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Person-Centered Maternal Emotion Socialization and Child Temperament: Relations to Children's Emotion Regulation and Anxiety and Depressive Symptoms

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Abstract

Maternal emotion socialization and children's temperament are two foundations of children's emotional development. Yet, emotion socialization and temperament are multidimensional, which suggests behavioral profiles are important to consider. We used a person-centered approach to compare children's emotion regulation and anxiety and depressive symptoms between maternal emotion socialization and child temperament profiles, uniquely and interactively. The participants were 322 mothers of a child ages 6–8 years ($M_{age} = 7.4$ years, $SD = 0.84$, 51% boys). Mothers completed survey questions about children's emotion regulation, anxiety and depressive symptoms, temperament traits, and mothers' emotion socialization behaviors. Four profiles of maternal emotion socialization (coaching/accepting, blended, punishing/minimizing, and low involved) were identified that explained significant variation in children's emotion regulation and anxiety symptoms. Four temperament profiles were found which revealed two vulnerable groups, namely emotional/cautious and emotional/impulsive, which distinguished children with more emotion dysregulation and anxiety and depressive symptoms. Unique associations of maternal and temperament profiles were found, but no interaction of profiles was significant in relation to children's emotion regulation or their internalizing symptoms. There is merit in continuing to examine parenting behaviors and their influence by drawing from a person-centered perspective.

Keywords Person-centered approach · Emotion socialization · Child temperament · Emotion regulation · Internalizing symptoms

Highlights

- Child emotion regulation and anxiety symptoms differed between four maternal emotion socialization profiles.
- Emotional children temperamentally cautious or impulsive have poorer regulation and more internalizing symptoms compared to others.
- Interactions of maternal socialization and child temperament profiles were not significantly related to child outcome measures.

Perhaps not surprisingly there is an abundance of research devoted to understanding parenting and child traits in

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relation to children's emotion regulation and symptoms of internalizing disorder. In particular, parents' socialization of children's emotion has been described as a key foundation of children's emotional development (Denham et al., 2015; Grusec, 2011). In this research, usually focused on mothers, parents who report more supportive responses to their children's negative emotions have children with more skills in emotion regulation and have more favorable scores on many measures of socioemotional functioning (e.g., prosocial behavior with peers, internalizing symptoms), whereas non-supportive parental responses to children's negative emotions have been associated with poorer child

socioemotional development (Hurrell et al., 2015; Song & Trommsdorff, 2016). Yet, parents may engage in complex patterns of both supportive and unsupportive responses to their children's negative emotions, but this possibility has rarely been considered in this research (for exceptions see Mirabile, 2014; Wang et al., 2019).

Understanding person-level emotion socialization configurations seems relevant given that parents rarely use one response and young children tend to display many negative emotions within a single day. Parents rely on many responses in attempts to manage and socialize their children's behaviors when they are sad, fearful, or angry, and parents themselves do report accessing and implementing multiple strategies in succession or almost simultaneously to manage disruptive or other problematic child behavior (Lunkenheimer et al., 2007). For example, Mirabile (2014) reported that parents (85% mothers) were mostly consistent in their overall approach to emotion socialization across different domains, but there was evidence of inconsistency that explained variation in children's adaptive and maladaptive emotion regulation and internalizing symptoms. Thus, parents may practice a mix of supportive and non-supportive behaviors in response to their children's negative emotions rather than being selective of one over the other (Miller-Slough et al., 2018; Wang et al., 2019). Such views have led to the encouragement of using person-centered approaches to examine how patterns of parenting behaviors relate to children's outcomes (Lunkenheimer et al., 2007). In the present study of mothers and children ages 6 to 8 years, we expected that this approach would identify person-level patterns of maternal emotion socialization that would explain children's variation in their emotion regulation capacity and their anxiety and depressive symptoms. More broadly, we expected that the findings would provide some initial information on how mothers manage the complex task of responding to their children's negative emotions, which could then be useful for informing parenting and child support programs.

Parent Socialization of Children's Negative Emotion

Parents have a range of responses to their children's negative emotions, with many of these responses aimed at socializing children to manage their emotion to reach a goal, such as maintaining social relationships, to persevere at an important task, or to meet contextual demands (Eisenberg et al., 1998; Hurrell et al., 2015; Shewark & Blandon, 2015). Some responses are supportive, such as helping or encouraging the child to solve the problem that caused their distress or providing support to assist the child to utilize ways to manage emotion. These responses are expected to

support children's mastery, whereby they become more able at personal problem-solving and emotion regulation over time. Responses that comfort the child and help the child recover from outbursts of emotion (emotion focused responses) could also change children's reactivity to negative events and can provide opportunities to learn socially competent ways to express negative emotions. Encouraging the expression of negative emotions (expression encouragement) can validate children's experience whilst also providing opportunities to discuss, learn about and understand their negative emotions and manage them more adaptively into the future. These responses provide a rich tapestry of opportunities for parents to foster children's developing skills at emotion regulation, especially in young children by providing feedback on what is an appropriate way of expressing negative emotion across varying contexts (Eisenberg et al., 1998; Gottman et al., 1996; Shewark et al., 2015). On the other hand, a parent's non-supportive response, which includes punitive, minimization, and distress behaviors, potentially exacerbates a child's state of distress, while diminishing opportunities for children to experience, understand, acknowledge, and learn about these emotions and develop appropriate regulation strategies (Eisenberg et al., 1998). As expected, based on theory, parents' emotion socialization has been associated with children's emotion regulation in studies using variable-oriented methods. When mothers report more supportive responses, they have children who score higher in effective regulation (Shaffer et al., 2012) and lower in anxiety (Hurrell et al., 2015). Also, both mother and father supportive responses have been associated with fewer depressive symptoms in adolescents (Shortt et al., 2016). Conversely, non-supportive parent (mostly mother) emotion socialization has been consistently associated with less effective emotion regulation such as more negativity/lability (Fabes et al., 2001, Song & Trommsdorff, 2016).

It is important to note that the benefit of supportive parent emotion socialization for children's emotion regulation and reduced symptoms is not always found. Studies also report that supportive parent emotion socialization is associated with poorer regulation and more symptoms for school aged children (Miller-Slough et al., 2018; Mirabile et al., 2018), or they describe no significant relationship (Binion & Zalewski, 2018; Suveg et al., 2011). Such findings suggest that parent emotion socialization processes could be complex. For instance, parents that rely primarily on very supportive responses to their children's negative emotions could inadvertently prompt rumination, thereby increasing risk for internalizing symptoms (Schwartz et al., 2012). However, when used in combination with some non-supportive responses it may foster a greater repertoire of emotion regulation strategies and result in more effective regulation and fewer

symptoms (Lunkenheimer et al., 2007; McElwain et al., 2007). This was demonstrated in a study by Miller-Slough et al., 2018 in which they examined patterns of self-reported maternal and paternal responses to their child's sad emotions in relation to parent reported child social competence and internalizing and externalizing symptoms. Supportive fathers and mothers had children with higher internalizing symptoms. Non-supportive parental behaviors were associated with lower child internalizing symptoms, and when fathers were high in both (and mothers were low in both) children's internalizing symptoms were also lower. Similarly, Poon et al. (2017) examined mothers' and fathers' responsiveness (negative and positive) to children's sadness expressivity and its association with child social competency. For boys, social competence was highest when at least one parent was high in responsiveness and the other parent was disengaged (or low in responsiveness). Together, these findings indicate support for the divergence model (McElwain et al., 2007) in that being exposed to a wider array of responses and strategies from both parents could encourage flexibility and increase a child's ability to select an appropriate response when experiencing a distressing or negative emotion. Such a possibility depends on examining complex combinations of both supportive and unsupportive emotion socialization responses, which can be addressed by using a person-centered approach.

Children's Temperamental Traits

Children's temperament, which refers to early occurring reactivity and regulation tendencies (Rothbart, 2011), provides a foundation for children's developing emotion regulation (Eisenberg et al., 1999). These temperamental tendencies are recognized as key contributors in many models of the development of internalizing symptoms (Meesters et al., 2007; Muris et al., 2007), and research supports these models with children higher in reactivity or lower in regulation at risk of internalizing symptoms (Forbes et al., 2017; Hudson et al., 2019). Rothbart and Bates (2006) proposed three broad dimensions of temperament in their developmental theory: surgency, which relates to positive affectivity and activity; negative affectivity; and effortful control. Briefly, surgency has been associated with lower internalizing symptoms (Fettig, 2015), whereas negative affectivity has been associated with poorer emotion regulation (Papachristou et al., 2018; Van Beveren et al., 2016) and strongly associated with more anxiety and depressive symptoms (Northerner et al., 2016). Finally, effortful control, which involves attention, has been associated with more effective emotion regulation (Eisenberg et al., 2014). Yet, excessive effortful control has also been

described as maladaptive, given it can be a risk factor for internalizing symptoms (Murray & Kochanska, 2002).

Child temperament has often been examined using a person-centered approach, given the longstanding view that children can present with various combinations of temperamental traits. However, when it comes to examining temperament profiles in the context of child adjustment most studies have focused on specific temperament categories, for instance, Thomas and Chess's (1977) 'difficult' temperament or a 'behavioral inhibition' profile (Kagan et al., 1984). While these approaches have been important in the conceptualization and identification of children at risk for later behavioral and emotional difficulties, they do not fully capture the three components of temperament proposed by Rothbart (2011). For example, a 'difficult temperament' taps traits of surgency and negative affectivity but does not consider effortful control. Behavioral inhibition is limited even further to children who are fearful and shy. The few studies that have examined a fuller array of traits from a person-centered perspective reveal the value of including all dimensions when profiling temperament, as unique combinations of the three traits have been found to explain important differences in children's concurrent and prospective anxiety symptoms (Sanson et al., 2009).

The Interaction of Parent Socialization of Emotion with Temperament

According to the 'goodness of fit' hypothesis (Thomas & Chess, 1977), certain parenting practices may better fit children with specific temperamental traits, suggesting that parenting practices can moderate the effect of temperament on children's functioning (Kochanska et al., 2007; Rubin et al., 2002). This view has resulted in decades of research that has examined the interactive effects of parenting and temperament on socioemotional adjustment outcomes of children, with most studies supporting some tenets of the differential susceptibility model (Belsky & Pluess, 2009). This model broadly posits that children with a vulnerable temperament (typically defined as inhibited or fearful) have a greater sensitivity to the impact of both harsh and positive parenting, resulting in either more maladaptive or advantageous pathways relative to other children, respectively. Most studies that have examined the interactive effect of parents' emotion socialization with child temperament profiles have focused on children's emotion competence (Root et al., 2015; Woodward et al., 2020), and findings tend to align with the vulnerable susceptibility model. In particular, children with a vulnerable temperament tend to be more responsive to both supportive (Root et al., 2015; Woodward et al., 2020) and unsupportive parent emotion socialization (Brooker & Buss, 2014) when it relates to their

capacity for adaptive emotion regulation. While these studies have been particularly informative about how parents' emotion socialization and child temperament interact in relation to children's emotion regulation capacity, to our knowledge there has been no study using a person-centered approach for both parent socialization practices and child temperament to identify how distinct profiles of mothers and children interact to account for young children's (age 6–8 years) emotion regulatory ability as well as their anxiety and depressive symptoms. The 6 to 8-year-old age range is a relatively understudied group of children compared to earlier years when it relates to parents' emotion socialization, despite evidence that socialization by parents remains influential in this age period (Adrian et al., 2011). Age 6 to 8 is also a critical developmental period that captures the first years of school when a child is likely to encounter novel social and emotional challenges in navigating friendships and academic stressors, as well as adjusting to cognitive changes that can bring about emotion regulation and internalizing difficulties or strengths.

The Present Study

In summary, the present study examined mothers' emotion socialization and children's temperament taking a person-centered approach to profile mothers and children separately. A person-centered approach allowed us to identify mothers who best fit various profiles that involved combinations of supportive and unsupportive responses to their children's negative emotion. For children, we also applied a person-centered analysis to identify those who exhibited different profiles of temperamental traits of surgency, negative affectivity, and effortful control. The primary aims were then addressed by comparing children's emotion regulatory capacity and anxiety and depressive symptoms between these maternal and child profiles, uniquely and interactively. Six hypotheses were tested:

H1. There will be four maternal emotion socialization profiles: coaching/accepting (characterized by high supportive and low non-supportive responses); blended (characterized by both supportive and non-supportive responses); punishing/minimizing (characterized by low supportive and high non-supportive responses); and low involved (characterized by low supportive and low non supportive responses).

H2. There will be at least three child temperament profiles: inhibited (high negative affectivity, low surgency, level of effortful control is exploratory and to be determined), reactive (high surgency, low effortful control, level of negative affect is exploratory and to be determined) and controlled (average surgency and negative affectivity and moderate effortful control).

H3. Mothers with coaching/accepting and blended emotion socialization profiles will have children with better emotion regulation than children with mothers with punishing/minimizing and low-involved profiles.

H4. Mothers with blended emotion socialization profiles (i.e., average levels of supportive but also unsupportive emotion socialization, reflecting variety) will have children with fewer anxiety and depressive symptoms compared to children with mothers with coaching/accepting and punishing/minimizing profiles.

H5. Children with inhibited and reactive temperament profiles will have poorer emotion regulation and higher anxiety and depressive symptoms compared to children with other temperament profiles.

H6. Maternal socialization profile will moderate the association of children's temperament profile with children's emotion regulation and symptoms. In particular, children with an inhibited profile will have greater emotion regulation and fewer symptoms when mothers are coaching/accepting compared to when mothers are punishing/minimizing, and this difference will be of greater magnitude relative to children in other temperament profiles.

Method

Participants

The participants were 322 mothers of a child aged 6–8 years ($M_{age} = 7.4$ years, $SD = 0.84$, 154 girls and 166 boys, 2 not reported). Most mothers reported that they were white (92%), whereas others were Aboriginal or Torres Strait Islander (3%), Asian (2%), or identified as other (3%). Most mothers lived with the other biological parent or a partner (77%), whereas the remaining mothers were single (23%). Most mothers reported part-time (34%) or full-time (28%) employment, with 21% stay-at-home mothers, self-employed (8%), or students (9%). Mothers reported at least some university (57%), vocational training (33%), high school only (6%), or had not completed high school or other training (3%). Most partners (78%) had completed at least vocational training or other tertiary education, with others completing high school education or less (22%). When compared to census data for the region and the state, 22% of adults in the state reported at least some university education. Overall, the present sample overrepresented individuals with university experience. However, other demographic characteristics did not differ substantially from those of the region or the state. The initial pool of participants also included 17 fathers, but because this group was small and might differ from mothers in their emotion socialization, fathers were not included in the analyses.

Procedure

Participants were recruited via social media advertisements targeted to parents of 6 to 8-year-old children living within a 150 km radius of the university area, university email contact lists, flyers posted at schools and in public places, and via word of mouth. Prior to conducting this study, approval was received from the Griffith University Human Research Ethics Committee (Protocol 2017/203). Most parents who completed the survey were channeled via the social media advertisements, followed by the university contact pool then the flyers. A drawing for two $200 gift card vouchers were offered for participation. The survey was completed online via a link provided after personal email contact. Consent and information packages were distributed via email and were also made available on the survey website. If parents had more than one child within the 6–8 year age range, they were instructed to choose the eldest child when answering the questions. In addition to the 339 participants, another 126 (25%) parents clicked on the survey link providing consent but did not complete any questions, and a further 24 (5%) parents answered a few questions on the survey but did not complete it.

Measures

All measures selected have been widely used and had evidence of good or excellent reliability and validity.

Children's anxiety and depression symptoms

The 25-item Revised Children's Anxiety (15 items) and Depression (10 items) Scale – parent report short version (Chorpita et al., 2005) measured depression and anxiety symptoms. Responses ranged from 1 (never) to 100 (always). The Cronbach's α were 0.86 for depression and 0.86 for anxiety items.

Emotion regulation

The 24-item Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997) asks parents how often their child displays certain developmentally appropriate behaviors, yielding measures of dysregulated negative affect and mood lability (Negativity/Lability scale, e.g. 'exhibits wide mood swings', 10 items); and outcomes of adaptive regulation such as empathy and emotional self-awareness (Emotion Regulation, e.g., 'can say when s/he is feeling sad, angry or mad, fearful or afraid', 14 items). Usually, response options range from 1 = never to 4 = Always. Items responses were modified to conform to the RCADS format (range from 1 = never to 100 = always). The Cronbach's α were 0.91 for the negativity/lability items and 0.86 for the emotion regulation items. The emotion regulation items largely tap adaptive regulation or emotion-related social skills (such as emotional awareness and empathy). It should be noted that there was one item from the negativity/lability subscale which had similar wording to an item on the depression subscale of the RCADS.

Children's temperament

The Children's Behavior Questionnaire very short form (CBQ- VSF, Putnam & Rothbart, 2006) was used to measure children's temperament. The CBQ-VSF is a 36-item parent-report measure that captures the broad dimensions of effortful control (e.g., 'prepares for trips and outings by planning things they will need'), negative affectivity (e.g., 'gets quite frustrated when prevented from doing something they want to do') and surgency (e.g., 'often rushes into new situations'). Response options range from 1 (extremely untrue of my child) to 7 (extremely true of my child). Cronbach's α were 0.75 for effortful control, 0.81 for negative affectivity, and 0.79 for surgency.

Parent emotion socialization

To measure parents' emotion socialization, the Coping with Children's Negative Emotions Scale (CCNES, Fabes et al., 2002) was used. The CCNES measures how parents typically respond to young children's negative affect when children experience distressing events. Parents are presented with 12 hypothetical vignettes in which the child reacts with distress or anger, and then reports their anticipated use of six possible responses, using a scale from 1 (not at all likely) to 7 (very likely). Six subscales are derived that reflect the specific types of responses parents tend to use in these situations, namely distress, punitive, minimization, expression encouragement, emotion-focused, and problem-focused responses. An example of a vignette and a problem-focused response is, "If my child loses some prized possession and reacts with tears, I would help my child think of places he/she hasn't looked yet". Cronbach's α ranged from 0.73–0.88 in the present study.

Results

Preliminary Analyses and Descriptive Information

Less than 1% of data were missing, so total scores were formed by averaging completed items. Age was missing for three children and gender was missing for two children. Therefore, $N = 317$ for analyses that involved age or gender. A square root transformation was applied to child anxiety and depressive symptom scores to correct moderate

positive skew. These transformations were used in all analyses of children's outcomes; however, raw means (Ms) and standard deviations (SDs) are displayed in Table 1.

Ms and SDs for all measures and correlations between all measures can be found in Table 1. Children with more depressive symptoms had lower emotion regulation, surgency, and effortful control; higher negativity/lability and negative affectivity; and mothers with more distress in response to their children's emotions. Children higher in anxious symptoms had lower emotion regulation and surgency; higher negativity/lability and negative affectivity; and their mothers reported more distress responses to their children's emotions. In addition, five of six possible correlations between children's emotion regulation and temperament were significant, and emotion regulation and temperament tended to have small and intermittently significant associations with maternal emotion socialization. Age and gender were associated with multiple measures, so are controlled in most of the following analyses.

We determined the proportion of children with borderline and clinical levels of depression and anxiety using USA gender-based norms for 9-year-olds (Ebesutani et al., 2017). Thirty girls scored in the borderline (7, 5%) or clinical (23, 14%) range for anxiety, whereas 26 girls scored in the borderline (10, 6%) or clinical range (16, 10%) for depression. Forty-four boys scored in the borderline (10, 6%) or clinical range (34, 20%) for anxiety and 43 boys scored in the borderline (14, 8%) or clinical range (29, 17%) for depressive symptoms.

Cluster Identification and Description

Maternal emotion socialization clusters

Following best practice, the datafile was ordered randomly prior to using 2-step clustering procedures (Gore, 2000). In the first step of the analysis of the six standardized subscales of maternal emotion socialization, Schwarz's Bayesian criterion (BIC) indicated a 4-group cluster as the best fit, producing the lowest BIC (BIC for 4 clusters = 1147.93, for 5 clusters = 1153.87, and for 6 clusters = 1182.34). An iterative k-means clustering procedure was then used specifying 3, 4, 5, and 6 clusters that were compared for theoretical meaningfulness, parsimony, and explanatory power (Milligan & Cooper, 1985). A 4-cluster solution was selected as best fitting, as the 5-cluster produced one small sized cluster relative to other clusters ($n = 30$), which was only a slight variation of another cluster. The 3-cluster solution did not explain as much variation as the 4-cluster solution.

As can be seen in Fig. 1 and in support of H1 there were four maternal socialization clusters. The first cluster, named 'coaching/accepting' ($n = 99$, 50% girls and 50% boys),

had above average scores on all the supportive subscales (problem focused, emotion focused, and expression encouragement) and below average for non-supportive emotion socialization (punitive, distress, and minimization responses). Next, there was a 'blended' cluster ($n = 123$, 47% girls and 53% boys), with mothers who reported an average level of both supportive and non-supportive emotion socialization. The third cluster was labeled 'punishing/minimizing' ($n = 52$, 42% girls and 58% boys) and had below average supportive and above average non-supportive emotion socialization. Finally, the fourth cluster was labeled 'low involved' ($n = 48$, 54% girls and 46% boys), with mothers who were below average across all emotion socialization approaches. When one-way ANOVAs with pairwise comparisons were used to compare the four clusters, each of the six socialization subscale scores showed pairwise differences between all four clusters (see Table 2). The only exceptions were for non-supportive socialization (punitive, distress, and minimization scores) when the coaching/accepting and low involved clusters were compared, and the punishing/minimizing and low involved clusters did not differ in their problem focused or expression encouragement responses. Child gender distribution did not differ across maternal clusters, $\chi^2(3, N = 320) = 1.64$, $p = 0.650$.

Child temperament clusters

The same steps were followed to identify the best cluster solution for child temperament. For the standardized temperament trait scores, evaluation of Schwarz's Bayesian criterion (BIC) from the first step hierarchical cluster analysis indicated a 4-group cluster solution was the best fit with the BIC change between 4 and 5 clusters very small and the BIC increased with 6 clusters (BIC for 3 clusters = 598.27, for 4 clusters = 567.24, for 5 clusters = 562.74, and for 6 clusters = 566.38). Thus, this was followed by conducting an iterative k-means clustering procedure specifying 3, 4, and 5 clusters for theoretical meaningfulness, parsimony, and explanatory power (Milligan & Cooper, 1985). A 4-group cluster solution was selected as the best fit as the 5-group cluster solution produced a small cluster group that did not sufficiently differentiate from another cluster, and the 4-cluster solution explained more variation than the 3-cluster solution.

The first cluster of children labeled 'emotional/cautious' ($n = 102$, 54% girls and 46% boys), had an above average level of negative affectivity, below average level of surgency/positive affect, and average level of effortful control (see Fig. 2). Second, there was an 'emotional/impulsive' cluster ($n = 49$, 37% girls and 63% boys); these children were above average in negative affectivity, high in

Table 1 Means (M) and Standard Deviations (SD) of all Measures and Correlations Between Measures (N = 322)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. C depression															
2. C anxiety	0.80**														
3. C emotion reg	−0.63**	−0.50**													
4. C lability	0.60**	0.44**	−0.60**												
5. C surgency	−0.28**	−0.37**	0.31**	0.04											
6. C negativity	0.65**	0.59**	−0.56**	0.68**	−0.25**										
7. C Effortful control	−0.12*	−0.02	0.24**	−0.29**	−0.07	−0.11									
8. P problem-focus	0.02	0.08	0.17**	−0.05	−0.02	0.04	0.20**								
9. P emotion-focus	0.09	0.07	0.03	0.08	−0.09	0.19**	0.03	0.61**							
10. P exp enc	−0.01	0.03	0.11*	−0.02	−0.01	0.02	0.09	0.53**	0.44**						
11. P punitive resp	0.09	0.08	−0.19**	0.23**	0.08	0.15**	−0.20**	−0.36**	−0.19**	−0.42**					
12. P distress resp	0.16**	0.14*	−0.23**	0.21**	−0.09	0.26**	−0.18**	−0.25**	−0.06	−0.29**	0.63**				
13. P minimization	0.02	0.01	−0.13*	0.16**	0.13*	0.08	−0.16**	−0.27**	−0.07	−0.37**	0.75**	0.47**			
14. C age#	0.09	0.09	−0.05	0.05	−0.01	0.23*	−0.13**	−0.04	−0.03	−0.04	0.05	0.05	−0.01		
15. C Gender#	0.10	−0.01	−0.12*	0.10	0.08	−0.04	−0.29**	−0.01	0.02	0.07	0.09	0.04	0.09	0.07	
M	20.55	23.56	71.00	38.85	4.36	4.39	5.07	5.89	5.73	5.48	2.44	2.93	2.63	7.39	1.52
SD	16.86	15.95	13.58	19.66	0.97	1.06	0.82	0.49	0.64	0.73	0.74	0.74	0.78	0.84	0.50

Gender was coded 1 for girls and 2 for boys

C child, Emotion reg emotion regulation, P parent. Exp enc expressive encouragement, Resp responses

*p < 0.05; **p < 0.01

#Child age (N = 319) and Gender (N = 320)

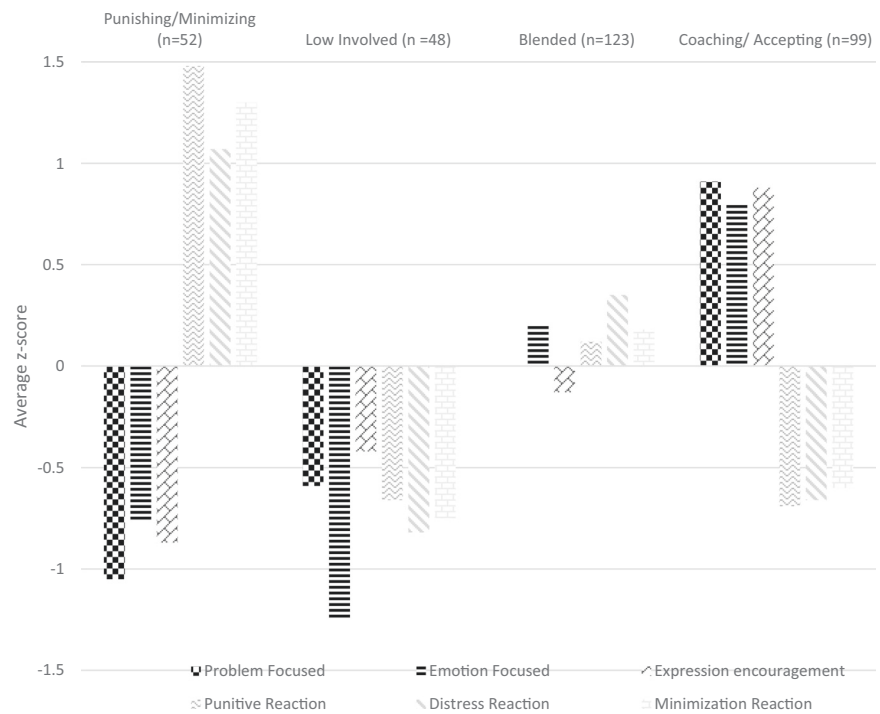**Fig. 1** Cluster Profiles of Maternal Emotion Socialization (*N* = 322)

Table 2 Descriptive Statistics and Comparisons of Maternal Emotion Socialization of Children's Negative Emotion Clusters (*N* = 322)

Parent emotion socialization subscale	1. Punishing/ minimizing (*n* = 52, 16.2%)	2. Low involved (*n* = 48, 15.0%)	3. Blended (*n* = 123, 38.2%)	4. Coaching/ accepting (*n* = 99, 30.8%)	*F* (3,318)	η²	Pairwise comparisons*
Problem focused	−0.92 (0.83)	−0.63 (0.79)	0.01 (0.68)	0.91 (0.55)	102.42*	0.49	3 > 2,1; 4 > 3,2,1
Emotion focused	−0.66 (0.72)	−1.26 (0.74)	0.21 (0.60)	0.80 (0.65)	129.47*	0.55	3 > 2,1; 4 > 3,2,1; 1 > 2
Expression encouragement	−0.83 (0.86)	−0.40 (1.09)	−0.10 (0.71)	0.89 (0.57)	68.44*	0.39	3,2 > 1; 4 > 3,2,1
Punitive response	1.46 (0.83)	−0.63 (0.66)	0.14 (0.62)	−0.70 (0.54)	146.72*	0.58	3 > 2,4; 1 > 3,2,4
Distress response	1.12 (0.68)	−0.80 (0.69)	0.34 (0.71)	−0.67 (0.80)	96.21*	0.48	3 > 2,4; 1 > 3,2,4
Minimisation response	1.27 (0.84)	−0.75 (0.66)	0.18 (0.70)	−0.60 (0.67)	99.38*	0.48	3 > 2,4; 1 > 3,2,4

Note. Standardized scores are shown

*$p < 0.001$

surgery, and had moderately low effortful control. A third cluster, labeled 'controlled' (*n* = 101, 59% girls and 41% boys), was slightly below average on negative affectivity, average on surgency, and highest in effortful control. The fourth cluster labeled 'positive under-controlled' (*n* = 70, 33% girls and 67% boys), was below average and the lowest out of all the clusters in negative affectivity, slightly above average on surgency, and below average on effortful control. Each of the three temperament trait scores showed pairwise differences between clusters, with three exceptions – one for each temperamental trait (see Table 3); negative affectivity did not differ between the emotional/cautious and the emotional/impulsive clusters, surgency did not differ between the controlled and the positive under-

controlled clusters, and effortful control did not differ between the emotional/impulsive and the positive under-controlled clusters. There were disproportionately more girls and less boys in the controlled temperament profile than expected and more boys and less girls in the positive under-controlled profile, $\chi^2(3, N = 320) = 14.97$, $p = 0.002$.

Association between Maternal Emotion Socialization and Temperament Clusters

There was no significant association between children's temperament clusters and maternal emotion socialization clusters, $\chi^2(9, N = 322) = 10.49$, $p = 0.313$.

Fig. 2 Cluster Profiles of Children's Temperament Traits (N = 322)
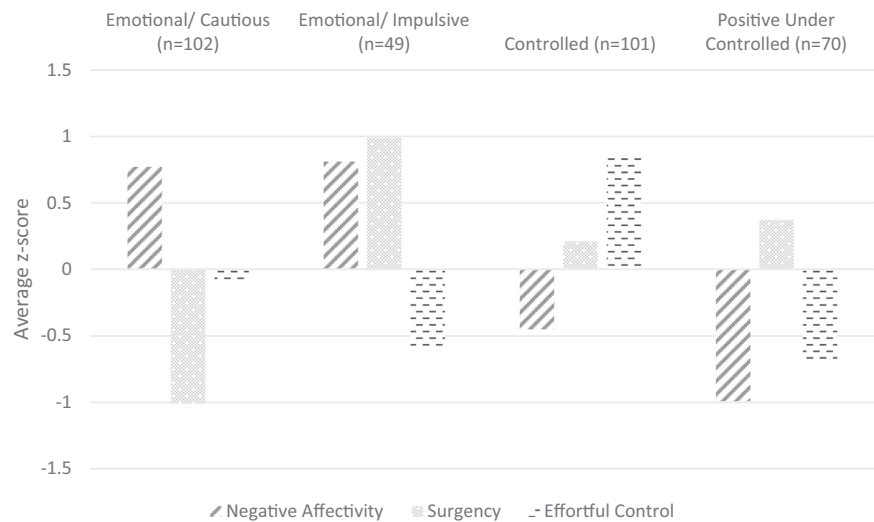

Table 3 Descriptive Statistics and Comparisons between Temperament Clusters ($N = 322$)

Child trait	1. Emotional/ cautious ($n = 102$, 31.7%)	2. Emotional/ impulsive ($n = 49$, 15.2%)	3. Controlled ($n = 101$, 31.4%)	4. Positive under controlled ($n = 70$, 22.7%)	F (3,318)	η^2	Pairwise comparisons*
Negative affectivity	0.78 (0.66)	0.82 (0.50)	−0.45 (0.75)	−1.04 (0.63)	143.82*	0.58	1,2 > 3,4; 3 > 4
Surgency	−1.01 (0.65)	1.03 (0.61)	0.22 (0.69)	0.37 (0.87)	112.36*	0.52	2 > 3,4,1; 3,4 > 1
Effortful control	−0.10 (0.85)	−0.57 (1.07)	0.87 (0.53)	−0.66 (0.71)	68.50*	0.39	3 > 1,2,4; 1 > 2,4

Note. Standardized scores are shown

*$p < 0.001$

Clusters and Child Adjustment Outcomes

To examine cluster differences in children's global emotion regulation, lability/negativity, and anxiety and depressive symptoms, a 4 (maternal emotion socialization clusters) × 4 (child temperament clusters) MANCOVA was conducted, with post-hoc pairwise comparisons and significance adjusted with Bonferroni. Initial data screening and assumption tests were carried out, which showed all assumptions were met for the MANCOVA. As shown in Table 4, maternal socialization cluster differences were found for children's emotion regulation and anxiety symptoms. Also, significant temperament cluster differences were found across all child emotion regulation and symptom measures. In addition, gender was significant in the model for emotion regulation and depressive symptoms; girls had higher reported emotion regulation and boys had higher reported depressive symptoms (gender could not be included as a fixed factor in the model due to too small cell sizes and including gender as a fixed factor did not result in any significant main effects of gender or interactions nor did it alter any of the other findings reported here). There was

no significant maternal socialization × temperament cluster interactions. Thus, H6 was not supported.

Maternal emotion socialization cluster main effects

Regarding findings for children's emotion regulation, mothers in the coaching/accepting cluster had children higher in emotion regulation relative to children with mothers in the punishing/minimizing cluster, providing partial support for H3.

Regarding findings for children's internalizing symptoms, mothers in the punishing/minimizing and coaching/accepting clusters reported significantly higher anxiety symptoms for their children than mothers in the blended socialization cluster, supporting H4. There were no child anxiety differences when comparing mothers in the blended cluster to mothers in the low involved clusters nor were there any child anxiety differences when comparing mothers in the low involved and the coaching/accepting or punishing/minimizing clusters. There were no significant differences between maternal clusters on reported child depressive symptoms or lability/negativity.

Table 4 Results of MANCOVA Testing Differences in Child Emotion Regulation and Symptoms by Maternal and Temperament Clusters, with Adjustment for Child Age and Gender ($N = 317$)

Independent variables	Dependent variables			
	Emotion regulation~	Lability/ negativity	Anxiety symptoms	Depressive symptoms~
Maternal, F (3,299), η^2	3.04*, 0.03	2.43^, 0.02	4.00**, 0.04	0.92, 0.01
1. P/M, M(SE)	66.60 (1.61)	44.45 (2.33)	4.86 (0.20)	4.27 (0.22)
2. LI, M(SE)	70.19 (1.83)	35.54 (2.65)	4.33 (0.26)	3.98 (0.26)
3. Blended, M(SE)	71.33 (1.09)	41.22 (1.57)	4.22 (0.13)	3.96 (0.15)
4. C/A, M(SE)	72.48 (1.20)	38.99 (1.74)	4.79 (0.15)	4.28 (0.17)
Pairwise comparisons	1 < 4	–	3 < 1,4	–
Temperament, F (3,316), η^2	41.30**, 0.29	34.16**, 0.26	33.08**, 0.25	36.83**, 0.27
1. E Cautious, M(SE)	60.49 (1.29)	47.05 (1.86)	5.74 (0.16)	5.46 (0.18)
2. E Impulsive, M(SE)	65.13 (1.82)	54.40 (2.63)	4.74 (0.22)	4.65 (0.25)
3. Controlled, M(SE)	77.60 (1.28)	29.41(1.84)	4.26 (0.16)	3.44 (0.18)
4. Positive UC, M(SE)	77.37 (1.43)	29.34 (2.07)	3.47 (0.18)	2.94 (0.20)
Pairwise comparisons	1,2 < 3,4	1,2 > 3,4	1 > 2,3 > 4	1,2 > 3,4
Parenting × Temperament, F (9,316), η^2	0.69, 0.02	1.83, 0.05^	0.90, 0.03	0.73, 02
Total η^2	0.35	0.36	0.32	0.33

Significance Bonferroni adjusted. Age and gender were included as covariates: ~Gender significant in model. No interactions between maternal and temperament cluster were significant, so details are not reported.

P/M punishing/minimizing, *LI* low involved, *C/A* coaching/accepting, *E* emotional, *UC* under-controlled

*$p < 0.05$; **$p < 0.01$; ^$p < 0.10$

Temperament cluster main effects

In support of H5, children in the emotional/cautious and the emotional/impulsive clusters had significantly lower emotion regulation and higher lability/negativity and depressive symptoms than children in the controlled and the positive under controlled clusters. In addition, children in the emotional/cautious cluster were higher in anxiety symptoms and children in the positive under controlled cluster were lower in anxiety symptoms relative to the other three temperament profiles (partial support of H5).

Interactions: maternal emotion socialization × temperament clusters

There were no significant maternal socialization × temperament cluster interactions at $p < 0.05$ (see Table 4).

Discussion

The aim of the current study was to examine profiles of maternal emotion socialization and children's temperament

in relation to children's emotion regulation and anxiety and depressive symptoms. A person-centered approach was used to isolate clusters of mothers and children who differed in their emotional socialization and temperament patterns, respectively. As hypothesized (H1) and supporting the findings of previous studies (Root et al., 2015, Woodward et al., 2020), four profiles of maternal emotion socialization were identified, including coaching/accepting, punishing/minimizing, low-involved, and blended. Maternal socialization profiles explained significant variation in children's emotion regulation indicators and their anxiety symptoms (partially supporting H3 and H4), with findings similar to one previous study of adolescents and their fathers (Wang et al., 2019). Furthermore, four temperament profiles were found (partially supporting H2) that, as hypothesized, revealed two vulnerable groups of children. Children in these two profiles had poorer parent-reported emotion regulation and more anxiety and depressive symptoms (H5) compared to children in the other two temperament profile groups. In contrast to what we also hypothesized (H6), however, cross-products of maternal socialization and child temperament did not further account for children's emotion regulation or their internalizing symptoms.

Maternal Emotion Socialization Profiles and Children's Emotion Regulation and Symptoms

Children's emotion regulation and anxiety symptoms differed between maternal socialization profiles. Mothers in the punishing/minimizing profile, who react to their children's negative emotions by using more punishment, minimization, or becoming distressed themselves, were found to have children with the poorest emotion regulation and the most anxiety. In contrast, mothers with a blended profile, who report average supportive and non-supportive emotion socialization, report fewer anxiety symptoms in their children compared to mothers classified as coaching/accepting (those who reported high support and low non-support) and those classified as punishing/minimizing (those who reported the converse). These findings are consistent with variable-centered studies regarding the negative effects of unsupportive parent emotion socialization (Miller-Slough et al., 2018; Song & Trommsdorff, 2016). Moreover, the findings also support the divergence model (McElwain et al., 2007), which suggests children who are exposed to various socialization responses (a blended approach) would have a broader understanding of the different ways emotions can be managed. This exposure is expected to result in greater emotional awareness and the ability to draw on a more varied repertoire of strategies when faced with a distressing situation which may incidentally result in less anxiety.

There was no support for the hypothesis that mothers with a low involved profile would have children who are less regulated than other children. Research on parenting practices has highlighted the detrimental effects of disengaged or neglectful parenting on children (Khaleque, 2015). We expect that low parent emotion socialization in the present study does not necessarily equate to neglect or disengagement, but instead could reflect that some parents have fewer opportunities to respond to children's negative emotions because they less often express such negativity. It is unknown whether this extends to low emotion socialization in other contexts; further research is necessary to explore this.

Surprisingly, there was no difference in child depressive symptoms when maternal socialization profiles were compared. While variable-centered studies indicate emotion socialization is related to child depression (Shortt et al., 2016), the relationship is often complex and depends on many other contextual variables such as the type of emotion being socialized, level of child dysregulation, and whether symptoms are measured concurrently or prospectively (Hastings et al., 2014; Shortt et al., 2016).

Temperament Profiles and Children's Regulation and Symptoms

Four child temperament clusters were identified with two (emotional/cautious and emotional/impulsive) found to characterize children most vulnerable to low emotion regulation and high anxiety and depressive symptoms. Children in these two vulnerable clusters were high in negative affectivity and had poorer emotion regulation and higher lability/negativity than children in the other two clusters (controlled and positive under controlled group), findings supported by previous studies that have considered temperament profiles (Letcher et al., 2009; Van Beveren et al., 2020).

It was expected that children high in negative affectivity would be less regulated and higher in symptoms, but it is striking that children in the emotional/cautious and emotional/impulsive profiles differed in surgency, with the cautious group very low and the impulsive group very high. This suggests that the foundations of poor regulation and symptoms may differ for these groups. For instance, children high in surgency often have difficulties that are characterized by interpersonal conflict with peers and authority, and aggression and attention difficulties which commonly co-occur with feelings of frustration and anger (Oldehinkel et al., 2004). In contrast, emotional/cautious children can be high in social avoidance and withdrawal (Bijttebier et al., 2009) and are likely to report more sadness, loneliness, worries, and fears relative to emotional/impulsive children. Therefore, it is likely that emotional/impulsive and emotional/cautious children experience and face unique yet equally problematic social experiences and emotional reactivity. Here, we measured global inferences of emotion regulation rather than the regulation of different types of emotions. A functionalist perspective supports the idea that specific emotions serve particular functions across contexts. Thus, difficulties with each emotion can lead to different trajectories towards similar problematic emotional regulation and symptoms (Hurrell et al., 2015; Zeman et al., 2002). Future research which examines emotion specific regulation across temperament profiles could address this possibility in greater detail.

As expected, the emotional/cautious group of children had the highest anxiety symptoms compared to all other profiles. Variable-centered studies have demonstrated a strong relationship between negative affectivity in combination with inhibition (low surgency) and risk for concurrent and later onset anxiety (Rapee et al., 2009; Sandstrom et al., 2020). Emotional/cautious children experience fear, anger/frustration, and sadness with more frequency and intensity, while also being introverted with an average ability to focus and control their attention.

According to the tripartite model of anxiety and depression (Clark & Watson, 1991), a predisposition to experience high levels of negative affect is a factor that is shared by both anxiety and depression. When this predisposition is combined with a reserved and restrained nature (low levels of surgency), this maps closely onto the dysphoric and anhedonic symptoms of depression, respectively. While this model posits that low positive affect (or low surgency) is a relatively unique risk for depression, many studies have also demonstrated its relationship to anxiety, such as social phobia (Brown et al., 1998; Chorpita et al., 2000), making it possible that it is central to anxiety that arises from social interaction (Hughes et al., 2006). Thus, taken together this could explain why the emotional/cautious children in the present study had higher levels of both anxiety and depressive symptoms relative to others.

Child gender influence

It is important to note that there were disproportionately more girls and less boys in the controlled temperament profile than expected and more boys and less girls in the positive under controlled temperament profile than expected. The controlled profile was characterized by high effortful control and average negative affect and surgency traits, whereas the positive under controlled profile was characterized by high surgency and low effortful control and negative affect. The differences in gender distribution within these temperament profiles are consistent with gender differences noted in the literature that map onto the temperament traits that characterize these profiles. For instance, a meta-analysis (Else-Quest et al., 2006) reported strong gender differences for the trait effortful control, with girls scoring higher than boys during childhood, which is reflected in the pattern of differences found for the controlled and the positive under-controlled profiles in this study. This meta-analysis also reported gender differences in surgency, with boys scoring higher than girls during childhood, which is also consistent with the child gender pattern in the positive under controlled profile in this study.

Maternal and Temperament Profiles in Combination

In contrast to what we expected, there were no significant maternal socialization × temperament interactions. According to the differential susceptibility model (Belsky & Pluess, 2009), the advantages of supportive socialization and the disadvantages of non-supportive socialization on children's outcomes would be heightened for children with a susceptible or vulnerable temperament (impulsive and cautious profiles) relative to children with low vulnerability (controlled and positive low controlled profiles). However, in the present study we found no evidence of this. Variable-centered studies that have supported the differential susceptibility model have typically examined temperament as specific trait level measures such as fear (Brooker & Buss, 2014), shyness (Root et al., 2015), or perceptual sensitivity (a trait of EC, Woodward et al., 2020). Therefore, there are multiple other temperamental traits that deserve attention in future person-centered research.

Limitations and Future Research

There are several study limitations regarding measurement and methodology to note. First, all measures were reported by mothers, which raises the possibility of social desirability and shared method variance. A triangulation method of investigation, including child and father report of emotion regulation and anxiety and depressive symptoms, and observational data of parent child interactions to evaluate socialization behaviors would help to address these limitations. The present study also used a cross sectional design, making it impossible to discern the direction of effects; future longitudinal research could address this limitation.

It is also necessary to point out that, while the emotion regulation checklist is one of the most widely used measures of children's emotion regulation and is a useful indicator of effective regulation, the ongoing discussion about the operationalization of emotion regulation (see Zeman et al., 2007, for a detailed discussion) is having an influence on the definition and measurement of emotion regulation in children. In particular, the emotion regulation checklist does not measure adaptive regulation *strategies* or children's emotional awareness, which may be of more interest in future research.

Another measurement issue to raise relates to the conceptual overlap between subscales on the measures of temperament (i.e., negative affectivity and effortful control) and emotion regulation (lability/negativity and emotion regulation) used in this study. This is reflected in the ongoing conceptual discussion concerning the degree to which temperament and emotion regulation are distinct (Rothbart et al., 2014; Eisenberg et al., 2014). In particular, this has important implications in the present study when considering the results of comparing lability/negativity between temperament profiles. The differences identified may be founded in conceptual overlap between the temperamental trait of negative affectivity and the emotion regulation subscale of lability/negativity, rather than illustrating the possible influential role of temperament in children's emotion regulation. Future research examining the relationship between child temperament and emotion regulation within a developmental model could address this by examining how specific components of negative affectivity (such as fear, anger and frustration, and sadness) differentially relate to children's lability and if these traits relate to

change in lability over time. We also raise some caution about potential conceptual overlap between the temperament trait of effortful control, defined as a child's ability to utilize attention resources (for example the executive attention network) and to inhibit behavioral responses to modulate behavior (Rothbart et al., 2014), and emotion regulation. Yet, this caution is tempered by past findings of distinctions between effortful control and emotion regulation, with researchers reporting that one does not necessitate the other (Zalewski et al., 2011).

Notably, the participants here were demographically representative of the region from which they were drawn, with the exception of a higher education level relative to the population in the region. Yet, the participants were also culturally and ethnically homogenous (reflecting the region). Therefore, generalizability of the findings may be limited. Finally, it is worth noting that the present study had a sound sample size for the purpose of person-centered analysis, but the sample size did potentially constrain the ability to identify significant interactions as some individual cell sizes at this level were small. Increasing sample size and hence power would elucidate if certain temperament profiles do respond better to particular types of maternal socialization behaviors when it comes to their ability to regulate their emotions, and importantly their level of anxiety or depressive symptoms.

Implications and Conclusion

Findings from the present study suggest that maternal emotion socialization behaviors lend themselves to profiling using a person-centered method. Four unique patterns of mothers' emotion socialization behaviors were identified that accounted for variation in either child emotion regulation or anxiety. If the structure and pattern of these profiles is replicated, these findings provide initial support for examining parent emotion socialization behaviors as a 4-group categorization.

Furthermore, these findings lend additional support to the view that mothers with a punishing/minimizing emotion socialization profile have children with poorer emotion regulation and more anxiety. Also notable, however, is the finding that some non-supportive responses from parents can occur and may not be associated with elevated problems in children if they are blended with supportive responses. Many parenting programs are effective at facilitating positive change in parent socialization behavior, whilst also supporting improvements in children's emotion regulation and internalizing symptoms (Zimmer-Gembeck et al., 2019). It is assumed these improvements occur because the programs assist parents to identify and anticipate their children's emotions; learn to regulate their own emotions; and give parents opportunities to learn and practice supporting their children to regulate

negative feelings such as distress, sadness, anger, and fear (Zimmer-Gembeck et al., 2022a, 2022b). Our findings support the focus of these interventions but also suggest that there are parents who are not supportive all the time and, as long as they report blended support, children's anxiety may even be attenuated from encountering a variety of parent responses. Although more research is certainly needed, it is possible that children whose parents report a balance of unsupportive and supportive responses to their negative emotion might incidentally build their capacity for complex thinking and understanding of their emotions, while also broadening their understanding of social relationships (McElwain et al., 2007).

Children's temperament is also important to consider; children whose temperament profiles consist of high negative affect are more likely to have poor regulation and more internalizing symptoms, unique from parents' emotion socialization. Future research examining specific regulation deficits these vulnerable groups encounter and whether these are emotion- or context-specific could inform a more personalized individual approach to child internalizing intervention programs.

Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Ethical Approval This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Griffith University (Date: 04/2017/ No. 2017/203).

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