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A randomized controlled trial of an emotion socialization parenting program and its impact on parenting, children's behavior and parent and child stress cortisol: *Tuning in to Toddlers*

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Abstract

This paper examines the efficacy of a universally-offered parenting program, *Tuning in to Toddlers* (TOTS), that aims to improve parent emotion socialization, reduce parent and toddler stress and improve social, emotional, and behavioral functioning in toddlers. Three hundred parents of an 18-36 month old toddler were cluster randomized into intervention or control. Parents in the intervention participated in 6 x 2 hour group sessions of TOTS. Baseline and 12-months post-intervention measures were collected using parent-report questionnaires and hair samples from parents and toddlers of systemic cortisol stress. Compared to controls, intervention parents reported significantly greater reductions in difficulties in emotion regulation (difficulty remaining goal directed: 95% CI .10, 1.71,  $p = .028$ ; lack of access to strategies: 95% CI .62, 2.42,  $p = .001$ ), emotion dismissing (beliefs: 95% CI 2.33, 4.82,  $p < .001$ ; behaviors: 95% CI .32, .65,  $p < .001$ ), greater increase in empathy (95% CI -2.83, -1.50,  $p < .001$ ), emotion coaching (beliefs: 95% CI -2.56, -.27,  $p = .016$ ; behaviors: 95% CI -.58, -.24,  $p < .001$ ), children's behavior (95% CI .19, 2.43,  $p = .022$ ) and competence (95% CI -1.46, -.22,  $p = .008$ ). Significant greater reductions in systemic cortisol were found for intervention but not control children (95% CI .01, .35,  $p = .041$ ). Findings provide preliminary support for the use of TOTS as a universal prevention program to improve parent emotion socialization and children's functioning.

Trial Registration: Australian and New Zealand Clinical Trials Registry:

ACTRN12615000962538

**Keywords:** toddlers, parenting, emotion socialization, emotion coaching, intervention, prevention

## Introduction

Toddlerhood is a developmental stage where children often express intense emotions while striving for autonomy and learning about the world. Parents shape the development of children's emotional competence (the capacity to recognize, understand and regulate emotions) via how they respond to and what they teach children about emotions (i.e., emotion socialization; Eisenberg et al., 1998). Yet, many parents do not have optimal emotion socialization skills, despite how central these are in determining children's functioning. Indicators of risk for later mental health difficulties can first emerge in toddlerhood (Briggs-Gowan & Carter, 2008), making this an important time for prevention and early intervention (Powell et al., 2006). *Tuning in to Toddlers* (TOTS) is a program that aims to assist parents with their own emotional competence while also teaching skills in responding to children's emotions to support emotional and behavioral development. The current study is a cluster randomized controlled trial of TOTS with a community sample of parents and their 18-36 month old children with follow up 12-months post intervention.

### *Background*

Rapid maturation during toddlerhood facilitates development of emotional understanding, expression and regulation (Gross & Thompson, 2007; Sroufe, 1996). These emotional competencies develop sequentially and continue to mature across childhood and adolescence, beginning with the ability to recognize, name and express emotions (i.e., acquiring an emotion vocabulary), followed by understanding causes of one's own and other people's emotions, and learning to regulate emotions and their expression (Saarni, 1999). While young children are able to use basic behaviors to self-regulate, they rely heavily on co-regulation by caregivers (e.g., being held and soothed). With repeated experiences of being co-regulated children gain emotion knowledge and become able to regulate their emotions in socially appropriate ways (Saarni, 1999). Child temperament interacts with these processes,

and plays a significant role in determining children's early emotionality (intensity of reactions and quality of mood), effortful control (regulation of action), and aspects of emotion regulation (Rothbart et al., 2014). More temperamentally difficult children have been found to be less emotionally competent (Sallquist et al., 2009), perhaps because their heightened emotionality overwhelms them and their parents, who may find it more difficult to respond supportively to their children's emotional expression. These difficulties may manifest as greater physiological arousal/cortisol stress and dysregulated emotion (in children and parents) as well as challenging social and behavioral functioning in children and mental health difficulties in parents (Sallquist et al., 2009).

Parent emotion socialization has been found instrumental in shaping emotional competence and is associated with children's emotional learning via a number of pathways (Eisenberg et al., 1998). Observation of emotions expressed by parents provides young children with models of expression (Valiente et al., 2004). For example, parents who display intense anger, model such expressive styles for children (Eisenberg et al., 1998). Similarly, children witnessing parents with heightened fear expression are more likely to show increased fearfulness and avoidance, while those with a depressed parent show more negative and less positive affect (Aktar & Bögels, 2017). Further, children also engage in social referencing - watching and learning from parents' social cues about how to react in emotionally evocative situations (Eisenberg et al., 1998). Lastly, the expression of emotions by parents affects the family emotion climate (Eisenberg et al., 1998) creating greater levels of stress. A more volatile climate with higher anger expression has been associated with mental health difficulties (Barrios et al., 2017) as well as higher levels of systemic cortisol in parents and children, a marker for chronic hypothalamic-pituitary-adrenal axis activation as a result of stress (Simmons et al., 2016; Stalder et al., 2017).

Research conducted with parents of toddlers has found that emotion dismissing (i.e., punitive or minimizing responses to emotions) is associated with poorer toddler emotion knowledge and regulation (Ornaghi et al., 2018), including higher levels of expressed anger and sadness by toddlers (Martins & Gaffan, 2000). In turn, poorer toddler emotional functioning, including a more reactive temperament, has been found predictive of later internalizing (e.g., depression, anxiety) and externalizing (e.g., aggression, destructive, oppositional) behavior problems (Engle & McElwain, 2011; Mathiesen et al., 2009). Engle and McElwain (2011), found that parents' punitive and minimizing responses to children's emotions were associated with greater internalizing problems for boys (but not girls) with higher negative reactivity six months later. The authors suggest that parental non-supportive reactions to children's negative emotions may lead toddlers to suppress negative emotions but remain physiologically aroused. Conversely, emotion coaching (where parents value emotions, connect, empathize, label emotions and then assist with solving problems/setting limits) has been found to be associated with better academic results, emotion knowledge, and social skills, as well as fewer physical illnesses and behavior problems in children (Gottman et al., 1997) and better emotion regulation in toddlers (Ornaghi et al., 2018). In addition, maternal discourse with toddlers about emotions has been found to be associated with better emotional knowledge as children get older (Dunn et al., 1991). Toddlers may feel more open to express emotions and view their parents as reliable resources in managing distress when parents are accepting of children's feelings and help them talk about emotions (Gottman et al., 1997). Maternal warmth and emotion coaching have also been found to be associated with lower child systemic stress using measures of hair cortisol concentrations (Simmons et al., 2019). Thus, emotion coaching may be valuable for toddlers to help promote optimal emotional development.

Tantrums peak in frequency and intensity during the toddler years, when children struggle to express their needs and begin seeking autonomy (Potegal et al., 2009). In addition, sleep disruption is common and many families are juggling siblings, family and work commitments, all of which create higher stress (Williford et al., 2007), placing parents at risk of emotion dysregulation and emotionally dismissive responses when toddlers are emotional (Havighurst & Kehoe, 2017). Emotion focused parenting interventions that focus on assisting parents with regulating emotions, managing stress, and improving parenting are likely to be important for preventing emotional and behavioral problems during this time. Currently, there are few evidence-based programs for parents of toddlers (see Barlow et al., 2016), and those that have efficacy either use behavioral strategies (i.e., teach consistent discipline, consequences and rewards) with universal populations [i.e., *Toddlers without tears* (Hiscock et al., 2008), *Triple P for Toddlers* (Morawska & Sanders, 2006), and *The Incredible Years Toddler Basic* (Gross et al., 2003)] or aim to increase parental sensitivity/responsiveness when there are attachment difficulties in clinical populations (i.e., *Circle of Security*; Hoffman et al., 2006). While these approaches offer important contributions to parenting of young children, they do not target parents' ability to engage in adaptive emotion socialization, despite the important contribution of these aspects of parenting for toddler development.

*Tuning in to Toddlers* (TOTS; Havighurst et al., 2018) is a group parenting program that targets emotion socialization as a way of promoting optimal child emotional development to prevent mental health difficulties. TOTS teaches the five steps of emotion coaching outlined by Gottman and DeClaire (1997); gives psychoeducation about toddler emotional, cognitive and brain development; provides opportunities for parents to explore their automatic beliefs about emotions that may contribute to emotionally dismissive parenting; teaches skills in responding to attachment and exploration needs in their toddler;

outlines strategies to help children understand and regulate emotions and behavior; and helps parents develop skills to understand and regulate their own emotions. The TOTS program was adapted from the evidence-based *Tuning in to Kids* (TIK) program (Havighurst & Harley, 2007; Havighurst et al., 2010). A pilot study of TOTS with 34 parents of 24-36 month old children using parent report measures and observations of parent-toddler interaction showed there were reductions in parent emotion dismissing and increases in emotion coaching post-intervention; these were associated with reduced toddler behavior problems (Lauw et al., 2014). The current randomized controlled trial used a longer follow-up, a larger sample and biological measures of parent and toddler cortisol stress to test whether the TOTS program was efficacious. Toddler age inclusion was also widened from 18-36 months because families of 18-24 month old children experience similar challenges as those in the 24-36 month age bracket and because the pre-verbal stage of toddler development was still deemed optimal for TOTS delivery.

### *Aims*

We aimed to establish efficacy for the TOTS program with a community sample of parents of 18-36 month old children. The primary outcomes were parent-reported changes in parent emotion socialization. Secondary outcomes included changes in social, emotional and behavioral difficulties in toddlers and systemic cortisol stress in parents and toddlers. Outcomes were measured at 12-month post-intervention. Given findings from previous studies of TIK, we expected that TOTS would lead to improvements in parent emotion socialization (emotion awareness/ regulation, emotion dismissing and coaching beliefs and behaviors, and empathy) in intervention but not in control participants. It was expected that children in the intervention would demonstrate fewer behavioral difficulties, greater competence, and lowered temperamental emotionality compared to control participants. Given parenting during this stage of children's development can be stressful for both parents



and their children, we also evaluated the program impact on parent and toddler systemic stress cortisol. It was expected that those in the intervention condition would have improved parent and child systemic stress cortisol relative to controls.

## Method

### *Participants*

Participants were a universal sample of 300 parents ( $M age = 37.2, SD = 4.9$ ; 89% mothers; 11% fathers) of a child aged 18 to 36 months ( $M age = 25.6, SD = 5.2$ ; 54.7% boys, 45.3% girls). The majority had one ( $n = 171, 57.0%$ ) or two children ( $n = 114, 38.0%$ ; range = 1 - 5 children), and resided with their child and the child's other biological parent (267, 89.0%). Seven parents had re-partnered (2.3%), 22 were sole parents (7.3%), and four parents reported other family composition (e.g., shared custody, extended family, blended family, adoptive family). English was the main language spoken at home ( $n = 280; 93.3%$ ), with 222 parents (74%) born in Australia, and the remainder born in Asia ( $n = 22, 7.3%$ ), Europe ( $n = 19, 6.3%$ ), the United Kingdom ( $n = 13; 4.3%$ ), Africa ( $n = 6, 2.0%$ ), or North America ( $n = 5; 1.7%$ ). Six parents did not provide details for their country of birth. High school completion was 95.7%, and most parents reported completing a post-school qualification (96.7%; none  $n = 10, 3.3%$ ; certificate/trade  $n = 21, 7.0%$ ; diploma  $n = 18, 6%$ ; undergraduate degree  $n = 118; (39.3%)$ ; graduate diploma ( $n = 28; 9.3%$ ), and postgraduate degree  $n = 105, 35.0%$ ). Of those that were currently employed ( $n = 233, 78.0%$ ), the average hours worked were 26.87 hours per week ( $SD = 10.10$ ; range = 2 – 50 hours). Thirteen percent of families were on a low income (below AU\$64,999), 28% were on a low - middle income (AU\$65,000-119,999), and 59% were on a middle to high income (over AU\$120,000). In 2016, the average household income for Melbourne was \$95,000 (Australian Bureau of Statistics, 2016), suggesting the sample were slightly higher than average.

*Procedure*

The study used a cluster randomized controlled design, with data collected at baseline and 12-months post-intervention follow-up (15-months after baseline measures for the control participants) during 2015-2017. A detailed description of the research protocol has been published elsewhere (Havighurst et al., 2019). Child Care (CC) centers ( $n = 159$ ) and maternal child health (MCH) centers ( $n = 57$ ) consented to support recruitment of parents. Parents of toddlers were invited to participate either via newsletter or billboard advertisement, or letters of invitation that were emailed or handed out. They were offered participation in a group parenting program to assist with promoting their child's emotional competence, to assist them with managing their own emotions when parenting and to build parent-toddler connections. Parents expressing interest participated in a telephone intake interview conducted by a research assistant to explain study procedures. Study inclusion criterion were being a parent/caregiver of an 18-36 month old child attending childcare/maternal child health center (only one parent from any given family was able to enroll) and sufficient English language to complete measures and attend the intervention. Pairs of CC or MCH centers were matched based on location, socio-economic criteria (i.e., median house price in that area) and parent uptake after recruitment, and then randomized into intervention and waitlist control condition using Research Randomizer (Urbaniak & Plous, 2015). The study was designed to adhere with the CONSORT statement (Schulz et al., 2010). Approval was obtained from The University of Melbourne Human Ethics Committee (#1443496), the Department of Education & Training (#2015-002692) and was registered in the Australian and New Zealand Clinical Trials Registry (ACTRN12615000962538). See Figure 1 for Consort diagram. Measures included parent report on questionnaires and hair cortisol samples taken from a subset of the total sample (78% of parents; 66% of toddlers) with this smaller sample due to parents choosing not to subject themselves or their toddler

having a hair sample taken ( $n = 45$ ) and funding limitations ( $n = 54$ , determined at random). Follow-up measures (15 months following baseline for those in both intervention and control conditions) were collected from 91% of parents questionnaires, 77% for parent cortisol and 78% of child cortisol. Intervention participants commenced TOTS within one month of baseline assessment while control participants received the intervention after follow-up.

### *Tuning in to Toddlers (TOTS) Intervention*

TOTS is based on emotion socialization theory and draws on attachment, mindfulness and neurobiological theories. The program aims to teach parents the five steps of emotion coaching outlined by Gottman and DeClaire (1997) modified for younger children: (1) be aware of low-intensity emotions in your child, (2) view your child's emotions as a time for connection, (3) communicate understanding and empathy, (4) name/reflect the feeling, and (5) if necessary, give comfort, assist with choices, set limits, provide distraction, or problem solve. Activities in the program were developed to increase: parent awareness and understanding of emotions (including exploring family of origin experiences and attitudes toward emotions); perspective taking and empathy; and skills in assisting children to regulate emotions. Parents were also provided with information on cognitive, emotional and brain development in toddlers, and taught to recognize and respond to their toddlers' needs for connection and exploration (see Havighurst et al., 2019 for detail on program content).

TOTS was delivered as a group psycho-education to teach the skills and used audiovisuals demonstrating the difference between emotion dismissing and coaching; scaffolded exercises to teach the steps of emotion coaching; group discussions about emotion coaching and exploring parents beliefs about emotions and family of origin; role-plays to practice skills with the whole group and in dyads; and homework activities. TOTS was delivered in the evenings (14 groups) or daytime (2 groups) for 2 hours per week for six weeks. Course content was delivered by two facilitators using a structured manual and parent

booklet. Parents were provided with posters of emotion faces to assist with emotion labeling. Groups were led by primary facilitators from the research team (all with an MA or PhD in Psychology or Education) who had extensive experience in delivering the TIK program (on which TOTS was based). Co-facilitators trained in the TIK program supported each delivery. All facilitators participated in peer supervision with the first or third author and fidelity checklists completed by facilitators showed 100% of compulsory program content was delivered. Groups averaged 10 parents (range 6 to 14), with 91% attending at least four of the six sessions.

### *Measures*

#### *Parent-Report Questionnaires*

##### *Parent Emotion Socialization*

*Parent Emotional Style Questionnaire* (PESQ) – is a 21-item questionnaire to measure parental *beliefs* about emotion socialization rated on a 5-point Likert scale (1 = *strongly disagree* through 5 = *strongly agree*) with three subscales (emotion coaching, emotion dismissing and empathy). The measure was included because the TOTS program aims to shift parent's beliefs to be more accepting of children's emotions. The PESQ is a modified version of the *Maternal Emotional Style Questionnaire* (MESQ; Lagacé-Séguin & Coplan, 2005) that explores maternal beliefs about responding to children's sadness and anger - modified to be gender neutral and with seven items added to measure beliefs about responding to children's fears. The emotion dismissing beliefs subscale has 10 items (e.g., *childhood is a happy-go-lucky time, not a time for feeling sad or angry*) and the emotion coaching beliefs subscale has 11 items (e.g., *anger is an emotion worth exploring*). Havighurst et al. (2010) selected five items to create an Empathy subscale (e.g., *when my child is angry, I take some time to try to experience this feeling with him/her*). The PESQ has

shown good reliability (Havighurst et al 2010; 2019). In the current study, Cronbach's alphas at baseline and follow-up were  $\alpha = .84$  and  $.86$  for Emotion Dismissing,  $\alpha = .79$  and  $.79$  for Emotion Coaching and  $\alpha = .72$  and  $.79$  for Empathy.

*Coping with Toddlers Negative Emotions Scale* (CTNES) (Spinrad et al., 2004), is an adaptation of the Coping with Children's Negative Emotions Scale (Fabes et al., 1990) measuring parent emotion socialization *behaviors*. The measure was included because the TOTS program aims to teach parents specific emotion coaching behaviors to engage in when their children experience emotions. Parents respond to 12 hypothetical scenarios where their child is sad, angry or worried (e.g., *If my child is going to spend the afternoon with a new babysitter and becomes nervous and upset because I am leaving him, I would ...*), and then endorse from 1 (*very unlikely*) to 7 (*very likely*) whether they would respond in each of seven possible ways resulting in seven subscales: (a) Distress Reactions (e.g., *feel upset or uncomfortable because of my child's reactions*); (b) Granting the Child's Wish (e.g., *change my plans and decide not to leave my child with the sitter*); (c) Problem-Focused Reactions (e.g., *help my child think of things to do that will make it less stressful, like me calling him once during the evening*); (d) Emotion-Focused Reactions (e.g., *distract my child by playing and talking about all of the fun he will have with the sitter*); (e) Expressive Encouragement (e.g., *tell my child that it's ok to be upset*); (f) Punitive Reactions (e.g., *tell my child he won't get to do something enjoyable...if he doesn't stop playing like that*); and (g) Minimizing Reactions (e.g., *tell my child that it's nothing to be upset about*). The CTNES has demonstrated validity and test-retest reliability (Spinrad et al., 2007). In the currently study the Punitive and Minimizing Reactions subscale items were summed to measure Emotion Dismissing behaviors while the Expressive Encouragement and Problem-focused Reactions subscales were summed to measure Emotion Coaching behaviors. Cronbach's alphas at

baseline and follow-up were  $\alpha = .89$ , and  $\alpha = .92$ , for Emotion Dismissing and  $\alpha = .92$  and  $.94$  for Emotion Coaching behaviors respectively.

*Difficulties with Emotion Regulation Scale* (DERS) is a 36-item self-report questionnaire measuring parent emotional awareness and regulation difficulties (Gratz & Roemer, 2004). The measure was included because the TOTS program aims to teach parents to become more aware of and able to regulate their own emotions. Items are rated from 1 (*almost never*) to 5 (*almost always*). The DERS has six subscales: (a) emotional awareness (e.g., *I pay attention to how I feel*); (b) emotional non-acceptance (e.g., *When I'm upset, I become embarrassed for feeling that way*); (c) emotional clarity (e.g., *I have difficulty making sense out of my feelings*); (d) capacity to undertake goal-directed behavior when distressed (e.g., *When I'm upset, I have difficulty getting work done*); (e) impulse control (e.g., *When I'm upset, I feel out of control*); and (f) access to regulation strategies (e.g., *When I'm upset it takes me a long time to feel better*). The DERS subscales and total score have shown high validity and test-retest reliability (Gratz & Roemer, 2004). Cronbach's alphas at baseline and follow-up were  $.94$  and  $.94$  respectively for the total DERS and ranged from  $.80$  to  $.88$  at baseline and  $.79$  to  $.89$  at follow up for subscales.

### *Toddler Functioning*

The *Brief Infant Toddler Social Emotional Assessment* (BITSEA) is a 34-item measure of toddler behavior problems and competence in the last 4 weeks (BITSEA; Briggs-Gowan et al., 2002). These aspects of child functioning were expected to improve as a result of parents participating in TOTS. Items are rated on a 5-point Likert scale, and give subscales for behavior problems (e.g., *Breaks or ruins things on purpose*) and competence (e.g., *Is affectionate with loved ones*). The measure has demonstrated excellent test-retest reliability and good interrater agreement across parents and carers (Briggs-Gowan et al., 2004; Zimmer-Gembeck & Thomas, 2010). In the current sample, Cronbach's alpha's at baseline and

follow-up were  $\alpha = .74$  and  $\alpha = .76$  for behavior problems and  $\alpha = .62$  and  $\alpha = .62$  for competence.

*Toddler Temperament Scale* (TTS) – temperament was measured using a shortened version of the *Short Infant Toddler Temperament Questionnaire* (ATP; Prior et al., 1989). The TTS consists of 13 items and captures three dimensions of temperament (Approach, Reactivity, Persistence), giving a total score. The measure was included in order to see whether the parenting program led to any changes in this aspect of toddler functioning. Parents report the frequency their toddler, e.g., *smiles when an unfamiliar adult plays with him/her* (Approach, reversed), *responds to frustration intensely (screams, yells)*, (Negative Reactivity), and *stops to examine objects thoroughly (5 minutes or more)* (Persistence, reversed), on a 6-point Likert scale from 1, *almost never* to 7, *almost always*. The TTS has demonstrated reliability and validity (e.g., Pedlow et al., 1993). In the current study Cronbach's alphas were .67 and .72 at baseline and follow-up for the total.

#### *Stress Cortisol*

Stress was measured objectively via cortisol, a glucocorticoid hormone (Wells et al., 2014). Under stress, the hypothalamic-pituitary-adrenal (HPA) axis is activated releasing cortisol from the adrenal cortex (Staufenbiel et al., 2013). Stress has usually been measured using cortisol concentrations in blood, urine and saliva at a single time point where stress occurs (Wells et al., 2014), however, a technique using hair cortisol concentrations was used in the current study as it provides a measure of retrospective chronic stress over the preceding month (Russell et al., 2012). This method has been validated in humans (Russell et al., 2012). With hair growing at approximately one centimeter/month, the first centimeter from the scalp can be used to determine the previous months' cortisol production. Cortisol was measured

because the TOTS program was expected to improve parent emotion socialization and parent emotion regulation, thereby leading to reduced stress in parents and children.

Research team members took hair from the back of the parent and toddler's head cut close to the scalp. Samples were tied using cotton and packaged in foil for storage. Cortisol analysis was conducted by an external laboratory, Stratech Scientific, using standard techniques (for further detail see Havighurst et al., 2019). Intra assay variability was reported at 5.3% and inter assay variability at 5.9%. Data was provided as nanograms of cortisol per 50 milligrams of hair.

### *Analytic Strategy*

Power calculations were conducted using WebPower for cluster randomized trials with two arms (Zhang & Yuan, 2018). Considering the sample size of 300, average cluster size of 1.4, and setting power at .80 and an alpha of .05, the study had sufficient power to be able to detect small effect sizes (e.g., .33).

Data were analyzed for missing values, normality, outliers and potential covariates. Expectation maximization was used to replace missing items (Dong & Peng, 2013). Multilevel Analyses Mixed Models (MM) were used to consider the impact of center membership and examine condition by time interactions. Effect sizes ( $d$ ) were computed using the difference between the estimated means of the slopes (unstandardized  $b$  value) of the two groups (intervention and control over time) divided by the baseline  $SD$  of raw scores equivalent to the square root of the mean squared error from analysis of variance (ANOVA), obtained from a one-way ANOVA with center/preschool as the group variable (Feingold, 2009). Effect sizes ( $d$ ) of .20 are small, .50 medium, and greater than .80 large.

## Results

### *Preliminary Analyses*



At both time points there was less than 1% of missing questionnaire items and Little's Missing Completely at Random Test was not significant, indicating that these data were missing completely at random (MCAR; Little, 1988). Sample characteristics were first assessed for comparability between intervention and waitlist controls at baseline. Intervention parents were slightly older,  $t(294) = 2.98, p < .003$  (mean difference in years = 1.7; 95% CI .57, 2.78), and there were more fathers in the intervention condition ( $n = 24, 14.7%$ ) compared with the controls [ $n = 9, 6.6%$ ;  $\chi^2(1, N = 300) = 4.26, p = .039, \phi = .13$ ]. There were also fewer parents in the lowest two income brackets in the intervention condition compared with the control  $\chi^2(1, N = 300) = 13.63, p = .009, \phi = .21$ . These variables were included as covariates in all subsequent analyses. Parents failing to return questionnaires at follow-up ( $n = 26; 8.7%$ ) were  $< 10%$  and therefore complete case analysis was used (CONSORT, 2010). Those failing to return the follow-up survey rated slightly higher on Emotion Dismissing behaviors ( $M = 2.89, SD = .95$ ) when compared with those that returned questionnaires ( $M = 2.45, SD = .78; n = 275; t(298) = 2.64, p = .009, 95\% CI .11, .77$ ). They did not significantly differ from the rest of the sample in any other way. Families who did not provide a hair sample for cortisol analyses at baseline were more likely to be parents of boys (65.3%),  $\chi^2(1, n = 300) = 6.37, p = .012, \phi = .15$ . This was due to boys' hair sometimes being too short to be suitable for collecting a hair sample. Bivariate correlations showed that child gender was unrelated to cortisol levels and therefore child gender was not considered as a covariate. There were no other significant differences. Parents who provided hair samples at follow-up reported lower difficulties in emotion awareness and regulation  $t(298) = 2.98, p < .045$  (mean difference = 4.62; 95% CI .10, 9.14). Toddler behavior and competence was within the normal distribution range for the BITSEA at baseline (Briggs-Gowan et al., 2004). Normative data for toddler hair cortisol is difficult to find, however, when compared to

published data for older children from a low-income sample, the current sample was 1.5 standard deviations higher (Simmons et al., 2016; 2019).

Participants were nested in centers (i.e., childcare and maternal child health centers) and intra-class correlations revealed that center membership explained between 0 and 12.7% of the variation in the study variables (toddlers outcomes 0 to 7.5% and parent outcomes 0 to 12.7%), confirming that Multilevel Analyses Mixed Models (MM) was appropriate (using SPSS, version 24, Mixed Models). First, to allow us to control for any center level effects, a baseline random intercept model (i.e., parent nested in centers) was constructed for each outcome measure. As indicated by the smallest Akaike information criterion (AIC) index, best model fit for the null model (Step 1) was achieved using restricted maximum likelihood and a variance components covariance structure with intercept and center as a random effect and time as fixed (Field, 2009). At Step 2, key variables (condition and time; each dummy coded 0 and 1) were added into the model, followed by covariates to examine the fixed effect of condition on outcome variables while controlling for the random effect of ‘center’ and covariates. As indicated by chi-squared statistics for the change in -2 log likelihood, adding covariates significantly improved the model ( $p = .01$ ) for all outcomes (Field, 2009).

### *Main Outcomes*

Table 1 shows primary outcomes for parent emotion socialization and secondary outcomes of child behavior and parent and child cortisol at 12 months follow up. A significant interaction between time and condition reflects a difference in slopes for the two groups (i.e., change varies depending on condition). Main effects of time are only reported in text if they were significant.

Intervention parents reported significantly greater reductions in emotion dismissing beliefs (95% CI 2.33,4.82,  $p < .001$ ) and behaviors (95% CI 32, .65,  $p = < .001$ ), a greater increase empathy (95% CI -2.83, -1.50,  $p < .001$ ) (all with medium effect sizes), and

improved emotion coaching beliefs (95% CI -2.56, -.27,  $p = .016$ ) and behaviors (95% CI -.58, -.24,  $p = <.001$ ) (both with small effect sizes) when compared with waitlist controls. The interaction on total parent emotion regulation on the DERS approached significance (95% CI -.09, 6.42,  $p = .057$ ), and we therefore also examined subscales, which identified that there were significantly greater improvements for parents in the intervention on the subscales of DERS Goal Directed (95% CI .10, 1.71,  $p = .028$ ) and Limited Access to Strategies (95% CI .62, 2.42,  $p = .001$ ) with small effect sizes compared with controls.

For the secondary outcomes, interactions between time and condition indicated significantly greater reductions in toddler behavior problems (95% CI .19, 2.43,  $p = .022$ ) and greater improvements in toddler competence (95% CI -1.46, -.22,  $p = .008$ ) for those in the intervention condition at 12 months follow up (with small effect sizes) compared to waitlist controls. For toddler temperament, the interaction was not significant but there was a significant effect for time ( $\beta = -8.19$ ,  $SE = 1.17$ ,  $df = 280.11$ ,  $t = -7.01$   $p <.001$ , 95% CI -10.49, -5.89), indicating all children became easier across the study period regardless of condition. For cortisol outcomes, an interaction between time and condition indicated that intervention toddler cortisol was significantly lower at 12 months follow up compared with control participants (95% CI .01, .35,  $p = .041$ ) with a small effect size, however, for parent cortisol the interaction between time and condition was not significant (95% CI -.02, .27,  $p = .072$ ) (see Table 1).

## Discussion

We evaluated whether the parenting program *Tuning in to Toddlers* (TOTS) led to self-reported improvements in parent emotion socialization and in toddler social, emotional and behavioral functioning when conducted with parents of toddlers aged 18-36 months. We also examined the program's efficacy in reducing parent and toddler stress cortisol using biological measures at 12-month post-intervention follow-up. Consistent with expectations,

the study showed that compared with waitlist control parents, intervention parents reported greater reductions compared to controls in emotion dismissing beliefs and behaviors, as well as greater improvements in empathy, emotion coaching beliefs and behaviors. Aspects of parent emotion regulation difficulties were also reduced, with intervention parents reporting greater reductions in difficulties with Goal Directed and Limited Access to Strategies when compared with waitlist controls. In addition, intervention parents reported greater improvements in their toddlers' competence and behavior. Hair cortisol measures showed that intervention but not control children had lowered stress cortisol at follow-up. There was a trend for intervention parents (but not controls) to have lowered stress cortisol, however this did not reach significance. Child temperament emotionality was reduced across intervention and control conditions at follow-up with all parents reporting their children to have lower emotionality.

#### Parenting outcomes

Parents who took part in TOTS reported significant changes in non-supportive parenting including reduced emotion dismissing beliefs and behaviors. TOTS targets parents' skills at recognizing and responding to emotions and provides psychoeducation about what factors constitute emotion dismissing parenting. Parents were also encouraged to reflect on their meta-emotion philosophy, that is examine their beliefs about emotions. Helping parents to view emotions as an opportunity to connect with their child and building their ability to reflect on the inner-world of their child appears to facilitate increased empathy and creates an attitude change in parents where they begin to become less emotionally dismissing and can take a more child-centered approach to parenting (Havighurst et al., 2019; Smaling et al., 2016). The study also found changes in supportive emotion socialization for parents who participated in TOTS including parent-reported increases in emotion coaching beliefs and

behaviors as well as empathy. These findings are consistent with our other evaluations of TOTS and TIK (Havighurst et al., 2010; Lauw et al., 2014).

Improvements in parent emotion regulation were found for those in the intervention but not in the control condition. While reductions in the total score for the DERS only approached significance ( $p = .057$ ), subscale analyses revealed that parents in the intervention reported greater access to regulation strategies when distressed and greater ability to remain goal focused. The TOTS program included strategies to improve parents' awareness of their emotional and physiological arousal, explored family of origin experiences with emotions to increase awareness of automatic reactions to emotions, practiced skills to manage strong emotions including building in a pause before reacting, and facilitated parents to engage in emotional self-care to reduce stress. These strategies are all hypothesized to be important for assisting in emotion regulation and stress reduction, and are central in assisting parents when they are responding to their children's emotions (Havighurst & Kehoe, 2017). If parents of young children are unable to regulate their own emotions it can be difficult to access parenting skills that might help them respond to their child. Parent cortisol showed a trend toward being significantly reduced for those in the intervention condition but not the control condition, and in combination with improvements in aspects of parent emotion regulation, suggests the program may be helping parents to better regulate negative emotions and reduce stress.

#### Child Outcomes

Compared with control participants, parents who took part in TOTS reported greater improvements in child functioning. Behavior problems were significantly lowered with reductions on items such as *'Hits, shoves, kicks or bites children'*, and *'Is destructive. Breaks or ruins things on purpose'* (Briggs-Gowan et al., 2004). These behaviors were addressed in TOTS by helping parents notice and respond to emotions and needs that may underlie their

child's behavior (such as fear of a parent leaving, frustration with limits, or needing connection after a long day in care). Toddlers often become challenging for parents during this stage of development because with rapidly developing cognitive, motor, and language skills they seek autonomy and explore their surroundings: the flip side of this is that they may have increased behavior difficulties and tantrums (Green et al., 2011). Improvements were also reported in child competence but not for controls. This subscale of the BITSEA had items such as *'Is affectionate with loved ones'*, and *'Tries to help when someone is hurt'* (Briggs-Gowan et al., 2004). Changes suggest parents saw improvements in empathy and prosocial behavior in their toddlers. Universal interventions that assist parents with skills in how to guide children are important to deliver while children are young (Powell et al., 2006) and other programs have also found benefits of improved parenting and toddler behavior in this target age (e.g., Triple P; Morawska & Sanders, 2009). The current study showed significantly less difficult temperament in all children over time (intervention and control participants), however, significant reductions in children's challenging behaviors and improvements in competence were only found for those whose parents participated in TOTS. While this is consistent with the notion that toddlers on the whole become easier with age as they learn to understand and regulate emotions (Denham et al., 1998), these changes suggest TOTS may have preventative benefits in reducing risk for later mental health difficulties (Briggs-Gowan & Carter, 2008).

Children of parents who participated in TOTS had significant reductions in systemic cortisol measured using scalp hair compared to control children. When parents learned skills in their own emotion awareness/regulation and in responding less dismissively and with emotion coaching, this coincided with reductions in children's cortisol stress. This finding is an important outcome of a preventive intervention and provides verification of changes. Others have also found warmer parenting and emotion coaching is associated with lower

cortisol stress in children and adolescents (Simmons et al., 2019; Whittle et al., 2017), however, this is the first demonstration of how improvement in parent emotion socialization via intervention can reduce children's cortisol. Higher cortisol stress is hypothesized to be associated with poorer child functioning possibly because of the neurotoxicity that underlies the relationship between adversity and brain development (Lee et al., 2002). In toddlers, improving parental emotional responsiveness may buffer the effects of adversity or stress at an early age and lower cortisol at a time when brain maturation is occurring.

### *Strengths and Limitations*

The study strengths included using parent report and biological measures to determine outcomes; a large sample; a long (12-month) follow-up; and high study retention (92%) including controls. The objective measure of cortisol using scalp hair is a strength in providing a sustained measure of stress over one month (c.f. measures of saliva or blood of immediate stress), but is also limited because contaminants (e.g., hair dye, steroidal medication) can affect readings, while extremely high levels of stress can have an inverse function causing lowered HPA activation and cortisol production. Not all participants gave cortisol samples with a number of parents reporting concern about their child 'having a haircut', some parents' hair was too short/were bald, and funding limitations meant a random sample did not have cortisol measured. Participants who chose not to have cortisol measures had significantly higher child behavior problems, suggesting they may have been a more stressed sub-sample. There was greater proportion of families from higher SES backgrounds that may limit the generalizability of the findings. However, in other studies of Tuning in to Kids, families with lower SES had larger effect sizes in changes following the program (Havighurst et al., 2015). Lastly, self-report measures of parent emotion socialization and children's functioning are subject to expectancy bias: direct observation using structured assessments would have strengthened the design.

## Conclusion

This study of the *Tuning in to Toddlers* program with a community sample of parents and their 18-36 month old children provides evidence of program efficacy. Beneficial outcomes were found on parent-reported changes in parent emotion socialization and child functioning, as well as biological measures of cortisol stress in children following the intervention. It appears that when parents learn skills in understanding and regulating their own emotions, as well as ways of responding to their toddler's emotions that support and guide their child's emotional competence, this results in improvements in both parenting and child functioning. This is one of the first parenting intervention trials to demonstrate impacts on children's systemic cortisol stress levels providing important biological evidence of the benefits of a parenting intervention. The current study looked at outcomes for the total sample rather than for specific subgroups. Further examining for whom the intervention was most effective may shed light on directions for future research, including whether parents or children who have more difficulties gain greater benefits from TOTS.

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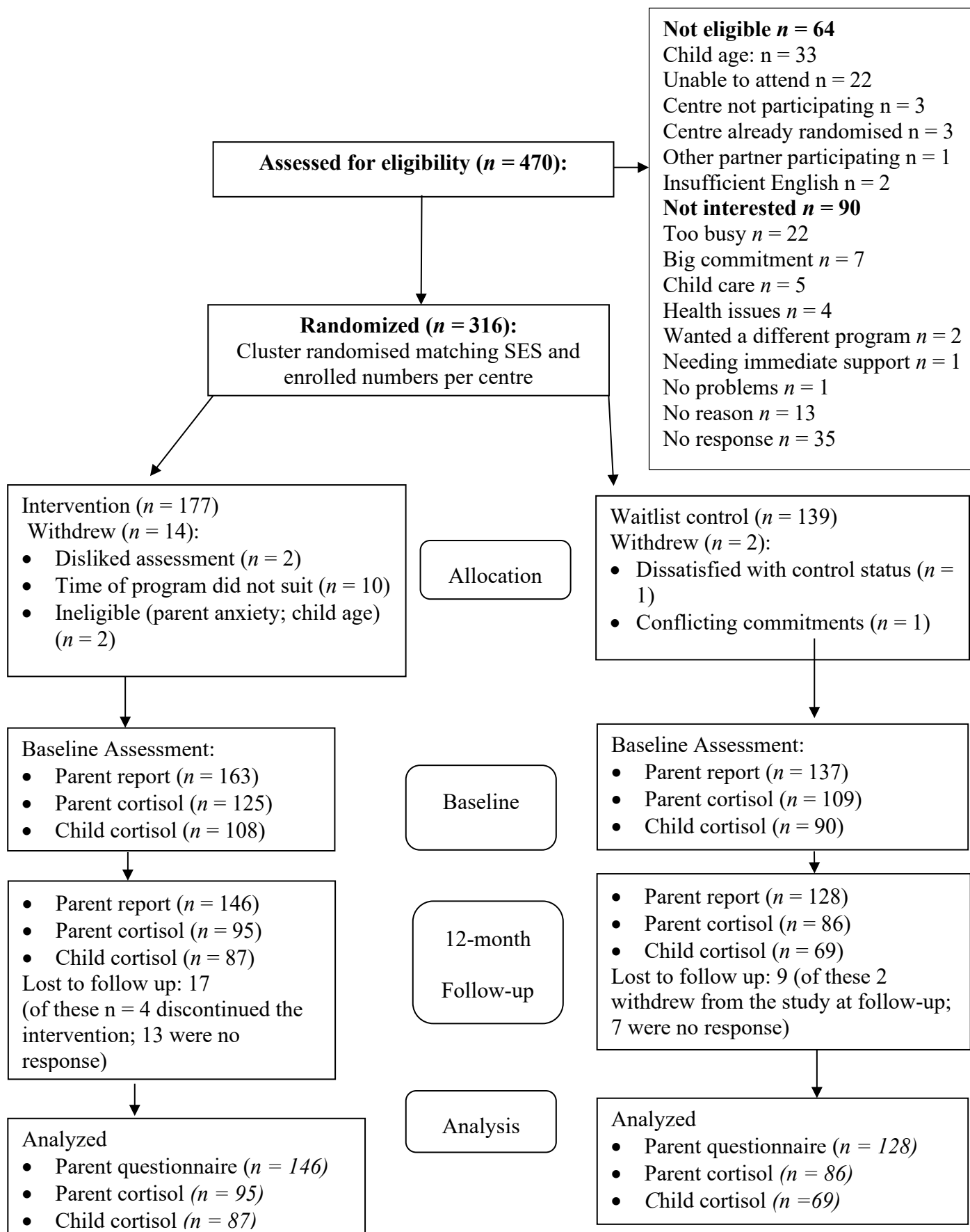


Figure 1 Consort diagram

Table 1

*Multi-level Mixed-effects Modeling: Parent and Child Outcomes*

		<i>Adjusted Mean<sup>a</sup></i>										
		Baseline		Follow-up		Test of Interaction						
Measures	Condition	<i>Mean</i>	<i>SE</i>	<i>Mean</i>	<i>SE</i>	$\beta$	<i>SE</i>	<i>df</i>	<i>t</i>	<i>p</i>	95CI%	<i>d</i>
Emotion dismissing beliefs	Intervention	33.28	.51	27.68	.53	3.58	.63	276.07	5.66	<.001	2.33, 4.82	.61
	Control	33.16	.56	31.13	.57							
Emotion dismissing behaviors	Intervention	2.53	.08	2.14	.08	.48	.08	268.43	5.90	<.001	.32, .65	.59
	Control	2.44	.08	2.53	.08							
Emotion coaching beliefs	Intervention	41.65	.43	43.81	.44	-1.42	.58	272.55	-2.43	.016	-2.56, -.27	.26
	Control	41.71	.47	42.45	.48							
Emotion coaching behaviors	Intervention	5.20	.08	5.82	.08	-.41	.09	275.12	-4.73	<.001	-.58, -.24	.49
	Control	5.34	.09	5.54	.09							
Empathy	Intervention	17.81	.27	20.51	.28	-2.16	.34	273.57	-6.38	<.001	-2.83, -1.50	.69
	Control	18.18	.29	18.71	.30							
Total Parent ER	Intervention	74.19	1.51	70.35	1.55	3.17	1.65	272.73	1.92	.057	-.09, 6.42	.16
	Control	74.15	1.66	73.48	1.68							
Parent ER Goal Directed	Intervention	13.15	.33	11.95	.34	.90	.41	274.98	2.21	.028	.10, 1.71	.21
	Control	12.69	.36	12.40	.37							

Running Head: TUNING IN TO TODDLERS: OUTCOMES

Parent ER Limited Access to Strategies	Intervention	14.14	.40	13.06	.41	1.52	.46	272.87	3.32	.001	.62, 2.42	.30
	Control	13.79	.44	14.24	.45							
Parent cortisol	Intervention	.31	.04	.25	.04	.13	.07	192.65	1.81	.072	-.02, .27	.36
	Control	.28	.04	.35	.04							
Child behavior problems	Intervention	8.84	.42	6.61	.43	1.31	.57	262.67	2.30	.022	.19, 2.43	.27
	Control	8.82	.46	7.90	.47							
Child competence	Intervention	16.04	.24	18.05	.24	-.84	.31	267.85	-2.68	.008	-1.46, -.22	.31
	Control	16.16	.26	17.33	.27							
Child temperament	Intervention	42.18	.61	39.65	.63	.27	.82	280.10	.33	.742	-1.34, 1.88	.04
	Control	43.18	.67	40.92	.68							
Child Cortisol	Intervention	1.06	.22	.54	.23	.18	.09	166.93	2.06	.041	.01, .35	.35
	Control	1.27	.23	1.16	.26							

*Note.* <sup>a</sup>all analyses adjusted for center membership, family income, parent gender and age. ER = Emotion Regulation