied by its elaboration.

Three general parenting behaviors were coded that reflect a positive (*warmth* and *praise*) or a negative (*criticism*) emotional climate of the family. These behaviors were not necessarily in response to child emotion; rather, they represent the overall emotional climate facilitated by the parent (Morris et al., 2007, 2017). Warmth is the parent seeking a positive emotional connection with the child and caring about the child's needs through positive affect (e.g., shared laughing), physical contact (e.g., hug), expressions of empathy or

affection, or interest in the child's emotions. Disconnection (e.g., fighting or ignoring) detracted from the warmth score. Praise is the parent offering genuine, positive feedback or approval to the child about their behavior or character. Praise could be verbal (e.g., I really liked how you shared) or non-verbal (e.g., parent gives a high five after the child does a desirable behavior). Finally, criticism is the parent showing negative emotions toward the child through tone of voice or body language that indicates frustration or hostility, verbal statements that express negative emotion (e.g., you embarrassed me), or corrective feedback that is framed negatively (e.g., don't be such a bad loser; you are so out of control) or includes disparaging comparisons. Instances of warmth, praise, and criticism were all coded for their elaboration (major, minor, incidental), and parents were assigned a score from 0–5 depending on the number and elaboration of instances, with a higher score indicating more of the parent behavior. The coding manual is available by request.

The 5-min prep period and the 5-min debrief period between the parent and child were each coded by two independent observers. Intraclass correlations (ICCs) calculated to assess inter-rater reliability were acceptable: emotion strategies = 0.85; warmth = 0.82; praise = 0.89; criticism = 0.77. The final score for each behavior in prep and in debrief was an average of the two coders' scores. As we wanted to represent the entire parent–child interaction while also reducing the number of analyses, the prep and debrief scores were summed to provide a final total emotion strategy (continuous count), warmth, praise, and criticism (scale of 0 – 10) score. Further, the average correlation across timepoints for parental behaviors was 0.28 (range 0.19–0.32; small to medium effect size) between prep and debrief periods. In five cases (across all timepoints) where we only had either prep or debrief scores for a family, we prorated the scores.

### Child Affect

Independent observers (different from those who coded parent behavior) coded the child-friend interaction for affect displayed by each child. Coders scored affect as either positive, neutral, or negative at 5-s intervals during the tasks. The current study considered positive and negative affect. Positive affect reflected the proportion of intervals in which the coded child displayed laughter, smiles, or jokes. Negative affect was the proportion of intervals in which the coded child showed irritation, anger, or sadness. Twenty percent of videos were randomly selected to be double coded and inter-rater reliability for positive and negative affect was  $\kappa=0.81$ .

The average ICCs (reflecting the proportion of the variance at the dyadic level) between the child and friend across timepoints in the car-race and toy-sharing tasks were 0.61 and 0.58 for positive affect, and 0.13 and 0.39 for negative

affect, respectively, indicating that the affect of children and friends were highly influenced by one another. As recommended in the literature (Kenny et al., 2006) and in line with past research on the friendship interactions of children with ADHD (Normand et al., 2011), we used the average of the scores from the child and friend to represent dyadic positive and negative affect. The average cross-task correlations for positive and negative affect across timepoints were 0.53 and 0.32, respectively, and there was a similar range in affect in both tasks; therefore, we use the average affect across the two tasks.

### Child Social Behaviors Related to Emotional Difficulties

Parents completed the Child Behavior Checklist (CBCL) and teachers completed the parallel Teacher Report Form (TRF; Achenbach & Rescorla, 2001). These are standardized, normed measures of children's problem behaviors. Achenbach and Rescorla (2001) report good reliability for the CBCL and TRF (mean test–retest reliability of problem scales for CBCL and TRF = 0.90; internal consistency range for problem scales: CBCL = 0.78–0.97, TRF = 0.72–0.95). They also report good content and construct validity, and both versions discriminate between referred and non-referred children. Behaviors are rated as very true, sometimes true, or not true of the child. We selected two narrowband subscales that most reflected the manifestation of emotional difficulties in children's real-life social contexts. First, the Withdrawn/Depressed subscale represents the child's sad and socially withdrawn behaviors (8 items; e.g., rather be alone, won't talk, shy/timid). Second, the Aggressive Behavior subscale reflects the child's aggressive and angry behaviors (18 items; e.g., argues a lot, mean, attacks people, stubborn). Composites of the parent and teacher reported *T*-scores for each subscale were used, supported by high correlations between parent and teacher ratings at every timepoint (all  $p < 0.001$ ). In 20 baseline, 20 post-treatment, and 22 follow-up cases where there was a rating from only one informant, we relied on this informant's report.

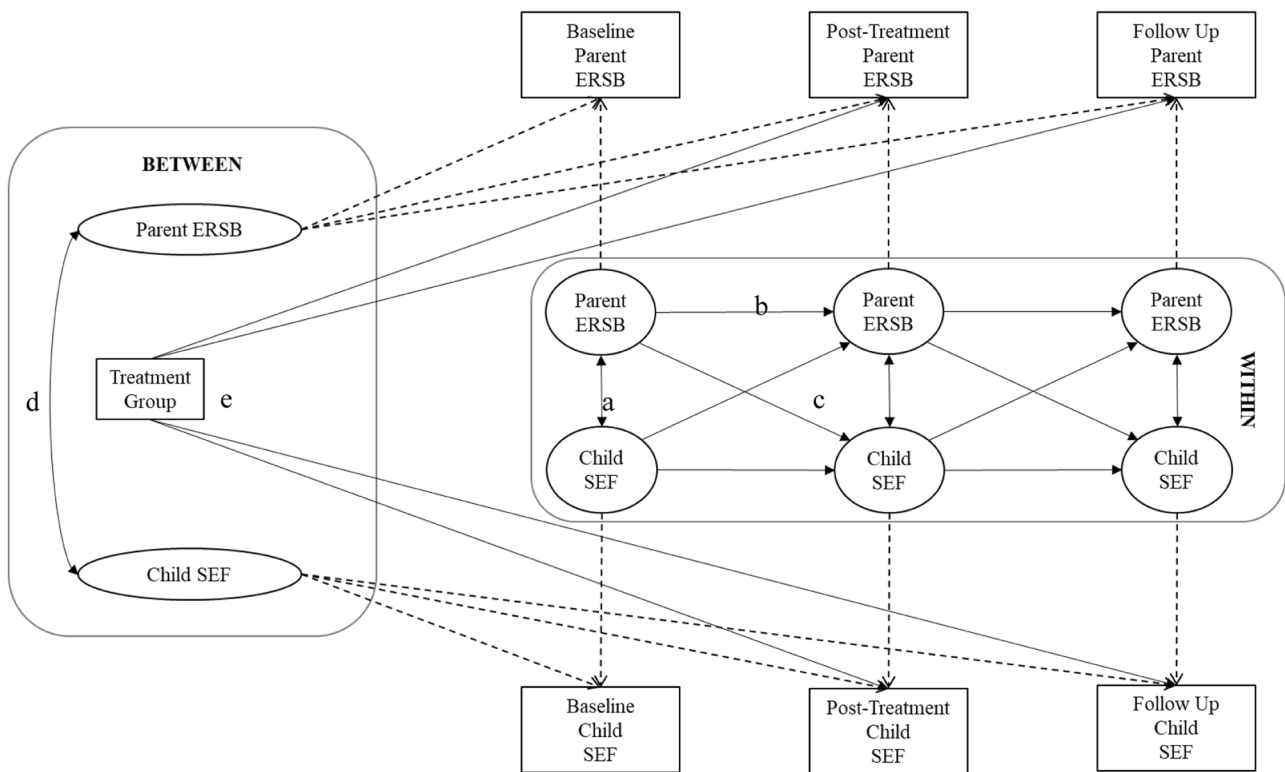
### Data Analytic Plan

Analyses were conducted using Mplus 8 (Muthén & Muthén, 2017). The random intercepts cross-lagged panel model (RI-CLPM; Hamaker et al., 2015) with a time invariant predictor (Mulder & Hamaker, 2020) was used to model study aims (see Fig. 1). RI-CLPM splits the observed score into variance due to between-person stable, trait-like differences (random intercepts) and within-person fluctuations. In our primary hypotheses (1a, 1b), treatment condition was used

as a time-invariant predictor of parental emotion-related socialization behaviors and child socioemotional functioning at post-treatment and follow-up to determine whether there was a difference between the means of the PFC and CARE conditions on these variables. Our secondary hypotheses (2a, 2b) testing the bidirectional associations between parent and child variables were conducted by estimating the cross-lagged paths, after accounting for autoregressive effects and cross-sectional associations, for the within-person components of the model. Finally, we explored whether the cross-lagged paths were the same for PFC and CARE with multi-group analysis. We ran our models for the PFC condition and the CARE condition, and tested for differences between the parameters of interest in each group.

We attempted to create 16 models, with each of the four parent variables (emotion strategies, praise, warmth, criticism) paired with each of the four child variables (positive affect, negative affect, withdrawn/depressed behavior, aggressive behavior). Models with negative affect did not converge, likely because this variable had little presence and low variance at post-treatment and follow-up (see Table 2). Therefore, our final analyses omitted negative affect, resulting in 12 models. A Comparative Fit Index (CFI) larger than 0.95, a Root Mean Squared Error of Approximation (RMSEA) smaller than 0.06, and a Standardized Root Mean Squared Residual (SRMR) smaller than 0.08, indicate good model fit (Hu & Bentler, 1999a). Because the literature about effects of intervention on parental emotion-related socialization behaviors and child socioemotional functioning in ADHD samples is relatively new, we report all findings that were significant at the  $p < 0.05$  level. However, we also note which findings held after applying the Benjamini and Hochberg (1995) procedure with the false discovery rate set to 0.05.

Models were estimated with robust standard errors and full information maximum likelihood, which includes all participants with data on at least one model variable. Our models with child withdrawn/depressed or aggressive behavior included all 172 families. Twelve families did not bring in a reciprocated friend at any timepoint, resulting in a sample size of 160 for models with child positive affect. In comparisons of participants with versus without missing data at each timepoint, only four out of 67 analyses (< 6%) indicated a significant difference. Families with missing data were more likely to have lower income, parent education, or child IQ, but did not differ on any measure of parental emotion-related socialization behaviors or child socioemotional functioning. Additionally, those with “just ok” friends were less likely to be White than those with “best/close” friends or without reciprocated friends, and those with a “best/close” friend had higher family income than those without friends.



**Fig. 1** RI-CLPM with a Time Invariant Predictor. ERSB=emotion-related socialization behavior; SEF=socioemotional functioning. RI-CLPM=random intercept cross-lagged panel model. **a** cross-sectional paths (at baseline: extent to which a person’s deviation from their expected score for one variable is associated with the deviation of their expected score for the other variable; at other timepoints: extent to which within person changes in one variable are linked to within person changes in the other variable), **b** autoregressive paths (the extent that deviations from a person’s expected score predict

deviations on a subsequent score), **c** cross-lagged paths (bidirectional relationships; the extent that deviations from a person’s expected score in one variable predict deviations from their expected score in the other variable at the next timepoint), **d** correlation of between person stable components (the association between the stable between person differences in the variables), **e** time invariant predictor (effect of treatment on the observed mean); see Mulder and Hamaker (2020). Squares are observed variables

## Results

### Descriptive Statistics and Model Fit

Descriptive statistics are in Table 2 and bivariate correlations are in Supplementary Tables S1a, b. Fit statistics for all models were  $CFI \geq 0.988$ ;  $RMSEA \leq 0.064$ ;  $SRMR \leq 0.052$ ; and all chi-square tests were nonsignificant ( $p \geq 0.175$ ); see Supplementary Table 2 for details. With the exception of the warmth and positive affect model with an RMSEA of 0.064 (suggested value is  $< 0.06$ ), models had acceptable fit (Hu & Bentler, 1999b).

Primary Hypotheses: Treatment Effects.

Table 3 summarizes the treatment effects on the observed means of parental emotion-related socialization behaviors and child socioemotional functioning. Parents in PFC relative to CARE offered more emotion strategies at post-treatment in all models, and at follow-up in two of the three models. Parents in PFC relative to CARE also used more praise

at post-treatment and follow-up, and warmth at follow-up. Treatment condition did not predict parental criticism at post-treatment or follow-up. Children who had parents in PFC relative to CARE had less withdrawn/depressed behavior at follow-up. Treatment condition was not associated with child positive affect or aggressive behavior, at post-treatment or follow-up. See Supplementary Figures for full model details. After applying the Benjamini–Hochberg Procedure, our findings of more emotion strategies and warmth at follow-up for those in PFC did not survive corrections.

### Secondary Hypotheses: Bidirectional Associations Between Parent and Child Variables

There were some significant bidirectional pathways indicating that within-person changes in parent emotion-related socialization behaviors were associated with within-person



**Table 2** Descriptive Statistics of Study Variables Across Timepoints and Groups

	PFC			CARE			Total		
	BL	PT	F	BL	PT	F	BL	PT	F
Parent									
Emotion Strategies	3.03 (2.89)	4.30 (3.65)	4.23 (3.41)	2.88 (2.50)	2.94 (2.36)	3.04 (2.57)	2.96 (2.69)	3.59 (3.11)	3.60 (3.04)
Warmth	6.31 (1.55)	6.68 (1.83)	6.95 (1.75)	6.85 (1.89)	6.88 (1.76)	6.48 (1.66)	6.59 (1.75)	6.78 (1.79)	6.70 (1.71)
Praise	3.42 (2.24)	5.35 (2.47)	4.73 (2.93)	3.59 (2.45)	3.92 (2.83)	3.48 (2.35)	3.51 (2.34)	4.60 (2.75)	4.07 (2.70)
Criticism	1.47 (1.84)	1.08 (1.60)	0.94 (1.34)	1.56 (2.01)	1.33 (1.90)	1.33 (1.60)	1.52 (1.92)	1.21 (1.76)	1.15 (1.49)
Child									
Positive Affect	0.25 (0.17)	0.26 (0.17)	0.29 (0.17)	0.28 (0.17)	0.30 (0.18)	0.31 (0.19)	0.26 (0.17)	0.28 (0.18)	0.30 (0.18)
Negative Affect	0.03 (0.05)	0.03 (0.05)	0.01 (0.01)	0.03 (0.04)	0.03 (0.06)	0.02 (0.03)	0.03 (0.05)	0.03 (0.05)	0.01 (0.02)
Withdrawn/Depressed	61.24 (7.43)	59.53 (7.85)	58.75 (7.71)	62.09 (6.62)	61.45 (6.54)	62.19 (8.05)	61.68 (7.02)	60.49 (7.26)	60.49 (8.04)
Aggressive Behavior	65.82 (8.88)	63.21 (8.88)	61.71 (7.85)	66.50 (9.08)	64.69 (8.79)	62.84 (8.75)	66.17 (8.96)	63.96 (8.84)	62.28 (8.31)

All reported are *M(SD)*, unstandardized, *CARE* Coping with ADHD through Relationships and Education, *PFC* Parental Friendship Coaching, *BL* baseline, *PT* post-treatment, *F* follow-up. For all variables, a larger number indicates more of the behavior or affect. Emotion strategies continuous count. Warmth, praise, criticism 0–10 scale. Positive and negative affect proportion of 5-s intervals coded as positive or negative (0–1). Withdrawn/depressed and aggressive behavior T-scores reflecting the average of parent and teacher ratings on the Child Behavior Checklist/Teacher Report Form

**Table 3** Summary of Treatment Effects

Outcome Variable	Other Variable in Model	Treatment Effect at PT			Treatment Effect at F		
		Est	SE	<i>p</i>	Est	SE	<i>p</i>
Emotion Strategies	Positive Affect	0.20	0.07	0.005	0.16	0.09	0.063
	Withdrawn/Depressed	0.19	0.08	0.011	0.17	0.09	0.046 <sup>a</sup>
	Aggressive Behavior	0.20	0.07	0.006	0.17	0.09	0.046 <sup>a</sup>
Warmth	Positive Affect	-0.002	0.08	0.977	0.18	0.08	0.027 <sup>a</sup>
	Withdrawn/Depressed	-0.02	0.08	0.782	0.18	0.08	0.035 <sup>a</sup>
	Aggressive Behavior	-0.01	0.08	0.861	0.18	0.08	0.035 <sup>a</sup>
Praise	Positive Affect	0.29	0.07	<0.001	0.28	0.08	<0.001
	Withdrawn/Depressed	0.29	0.07	<0.001	0.28	0.08	0.001
	Aggressive Behavior	0.29	0.07	<0.001	0.28	0.08	<0.001
Criticism	Positive Affect	-0.06	0.08	0.426	-0.13	0.08	0.132
	Withdrawn/Depressed	-0.08	0.08	0.331	-0.11	0.08	0.206
	Aggressive Behavior	-0.07	0.08	0.356	-0.12	0.08	0.162
Positive Affect	Emotion Strategies	-0.06	0.06	0.349	-0.07	0.08	0.362
	Warmth	-0.07	0.07	0.306	-0.07	0.08	0.376
	Praise	-0.06	0.07	0.352	-0.07	0.08	0.356
	Criticism	-0.06	0.07	0.334	-0.08	0.08	0.344
Withdrawn/Depressed	Emotion Strategies	-0.09	0.06	0.125	-0.18	0.07	0.007
	Warmth	-0.10	0.05	0.071	-0.17	0.07	0.009
	Praise	-0.08	0.06	0.126	-0.18	0.07	0.008
	Criticism	-0.09	0.06	0.122	-0.19	0.07	0.005
Aggressive Behavior	Emotion Strategies	-0.05	0.04	0.265	-0.04	0.06	0.564
	Warmth	-0.05	0.04	0.256	-0.03	0.06	0.618
	Praise	-0.05	0.04	0.235	-0.02	0.06	0.706
	Criticism	-0.05	0.04	0.277	-0.03	0.06	0.570

Treatment condition coded as 0 CARE, 1 PFC. PT post-treatment, F follow-up. Value in each cell represents range of values across models; for each parent behavior there are three models represented (one for each child variable), and for each child variable there are four models represented (one for each parent variable). Models with positive affect: *n* 160, models with withdrawn/depressed or aggressive behavior: *n* 172, degrees of freedom for all models 3. All models were additionally run without fathers (9% of the sample); these models found that parents in PFC engaged in more emotion strategies at follow-up compared to CARE in all three models (instead of two), and the finding that parents in PFC engaged in more warmth at follow-up compared to parents in CARE was no longer significant

<sup>a</sup>Findings no longer significant after the Benjamini–Hochberg Procedure

changes in child socioemotional functioning (see [Supplementary Figures](#)). Specifically, a positive deviation in a parent's expected warmth score at baseline (indicating more warmth) predicted a negative deviation in a child's expected withdrawn/depressed behavior at post-treatment (indicating less withdrawn/depressed behavior; Est. = -0.28, SE = 0.11, *p* = 0.012). A positive deviation in a parent's criticism at baseline predicted a positive deviation in a child's aggressive behaviors at post-treatment (Est. = 0.16, SE = 0.08, *p* = 0.039). Further, when the child had a positive deviation in expected withdrawn/depressed behaviors at post-treatment, it predicted a positive deviation in a parent's expected criticism at follow-up (Est. = 0.49, SE = 0.18, *p* = 0.015). Last, a positive deviation in a child's expected positive affect at post-treatment predicted a positive deviation in a parent's criticism at follow-up (Est. = 0.29, SE = 0.14, *p* = 0.042). After the Benjamini–Hochberg Procedure, none of these bidirectional associations survived corrections. In our multi-group analyses, one model (parent emotion strategies and child positive affect, of 12 tested) had a parameter that was

significantly different between PFC and CARE conditions. Parents in CARE who provided more emotion strategies at baseline had children who displayed less positive affect at post-treatment (Est. = -0.58, SE = 0.19, *p* = 0.003). This path was not significant in the PFC model.

## Discussion

There is limited research on parental emotion socialization in children with ADHD, and few treatments target this despite the known emotional difficulties for these children and the associated impairment in real-life social relationships. In a relatively large sample of families of children with ADHD, we conducted a secondary data analysis of a randomized controlled trial to examine the effect of treatment on parental emotion-related socialization behaviors and child socioemotional functioning. PFC, an intervention that teaches parents to coach their child in friendship skills (including managing emotions), was compared to CARE,

an intervention containing psychoeducation and social support around friendship difficulties. Receiving PFC, relative to CARE, resulted in parents using more emotion strategies, praise, and warmth, and in less withdrawn/depressed behavior in children. Results were found at post-treatment (emotion strategies, praise) and at an 8-month follow-up (emotion strategies, praise, warmth, withdrawn/depressed behavior), although follow-up findings for warmth and emotion strategies did not hold after corrections for multiple comparisons. We further found some bidirectional relationships between parent and child behaviors; however, none maintained after corrections.

### Effects of the Parental Friendship Coaching Intervention

PFC may have some positive effects on parental emotion-related socialization behaviors. Our findings are largely consistent with what was found in the pilot of PFC for improvement on general parenting practices that contribute to a positive emotional climate of the family (Mikami et al., 2010), but obtained with a more rigorous comparison group (CARE instead of no treatment) and follow-up data 8 months after treatment ended. The current study also extended the findings of Mikami et al. (2010) to include effects on parental emotion-related friendship strategies. At follow-up, the changes associated with PFC either maintained (emotion strategies and praise) or appeared for the first time (warmth), suggesting that parents continued these behaviors over time, with the caveat that findings for emotion strategies and warmth at follow-up did not survive multiple comparison corrections. Both parental behaviors specific to emotion (Eisenberg et al., 1998) and general parenting behaviors that affect the family emotional climate (Morris et al., 2017) have been posited to be part of the emotion socialization process. Thus, it is interesting that PFC was suggested to have positive effects on both types of parent behavior. Future research should examine whether these two aspects of emotion socialization are affected by different aspects of intervention, or if they have distinct implications for child functioning.

We also examined intervention effects on child emotional functioning in their real-life social contexts. We measured this through children's display of positive affect with their friends, and through ratings of their social behavior problems reflecting emotional difficulties at home and school. This method has the benefit of capturing clinically significant ways in which emotional difficulties affect the day-to-day experiences of children with ADHD with real-life peers. At follow-up, parents and teachers rated children as having less withdrawn/depressed behavior in the PFC condition, indicating that children were less sad and shy. That this result was found only at

follow-up and not post-treatment possibly suggests that the positive effects of parental emotion-related socialization behaviors as a result of PFC may take some time to reflect in child behaviors. Our findings build on studies of previous parenting interventions that address parental emotional socialization and emotional difficulties in children with ADHD (Chronis-Tuscano et al., 2016; Herbert et al., 2013), using a more rigorous design and a significantly larger sample. They also add to the argument for interventions focusing on parental emotion-related socialization behaviors to yield eventual socioemotional benefits in children with ADHD.

However, PFC did not appear to influence parental criticism, which was in contrast to the PFC pilot (Mikami et al., 2010). The means of our criticism variable seem to indicate that both PFC and CARE groups were low in criticism overall, and had reductions in criticism, especially from baseline to post-treatment. PFC also did not influence child positive affect in the tasks with the friend or aggressive behavior. Mikami et al. (2010, 2020) found PFC to result in some decreases in specific child aggressive actions directed toward friends during playdates (as reported by parents or observed). Our measure of aggressive behavior in the current study assessed various behaviors across multiple social contexts and was reported by teachers and parents, as we thought this better reflected the broad manifestation of emotional difficulties. Given the strong research support for the positive effects of parental praise and warmth for children with ADHD (Johnston & Chronis-Tuscano, 2015), perhaps parents' continued emotion-related socialization behaviors will lead to eventual improvements in these other facets of socioemotional functioning.

### Bidirectional Relationships Between Parent and Child Variables

Findings indicated that general parenting behaviors that reflect the emotional climate of the family may predict child social behaviors related to emotional difficulties. Parents who showed more warmth at baseline had children with less withdrawn/depressed behavior at post-treatment, and parents who criticized their child more at baseline had children with more aggressive behavior at post-treatment. Child behavior also affected parenting: children with more withdrawn/depressed behavior and who displayed more positive affect at post-treatment had parents criticize them more at follow-up. However, none of these findings maintained after our alpha level corrections; therefore, these findings and interpretations are all tentative and require replication, ideally with a non-treatment involved sample.

The pathways from parent to child were suggested to occur from baseline to post-treatment, whereas the pathways from child to parent were from post-treatment to follow-up. We wonder if perhaps the effect of parental emotion-related socialization behaviors on child socioemotional functioning is strongest when parents are in a parenting intervention, as they may be primed to think about how they are shaping child behavior. Once the intervention has concluded, parents may become more reactive to their children's behaviors. Also, both suggested pathways from parent to child variables were in the hypothesized direction, as was the pathway between more child withdrawn/depressed behavior (which might be frustrating to parents) and more parental criticism. The finding that more child positive affect may predict more parent criticism is less intuitive. It is possible that children were dysregulated in their positive emotions with friends (e.g., gloating, screeching), leading to parental criticism of such behavior. Other work (Lee et al., 2018) coded positive and negative emotion dysregulation and found it to mediate the relationship between ADHD symptom severity and negative peer sociometric ratings, however, our coding did not consider whether positive affect was dysregulated.

That we found some tentative bidirectional pathways between parent and child variables suggests that it is important to consider both parent and child behaviors together to understand the emotion socialization process (see Johnston & Chronis-Tuscano, 2015). However, perhaps in the same way that intervention effects may take time to be observed, more time may be required to see relationships between parental emotion-related socialization behaviors and child socioemotional functioning. Longitudinal relationships between parental emotion socialization and child outcomes have been found in other work, such as Breaux et al. (2018) after 1 year in an ADHD sample, or Blair et al. (2014) after 2–4 years in typically-developing children. The few bidirectional relationships may also stem from the friendship context and the use of dyadic affect in our study. Friendships depend on both the behaviors of the child with ADHD and the friend's interpretations and responses. Therefore, parental emotion-related socialization behaviors may have less of an impact on children in the friendship context (where the friend is a large contributor) than they might have in another context (e.g., in a parent–child interaction).

Finally, in our exploratory multi-group analyses testing four parameters across 12 models, all but one of the 48 associations between parent and child variables did not differ across treatment conditions. With the caveat that our sample size is small for these analyses, this suggests that the pathways between parental emotion-related socialization behaviors and child socioemotional functioning were relatively universal. That is, treatment condition affected

the mean levels of parent and child variables, but not the associations between them.

## Strengths and Limitations

This is the first study of this size of a clinical sample of children with ADHD to examine treatment effects on parental emotion-related socialization behaviors and child socioemotional functioning. Our three timepoints allowed us to test the effects of PFC at the end of treatment and 8 months later, and to examine pathways between parent and child variables over time. We utilized observations of parent behaviors and child affect, and both parent and teacher ratings of children's withdrawn/depressed and aggressive behaviors; instead of only using parent reports.

This study also has a number of limitations. A sample of 172, while large for a clinical sample, is on the lower end of what is ideal for the analyses conducted. Due to this and the multiple models that we conducted, our results require replication. Our sample sizes reduced further because of attrition over time and the requirement that children bring reciprocated friends to the lab for observational tasks. Nonetheless, our retention rates for the proportion of children with friends at baseline who brought friends at post-treatment (96%) and the 8-month follow-up (76%) are comparable to the retention rate of 82% found for children with ADHD in a 6-month longitudinal study (Normand et al., 2013). Analyses also indicated that families with complete data might possibly over-represent those with a higher income, parent education, or child IQ, and therefore limit the generalizability of our findings.

Our sample also contained children with ADHD *and* peer problems, who may be more likely to have emotional difficulties. Conversely, because our analyses with child affect were limited to children who had reciprocated friendships, it is also possible that children with the greatest socioemotional difficulties were not included; we tried to address this by including those with “just ok” friends. These sample characteristics may have prevented us from finding significant results on some variables and again limit generalizability. Further, there were few fathers in our sample and more research must be done to test how the emotion socialization process might occur differently in mothers versus fathers. Child gender (and parent/child gender match) should also be considered. Finally, although our sample represents diverse regions of Canada (English- and French-speaking families), most of our sample identified as Caucasian/White, which also limits the generalizability of our findings.

We must also note the limitations of our variables and their measurement. Our parenting variables included both specific emotion-focused strategies and general parenting behaviors that contribute to the family's emotional climate.

The latter may have diverse implications for children in areas beyond socioemotional functioning. As parenting behaviors were measured in response to peer interactions, the generalizability of this to the broader family emotional climate also cannot be assumed. Our child variables of positive affect with a friend, aggressive behaviors and withdrawn/depressed behaviors, although externally valid measures that represent the ways emotional difficulties affect real-life social functioning, are distinct from measures used in other emotion socialization research, such as emotion identification or regulation measures. In addition, our lab observations may not accurately represent typical parent or child functioning. We tried to minimize this risk by having children bring their real-life friends. Relatedly, our models with negative affect did not converge. Perhaps there were low rates of negative affect in the task because all dyads were reciprocated friends. The loss of negative affect as a variable was unfortunate, as it relates most closely with the constructs of emotional reactivity and regulation in the literature and we did not have other measures that explicitly assessed these constructs.

## Implications, Future Directions, and Conclusions

This study advanced the literature by examining the effects of an intervention that teaches parents to coach their children in friendship skills within an emotion socialization framework. Clinicians may be heartened that encouraging positive parenting (praise and warmth) and discussions of emotion-related friendship strategies with children may lead to parents' greater use of these behaviors, and to reductions in children's withdrawn/depressed behaviors. The indication of some bidirectional relationships suggests that when working clinically with these families, addressing both parent and child behavior may be the most comprehensive and useful approach. However, further thought must be given to how to change child affect. Melnick and Hinshaw (2000) found that parental advice *during* a challenging situation led to fewer emotion regulation difficulties, so perhaps this approach could be applied in PFC when children are with their friends, at least initially. In addition, involving teachers in PFC might better encourage change in child aggressive behaviors at school where parents are not present. Examining other social contexts (e.g., parent-child, teacher-student relationships) is also important to understand the range of ways emotional difficulties affect the real-life social functioning of children with ADHD. Continued research on interventions meant to support the socioemotional difficulties of children with ADHD is recommended given the high impairment in this area for these children.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s10802-021-00818-9>.

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## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Informed Consent** Informed consent was obtained from parents and teachers for this study, and children provided assent.

**Ethical approval** Procedures were approved by all associated ethics boards (UBC Behavioural Research Ethics Board, Comité d'éthique de la recherche de l'Université du Québec en Outaouais, and school districts and hospitals which supported recruitment or where teachers completed study measures about child participants).

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