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# BMJ Open The Child and Parent Emotion Study: protocol for a longitudinal study of parent emotion socialisation and child socioemotional development

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## ABSTRACT

**Introduction** Parents shape child emotional competence and mental health via their beliefs about children's emotions, emotion-related parenting, the emotional climate of the family and by modelling emotion regulation skills. However, much of the research evidence to date has been based on small samples with mothers of primary school-aged children. Further research is needed to elucidate the direction and timing of associations for mothers and fathers/partners across different stages of child development. The Child and Parent Emotion Study (CAPES) aims to examine longitudinal associations between parent emotion socialisation, child emotion regulation and socioemotional adjustment at four time points from pregnancy to age 12 years. CAPES will investigate the moderating role of parent gender, child temperament and gender, and family background.

**Methods and analysis** CAPES recruited 2063 current parents from six English-speaking countries of a child 0–9 years and 273 prospective parents (ie, women/their partners pregnant with their first child) in 2018–2019. Participants will complete a 20–30 min online survey at four time points 12 months apart, to be completed in December 2022. Measures include validated parent-report tools assessing parent emotion socialisation (ie, parent beliefs, the family emotional climate, supportive parenting and parent emotion regulation) and age-sensitive measures of child outcomes (ie, emotion regulation and socioemotional adjustment). Analyses will use mixed-effects regression to simultaneously assess associations over three time-point transitions (ie, T1 to T2; T2 to T3; T3 to T4), with exposure variables lagged to estimate how past factors predict outcomes 12 months later.

**Ethics and dissemination** Ethics approval was granted by the Deakin University Human Research Ethics Committee and the Deakin University Faculty of Health Human Research Ethics Committee. We will disseminate results through conferences and open access publications. We will invite parent end users to co-develop our dissemination strategy, and discuss the interpretation of key findings prior to publication.

**Trial registration** Protocol pre-registration: DOI 10.17605/OSF.IO/NGWUY.

## Strengths and limitations of this study

- The Child and Parent Emotion Study (CAPES) is the first multicountry and large-scale longitudinal study investigating mother and father emotion socialisation and child development from pregnancy and across early and middle childhood.
- CAPES will include longitudinal, repeated measurement of a range of parent, family and environmental factors, allowing investigation of the nature and direction of associations between emotion socialisation and child outcomes.
- Data collection with first-time pregnant parents will allow investigation of how parents' pre-existing emotion regulation skills and beliefs about emotions influence their subsequent emotion socialisation practices after becoming a parent.
- Due to the use of a brief online survey, measures of parent emotion socialisation processes are parent-reported and may be biased by parent factors.
- This study is restricted to participants residing in Western countries and who can read/write in English.

## INTRODUCTION

Emotion competence refers to the ability to recognise and understand, effectively regulate and to manage the expression of emotions.<sup>1–3</sup> These skills are foundational, and underpin lifelong well-being and mental health by determining our ability to form and maintain relationships, manage conflict and navigate the challenges of daily life.<sup>4–8</sup> Difficulties with emotion regulation are linked to child internalising and externalising problems,<sup>4 5</sup> and to peer rejection, anti-social behaviour and suicide risk.<sup>6 9 10</sup> These associations are known to persist into later life, where adults with poor self-regulation are more likely to have mental health problems.<sup>7</sup> The effects of poor emotion regulation also translate to the parenting context,

where parent emotion regulation difficulties are linked to less supportive parenting practices,<sup>11</sup> and to child behaviour and conduct problems.<sup>12-13</sup> However, there is a lack of longitudinal evidence investigating pathways from mother and father/partner emotion socialisation to child outcomes at different child ages, and the influence of cultural, economic and social factors.

Emotion socialisation theory describes how a number of family based factors influence the development of children's emotional competence.<sup>2 14-17</sup> First, children are influenced by their parents' own emotion understanding and regulation. Children observe parents, and model their emotion expression and regulation.<sup>18-19</sup> Second, parents' emotions impact children's emotions via the emotional climate of the home environment to which all family members, but particularly parents, contribute.<sup>18-19</sup> Third, children are influenced by parents' accepting or non-accepting beliefs about emotions.<sup>20-21</sup> Fourth, parenting practices, such as how parents respond to, discuss and manage their child's emotions affect children's emotional development.<sup>14</sup> However, with some exceptions,<sup>6 12 22</sup> much of the emotion socialisation research evidence has been from studies with cross-sectional research designs and/or with relatively small sample sizes.

A great deal of the emotion socialisation research has focused on parenting practices. Gottman and colleagues introduced the *parental meta-emotion philosophy* in 1996, which sits within emotion socialisation theory, and proposes that parents' beliefs, thoughts and feelings in relation to their own and their children's emotions, influence emotion-related parenting and child emotional development.<sup>17-22</sup> Parents are thought to vary widely in the beliefs they hold about emotions and their socialisation. That is, some parents may believe it is important to be in touch with emotions and to express them in socially appropriate ways, whereas others may believe that negative emotions are harmful, should be controlled, not expressed, or overcome quickly.<sup>22</sup> Cross-sectional evidence shows that supportive parenting practices, characterised by acknowledging, validating, and coaching children around positive and negative emotions,<sup>22</sup> are associated with secure parent-child attachment,<sup>23</sup> and optimal child emotional and psychological functioning in preschool and primary school,<sup>24-25</sup> and in adolescence.<sup>26</sup>

There is now considerable (mostly cross-sectional) evidence documenting multiple ways in which parents' emotion socialisation practices influence the development of their children's emotional competence,<sup>18-19 24-26</sup> and some longitudinal research demonstrating long-term influences for child emotional functioning and mental health.<sup>24-27-29</sup> However, the evidence to date has a number of specific gaps. Existing research studies have predominantly focused on mothers of primary school-aged children. The next steps are to test associations in larger, longitudinal studies, that better reflect parents' diversity, including representing both mothers and fathers/partners.

It will also be important to understand associations at different stages of child development, for example, in the first years of life when parents' responses to their own emotions may be particularly important to enable them to remain calm and to co-regulate their child's emotions; compared with primary school age when more sophisticated emotion socialisation occurs, and parents may engage in more complex discussions about emotions with their children. A recent systematic review shows that parenting interventions that improve parent and child emotion regulation are effective in improving child mental health.<sup>30</sup> To translate positive intervention effects to a population level, we require additional understanding of how to best support both mothers and fathers/partners at each stage of child development. It may be that parents struggle with different aspects of parent emotion socialisation at different stages; perhaps parents struggle more with their own emotion regulation in caring for infants, and more with supportive emotion-related parenting practices for older children. Further, few studies have looked at the transition to parenthood, although research has shown that emotion regulation may change as a result of becoming a parent.<sup>31</sup> It will be important to understand how parents' pre-existing emotion regulation, beliefs and attitudes, that is, prior to their experience of being a parent, are associated with their future emotion regulation, beliefs about child emotions and emotion-related parenting practices. Longitudinal investigation is warranted to examine the direction of associations between these parent, family and child factors.

We use the term 'parent emotion socialisation' to encompass parents' emotion regulation, beliefs about child emotions, the family emotional climate and emotion-related parenting practices. It is likely that these factors all influence each other and act together to influence child development.<sup>24-29</sup> However, few studies have examined all four aspects simultaneously and over time, and thus the way in which they act together to influence children is not yet clear. For example, there is evidence that parents' beliefs about negative emotions are associated with emotion-related parenting.<sup>27-28</sup> However, findings in relation to how parents' own emotion regulation influences their emotion-related parenting have been mixed. Some studies suggest that these factors are independent,<sup>32</sup> while others have suggested that emotion-related parenting may account for (ie, mediate) the association between parent and child emotion regulation.<sup>1 33-35</sup> For example, it may be that more well-regulated parents are better able to apply supportive emotion-focussed parenting practices. However, existing studies have been cross-sectional, and it is possible that the associations may be bidirectional, such that the use of emotion-related parenting skills assist parents to regulate their own emotions better, which in turn may model positive emotion regulation to their children, and improve the emotional climate of the family environment by reducing stress. Longitudinal research is necessary to investigate the nature and direction of these associations.

Evidence is also required about how parent emotion socialisation factors operate within the wider family environment. In addition to the four parent emotion socialisation factors described, children's emotional development is influenced by a range of family factors.<sup>14 18 19 36</sup> For example, higher levels of parenting warmth, and lower levels of parenting irritability and interparental conflict are consistently associated with more positive child outcomes.<sup>37 38</sup> Further research needs to examine how these aspects of parenting and family functioning relate to parent emotion socialisation factors; and how both parent and family level factors act together to shape children's development. There is also little known about family, cultural, economic and social predictors of parent emotion socialisation. However, it is well established that parents experiencing social disadvantage, life event stress, family conflict or those who have a child with poor global health, are more likely to exhibit parenting practices that are less warm and more irritable;<sup>39–43</sup> thus it is likely that these factors will also be associated with less optimal parent emotion socialisation.

The Child and Parent Emotion Study (CAPES) is a longitudinal study concurrently investigating two cohorts of parents, who at recruitment were either (1) Pregnant with their first child; or (2) Current parents of a child 0–9 years. Recruitment of both pregnant and current parents allows us to explicitly test the direction of associations between parent emotion socialisation and later child socio-emotional outcomes. Specifically, we aim to investigate the following set of research questions.

### Parenting and child outcomes

We build on prior research evidence, by asking, what are the longitudinal associations between parent emotion socialisation (ie, parents' emotion regulation, beliefs about child emotions, emotion-related parenting practices and the family emotional climate) and later child emotion regulation and socioemotional adjustment? In line with the considerable research evidence reviewed above, we expect all four aspects of parent emotion socialisation to be associated with child outcomes. Our research study will also enable us to examine the nature and direction of associations between multiple aspects of emotion socialisation practices, prohibited in previous cross-sectional designs.<sup>24 27–29 32</sup> In addition, our study will address the following questions, addressing other limitations in prior research. We ask, do associations between parent emotion socialisation practices and child outcomes hold when accounting for other important factors, such as parenting warmth and irritability, interparental conflict, parent mental health and positive affect, and the quality of the home learning environment? Does the nature and strength of associations between parent emotion socialisation and child outcomes differ according to child age, for example, in early childhood (0–3 years), preschool (4–5 years) and primary school (6–12 years)?

### Pregnancy

Compared with adults with poor emotion regulation skills, are adults with competent emotion regulation skills and supportive beliefs about child emotions during the pregnancy of their first child more likely to subsequently engage in supportive emotion-focused practices when they become a parent? To our knowledge, this has not been investigated in prior research, and will thus be an exploratory research question.

### Parent gender

Do mothers and fathers/partners report differences in their parent emotion socialisation, and do gender differences differ by child age? What role do mothers and fathers/partners each have in influencing child emotional regulation and socio-emotional adjustment via their parent emotion socialisation? In line with emerging cross-sectional evidence showing that mothers report more accepting beliefs about negative emotions than fathers,<sup>27 44</sup> and are more likely to report using supportive emotion-related parenting practices,<sup>27 44–48</sup> we expect mothers to report more supportive beliefs about children's emotions, and more supportive emotion-socialisation parenting practices. Findings related to how mothers and fathers parent their sons and daughters are inconsistent.<sup>49–51</sup> Thus, our study findings will provide useful longitudinal evidence to further elucidate gender differences in parents and children.

### Predictors

Are there factors related to the context of the parent (mental health, adverse life events, culture) and family (socioeconomic status, neighbourhood) that are associated with poorer parent emotion socialisation? Are some risk factors more or less relevant at different stages of child development? We know that parents facing difficult socioeconomic circumstances have fewer resources and experience greater psychological stress and mental health problems;<sup>32</sup> thus we expect that these parents will also struggle to provide optimal emotion socialisation for their children.

### Interactions

Are children more or less sensitive to parent emotion socialisation under particular conditions? For example, do individual child factors (eg, child gender, health and temperament) or parent and family factors (eg, parent mental health, adverse life events, social disadvantage) moderate the association between parent emotion socialisation and child outcomes? This is also an exploratory research question, given a lack of prior evidence. It's possible that increased risk related to pre-existing health problems, social disadvantage and life event stress may increase children's sensitivity to parent emotion socialisation, where children with individual or family level risk may suffer most in context of poor parent emotion socialisation, and benefit most (ie, be 'buffered') by strong and positive parent emotion socialisation.

**Table 1** Data collection time points for the Child and Parent Emotion Study (CAPES) pilot and main period of data collection

	Pilot data collection	Main data collection
Time 1	July–October 2018 (completed)	May–August 2019 (completed)
Time 2	May–August 2019 (completed)	June–August 2020 (completed)
Time 3	June–August 2020 (completed)	June–August 2021 (planned)
Time 4	June–August 2021 (planned)	June–August 2022 (planned)

## METHODS

### Study design

The current study is an age-stratified longitudinal cohort study that involved the recruitment of two new cohorts of (1) Prospective (ie, pregnant) and (2) Current mothers and fathers/partners of a child aged 0–9 years. The study comprises four online surveys administered at: recruitment (time 1); 12 months (time 2), 24 months (time 3) and 36 months (time 4). Each time point involves the collection of self-report data from an online survey of approximately 20–30 min duration.

### Setting

The study will be conducted entirely online using the Qualtrics survey tools, and administered from Deakin University in Melbourne, Australia. A pilot of CAPES was run in 2018 to test the feasibility of the methods for online recruitment for both the pregnancy and parent cohorts, and then the main cohort was recruited in 2019. [Table 1](#) summarises the completed and planned time points for data collection.

### Eligibility criteria

Participants were eligible to participate in the current study if they were: (1) A person currently pregnant with their first child and in the second or third trimester of pregnancy, (2) The partner of a person currently pregnant with their first child and in the second or third trimester of pregnancy; or (3) A current parent of a child aged 0–9 years. Participants were required to be between the ages of 18 years and 65 years, and reside in one of the following English-speaking countries: Australia; New Zealand; UK; Ireland; USA; or Canada.

### Recruitment

Participants were predominantly recruited via a set of online social media and research recruitment platforms, given that online advertising is more successful at recruiting hard-to-reach populations than traditional recruitment methods.<sup>53–55</sup>

### Pilot study recruitment

Recruitment for the pilot of CAPES was primarily run via Facebook. Although 1468 people opened the survey link, only 808 participants consented and just 378 completed the full survey (of whom 11% were fathers/partners). These data suggested that the paid and unpaid advertisements successfully engaged Facebook users, but may have lacked key information to ensure potential participants

understood the study requirements before clicking on the survey link; and were less successful in attracting fathers/partners to participate.

During recruitment for the CAPES pilot, one participant sent feedback with concerns about the amount of identifiable, personal information collected in the online survey, including parent and child first and second names, and home addresses. These data were initially included to enable matching of participants within the same family who may have completed the survey without using the unique partner survey link. We altered our approach in the main study to ask only first names for parents and the study child, and no longer requested home addresses (note, we still asked for participant postcode to determine neighbourhood-level disadvantage, and phone and email details for follow-up contact). To assist with data matching, an additional question was added to the survey asking participants if their partner had referred them to the survey. The pilot study had a relatively high rate of participant drop-off through the survey, with a lower number of participants completing measures that were presented at the end of the survey. To ensure a more even distribution of completion across the survey measures, the order of measures presented in the main survey was divided into blocks (independent variables; demographic variables; dependent variables), with each measure presented in randomised order within each block.

### Main study recruitment

The main CAPES recruitment period occurred in May–August 2019 and was supported by a larger team of staff and students, with a focus on developing specific ad campaigns targeting fathers/partners and a more population-representative sample, including parents from a range of cultural and socioeconomic backgrounds. Further, while the 2018 pilot recruited Australian residents only, in 2019 the inclusion criteria were broadened to parents residing in one of the following English-speaking countries: Australia; New Zealand; UK; Ireland; USA; or Canada.

### Marketing approach

The style and wording of Facebook advertisements is important in determining recruitment success. In line with research findings, this study employed advertisements that (1) Referred to research; (2) Included the University affiliation; (3) Referred to the incentive (described below); and (4) Were written in engaging and plain

language.<sup>53</sup> The CAPES logo was professionally designed prior to the pilot study in 2018, but otherwise the pilot advertisements were developed by the study team with minimal design expertise. For the main study recruitment conducted in 2019, all of the study advertisements and social media resources were designed professionally with a coherent colour scheme, depicting appealing and 'real-to-life' and diverse images of parents and children. The majority of the images used in advertisements depicted fathers with children, given our emphasis on increasing the representation of fathers/partners in our study and given evidence showing that fathers require targeted ad campaigns, whereas mothers respond to campaigns using language relating to 'parents' and/or 'fathers'.<sup>55</sup>

#### Paid social media

Paid Facebook advertising using inbuilt filters and targeting features were used flexibly throughout the project to target particular parent groups that were underrepresented.

#### Unpaid social media

Unpaid methods focused on Australian groups. Project Facebook, Twitter and Instagram pages were established to maintain contact with participants, affiliate organisations and the wider public. A range of unpaid strategies were used, including making contact with established groups or organisations on Facebook via the project Facebook page and/or Deakin University email to request they endorse our project by posting the project advertisement on their wall. In the pilot study, the majority of the Facebook pages/groups targeted were mother-focused. In the main study, a broader range of Facebook pages/groups were targeted, including groups related to parenting (n=26 groups); mothers (n=44); fathers (n=30); by metro or regional location within Australia (n=50); expectant mothers/pregnancy (n=13); young parents (n=2); single parents (n=13); expats in Australia (n=20); university affiliations (n=8); parent support groups for Attention-Deficit/Hyperactivity Disorder (ADHD), autism or high-needs babies (n=7); specific occupation or employment-related groups (n=8; for example, parents working from home; medical parents; 'mumpreneurs'); various international parenting groups (n=24); and various others (n=17).

#### Snowballing

'Snowballing' refers to practices that involve participants recruiting other participants. We used snowballing to recruit two parent dyads within the same family. Within the survey, participants were asked whether they have a partner, and, if yes, they were sent an email at the completion of the survey with an invitation and survey link to forward to their partner. The email contained an automatically generated hyperlink that contained a unique ID number to link the partner's survey with the original participant survey for data analysis purposes.

#### Other recruitment methods

The research team emailed libraries, toy libraries, unemployment and job seeking agencies, and community organisations around Australia, with a request to pin up a set of recruitment advertisements. Postcodes representing areas of disadvantage according to the Socio-Economic Indexes for Areas were prioritised. The email also requested that the organisations include a post about CAPES on their social media pages, with an example post provided.

#### Incentives

All unpaid and paid recruitment methods advertised an incentive to participants. In the 2018 pilot study, participants were offered the chance to win one of 10 \$A50 gift vouchers to a popular chain of Australian supermarkets and shopping centres. We also ran a specific paid Facebook campaign targeting fathers/partners which offered an additional chance to win one of five \$A50 gift vouchers to an Australian hardware store. In the main CAPES data collection in 2019, participants were offered the chance to win one of 20 \$A50 gift vouchers (on receipt, participants were able to select an online retailer such as Amazon or eBay).

#### Prolific

Prolific is a paid online research recruitment tool with users mainly from the UK and the USA. Prolific collects a wide range of demographic information from their users at enrolment; researchers are then able to advertise their survey to target users according to selected demographic characteristics (eg, age, gender, country of birth) and to specify the number of respondents they require. Prolific users are offered payment on completion of the survey (at or above UK minimum wage). Participants were invited to one of three specific surveys depending on their child's age, with each survey offering different payment amounts based on expected survey completion times with reference to the length of the survey for different child age groups. As the aim was to recruit two parent dyads within the same family, participants who declared that they had a partner were offered a second survey for their partner to complete with the same payment. Given that they were directly paid for their participation, Prolific participants were not offered gift voucher incentives.

#### Follow-up and reminders

Participants will be contacted and invited to complete the follow-up surveys at 12-month intervals. A multimethod approach will be used to maximise retention for non-Prolific participants, including an initial email invitation with a survey link. If participants have not started the survey, a text message will be sent to participants' mobile phone numbers 2 weeks after the initial email, and a phone call will be made at 3 weeks after the initial email, if prior contact has not been achieved. Follow-up for time 2 will be complete in December 2020; time 3 in December 2021; and time 4 in December 2022.

**Table 2** Summary of assessment domains across cohorts, time points and child ages

Construct	Time point		Measurement across childhood: age-appropriate measures		
	Pregnant	Parent	(Infancy)	(Early childhood)	(Middle childhood)
Demographics	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Demographic questions		
COVID-19 items	2 and 3	2 and 3	<b>All child ages:</b> COVID-19 questions		
Parent beliefs about child emotions	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> The Parents' Beliefs about Children's Emotions Questionnaire		
Family emotional climate	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> The short-form of the Self-Expressiveness in the Family Questionnaire		
Parent emotion-related parenting practices	2, 3 and 4	1, 2, 3 and 4	<b>6–47 months:</b> The Coping with Toddler's Negative Emotions Scale	<b>4–14 years:</b> The Coping with Children's Negative Emotions Scale	
Parent emotion regulation	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Difficulties in Emotion Regulation Scale—16 Item Version		
Parent reflective functioning	2, 3 and 4	2, 3 and 4	<b>All child ages:</b> Parental Reflective Functioning Questionnaire		
Parenting	2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Parenting warmth and irritability		
Home learning environment	2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Shared book reading; Books in the home		
Parent psychological distress	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Kessler-6		
Parent stress	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Depression, Anxiety and Stress Scale, Stress subscale		
Parent positive affect	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Positive and Negative Affect Schedule Short Form, Positive Affect subscale		
Child emotion regulation	2, 3 and 4	1, 2, 3 and 4	<b>0–12 months:</b> The Infant Behaviour Questionnaire Very Short Form	<b>13–47 months:</b> The Early Childhood Behaviour Questionnaire Very Short Form	<b>4–9 years:</b> The Children's Behaviour Questionnaire Very Short Form <b>10 years, from time 2:</b> Temperament in Middle Childhood Questionnaire <b>11–14 years, from time 2:</b> Early Adolescence Temperament Questionnaire
Child socioemotional outcomes	2, 3 and 4	2, 3 and 4	<b>All child ages:</b> Child irritability	<b>2–14 years:</b> Child Loneliness; Mood and Feelings Questionnaire—Short Version; the short form of the Spence Children's Anxiety Scale; the short form of the Swanson, Nolan and Pelham Rating Scale, Opposition/Defiance Subset	
Child socioemotional outcomes	2	1 to 2	Not measured	<b>2–12 years:</b> The Strengths and Difficulties Questionnaire	
Child temperament	2, 3 and 4	1, 2, 3 and 4	<b>0–12 months:</b> Abbreviated short form of the Short Temperament Scale for Infants, Approach-Sociability and Persistence Scales	<b>1–3 years:</b> Abbreviated short form of the Short Temperament Scale for Children, Approach-Sociability and Persistence Scales	<b>4–5 years:</b> Abbreviated short form of the Short Temperament Scale for Children, Approach-Sociability and Persistence Scales <b>6–14 years, from Time 2:</b> The School-Age Temperament Inventory, Approach and Persistence scales
Life event stress	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Stressful life events over the past 12 months		
Social support	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Social support		
Interparental conflict	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Argumentative Relationship Scale, adaptation of the Co-parental Communication Scale		

Continued

Table 2 Continued

Construct	Time point		Measurement across childhood: age-appropriate measures		
	Pregnant	Parent	(Infancy)	(Early childhood)	(Middle childhood)
Child physical health	2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Global child health		
Family socioeconomic position	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Demographic questions (about you and your family survey)		
Neighbourhood disadvantage	1, 2, 3 and 4	1, 2, 3 and 4	<b>All child ages:</b> Postcode used to derive country-level indices of deprivation.		

## Measures

Measures were selected to be age-appropriate and setting-appropriate; therefore expectant/pregnant parents and parents with different aged children were offered different versions of the survey. At recruitment, all participants completed self-report measures related to their beliefs about child emotions, emotion regulation, mental health, well-being and demographics. Parents of a child aged 0–9 years also completed age-specific measures of parenting practices, child temperament and socioemotional adjustment. In 2020, we included items assessing the impact of the COVID-19 pandemic on participants and their families. Table 2 summarises the key assessment domains included in the online survey, including details regarding which measures are used at each time point for each cohort. Tables 3 and 4 provide a more detailed summary of each of the measures included for measurement for parent, parenting and family variables (table 3), and measurement for child outcomes (table 4). Please note, we use a measure of a child-negative affect, drawn from temperament scales, to assess child emotion regulation, due to a lack of appropriate emotion regulation measures in early childhood.

## Statistical approach

### Analysis plan

We will use mixed-effects regression to address the primary research questions. The final data set will have four time points nested within parents. Our analysis approach will be to investigate data in ‘long format’ to simultaneously assess associations over three time-point transitions (ie, time 1 to time 2; time 2 to time 3; and time 3 to time 4). Here the key exposures of interest will be lagged to allow for estimation of how past parent factors (eg, time 1) predict future child or parent outcomes 12 months later (eg, time 2). We will estimate a random intercept to account for clustering of time points within parent. An incidental proportion of parents will be nested within the one family; we will also use a cluster robust variance estimator to account for clustering within the family. Analyses to address research question set 1 will involve regressing an outcome (eg, child emotion regulation, mental health) on to key exposures of interest (ie, parent emotion regulation, beliefs, family emotional climate and parenting)

and covariates (ie, child age, gender and health, family socioeconomic position). In addition to these covariates, we will adjust our final models to account for the influence of relevant pandemic-related factors. Analyses for research question sets 2 and 4 will involve regressing relevant parent emotion socialisation outcomes on to exposures of interest (ie, family emotional climate and parenting; or parent and family contextual factors) and relevant covariates. To assess moderation for research question sets 3 and 5, interaction terms will be included in the model to examine whether the primary relationships of interest are moderated by age, parental gender or family environmental factors. Multiple imputation will be used to account for missing data and attrition of participants over time.

### Sensitivity analysis

In addition to the analyses testing our primary research questions/aims, we will also investigate the impact of pandemic-related factors on the parent and child outcomes outlined in our primary research questions, and assess whether pandemic-related risk modifies (ie, intensifies or weakens) the associations between parent emotion socialisation processes and child developmental outcomes.

### Power calculation

We aimed to recruit 1800 participants with an even spread across child age, assuming an approximate ratio of 70:30 mothers to fathers based on previous research.<sup>43–45</sup> We anticipate approximately 30% of the parents will be from the same family. With repeated measures over three time-point transitions, our analysis approach will use an anticipated data set consisting of 1800\*3=5400 observations, clustered within time points and families. To account for clustering in the power estimation, we calculated conservative design effects of 3.1 for clustering of time points within individuals (average ICC=0.70, average cluster size=4) and 1.28 to account for clustering of parents within families (ICC=0.70, average cluster size=1.4). Using Monte Carlo simulation (10 000 draws) in Mplus 8, a sample size as low as n=200 provides 81% power to detect a true effect of interest (eg, an interaction effect between past emotion-related parenting practices and child age group in predicting future child functioning)

**Table 3** Details of measurement for parent, parenting and family variables

Measure (items)	Subscales	Scale	Example item	Psychometric properties
<b>COVID-19 items</b>				
Household	COVID-19 diagnosis, test result or symptoms	'Yes, and had a positive test'; 'Yes, and had a negative test'; 'Yes, had a medical diagnosis, but no test'; 'Yes, had some possible symptoms, but no diagnosis by a doctor'; 'No symptoms or signs'	'During the past 2 weeks have you or anyone in your household been suspected of having a COVID-19 infection?'	
About adult	Change in work or study circumstances; participant or family members affected by COVID-19; working from home; frequency and type of contact with work colleagues		'Has your work or study situation changed since the COVID-19 pandemic?' 'During the past 2 weeks have you or anyone in your household been suspected of having a COVID-19 infection?'	
About child	Whether school classes are running on campus; school attendance on campus or online. For children homeschooling: whether child is home with parent while they work; child's internet/computer access at home; parent's rating of how well they are managing child's home learning; time spent outside		'During the past 2 weeks has your child's school building been closed?' 'How much time is your child spending outside of the home (eg, going to stores, parks, etc.)?'	
<b>Parent emotion socialisation</b>				
The Parents' Beliefs about Children's Emotions Questionnaire <sup>20</sup> (26 items)	Five subscales: Value of Anger; Manipulation; Control; Autonomy; Stability	Six-point scale from 'strongly disagree' to 'strongly agree'	'Children use emotions to manipulate others'	USA, <sup>20</sup> ; Turkey ( $\alpha=0.60-0.77$ ) <sup>57</sup>
The short-form of the Self-Expressiveness in the Family Questionnaire <sup>58</sup> (24 items)	Two subscales: positive and negative expressiveness	Nine-point scale from 'not at all frequently in my family' to 'very frequently in my family'	'Showing contempt for another's actions'	USA ( $\alpha=0.82-0.88$ ) <sup>58</sup>
The Coping with Children's Negative Emotions Scale <sup>59</sup> (12 scenarios)	Seven subscales: Distress Reactions; Punitive reactions; Minimisation; Emotion-focussed; Problem-focussed; Expressive encouragement. We created a new subscale called 'Empathy', assessing whether the parent acknowledges and validates the child's emotion	12 scenarios with seven response items rated on a 7-point scale from 'very likely' to 'very unlikely'	'If my child becomes angry because he/she is sick or hurt and can't go to his/her friend's birthday party... I would: Send my child to his/her room to cool off; Get angry at my child; Acknowledge it can be disappointing to miss out on something you want to do.' (Empathy Scale)	USA ( $\alpha=0.69-0.85$ ) <sup>59</sup>
The Coping with Toddler's Negative Emotions Scale <sup>60</sup> (12 scenarios)	Eight subscales: Grant Wishing; Distress Reactions; Punitive reactions; Minimisation; Emotion-focussed; Problem-focussed; Expressive encouragement. New 'Empathy' subscale as per above	12 scenarios with eight response items rated on a 7-point scale from 'very likely' to 'very unlikely'	'If my child becomes angry because he wants to play outside and cannot do so because he is sick, I would: Feel upset myself; Let my child play outside; Acknowledge that they really want to play outside, and are feeling angry and frustrated.' (Empathy Scale)	USA ( $\alpha=0.69-0.85$ ) <sup>59</sup>
Difficulties in Emotion Regulation Scale—16-item version <sup>61</sup> (19 items)	Five subscales: Strategies; Non-acceptance; Impulse Control; Goals; Clarity. Three items from original Impulse Control subscale were added	Five-point scale from 'almost never' to 'almost always'	'I have difficulty making sense out of my feelings'	Sweden; USA ( $\alpha=0.92-0.95$ ) <sup>61</sup>
<b>Parenting, family and home environment</b>				

Continued

Table 3 Continued

Measure (items)	Subscales	Scale	Example item	Psychometric properties
Parental Reflective Functioning Questionnaire <sup>62</sup> (18 items)	Three subscales: Pre-Mentalising Modes, Certainty about the Mental States of the Infant, Interest and Curiosity in the Mental States of the Infant	Seven-point scale from 'strongly disagree' to 'strongly agree'	'The only time I'm certain my child loves me is when he or she is smiling at me.'	Belgium ( $\alpha=0.70-0.82$ ) <sup>62</sup>
Parenting warmth <sup>63</sup> (six items)	N/A	Six-point scale from 'never' to 'almost always'	'Thinking about the study child over the last 6 months, how often did you hug or hold this child for no particular reason.'	Australia (coefficient H=0.92–0.96) <sup>63</sup>
Parenting irritability <sup>63</sup> (five items)	N/A	10-point scale from 'not at all' to 'all the time'	'In the past 6 months, how often would you say... I have raised my voice with or shouted at this child.'	Australia (coefficient H=0.85–0.92) <sup>63</sup>
Shared book reading <sup>64</sup> (one item)	N/A	Four-point scale from 'not at all' to 'everyday'	'In a typical week, how often do you read books to your child?'	Australia ( $\alpha=0.68-0.76$ ) <sup>65</sup>
Books in the home <sup>64</sup> (one item)	N/A	'Less than 10'; '10–30'; '30+books'	'Approximately how many books does your child own?'	USA ( $\alpha=0.74$ ) <sup>66</sup>
Kessler-6 <sup>67</sup> (six items)	N/A	Five-point scale from 'none of the time' to 'all of the time'	'Thinking about yourself in the past 4 weeks, about how often did you feel nervous?'	USA ( $\alpha=0.89$ ) <sup>67</sup>
Depression and Anxiety Scale (DASS) 21-item version <sup>68</sup> (7 items)	Stress subscale	Four-point scale from 'did not apply to me at all' to 'applied to me very much, or most of the time'	'I found it hard to wind down.'	Australia ( $\alpha=0.89$ ) <sup>68</sup>
Positive and Negative Affect Schedule—Short Form <sup>69</sup> (five items)	Positive Affect subscale	Five-point scale from 'very slightly or not at all' to 'extremely'	'Thinking about yourself in the past 4 weeks, about how often did you feel... alert?'	Australia; Burma; Canada; China; Hong Kong; Hungary; India; Indonesia; Japan; Malaysia; Mexico; Mongolia; the Philippines; Singapore; Taiwan; Thailand; Tonga; UK; USA; Vietnam ( $\alpha=0.80$ ) <sup>69</sup>
Stressful life events over the past 12 months <sup>70</sup> (eight items)	N/A	Items rated yes/no	'In the last year, have any of the following happened to you (or your partner)? You became pregnant or had a baby; You moved house.'	UK ( $\kappa=0.78-1.0$ ) <sup>70</sup>
Social support (one item)	N/A	Four-point scale from 'I get enough help' to 'I don't get any help at all'; and 'I don't need any help'	'Overall how do you feel about the amount of support or help you get from family or friends living elsewhere?'	
Argumentative Relationship Scale, Adaptation of the Co-parental Communication Scale <sup>71</sup> (five items)	N/A	Five-point scale from 'never' to 'always'	'How often do you and your partner disagree about basic child rearing issues?'	Australia ( $\alpha=0.81-0.96$ ) <sup>39</sup>

Continued

Table 3 Continued

Measure (items)	Subscales	Scale	Example item	Psychometric properties
Neighbourhood disadvantage—postcodes used to derive deprivation indices	Country-specific deprivation indices derived for Australia; New Zealand; England; Wales; Northern Ireland; Scotland; and the USA			
Family demographic and socioeconomic questions	Parent and child age/gender; country of birth; language spoken at home; education setting; relationship status; parent/partner qualifications and employment; household income		'Are you currently in paid employment?'	

of even small magnitude ( $\beta=0.19$ , representing just ~3.6% extra variance explained in the outcome above a base level of ~10% explained by other variables in the model; at  $\alpha=0.05$ ). Applying both design effects, and accounting for an estimated ~30% attrition by the end of the project, we need a sample of 1133 to provide enough power for the primary research questions. These estimates are based on very conservative assumptions and thus the study will have greater power should the effects of interest or background variation explained by other variables be stronger, or the ICCs for either design effect be weaker. Thus, the study is well powered for small true effects of interest.

#### Management of bias

We will use a range of strategies to minimise methodological bias in our research approach. First, to minimise systematic bias in participant attrition over time, we will employ a range of evidence-based cohort retention strategies.<sup>56</sup> Second, as described above, we will seek to minimise confounder bias by adjusting for key socioeconomic and demographic factors in all analyses. Third, we minimise measurement bias by using gold-standard measures, many of which will provide international comparability, to ensure the most accurate classifications possible. Fourth, we will minimise missing data bias by using the most relevant technique per analysis (eg, multiple imputation and maximum likelihood) to account for item-level missing data patterns.

#### Ethics and dissemination

Ethics approval was granted by the Deakin University Human Research Ethics Committee (Project: 2018–144, concerning the cohort of prospective/pregnant parents) and the Deakin University Faculty of Health Human Research Ethics Committee (Project: HEAG-H 75\_2018, concerning the cohort of current parents). Participants indicated their consent to participate in the study at the start of the online survey at the baseline assessment (2018–2019) and at the third time-point (2020–2021). In addition, participants completed optional consent for future research participation and data sharing for projects relevant to parenting. Any protocol modifications will be submitted for approval to the respective committees. Although it is not expected that there will be any risk or

distress experienced by participants while completing the study, participants were provided with a plain language statement containing a list of contact numbers for telephone counselling service providers.

We will disseminate the results through conferences and peer-reviewed publications (open access where feasible). Findings will be presented in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology statement for cohort studies. The key findings of CAPES are also expected to inform the planning and development of a new early childhood smartphone app-based parenting intervention, focused on promoting positive emotion socialisation practices, to be led by the same investigator team. CAPES has a dedicated website (<https://capestudy.com/>) and a social media presence, which will both be used to disseminate published results.

#### Patient and Public involvement

We did not include patient and public involvement processes in the development, design and methods of CAPES. However, the time 2–4 surveys will include a request for participant feedback on the survey, and this information will be used for study refinements, if feasible and approved by the ethics committee. We will invite a group of parent end users (non-participants) to help us develop our dissemination strategy, and to discuss the interpretation of key findings before publication of our main outcomes paper.

#### DISCUSSION

Poor emotion regulation in childhood is a well-established precursor to poor mental health and suicide risk in later life,<sup>4–8</sup> thus, there is a strong imperative to better understand how to support the development of emotion regulation in early life. CAPES will gather new evidence on the parent and family mechanisms that facilitate emotion-focused parenting practices across early and middle childhood. It will also provide data on key systemic factors, such as family, cultural, economic and social predictors of parent emotion socialisation to better inform future intervention and prevention initiatives.

Our study design has both strengths and limitations. All data are collected online, limiting our sample to

**Table 4** Details of measurement for child outcomes

Measure (items)	Subscales	Scale	Example item	Psychometric properties
<b>Emotion regulation (ie, negative affect)</b>				
The Infant Behaviour Questionnaire—Very Short Form <sup>72</sup> (12 items)	Negative Affect subscale	Seven-point scale from 'extremely untrue' to 'extremely true'	'When tired, how often did your baby show distress?' 'When introduced to an unfamiliar adult, how often did the baby cling to a parent?'	UK; USA ( $\alpha=0.79-.81$ ) <sup>72</sup>
The Early Childhood Behaviour Questionnaire—Very Short Form <sup>73</sup> (12 items)	Negative Affect subscale	Seven-point scale from 'extremely untrue' to 'extremely true'	'When approached by an unfamiliar person in a public place (for example, the grocery store), how often did your child cling to a parent?'	USA ( $\alpha=0.71$ ) <sup>74</sup>
The Children's Behaviour Questionnaire—Very Short Form <sup>75</sup> (12 items)	Negative Affect subscale	Seven-point scale from 'extremely untrue' to 'extremely true'	'Gets quite frustrated when prevented from doing something s/he wants to do.' 'Is quite upset by a little cut or bruise.'	Canada; USA ( $\alpha=0.66-0.70$ ) <sup>76</sup>
The Temperament in Middle Childhood Questionnaire (12 items)	Two subscales: Anger/Frustration and five items from the Sadness Scale	Seven-point scale from 'extremely untrue' to 'extremely true'	'Gets very angry when another child takes his/her toy away.'	USA ( $\alpha=0.74-0.83$ ) <sup>77</sup>
The Early Adolescence Temperament Questionnaire—Revised <sup>78</sup> (13 items)	Two subscales: Aggression and Frustration	Five-point scale from 'almost always untrue' to 'almost always true'	'Gets very frustrated when s/he makes a mistake in her/his school work.'	USA ( $\alpha=0.71-0.74$ ) <sup>79</sup>
<b>Socioemotional outcomes</b>				
Child irritability (one item)	N/A	Five-point scale from 'not irritable or easily angered at all' to 'extremely irritable or easily angered'	'During the past 2 weeks, how lonely has your child been?'	
Mood and Feelings Questionnaire—Short Version (13 items)		Three-point scale from 'not true' to 'true'	'Your child felt miserable or unhappy.'; 'Your child found it hard to think properly or concentrate.'	USA ( $\alpha=0.87$ ) <sup>80</sup>
Spence Children's Anxiety Scale (four items)	Two subscales: One item from the Separation Anxiety Scale and three items from the Generalised Anxiety/Overanxious Disorder Scale	Four-point scale from 'never' to 'always'	'Your child worries about things.'	Australia; the Netherlands ( $\alpha=0.67-0.76$ ) <sup>81</sup>
Swanson, Nolan and Pelham Rating Scale (eight items)	Opposition/Defiance subset	Four-point scale from 'not at all' to 'very much'	'Often actively defies or refuses adult requests or rules.'	USA ( $\alpha=0.89$ ) <sup>82</sup>
The Strengths and Difficulties Questionnaire <sup>83</sup> (25 items)	five subscales: Hyperactivity/Inattention; Conduct Problems; Emotional Symptoms; Peer Problems; and Prosocial Skills	Three-point scale from 'not true' to 'certainly true'	'My child is considerate of other people's feelings.'	UK ( $\alpha=0.57-.82$ ) <sup>84</sup>
<b>Temperament</b>				
Abbreviated short form of the Short Temperament Scale for Infants <sup>85</sup> (16 items)	Two subscales: Approach-Sociability and Cooperation	Six-point scale from 'almost never' to 'almost always'	'This baby is pleasant (smiles, laughs) when first arriving in unfamiliar places (friend's house, shop).'	Australia ( $\alpha=0.63-.76$ ) <sup>85</sup>
Abbreviated short-form of the Short Temperament Scale for Children – Ages 1–3 <sup>86</sup> (16 items)	Two subscales: Approach-Sociability and Persistence	Six-point scale from 'almost never' to 'almost always'	'This child is pleasant (smiles, laughs) when first arriving in unfamiliar places.'	Australia <sup>86</sup>

Continued

Table 4 Continued

Measure (items)	Subscales	Scale	Example item	Psychometric properties
Abbreviated short form of the Short Temperament Scale for Children—ages 4–6 years <sup>86</sup> (eight items)	Two subscales: Approach-Sociability and Persistence	Six-point scale from ‘almost never’ to ‘almost always’	‘This child is shy with strange adults’; ‘This child is shy when first meeting new children.’	Australia ( $\alpha=0.74-0.81$ ) <sup>87</sup>
The School-Age Temperament Inventory <sup>88 89</sup> (20 items)	Two subscales: Approach-Sociability and Persistence	Five-point scale from ‘never/almost never’ to ‘always/almost always’	‘Walks quietly in the house when moving from room to room’; ‘Gets upset when he/she can’t find something.’	USA ( $\alpha=0.85-0.90$ ) <sup>88</sup>
Physical health				
Global child health	N/A	Five-point scale from ‘excellent’ to ‘poor’	‘In general, is your child’s current health...’	

parents with access and motivation to take part. We also use parent-report measures, preventing a fuller assessment of child functioning through direct assessment or child or teacher report. There are also limitations in the scope of our measures; for example, although parents’ beliefs about their own emotions are likely to be relevant in determining other aspects of parent emotion socialisation, including their beliefs about child emotions, this was beyond the scope of our study to measure, but would be of future relevance. Further, the child age-stratified research design was pragmatic in allowing examination of multiple child ages over time; but is not a truly prospective design, and thus limits our understanding of the very long-term associations between parent emotion socialisation in early life and child outcomes in middle to late childhood. Nevertheless, this design also has advantages. A common limitation in longitudinal studies relates to systematic differences in participant attrition over time, leading to underrepresentation of specific groups (eg, socioeconomically disadvantaged parents, fathers) at later time points, decreasing the representativeness of the sample at older ages. Therefore, a strength of the age-stratified design lies in allowing us to investigate within-person change in parent and child functioning over four time points (ie, a 3-year period) starting from infancy, early childhood and middle childhood. Although we also anticipate selective attrition, we have a complete baseline sample to examine associations starting from pregnancy, early and middle childhood. Another strength is the harmonisation of measures to the Australian population-based *Longitudinal Study of Australian Children*, which enables us to assess the degree to which our study findings can be generalised, and also provide guidance for whom our results will be most relevant for in terms of informing intervention.

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