



Children's Anxious Characteristics Predict how their Parents Socialize Emotions

Paul D. Hastings¹ · Jessica S. Grady² · Lindsey E. Barrieau³

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Abstract

Emotion socialization by parents contributes to children's trajectories of healthy and unhealthy emotional development, but there has been little research into the determinants and development of parental emotion socialization. We examined whether young children's anxious characteristics, including expressed anxiety with peers and low basal respiratory sinus arrhythmia (RSA), predicted changes in mothers' and fathers' emotion socialization over the subsequent year. Using regression and regions of significance analyses, we observed that children's expressed anxiety moderated the stability of mothers' and fathers' supportive and unsupportive emotion socialization, primarily in ways that would be likely to maintain or exacerbate children's social anxiety. For example, mothers' highly fretful and less supportive responses were more stable when children had been more anxious with peers. Basal RSA moderated the stability of fathers' punitive responses to children's anxious and sad emotions, and directly predicted changes in mothers' neglect of children's anxious and sad emotions, and negative and positive feelings about children's social withdrawal. These effects of children's characteristics on parents' emotions and behaviors support bidirectional and transactional models of the socialization of children's anxiety and internalizing problems, and identify aspects of emotion socialization by parents that could be amenable to intervention.

Keywords Child effects · Anxiety · Respiratory sinus arrhythmia · Emotion socialization · Mothers · Fathers

Early-emerging inhibited, wary, and anxious behaviors are evidence of young children's problems with effective emotion regulation that presage their risk for developing more serious internalizing problems in later childhood and adolescence (Zahn-Waxler et al. 2000). How parents raise anxious children affects whether they are likely to follow developmental pathways toward emotional well-being or emotional problems (Hastings et al. 2019). Many facets or domains of parenting can influence children's functioning (Grusec and Davidov 2015), and emotion socialization by parents is a salient contributor to children's social and emotional development (Denham et al. 2015), including their risk for internalizing problems (Klimes-Dougan et al. 2007). There are also

multiple determinants of parenting behavior (Belsky 1984). Yet, compared to many other aspects of parental socialization, relatively little is known about the origins and development of parents' emotion socialization (Denham et al. 2015). In particular, whether individual differences in children's affective characteristics contribute to how their parents approach the task of emotion socialization remains an open question.

Developmental scientists have long acknowledged that children influence their own development through reciprocal, bidirectional interactions with their parents (Bell 1968), with children's temperamental and emotional characteristics affecting the child-rearing they experience (Lerner 2002). Studies have shown that children's emotional characteristics are concurrently associated with their parents' emotion socialization beliefs and behaviors (Wong et al. 2009), and prospectively predict the development of other aspects of parental socialization (Kennedy et al. 2004; Rubin et al. 1999). However, there have been few longitudinal studies of child effects on emotion socialization, or studies that have examined the development of both mothers' and fathers' parenting (Hastings 2018). In this investigation, we addressed these limitations by examining the extent to which young children's anxious expressiveness with peers and parasympathetic regulatory capacities

✉ Paul D. Hastings
pdhastings@ucdavis.edu

¹ Psychology, Center for Mind & Brain, University of California, Davis, 267 Cousteau Place, Davis, CA 95618, USA

² Department of Psychology, University of the Pacific, Stockton, CA, USA

³ Children's Hospital of Eastern Ontario, Ottawa, Canada

contributed to the development of maternal and paternal emotion socialization over 1 year.

Children's Anxious Characteristics that Pose Risk for Internalizing Problems

Children's fearful and anxious affect may lead to shy and withdrawn behaviors, which are increasingly associated with peer rejection and internalizing problems over time (Rubin et al. 2009). Children's expressions of these emotions can present challenges to parents who are balancing the goals of both managing their children's immediate behaviors and promoting their children's future emotional well-being. Frequent or excessive anxiety can also be reflective of difficulties with emotional self-regulation. One commonly studied index of children's dispositional capacities for emotion regulation is cardiac vagal tone, as measured by respiratory sinus arrhythmia (RSA). RSA reflects the degree to which the parasympathetic branch of the autonomic nervous system has influence over cardiac activity (Porges 2007). Higher basal RSA is reflective of a greater trait-like capacity for self-regulation (Beauchaine 2015; Katz and Rigterink 2012). Lower basal RSA in young children has been associated with greater wariness and inhibition (Hastings et al. 2005), and greater likelihood of manifesting social difficulties and internalizing problems in later childhood (Hastings et al. 2014). Whether children's expressed anxiety or parasympathetic regulation portends future social and emotional problems, however, has been found to depend on their experiences of supportive or unsupportive emotion socialization by parents (Davis and Buss 2012).

Parent Emotion Socialization and Children's Anxiety

Developmental scientists have been studying emotion socialization by parents for more than 40 years (Lewis and Saarni 1985). Saarni (1985), in particular, was germinal in fostering our understanding of the nuanced and subtle nature of emotion socialization. She emphasized that parents primarily shape their children's affective development not through deliberate efforts or didactic teaching, but rather through their own emotional expressiveness, their encouraging or discouraging reactions to children's emotions, and their belief systems or 'folk psychology' about emotions (Saarni 1999). Through such mechanisms, parents' emotion socialization sets the stage for their children's emotion-related competencies. These themes have been echoed in the prominent models of emotion socialization that guide current research (Denham and Grout 1993; Eisenberg et al. 1998; Gottman et al. 1996). Denham and colleagues (Denham et al. 2015) identified common features

of these models, including that parents socialize their children's emotions both indirectly through modeling and the general affective environment they provide, and directly through explicit responses to their children's expressed emotions.

Considering indirect processes, parents' own emotional displays and affective tendencies are associated with their children's emotions and social behavior. Greater maternal warmth and happiness is associated with more social competence in children (Denham and Grout 1993), whereas mothers' negative expressivity is associated with children's temperamental inhibition, emotional distress, and internalizing problems (Mills et al. 2012; Valiente et al. 2004). There is growing evidence that emotion socialization may be particularly salient for young children with anxious characteristics. For example, Rubin and colleagues (Rubin et al. 2002) found that greater maternal negativity and criticism increased the likelihood that socially reticent toddlers would be withdrawn and anxious with unfamiliar peers 2 years later.

Direct and contingent responses to children's emotions occur when children display some emotion and parents reward, neglect, or punish that emotion display through their own emotional expressions, their actions, and their verbalizations (Malatesta-Magai 1991; O'Neal and Magai 2005). Rewarding responses are supportive of children's emotional experiences, and include providing comfort, accepting the emotion, and assisting the child in dealing with the emotion or provocative situation. Neglecting responses convey disregard, as the parent either chooses to ignore or fails to notice the child's emotion. Punishing responses convey disapproval and rejection of the child's emotion, typically through facial expressions (e.g., giving the child a disgusted look) or verbal responses (e.g., telling the child not to be a crybaby).

Studies have shown that children manifest more emotional problems, or less social-emotional competence, when parents are more punishing or neglecting of their children's emotions (Denham et al. 2000; Eisenberg et al. 1996; Jones et al. 2002), especially when children are more emotionally negative (Engle and McElwain 2010) or have weaker self-regulation (Hastings and De 2008). Conversely, parents' rewarding, supportive or problem-focused reactions to children's negative emotions are associated with children's better self-regulation and social competence, and fewer emotional and behavioral problems (Eisenberg et al. 1996; Warren and Stifter 2008), especially among shy children (Davis and Buss 2012).

While these studies provide considerable evidence that emotion socialization by parents contributes to children's likelihood of healthy or unhealthy social-emotional development, it is equally likely that children's emotional characteristics elicit the parenting behaviors that constitute emotion socialization. Indeed, this is explicitly acknowledged in models of parents' contingent responses to children's emotions (Eisenberg et al. 1998; Malatesta-Magai 1991); first the child

expresses an emotion, and then the parent responds in a supportive or unsupportive manner. Thus, children's emotional characteristics should be expected to influence how parents come to respond, emotionally and behaviorally, to their children's affective experiences.

Child Effects on Emotion Socialization

Studies on child effects have shown that children's temperament, behavior, and emotions evoke parental socialization practices (Putnam et al. 2002). Children's anxious, wary, and shy behaviors have been found to elicit less supportive parenting over time (Hastings et al. 2010, 2019). Greater toddler shyness predicted less encouragement of independence by mothers and fathers 2 years later (Rubin et al. 1999), and more expressed anxiety with peers predicted fathers' overprotective parenting of preschoolers 1 year later (McShane and Hastings 2009), accounting for initial parenting. With respect to emotion socialization, mothers of socially withdrawn preschoolers reported greater disappointment, embarrassment, and guilt than did mothers of non-withdrawn preschoolers (Rubin and Mills 1990), however greater wariness also predicted mothers being less disappointed and surprised by wary behavior 2 years later (Hastings and Rubin 1999). In other words, parents of anxious children come to expect and accept their consistently wary behavior.

Passive genetic effects may contribute to these findings. For example, more anxious parents (who due to genetic relatedness may have more anxious children) engage in fewer supportive and more overprotective behaviors (e.g., less reasoning; more discouraging of independence) than do less anxious parents (Root et al. 2016). However, an adoption study showed that links between children's anxious characteristics and parenting cannot be attributed purely to genetic relatedness, as children's social wariness at 18 months predicted less structured parenting (fewer commands and requests during free play) in adoptive mothers (but not fathers) at 27 months (Natsuaki et al. 2013).

Physiological components of children's self-regulatory capacities also have been linked with subsequent parental socialization, although not with emotion socialization specifically. Kennedy and colleagues (Kennedy et al. 2004) found that toddlers who had less capacity for parasympathetic regulation of emotion, as indexed by lower basal respiratory sinus arrhythmia (RSA), had mothers who engaged in more controlling and restrictive, and less sensitive and supporting, parenting 2 years later, controlling for earlier parenting (see also Perry et al. 2014). Moreover, parasympathetic regulation moderated the development of parenting; restrictive, overly controlling parenting was most stable from 2 to 4 years for children with lower RSA (Kennedy et al. 2004). Combined, these longitudinal associations between children's earlier

anxiety and regulatory capacities and parents' later socialization behaviors suggest that child characteristics are likely to shape the nature of parental emotion socialization over time.

The Present Study

We examined how children's observed anxious affect in a peer context and their parasympathetic capacity for emotion regulation predicted the development of mothers' and fathers' self-reported responses to children's hypothetical emotional behaviors over 1 year. Displaying anxiety with peers at preschool is characteristic of children who are highly inhibited and at risk for internalizing problems (Coplan et al. 2008), and has been found to predict the development of other aspects of parental socialization (McShane and Hastings 2009). Children's expressed anxiety with peers and basal RSA and parents' responses to children's emotional behaviors were measured when children were 2 to 5 years old, and parents' responses to children's emotional behaviors were measured again 1 year later. Children who showed more anxiety or had lower RSA were expected to have parents who became more negative or worried, more dismissive or punitive, and less supportive, of their children's anxious and sad emotions and withdrawn behaviors, and who maintained greater stability in these aspects of emotion socialization over time.

Method

Participants

This investigation was conducted in a large urban area in eastern Canada. Targeted advertising (e.g., "Is your child quiet and cautious?") was used to over-sample for children with inhibited temperament and internalizing problems. Ninety families (82 two-parent families) with children between ages 2 and 5 years participated, including 50 girls and 40 boys ($M = 3.41$ years, $SD = 0.73$), 88 of their mothers ($M = 35.71$, $SD = 4.76$) and 55 of their fathers ($M = 38.68$, $SD = 5.03$). During a telephone screening, mothers reported on children's internalizing problems using an abbreviated version of the Child Behavior Checklist for 1.5–5 years (Achenbach & Rescorla, 2000). There were 27 children in the borderline-clinical to clinical range for internalizing problem (IP) T-scores ($T \geq 60$; 30.0%), 32 children with IP T-scores less than 1 SD above their gender- and age-normed average ($50 \leq T \leq 59$; 35.6%), and 31 children at or below that average ($T \leq 50$; 34.4%). Families were predominantly middle- to upper-middle class, with 64.4% of mothers and 51.2% of fathers having a university degree, and a mean pre-tax family income of 81,084.34 CND ($SD = 43,554.34$). The majority of the participants were Caucasian (80.0% of mothers and 82.2%

of fathers), with additional participants identifying as Asian, Indian, Middle Eastern, North African, Latino/Hispanic, or “Other.” Most families spoke English in the home (83.3%). All parents were proficient in English and completed measures in English.

Procedures

This study was reviewed and approved by the IRB of Concordia University, Montreal. Data for this study were collected during a visit to each family’s home and a visit to each child’s daycare or preschool approximately 4 months later (Time 1), and through follow-up questionnaires distributed and returned by mail (Time 2). Baseline RSA was obtained at home, and expressed anxiety was observed at preschool or daycare. Parents completed measures during the home visit (Time 1) and in a mailed questionnaire 12 months later (Time 2).

Basal RSA Basal RSA was measured during a calm period at home. Children’s cardiac activity was recorded using the Mini-Logger 2000™ (Mini-Mitter, Inc., Bend, OR), an ambulatory monitor, that the children kept in a fanny pack around their waist during the home visit. Continuous interbeat intervals (IBIs) were obtained through a recording band that was attached to children’s chest using either an elasticized belt around the torso or two adhesive electrodes. IBIs were recorded between successive R-waves to the nearest millisecond and transmitted to the monitor. Baseline IBI recordings began approximately 5 min after attaching the monitor. To keep children still and calm for the baseline recordings, children and their parents were asked to sit and watch a low-action animated video (*Dragon Tales*) or read a picture book (*Curious George*), with the goal of obtaining baseline IBI data for at least 3 min ($M = 4m41s$, $SD = 1m46s$). IBI data were later downloaded using customized software and transferred to MXEdit (Delta-Biometrics Inc., Bethesda, MD). MXEdit was used to visually inspect for outliers, edit artifacts (e.g., divide by 2 when an R-wave was skipped), and compute basal RSA in units of $\ln(ms)^2$. The frequency band used for RSA computation was 0.24 to 1.04 Hz, and RSA was computed for each sequential 20s epoch in each IBI datafile. The mean of the sequential RSA values was used as the measure of basal RSA for each child. Mean RSA did not differ significantly between the two baseline activities, $t(81) = 0.86$, ns .

Observed Anxious Affect Children were observed at daycare or preschool on a day that began with a free play period. Observations were completed at least 1 month after the child had started attending. Observations began 2 to 5 min after the child separated from the parent and entered the playroom, and continued for 24 to 48 min. Live observations were completed in 12-min blocks of time. Based on facial, vocal and

behavioral cues, observers rated children’s anxious expressed affect (“anxious/worried/tense”) on a scale from 1 (*None, absent*) to 5 (*Very strong, frequent*) after each 12-min interval ($M = 3.52$ observations, $range = 2$ to 4), depending on the length of the free play period. Coders were first trained using videotapes of quartets of preschoolers from a prior study, and then shadowed the senior author on preschool visits. Before being the primary coder for a participant, coders had to obtain intraclass correlations (ICC) ≥ 0.70 for at least two live preschool visits with the senior author. Coding integrity was maintained by periodically pairing observers in subsequent visits. Across 16 children, mean ICC across coders for ratings of anxious was 0.82.

Emotion Socialization Two parent-report instruments were used to assess distinct aspects of emotion socialization. To measure indirect emotion socialization, parents reported on their emotional responses to children’s wary behavior during a social situation (Child Behavior Vignettes; Hastings and Rubin 1999; Mills and Rubin 1990). A hypothetical vignette portrayed their child being socially withdrawn at preschool, standing alone and watching the other children play. Parents were asked to rate how strongly they would feel each of nine emotions (anxious, disappointed, happy, embarrassed, frustrated, guilty, pleased, puzzled, and concerned) using a 6-point scale from 1 (*not at all*) to 6 (*very strong*). Responses were collapsed into three categories: positive (happy, pleased), negative (frustrated, disappointed, embarrassed), and fretful (anxious, puzzled, concerned, and responsible). Coefficient α scores for all scales are reported in Table 1.

To measure direct emotion socialization, mothers and fathers reported on their behavioral responses to children’s displays of two discrete emotions using the Responses to Children’s Emotions scale (RCE; Klimes-Dougan et al. 2007), modified for use with parents of young children (Hastings and De 2008). The RCE provided parents with the prompt, ‘Over the past two months, when your child has been *scared or feeling anxious*, what did you do?’ (italicized words replaced with ‘*sad or feeling down*’ for second prompt), followed by 15 brief descriptions of possible reactions to their child’s emotion. Parents rated each of the possible reactions on a scale from 1 (*not at all typical*) to 5 (*very typical*). For the present investigation, parents’ responses to items reflecting support (labeled ‘reward’ in prior work, O’Neal and Magai 2005; e.g., ‘I comforted my child.’), neglect (e.g., ‘I ignored my child.’), and punish (e.g., ‘I gave my child a disapproving look.’) were included. As in prior investigations (Hastings and De 2008; Klimes-Dougan et al. 2007), parents’ responses to displays of anxiety and displays of sadness were highly corresponding and were therefore collapsed into responses to anxious/sad, or internalizing, emotions, providing 6 items per scale. Coefficient α scores for all scales are reported in Table 1.

Table 1 Descriptive statistics

	α	Time 1				α	Time 2				Paired <i>t</i>
		<i>N</i>	<i>M</i>	<i>SD</i>	Range		<i>N</i>	<i>M</i>	<i>SD</i>	Range	
Child variables											
Anxious expressiveness		88	1.55	0.56	1.00–3.75						
Basal RSA		83	5.30	1.27	2.20–8.82						
M Indirect socialization											
Fretful C withdrawal	0.78	84	3.28	1.21	1.00–5.50	0.75	86	3.14	1.04	1.00–5.50	0.80
Positive C withdrawal	0.90	84	1.33	0.69	1.00–4.00	0.91	86	1.36	0.83	1.00–5.00	–0.24
Negative C withdrawal	0.75	84	2.15	1.10	1.00–5.33	0.74	86	1.87	0.92	1.00–5.50	2.47
M direct socialization											
Support C anxious/sad	0.81	87	4.50	0.54	2.67–5.00	0.86	87	4.46	0.56	2.67–5.00	0.49
Punish C anxious/sad	0.71	87	1.32	0.38	1.00–2.67	0.72	87	1.33	0.42	1.00–3.17	–0.88
Neglect C anxious/sad	0.67	87	1.16	0.29	1.00–2.50	0.78	87	1.12	0.25	1.00–2.33	0.80
F indirect socialization											
Fretful C withdrawal	0.67	54	3.29	1.03	1.00–4.75	0.64	54	3.09	0.90	1.50–5.00	1.94
Positive C withdrawal	0.83	54	1.41	0.78	1.00–5.00	0.99	54	1.59	1.03	1.00–6.00	–1.57
Negative C withdrawal	0.82	54	2.09	1.15	1.00–6.00	0.64	54	1.91	0.82	1.00–4.00	1.55
F direct socialization											
Support C anxious/sad	0.79	55	4.28	0.58	2.50–5.00	0.80	55	4.35	0.55	2.83–5.00	–0.89
Punish C anxious/sad	0.64	55	1.57	0.56	1.00–3.33	0.60	55	1.51	0.44	1.00–2.83	1.09
Neglect C anxious/sad	0.82	55	1.43	0.48	1.00–3.33	0.73	55	1.43	0.39	1.00–2.50	0.02

RSA Respiratory Sinus Arrhythmia, C Child, M Mother, F Father

Analyses

There were 0 to 7 missing values for each of the measured variables (see Table 1). Little’s missing completely at random test ($\chi^2(77) = 90.24, p = 0.14$) indicated that missingness probably occurred at random. To maintain full use of the sample and minimize possible bias (Graham 2009; Widaman 2006), data were estimated using maximum likelihood estimation with robust standard errors (MLR) in the primary analyses. MLR was used rather than ML to account for non-normality in some of the outcome variables (Muthén & Muthén, 2012).

Hypotheses were tested using multiple regression analyses with MPlus version 7 (Muthén & Muthén, 2012). Each analysis predicted parent emotion socialization at Time 2 from child characteristics (age, sex, basal RSA, observed affect), parent emotion socialization at Time 1, and the two-way interactions of parent emotion socialization with child observed affect and RSA. Predictors were mean centered prior to data analysis.

Significant interactions were first evaluated by simple slopes analyses with the moderator at +1 and –1 SD. Additional follow-up regions of significance analyses (ROS; Preacher et al. 2006; <http://www.quantpsy.org/interact/mlr2.htm>) were also conducted. ROS analyses allowed us to determine the specific upper and lower bounds of parent

emotion socialization at Time 1 at which the regression lines for children with different levels of the moderator (+1 and –1 SD of child observed affect and basal RSA) experienced significantly different parent emotion socialization at Time 2. Evidence for significant divergence occurring at Time 1 scores $\geq -2 SD$ or $\leq +2 SD$ were interpreted as meaningful (Roisman et al. 2012).

Results

Descriptive statistics are presented in Table 1. Paired *t*-tests with Bonferonni correction ($\alpha = 0.004$) were non-significant for all measures, indicating that, on average, parents’ emotion socialization did not change from Time 1 to Time 2. The regression models are presented in Tables 2 and 3. For 11 of 12 measures, parental responses to their children’s behaviors and emotions at Time 1 predicted their responses 1 year later, indicating stability. There were five significant direct effects (20.8% of effects tested) of children’s RSA or anxiety predicting increases or decreases in maternal (four effects) and paternal (one effect) emotion socialization over time, two of which were subsumed within interactions. Five significant interaction effects (20.8% of effects tested) showed that children’s anxious characteristics moderated the stability of maternal (two effects) and paternal (three effects) emotion

Table 2 Models predicting incremental change in mothers' and fathers' indirect emotion socialization over 1 year

	M Response: Child Withdrawal			F Response: Child Withdrawal		
	<i>B</i>	β	<i>p</i>	<i>B</i>	β	<i>p</i>
	<hr/>					
Fretful T2						
Intercept	3.079	–	0.000	2.948	–	0.000
C Age	0.112	0.078	0.393	–0.017	–0.013	0.920
C Sex	0.043	0.021	0.826	0.200	0.110	0.427
Fretful T1	0.276	0.322	0.001	0.457	0.528	0.000
C RSA	–0.139	–0.172	0.091	–0.090	–0.138	0.292
C Anxious	0.331	0.177	0.045	–0.252	–0.162	0.263
C RSA × Fretful T1	0.018	0.027	0.788	0.103	0.142	0.270
C Anxious × Fretful T1	0.378	0.227	0.019	0.158	0.091	0.450
Model <i>R</i> ²	0.284		0.001	0.323		0.001
Positive T2						
Intercept	1.406	–	0.000	1.766	–	0.000
C Age	0.057	0.050	0.663	–0.046	–0.033	0.806
C Sex	–0.097	–0.058	0.548	–0.332	–0.159	0.162
Positive T1	0.352	0.290	0.132	0.605	0.455	0.020
C RSA	–0.155	–0.239	0.015	0.021	0.028	0.864
C anxious	–0.208	–0.139	0.063	0.456	0.255	0.031
C RSA × Positive T1	0.079	0.088	0.472	0.019	0.021	0.926
C Anxious × Positive T1	0.320	0.137	0.129	0.673	0.266	0.036
Model <i>R</i> ²	0.181		0.005	0.439		0.028
Negative T2						
Intercept	1.850	–	0.000	1.822	–	0.000
C Age	0.129	0.102	0.213	0.003	0.003	0.986
C Sex	0.021	0.012	0.894	0.123	0.074	0.557
Negative T1	0.467	0.559	0.000	0.413	0.583	0.000
C RSA	–0.137	–0.192	0.025	–0.046	–0.078	0.621
C Anxious	–0.198	–0.119	0.196	–0.203	–0.144	0.226
C RSA × Negative T1	–0.072	–0.108	0.183	0.019	0.039	0.829
C Anxious × Negative T1	–0.054	–0.033	0.698	–0.349	–0.384	0.007
Model <i>R</i> ²	0.368		0.000	0.392		0.001

Child sex was dummy coded with Male = 0 and Female = 1. Effects in bold font are significant
M Mother, *F* Father, *C* Child

socialization over the subsequent year. Four additional effects that approached significance ($0.10 < p < 0.05$) were not examined.

Direct Effects on Parents' Emotion Socialization

Lower RSA at Time 1 predicted greater increases in both positive and negative maternal emotional responses to children's social withdrawal (indirect emotion socialization), and in maternal neglect of children's anxious/sad emotions (direct emotion socialization), from Time 1 to Time 2. The associations between lower RSA and increased maternal negative emotions and neglecting behavior were in accord with hypotheses, whereas no a priori prediction had been made for

maternal positive emotions. More anxious affect at Time 1 predicted greater increases in maternal fretful, and paternal positive, emotional responses to children's withdrawal from Time 1 to Time 2, but these two effects were subsumed within significant interactions.

Additional post-hoc analyses were conducted to further understand the inverse associations of basal RSA with maternal positivity as well as maternal negativity and neglect. Mothers reported more negative than positive emotions in response to withdrawal at Time 2 ($t(85) = 3.83, p < 0.001$). At Time 2, neglect was positively correlated with negative emotions ($r = 0.22, p < 0.05$), and tended to be positively correlated with positive emotions ($r = 0.19, p < 0.10$); negative and positive emotions were not correlated ($r = 0.04, ns$).

Table 3 Models predicting incremental change in mothers’ and fathers’ direct emotion socialization over 1 year

	M Response: Child anxious/sad			F Response: Child anxious/sad		
	<i>B</i>	β	<i>p</i>	<i>B</i>	β	<i>p</i>
	<hr/>			<hr/>		
Support T2						
Intercept	4.487	–	0.000	4.252	–	0.000
C Age	0.042	0.054	0.558	–0.171	–0.228	0.064
C Sex	–0.087	–0.077	0.361	0.183	0.165	0.180
Support T1	0.767	0.737	0.000	0.447	0.477	0.002
C RSA	0.029	0.067	0.350	0.068	0.173	0.177
C Anxious	–0.078	–0.077	0.494	0.040	0.042	0.793
C RSA × Support T1	0.120	0.178	0.097	–0.074	–0.100	0.521
C Anxious × Support T1	0.603	0.265	0.049	–0.041	–0.032	0.855
Model <i>R</i> ²	0.454		0.000	0.312		0.012
Punish T2						
Intercept	1.286	–	0.000	1.550	–	0.000
C Age	–0.045	–0.077	0.376	0.131	0.218	0.019
C Sex	0.110	0.128	0.181	–0.027	–0.030	0.764
Punish T1	0.603	0.534	0.000	0.596	0.768	0.000
C RSA	0.003	0.008	0.940	–0.052	–0.162	0.218
C Anxious	–0.042	–0.055	0.544	–0.049	–0.065	0.642
C RSA × Punish T1	0.060	0.073	0.733	0.160	0.282	0.027
C Anxious × Punish T1	0.184	0.075	0.456	0.172	0.103	0.399
Model <i>R</i> ²	0.324		0.002	0.608		0.000
Neglect T2						
Intercept	1.100	–	0.000	1.503	–	0.000
C Age	–0.020	–0.058	0.627	–0.025	–0.045	0.733
C Sex	0.063	0.124	0.108	–0.140	–0.175	0.199
Neglect T1	0.475	0.550	0.000	0.353	0.430	0.000
C RSA	–0.054	–0.278	0.048	–0.036	–0.124	0.304
C Anxious	0.024	0.052	0.653	–0.049	–0.072	0.673
C RSA × Neglect T1	–0.144	–0.277	0.119	0.099	0.214	0.079
C Anxious × Neglect T1	0.340	0.159	0.289	–0.059	–0.039	0.822
Model <i>R</i> ²	0.430		0.008	0.276		0.015

Child sex was dummy coded with Male = 0 and Female = 1. Effects in bold font are significant
M Mother, *F* Father, *C* Child

Thus, some mothers may have tended to respond to children’s anxiety and withdrawal either with neglect and negativity (e.g., disengagement/rejection) or with positive feelings (e.g., accepting/approving), both of which were predicted by their children’s earlier poor parasympathetic regulation.

In addition, older children had fathers who reported greater increases in punitive responses to anxious/sad emotions from Time 1 to Time 2.

Moderation of the Stability of Parents’ Emotion Socialization

Indirect Emotion Socialization of Withdrawn Behavior
 Children’s anxious affect moderated the stability of mothers’

fretful and fathers’ positive and negative responses to withdrawal (see Table 2). In accord with hypotheses, mothers’ fretful responses to withdrawal were stable over time when children’s anxious affect was high at Time 1 ($\beta = 0.57, p < 0.001$), but not when it was low ($\beta = 0.07, p = 0.60$), see Fig. 1a. The upper and lower bounds for ROS on mothers’ fretful responses at Time 1 were $-0.01 SD$ and $-4.58 SD$, respectively, with simple slopes differing significantly outside this region. Mothers of children who expressed more anxiety at Time 1 reported significantly more fretful responses at Time 2 than mothers of children who expressed less anxiety, when mothers had been at or above $-0.01 SD$ in fretful responses at Time 1 (see the shaded area of Fig. 1a). The lower bound was beyond $-2 SD$, indicating that, regardless of their expressed

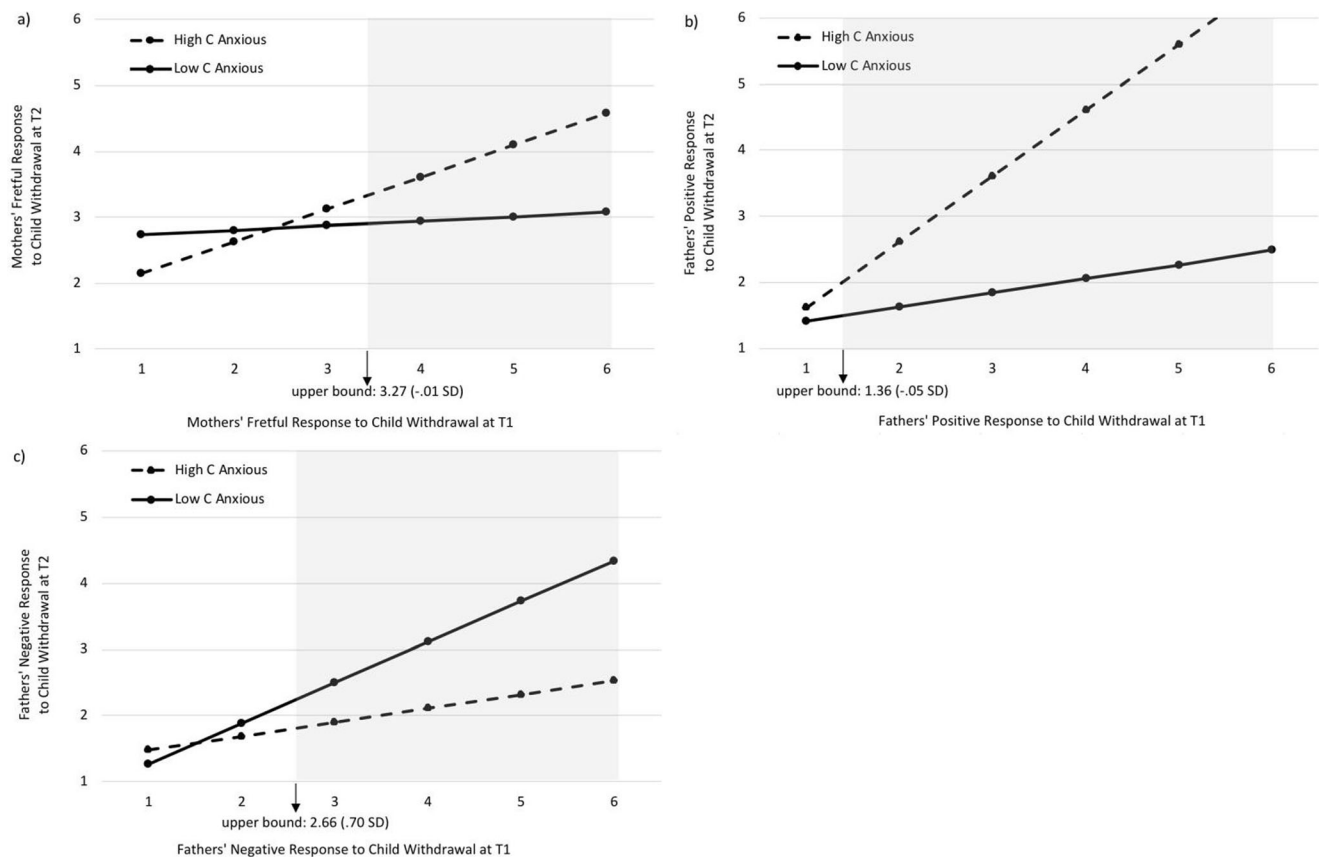


Fig. 1 Child anxious expressiveness at Time 1 moderated stability of (a) mothers' fretful and fathers' (b) positive and (c) negative emotional responses to child withdrawal from Time 1 to 2. Shaded regions represent the points at which Time 2 values diverge significantly

anxiety at Time 1, children received similarly low maternal fretful responses to withdrawal at Time 2 when mothers' fretful responses to withdrawal at Time 1 had been below the mean.

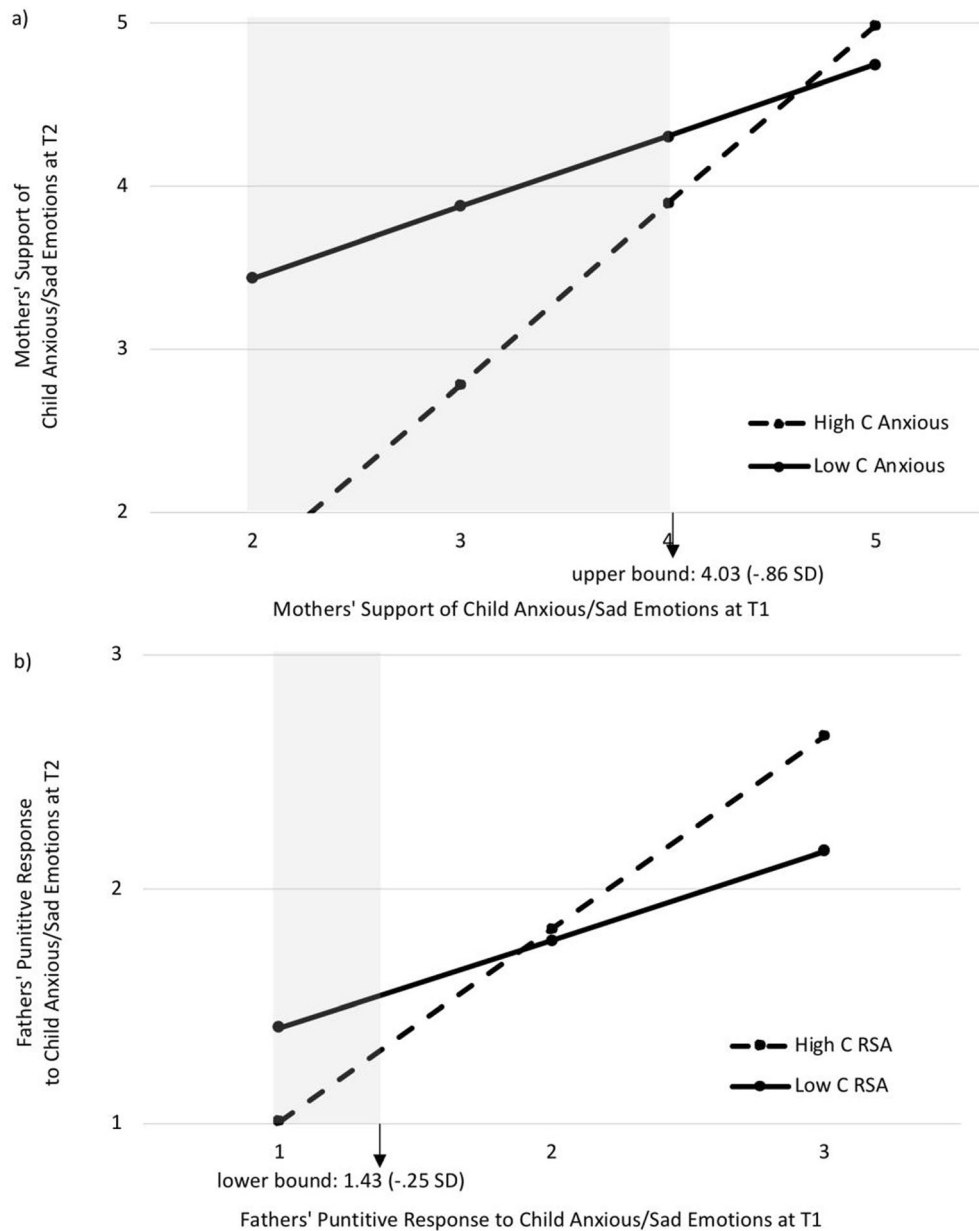
Fathers' positive responses to withdrawal were stable over time when children's anxious affect was high at Time 1 ($\beta = 0.75$, $p = 0.001$), but not when it was low ($\beta = 0.16$, $p = 0.54$), see Fig. 1b. The upper and lower bounds for ROS on fathers' positive responses at Time 1 were -0.05 SD and -18.09 SD, respectively, with simple slopes differing significantly outside this region. Fathers of children who expressed more anxiety reported significantly more positive responses at Time 2 than fathers of children who expressed less anxiety, when fathers had been at or above -0.05 SD in positive responses at Time 1 (see the shaded area of Figs. 1b). The lower bound indicated that children received similarly low paternal positive responses at Time 2 when fathers had reported less positive emotional responses at Time 1, regardless of children's expressed anxious affect at Time 1.

Counter to the hypotheses, the stability of fathers' negative responses to withdrawal was stronger for fathers of less anxious children ($\beta = 0.87$, $p < 0.001$) than

for fathers of more anxious children ($\beta = 0.30$, $p = 0.03$), see Fig. 1c. The upper and lower bounds for ROS on fathers' negative responses at Time 1 were 0.70 SD and -2.01 SD, respectively, with simple slopes differing significantly outside this region. Fathers of children who expressed less anxiety reported significantly more negative responses at Time 2 than fathers of children who expressed more anxiety, when fathers had been at or above 0.70 SD in negative responses at Time 1 (see the shaded area of Fig. 1c). The lower bound indicated similarly low paternal negativity at Time 2 when fathers had reported less negative responses at Time 1, regardless of their child's expressed anxiety at Time 1.

Direct Emotion Socialization of children's Internalizing Emotions Children's anxious affect moderated the stability of mothers' supportive responses to anxious/sad emotions (see Table 3). As predicted, the stability of mothers' supportive responses was stronger for mothers of children who expressed more anxiety ($\beta = 1.06$, $p < 0.001$) than for mothers of children who expressed less anxiety ($\beta = 0.41$, $p = 0.02$), see Fig. 2a. The upper and lower bounds for ROS on mothers' supportive responses at Time 1 were -0.86 SD and -22.11

Fig. 2 **a** Child anxious expressiveness at Time 1 moderated stability of mothers' supportive behaviors in response to child internalizing emotions from Time 1 to 2. **b** Child RSA at Time 1 moderated stability of fathers' punitive behaviors in response to child internalizing emotions from Time 1 to 2. Shaded regions represent the points at which Time 2 values diverge significantly. Axes present the range of observed values for these measures



SD, respectively, with simple slopes differing significantly *inside* this region (see the shaded area of Fig. 2a). Mothers of children who had expressed more anxious affect at Time 1 reported less supportive responses at Time 2 than did mothers of children who had been less anxious, when mothers had reported few supportive responses at Time 1 (or below $-0.86 SD$). The upper bound indicated similarly high maternal supportiveness at Time 2 when mothers had reported more use of supportive responses at Time 1, regardless of their child's expressed anxiety at Time 1.

Basal RSA moderated the stability of fathers' punitive responses to anxious/sad emotions (see Table 3). Counter to hypotheses, the stability of fathers' punitive responses was stronger for fathers of children with higher basal RSA

($\beta = 1.05, p < 0.001$) than for fathers of children with lower basal RSA ($\beta = 0.48, p < 0.001$), see Fig. 2b. The upper and lower bounds for ROS on fathers' punitive responses at Time 1 were $9.98 SD$ and $-0.25 SD$, respectively, with simple slopes differing significantly outside this region. Fathers of children with higher basal RSA reported fewer punitive responses at Time 2 than fathers of children with lower basal RSA, when fathers had been at or below the lower bound of $-0.25 SD$ in punitive responses at Time 1 (see the shaded area of Fig. 2b). The upper bound indicated similarly frequent paternal punitive responses at Time 2 when fathers had reported more punitive responses at Time 1, regardless of their child's basal RSA at Time 1.

Discussion

Multiple factors influence the ways in which parents raise their children (Belsky 1984), including parents' values and belief systems, their own childhood experiences of parenting, their mental health, and their children's characteristics. We examined how young children's anxious characteristics predicted the development of their parents' emotion socialization over 1 year. Children's expressed anxious affect with peers at preschool moderated the stability of mothers' and fathers' direct and indirect emotion socialization. Children's basal RSA directly predicted mothers' emotion socialization, and moderated the stability of fathers' punitive responses to children's internalizing emotions. The findings mainly supported the hypothesis that anxious children actively contribute to their own socialization experiences by eliciting and modifying behaviors from their parents that are likely to maintain or exacerbate children's anxiety-related social and emotional difficulties.

Although some of the contributions of children's anxious characteristics to the stability of parents' emotion socialization initially seemed counter to expectations (e.g., lower basal RSA predicting less stable paternal punitive responses), the regions of significance (ROS) analyses were essential for clarifying the nature of the moderating effects. Considering the effects for mothers' responses first, if mothers had initially reported that children's social withdrawal made them feel highly fretful, they were likely to maintain these highly fretful responses only if their children had expressed more anxiety with peers, whereas mothers' fretful responses decreased over time if children had expressed relatively little anxiety. And, if mothers had initially reported few supportive responses to children's anxious and sad emotions, they were likely to continue offering little support only if their children were more anxious, whereas their reports of supportiveness increased if children had been less anxious. Thus, more anxious children had mothers who reacted, and continued to react over time, to their children's anxious withdrawal in maladaptive ways that modeled an inability to regulate emotions and cope with social situations effectively (Hastings et al. 2019). Analogous to the bidirectional 'coercive cycles' between disruptive children and authoritarian parents (Dishion and Patterson 1997), mothers who are themselves too distressed to effectively assist their anxious children with social and emotional challenges have been found to further exacerbate the internalizing difficulties of their children (Coplan et al. 2008), which could perpetuate an 'anxious cycle.'

Conversely, mothers who had been less fretful or more supportive were equally likely to maintain these emotion socialization responses over time irrespective of their children's anxious expressiveness. Offering children understanding, comfort, and assistance, and not becoming worried or fretful, are aspects of maternal emotion socialization that would be

likely to help all children, whether less or more anxiety-prone, to learn how to deal with socially challenging situations that can evoke internalizing emotions (Denham et al. 2015; Saarni 1999). Perhaps these mothers had better emotion regulation (Root et al. 2016) or held coaching meta-emotion philosophies (Gottman et al. 1996) that helped them to cope effectively with challenging child-rearing situations. However, children who expressed more anxiety – and hence, had greater need for such emotion socialization – did not elicit greater adaptive change from mothers who were initially less fretful or more supportive than did less anxious children.

The moderating effects of children's anxious expressiveness on fathers' indirect emotion socialization were somewhat different. Fathers' initial reports of feeling rather happy and pleased by children's social withdrawal were maintained over time only if children had initially been more anxious, whereas they felt less positively if children had expressed little anxiety with peers. But, fathers' initial negative feelings about withdrawal were stable only if children had been less anxious with peers, whereas fathers felt less negatively about withdrawal over time if children had been more anxious. Together, these findings could suggest that fathers of anxious children were becoming more accustomed to and accepting of their children's shy and wary behaviors (Hastings et al. 2019), a pattern that has previously been suggested to characterize mothers of socially wary preschoolers (Hastings and Rubin 1999).

Would these changes in fathers' emotional responses be to the benefit or the detriment of their anxious children's emotional development? Parents' acceptance of children's emotional experiences is important for promoting healthy emotional development (Denham et al. 2015), and more anxious children may have elicited this in their fathers' indirect emotion socialization. However, children who are anxious and withdrawn with peers benefit from parents who engage with and scaffold their children's social and emotional coping (Davis and Buss 2012; Hastings et al., 2008), and this may be particularly true for fathers (Parke 1995). Fathers who feel good when they see wary behavior from their anxious children may not be sufficiently motivated to actively support their children's development of social skills and appropriate peer engagement. High levels of warmth and positivity are also characteristic of parents who engage in overprotective parenting, which can reinforce children's anxious emotional tendencies and problems (Buss and Kiel 2013; Hastings et al. 2014). Future research will need to replicate these findings, and examine whether fathers of more anxious children balance their positive emotional responses to children's social withdrawal with appropriate levels of support and scaffolding.

Fathers who initially reported feeling little positive or negative emotion about children's socially withdrawn behavior were likely to continue reporting little emotional arousal, regardless of their children's expressed anxiety. Reporting less intense emotional arousal conforms to culturally-normative

gender expectations for emotion (Zeman and Shipman 1996), and these fathers may have been following scripts of traditional masculinity in thinking about how they engage with their children. Whether this approach to emotion socialization by fathers would be beneficial for children, though, is an open question.

In the only moderating effect of children's basal RSA, if fathers had initially reported few punitive responses to children's anxious and sad emotions, they were likely to continue not being punitive if their children had higher RSA, whereas their reports of punitive responses increased over time if children had lower RSA. Lower basal RSA is posited to be a biomarker of generally poorer emotion regulation (Beauchaine 2015). Fathers of children with lower RSA may experience more instances of their children becoming more easily upset and more difficult to soothe, compared to fathers of children with higher RSA. Such repeated events could erode the patience of fathers for whom being punitive toward emotional expression might not be their primary inclination, but who have experienced failures in the effectiveness of other techniques to calm or help their emotionally challenging children (Bugental and Happaney 2002). Increases in fathers' punitive responses to anxiety and sadness would unfortunately not be likely to benefit children with weaker self-regulatory capacities. Punishing emotions can increase a child's distress, make the child feel that parent rejects the validity of the child's experiences, and increase the likelihood of developing emotion problems (Denham et al. 2000; Eisenberg et al. 1996), especially in vulnerable children (Engle and McElwain 2010; Hastings and De 2008).

Children's lower basal RSA also predicted increases in mothers' neglect of their children's internalizing emotions, and feelings of both negative and positive responses to children's social withdrawal. The findings for neglect and negativity mirror the past observation that toddlers with lower basal RSA had mothers who become more restrictive and less supportive over time (Kennedy et al. 2004). Children with less dispositional capacity for self-regulation could present such child-rearing challenges that mothers may become annoyed by and dismissive of their children's emotional needs, rather than providing the additional support and scaffolding that they would need for adaptive and healthy social and emotional development. Being relatively lacking in both internal and external sources of emotion regulation, however, would increase the risk of developing more serious internalizing difficulties (Hastings et al. 2014). It should be noted, though, that maternal emotion and neglect were not assessed in conjunction, and our variable-centered analyses was not designed to identify such a profile of parenting. It would be worthwhile to address this with person-oriented analyses in future research.

More surprising was the association of lower basal RSA with increases in mothers' happy and pleased feelings in response to children's wary behavior with peers. Intriguingly,

more emotionally positive mothers also tended to be more neglectful of children's anxiety. If maternal positivity was perceived as validating of a poorly regulated child's withdrawn tendencies, this could either portend a supportive context of indirect emotion socialization by mothers (Denham et al. 2015; Saarni 1999), or a context in which children's anxious withdrawal is accepted and permitted (Hastings et al. 2019). Whereas the former would imply a provision of emotional support likely to benefit children with weaker parasympathetic capacities for self-regulation, the latter would suggest a lack of behavioral support or scaffolding that a poorly regulated child may need to improve their social engagement. Future research will be needed to resolve these divergent interpretations.

Finally, in addition to the evocative effects of children's anxious characteristics, fathers reported more punitive responses to the anxious and sad emotions of relatively older children. Rubin and Mills (1992; Mills and Rubin 1992) have reported that mothers of withdrawn elementary school-aged children respond more negatively to their children's shy behaviors than do mothers of withdrawn preschoolers. This may be due to parents perceiving anxiety and wariness as developmentally normative and more acceptable in younger children (Hastings and De 2008; Klimes-Dougan et al. 2007). At Time 2, older children were kindergarten-age; their fathers may have become less tolerant for emotional arousal that they expected these older children to be able to manage.

Limitations

Lacking follow-up assessments of children's anxiety with peers and basal RSA, we could not examine fully bidirectional models including both parent effects and child effects. We did not show that children's future emotional well-being or internalizing problems were, in turn, predicted by the aspects of parental emotion socialization that had been shaped by children's anxious characteristics. Only children's basal RSA was considered, whereas polyvagal theory (Porges 2007) emphasizes the importance of dynamic changes in autonomic functioning in response to emotional and social demands. We also did not examine parent characteristics which may have affected their susceptibility to being influenced by children's characteristics, and given the genetic relatedness of parents and children, contributions of passive gene effects to the findings cannot be ruled out. We relied on parents' reports of their emotion socialization, which are only modestly associated with observations and child-reports of emotion socialization (Klimes-Dougan et al. 2007) and which may not be effective for tapping some subtle but important aspects of emotion socialization (Saarni 1999). This convenience sample was relatively small for testing moderation effects, particularly for fathers, and also homogeneous, with predominantly supportive parents, which tempers generalizability of these findings to more diverse populations or at-risk groups.

Conclusion and Future Directions

This study showed that young children's anxiety with peers and parasympathetic regulation contributed to the development of their fathers' and mothers' emotional and behavioral responses to children's social wariness and internalizing emotions over 1 year. Several of these child effects were of a nature that was likely to be disadvantageous to children, as the changes in parental emotion socialization were toward child-rearing patterns that have been associated with worsening trajectories of internalizing problems. Indications that children's anxious characteristics might elicit some adaptive or beneficial changes in parenting from some mothers and fathers warrants further investigation. These findings emphasize the importance of recognizing children's active roles in the creation of their socialization experiences with both mothers and fathers. Knowing that children's social anxiety and poor self-regulation influence how parenting unfolds over time may inform interventions targeting parents' emotion socialization, such as the promising "Tuning in to Kids" program (Havighurst et al. 2009), and thereby help vulnerable children to develop adaptively in social and emotional domains. Future research identifying the characteristics of parents and life contexts that may make parents more or less likely to be adversely influenced by their children's challenging emotional characteristics would complement these efforts.

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Compliance with Ethical Standards

Conflict of Interest The authors have no conflicts of interest with this work.

Ethical Approval This project was reviewed and approved by the Institutional Review Board of Concordia University, Montreal Quebec.

Informed Consent All parents provided informed consent for their own and their child's participation. All daycare and preschool instructors provided informed consent for the observers' presence in the classroom.

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