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Parenting the Crying Infant

Debra M. Zeifman[a] and **Ian St James-Roberts**[b]

[a]Vassar College, Department of Psychological Science, 124 Raymond Avenue, Mailbox 582, Poughkeepsie, NY 12604 USA

[b]Thomas Coram Research Unit, UCL Institute of Education, University College London, 27/28 Woburn Square, London WC1H 0AA, UK

Abstract

Crying conveys evidence about an infant's state and neurological health which, when carefully assessed, can provide diagnostic information for parents and clinicians. When crying is inconsolable or judged to be excessive, it can stress parents, disrupt parenting and, in rare cases, place an infant at risk for abuse. Research has revealed physiological and neural responses to crying that may predispose some adults to maltreat infants. Although this work suggests that parental vulnerabilities contribute to insensitive or aggressive reactions, there is a growing recognition that exposure to large doses of crying may be a challenge for all adults. Support programmes that inform parents about infant crying, enhance parenting, and improve parental wellbeing and coping, are under development with promising initial findings.

Keywords

infant crying; colic; parent-child bonding; infant condition; parenting

Introduction

The first part of this review summarises early studies of infant crying which provided the foundations for current research and clinical practice. Much of this research attempted to assess crying as an objective infant phenomenon that revealed something about an infant's condition, distinct from its context. In contrast, recent research has focused more on infant crying as a social phenomenon, so that how parents and other caregivers interpret and respond to it is a central concern. This has resulted in studies of how parental vulnerabilities affect responses to crying, an area of inquiry that bridges the traditional distinction between paediatrics and adult mental health. We conclude by reviewing contemporary research designed to apply these research findings by developing services that inform and support parenting. A proviso throughout is that studies of infant crying are largely comparative.

Correspondence to: Debra M. Zeifman.

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Randomised controlled trials to establish causation are rare. It follows that findings need to be interpreted cautiously by synthesizing the overall evidence rather than relying on individual definitive studies.

Crying as an Indicator of an Infant's Condition

Cry Quality

Some of the earliest scientific studies of infant crying focused on what the acoustic properties of cries, such as fundamental frequency (i.e. pitch) and duration (i.e. the length of a cry utterance) revealed about an infant's underlying condition. Using sound spectrograph techniques, Scandinavian researchers sought to identify differences in the cries of typical versus atypical infants, as well as differences in the cries of normal infants resulting from various eliciting circumstances (i.e. cry types) [1]. Of these two lines of inquiry, studies of cry sounds as indices of central nervous system integrity have proved reliable. Numerous neurological and medical conditions, including Down's syndrome, prematurity, brain damage, drug toxicity, and hyperbilirubinemia, are associated with atypical cries [2]. Recent investigations in two separate laboratories have documented atypical cry vocalizations in infants who go on to be diagnosed with autism [3,4]. This research holds promise for early detection.

In contrast, the idea that infants have different cry types, such as hunger, pleasure, and pain cries, has been largely refuted. A careful review concluded that infant crying is a *graded signal*, conveying information about the degree of an infant's distress, but not what is causing it [5]. This conclusion, now widely accepted, needs to be better communicated to parents so that they are not made to feel inadequate by an inability to detect the cause of their baby's crying from the sound alone.

Crying Amount

Studies of crying amount have been driven by parental reports that some infants cry 'excessively' without apparent reason. This crying was assumed to be caused by gastro-intestinal (GI) disturbance and pain, leading to the use of the word 'colic' (from the Greek word for intestine) to describe it [6]. The lack of clear criteria for identifying colic cases was partly resolved by Wessel et al.'s 'Rule of Threes' which defined a colicky infant as: *'one who, otherwise healthy and well fed, had paroxysms of irritability, fussing or crying lasting for a total of more than three hours a day and occurring on more than three days in any one week'* [7]. This definition stimulated studies of crying amount which compared age groups, clinical with community samples, and tested the assumption of digestive pain.

The premise that GI disorder may cause colic has led researchers to investigate the role of gut microbiota, with several studies documenting differences between the microbiota of infants with and without colic [8–12]. Clinical trials using probiotics (live, potentially beneficial microorganisms), however, have met with mixed and inconclusive results [13,14]. In some studies, administering *Lactobacillus reuteri*, an organism less abundant in the gut microbiota of infants with colic, has shown efficacy for reducing symptoms [15–18]. Other studies using the same or related probiotic strains, however, have failed to demonstrate

efficacy [14,19,20]. Larger, more rigorous studies are needed to draw robust conclusions about the usefulness of probiotic treatment of colic, and at this time, most practitioners caution against this approach [14]. An enduring challenge throughout this literature is the lack of accurate tests to distinguish infants with GI disorders from those without.

A full account of the colic literature is beyond the scope of this article, but recent reviews can be found elsewhere [21,22]. The evidence has accumulated that most infants who cry a lot are healthy and develop normally, that many normal babies have a crying 'peak' at around 1–2 months, and that 'unsoothable' crying bouts which can alarm parents usually resolve by three months of age. There are, however, important caveats to this overall conclusion. First, around 5% of cases of excessive crying brought to clinicians' attention do have an organic cause, and identification of these cases is a priority. Second, infants who cry a lot after four months of age, particularly where crying is accompanied by other regulatory problems, are in a distinct group prone to poor outcomes.

Several studies have found that persistent crying beyond four months of age is associated with long-term psychological and behavioural difficulties. In a large, population-based sample in the Netherlands, excessive infant crying at 13 weeks doubled the risk of mood, behavioural and hyperactivity disorders at 5–6 years, an effect that may have been partially driven by maternal characteristics [23]. In an at-risk Bavarian sample, excessive crying in infants older than three months, especially when it co-occurred with sleeping and eating difficulties, predicted diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) in middle childhood [24]. In a low-income Brazilian sample, three-month-old excessive criers had higher rates of internalizing and externalizing behaviours as measured by the Child Behaviour Checklist (CBCL) at four years of age [25]. These studies need to be replicated in representative populations to strengthen the conclusion that excessive crying in older infants per se, and not other factors, is predictive of later problems.

Adult Responses to Infant Crying

Responses as a Reflection of Parental Vulnerabilities

Whereas the first wave of objective cry research focused on conditions in the infant which affect crying, much of the contemporary work on infant crying examines parental characteristics and vulnerabilities that lead to non-optimal or harmful responses. Audio and videotapes of infant crying are often used to provoke and observe participant reactions and make inferences about caregiving behaviour. For example, women show reduced activity in brain regions associated with awake restful thinking when exposed to infant hunger cries but men typically do not [26]. Depressed women have muted behavioural, physiological, and neural responses to infant distress signals, and have less distinct responses to their own infant's crying versus that of an unfamiliar infant, compared to non-depressed women [27,28]. In addition to depression, several other clinical and subclinical conditions impact caregivers' response patterns, including anxiety [29] and high levels of neuroticism [30,31].

Adults with a predisposition to abuse also have recognizable reactions to crying. Frodi's pioneering work in this area demonstrated that adults with a history of physically abusing a child show signs of physiological hyper-arousal in response to infant distress, while those

with a history of child neglect show signs of under-arousal [32]. Some studies employ a handgrip paradigm to assess adults' tendency to overreact when stressed. Researchers have found that maltreating mothers are more prone to use excessive handgrip force when listening to infant crying than are non-maltreating mothers [33]. Similarly, parents with high scores on a well-validated measure of child abuse potential report more hostile feelings after viewing videotape of an infant crying, and have greater difficulty inhibiting handgrip force than parents with low scores [34].

Current work in this area also suggests that adults at-risk for abuse may have distinct hormonal and neural reactivity profiles in response to infant distress. Reijman and her colleagues reported significantly *lower* levels of alpha-amylase, a marker of autonomic nervous system activity, in a clinical sample that included both abusive and neglectful mothers [35], a pattern that has held up across several studies [36]. Childhood poverty, too, has been linked to distinctive responses to infant crying. In female non-parents, history of childhood poverty was associated with increased neural activation relative to a control group never exposed to poverty, whereas in male non-parents, exposure to poverty was associated with reduced neural activation [37]. These studies may hold promise for identifying at-risk families and providing interventions.

Responses as a Marker of Parental Sensitivity

One reason research has focused on infant crying is that it is the primary means of communication between baby and parent during the first months. The pioneering studies of Ainsworth and her colleagues suggested that responses to distress play a central role in determining the quality of the parent-child relationship [38]. According to this perspective, infants whose mothers ignore or respond inconsistently to crying are prone to develop insecure attachment, a pattern of relating to the mother figure and significant others that may be detrimental to social and cognitive development. Bell and Ainsworth appeared to demonstrate that, contrary to the tenets of behaviourism, responding promptly and sensitively to crying was associated with reductions in crying and accelerated language development [39]. Bell and Ainsworth's study was criticized on methodological grounds [40], however, and others failed to replicate their findings [41]. In theory, these issues could be resolved by randomised controlled trials but, in practice, it is difficult to persuade parents to change their preferred form of care and accept random assignment to an unfamiliar form of baby care. Cross-cultural studies provide an alternative source of information. There is consistent evidence that rapid and responsive parenting is associated with low overall amounts of infant crying in the early postnatal weeks, but does not eliminate the infant crying peak [42,43]. Although shared responsibility for soothing leads mothers to report less distress and fathers more parenting efficacy [44], there is a dearth of cross-cultural evidence to show whether highly responsive parenting methods provide long-term benefits for infants or parents.

Although some researchers continue to recommend immediate parental response to infant cues [45], others have adopted a more nuanced and differentiated approach. For example, infant-cued feeding in the first postnatal weeks is generally agreed to be beneficial in establishing lactation and maintaining breastfeeding. However, when continued past the

early months, infant-cued parenting that includes high proximity, rapid responses and, in some cases, bed-sharing, is associated with persistence of night-time waking and crying past the age when most infants start to 'sleep through the night' [43,46]. This phenomenon, often referred to as an 'infant sleep problem', is a source of distress for many parents and a substantial cost for health services. In contrast, both infra-red video recordings and most randomised controlled trials have found that 'limit-setting' parenting supports both breast and formula-fed infants in developing long night-time sleep periods [43]. 'Limit-setting' parenting—an approach which employs routines and delayed responding to encourage infants to develop autonomous settling— is common in western societies and increasingly adopted by parents in general as infants grow older, at least in Norwegian [47] and English [48] families. A provocative idea, supported by correlational evidence, is that some parents' unwillingness to tolerate crying leads to excessive involvement in soothing their infants to sleep, which gives rise to the development of sleep problems [49]. Given the evidence that 'authoritative' parenting, which combines warmth with limit-setting, is especially effective in supporting older children's development, the critical question may not be which type of parenting is 'best' so much as *when* to transition from infant-cued to limit-setting parenting so as to maintain breast feeding, support infant self-regulation, and prevent long-term night waking and distress [43].

Development of Support Programmes for Parents

The evidence that most infants who cry a lot are in good health has resulted in an awareness that the traditional focus on the crying needs to be balanced by equal attention to the impact of crying on parents and to the resources parents bring to bear. The period after a baby's birth is often referred to as a 'transition to parenthood' emphasising the changes to the parents' lifestyles involved. The experience can be idyllic, but often it is stressful, frustrating and exhausting, challenging parents' ability to cope. Infant crying compels parents to respond to it but is highly aversive to listeners when it persists. Add this to the general disruption involved in the transition to parenthood and it is easy to understand why many parents find this a trying period. There is evidence, for instance, that crying judged to be 'excessive' can trigger premature termination of breastfeeding [50], overfeeding [51], parental distress and depression [52,53], poor parent-child relationships [54], and infant abuse in a small number of cases [55]. By bringing infant crying—a topic which has traditionally concerned paediatricians—together with studies of adult wellbeing and mental health, the door has opened to a new avenue of research. Not the least of its appeal is that interventions to support parenting have the potential to help parents, enhance parent-infant interactions and infant development, and improve health services.

The first programmes specifically designed to provide information and support for parents with crying babies grew out of studies of 'Shaken Baby Syndrome' (SBS) and evidence that infant crying can trigger SBS [56]. More recently, some programmes have broadened their aims beyond abuse prevention to provide parents with information about infant crying and guidance on how to manage it and the parental emotions and actions it provokes. This reflects the assumption, noted above, that infant crying is more or less stressful for all adults, not just for those with prior mental health problems. Encouragingly, this approach to the crying has been incorporated into contemporary guidelines and algorithms for paediatric

practice [19,20]. Box 1 lists website addresses for parent support programmes in Australia, Canada and North America, and the UK and others are under development [57]. Trials of their value and cost-effectiveness are underway [58,59]. It is too early to say whether or not they will fulfil their promise, but early findings give some cause for optimism [60,61].

Box 1

Websites designed to provide information and support for parents with crying babies

http://purplecrying.info/

www.whatwerewethinking.org.au

http://www.copingwithcrying.org.uk

http://raisingchildren.net.au/articles/cry_baby_program.html/context/255

In addition to providing accurate information and targeted support for parents, future research will continue to illuminate the complex interactions between infant and parental characteristics that shape parenting, including optimal and suboptimal responses to infant crying. The most promising avenues of research currently underway incorporate neuroimaging, behaviour genetic, physiological, and behavioural measures in response to infant crying, and have the potential to reveal some of the underlying mechanisms that promote infant and parental mental health and wellbeing.

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* of special interest

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Highlights

- Crying can provide evidence about an infant's metabolic and neurological condition
- Excessive crying can trigger feeding problems, parental depression and infant abuse
- Specific parental vulnerabilities make adverse outcomes more likely
- The mechanisms underlying adult responses are starting to be uncovered
- Support programmes join paediatric with adult mental health services