



Is “crying it out” appropriate for infants?

A review of the literature on the use of extinction in the first year

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1 Extinction (crying it out) is the most studied intervention for infant sleep problems.

Advice in Popular Parenting Media:
“How long do I let my baby cry?”
To establish regular naps, no more than one hour. . . There is no time limit at night if the child is not hungry or ill. If we place an arbitrary limit on the duration of crying at night, we train our child to cry to that predetermined time. When it is open-ended, the child learns to stop protesting and to fall asleep.”
Healthy Sleep Habits, Happy Child
Weissbluth, 1999, p. 159.

Background

Concerns about the quality and quantity of an infant’s sleep top the list of worries for parents. While some literature indicates that infant sleep involves a complex interaction of biological, developmental, and environmental factors¹, the majority of research suggests that infant sleep problems result from caretaker responsiveness which inadvertently reinforces nightwaking behavior².

As a result, the most empirically investigated approaches to infant sleep problems involve modifying parental responses to nighttime crying. Based on behavioral theories, extinction of unwanted behavior involves withdrawing reinforcement (parental attention) for the operant behavior (waking and crying)³.

Popularly called crying it out (CIO), variations of the intervention include:

Unmodified or pure extinction (see also *systematic or planned ignoring, cold turkey*) involves putting the child to bed, closing the door and, unless the child is ill, not reentering until morning⁴.

Graduated extinction (see also *progressive delay responding, controlled crying, Ferberizing*), allows the parent to check in—but not pick up—the child at progressive intervals, thereby reassuring parents about the child’s well-being⁵ and allowing them to practice ignoring cries⁶.

Research to date submits that CIO is quick⁷, effective⁸, and without negative side-effects⁹.

However, a majority of existing research was conducted on children older than 1 year who presented with identifiable sleep disorders.

Popular parenting advice in the U.S. nevertheless endorses the use of CIO as a preventative approach for infants beginning as early as 3 months.

Does existing research support the use of CIO for infants under 1 year?

2 CIO is increasingly endorsed by popular parenting books and magazines for infants 3-6 months of age.

CIO is recommended by a majority of pediatricians¹⁰ and parent advice books on infant sleep¹¹.

While the majority of existing research focuses on ameliorating diagnosed nightwaking problems in infants older than 1 year¹², CIO is increasingly endorsed in popular parenting literature as a preventative approach for infants starting between 3 and 5 months¹³.

Some authors have suggested beginning as early as 6-8 weeks¹⁴. (See handout for overview of popular methods.)

Advice in Popular Parenting Media:
“Nor should you worry about letting a very young baby cry. In fact, the younger the infant, the easier the process will be. ‘Babies older than 5 or 6 months are naturally going to be more upset because you’ve changed the rules on them,’ Dr. Schaefer says. ‘A 3-month-old . . . knows only the routine that you create.’”

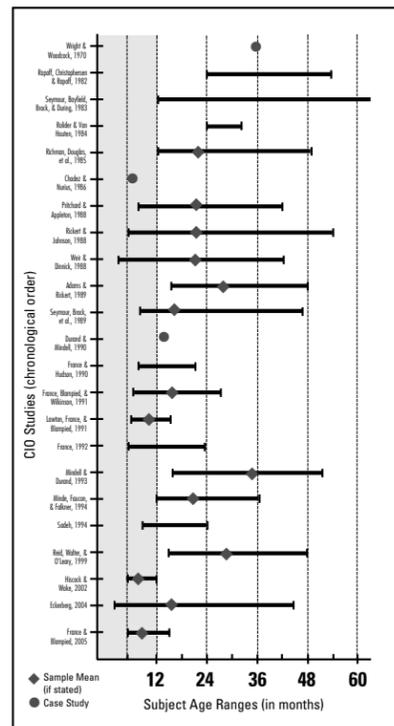
Teach Your Baby to Sleep In Just 7 Days
Parents Magazine, May 2000

Advice in popular parenting magazines and books suggests:

- 1 Parental behavior is the primary cause of nightwaking.
- 2 Sleep training should begin early to prevent sleep problems from taking root.
- 3 Prolonged crying is neither physically nor psychologically harmful and will not damage the infant’s relationship with the parent.

3 Research on CIO with infants <1 year is inadequate.

Table 1: Age ranges for CIO study samples.



A large number of CIO investigations did not include infants.

22 studies were found that investigated the use of either pure or graduated extinction with children (Table 1). Of these, 13 included any infants under 1 year¹⁵. Only 2 studies (one research study, and one case study) focused on infants exclusively¹⁶.

Only 2 studies include any infants under 6 months¹⁷; however, neither study indicates how many infants of this age were included in the sample.

Of the studies that included infants, none calculated effects for this age group.

With one exception¹⁸, results were reported for the sample as a whole. No studies examined effects for infants (<1 year) versus older groups.

In fact, infant sleep literature rarely distinguishes between infants and older children. Literature referencing CIO’s positive effects frequently cites as evidence studies conducted on toddlers and older children¹⁹.

Developmentally-based exploration of outcomes is lacking.



- The majority of CIO outcome measures focus exclusively on the extinction of crying²⁰ and fail to explore the existence of side-effects beyond whether or not the child stayed asleep.
- Only 5 studies were found that investigated the existence of changes in post-CIO behavior. Out of these, 3 included infants in the sample²¹. Each of these studies employed the same parent-report scale. No objective assessments were conducted.

The Flint Infant Security Scale²² was used in each study to assess post-CIO infant behavior. Though designed to measure infant security, it is not clear that the scale actually measures security per se, but rather describes behaviors more related to regulatory capacities, temperament, and developmental level (e.g. “Can accept sudden advances of a stranger.” “Enjoys a crowd.” “Can recover easily when upset.”) Further, results as measured by the Infant Security Scale have been misconstrued as evidence that CIO does not affect attachment²³.

To date, no studies of CIO have employed objective, observational assessments of changes in infant, caretaker, or dyadic behavior, or biobehavioral outcomes.

4 Is prolonged crying biobehaviorally benign?

Advice in Popular Parenting Media:
“Steel yourself. . . a little—or a lot of—crying may ensue. But rest assured, it will be tougher on you than on your baby. . . Get over the worry that ignoring your baby while he cries will do psychological harm,” emphasizes Dr. Schaefer.”

Teach Your Baby to Sleep In Just 7 Days
Parents Magazine, May 2000

Advice in Popular Parenting Media:
“Some parents fear that ignoring a baby’s wails at night may make her feel abandoned. . . . But most child-development specialists believe that letting an infant cry so she learns to fall asleep on her own is healthier in the long run. . . . Experts suggest holding off on sleep training until your baby is at least 3-months-old, when she’ll be better able to soothe herself.”

Goodnight baby!
Parenting Magazine, April 2002

Advice in Popular Parenting Media:
“Is crying harmful?” Not necessarily. In fact, recent studies have proven that crying produces accelerated forgetting of a learned response. So when a child cries, she may more quickly unlearn to expect to be picked up. When trying to stop an unhealthy habit, crying may have some benefit, because crying acts as an amnesic agent.”

Healthy Sleep Habits, Happy Child
Weissbluth, 1999, p. 159.

For young infants, extinction induced crying is physiologically stressful.

- Crying increases heart rate and blood pressure, reduces blood oxygenation, and propels the release of cortisol. Prolonged crying amplifies these effects²⁴.
- Animal studies have shown that extinction itself is particularly stressful—producing rapid, dramatic, and persistent increases in cortisol²⁵.

Physiological stress levels may remain high after the infant has stopped crying.

- Animal studies of extinction found that, though behavior appeared to adapt, physiology did not. In one study, infant rats ceased calling for their absent mothers; however, their physiological arousal remained high²⁶.
- The dissociation of observed behavior from adrenocortical activation makes it difficult to determine the absence of physiological stress simply by observing that the infant has fallen asleep²⁷.
- Further, it is unknown how the presence of increased cortisol levels affects the brain-building processes that occur during sleep²⁸.

The ability to modulate stress and return to homeostasis is age dependent.

- The ability to modulate distress (*self-soothe*) depends on the timing, type and intensity of the stress experienced. Stressors that are manageable at 12 months, may be disorganizing at younger ages²⁹.
- Further, infants with difficulties in self-regulation are less capable of modulating intense stress or withdrawing from overwhelming stimuli³⁰. For these infants, who display a larger cortisol responses to stress³¹, it is unknown how CIO impacts their neuropsychological development.

Empirical evidence of the safety of prolonged crying in infancy could not be found.

- Both researchers and popular parenting advice assert that an infant will not be harmed by the crying involved precipitated by CIO³²; however, no empirical evidence could be found to support this point.

In the absence of adequate data on the effects of prolonged crying and extinction on infants, the safety of CIO in the first year cannot be supported.

5 Rethinking CIO: Infant mental health perspectives are needed.

Discourse on infant sleep problems is currently driven by the pediatric community. As such, infant sleep is viewed as a largely behavioral event³³ shaped and perpetuated by parental responses. Within this context, responsiveness is framed as problematic behavior³⁴.

In the absence of transactional, dyadic perspectives, the socioemotional and contextual aspects of infant sleep have been largely discounted or overlooked.

Rethinking CIO: The family context.

An infant mental health perspective on CIO raises significant questions about the potential repercussions of sleep training techniques for infants, parents and families.

Individual Needs

- How does CIO interface with individual capacities (e.g. caregiver mental health, existing family stressors, etc.)?
- How does CIO interface with infants at various stages of development? Are some infants being left to cry too long at very early ages?
- How does the implementation of CIO affect parental self-concept or perceptions of the infant? How might CIO affect an infant’s emerging internal working model?
- How do parental working models influence the experience of implementing CIO?

Advice in Popular Parenting Media:
“A baby must adapt to the existing family; the existing family does not adapt to a baby.”

12 Hours Sleep by 12 Weeks
Giordano & Abidin, 2006, p. 16

Relationship Needs

- Does CIO affect parental responsiveness overall? Does CIO convey the notion that unwanted infant behavior may be controlled through the withdrawal of attention?
- What does CIO convey to parents about the meaning of crying?

More research is needed into the systemic effects of infant sleep interventions—effects that may extend beyond whether or not an infant abandoned crying and stayed asleep.

[In the behavioral view of infant sleep], caregiving is constructed as behavior management, and is underpinned by the idealization of all-night sleep as an achievable norm and an unquestioned. . . belief in the trainability of infants.

Rowe, J. (2003)
Nursing Inquiry, 10(3), p. 185.

Rethinking CIO:

Nightwaking as a symptom rather than a problem.

- A variety of relevant family variables have been significantly related to infant nightwaking: breastfeeding³⁵, attachment status³⁶, parental psychopathology³⁷, maternal depression³⁸, family stress³⁹, and relational disruption⁴⁰.
- Parents who are anxious or depressed are also more likely to report their infant’s waking as problematic—even when sleep behavior falls into normal ranges⁴¹.
- Nightwaking is also more likely in infants with temperamental or regulatory sensitivities because of their decreased capacity to buffer stimuli⁴². It is currently unknown how CIO interfaces with these infants who may also have a decreased capacity to self-calm or withdraw from distress⁴³.

Rethinking CIO:

Sleep problems as a port of entry for infant mental health.

- In the rush to provide one-size-fits-all sleep training information, professionals are missing a valuable opportunity for inquiry into relevant variables that contribute to or are impacted by nightwaking.
- Future research into CIO and other infant sleep interventions needs to account for the context within which nightwaking takes place.
- More research is needed to develop interventions that are context aware—helping infants achieve age-appropriate amounts of sleep, while supporting parents’ instincts to nurture and respond.

Summary of best-selling popular advice books on CIO in infancy*.

Sales Rank	Title/Author	
1.	Healthy Sleep Habits, Happy Baby.	Weissbluth, M. (1999).
Expectable Sleep Norms:	Suggested Method:	
Babies will wake from 1-2 times a night until about 8 months. (Author suggests that when naps are in line, nighttime sleep will naturally consolidate)	5-6 weeks: Maximum of 2 hours awake time. Put down drowsy, but awake. 10 or 20 minutes of crying won't hurt (p. 108). 3-4 months: 2 hours awake, 1/2 nap ritual, down for nap that may be short or long. Naps need to take place in the crib. Stroller or car sleep does not count as a nap.	<i>“In fact, all evidence accumulated by a wide array of child health specialists concludes that ‘protest’ crying at bedtime will not cause permanent emotional or psychological problems. In plain fact, the contrary is true. For example, Dr. D. W. Winnicott . . . emphasizes that the capacity to be alone is one of the most important signs of maturity in emotional development” (p. 157).</i>
Age to Start:	4-8 months: Maximum of 2 hours awake between naps.	
5-6 wks: Routines + put down awake	1 hour maximum of crying before a nap. Naps should be at least 45 min. to 1-hour long. No maximum of crying before nighttime sleep. Parents are not to go in and check on baby.	
4 mos: Pure extinction		
2.	What to Expect the First Year.	Murkoff, H., Hathaway, S.,& Eisenberg, A. (2003).
Expectable Sleep Norms:	Suggested Method:	
By 4 mos: Babies don't need to eat at night. Will sleep through at 11 lbs. By 5-6 mos: Nightwaking is a habit.	3-4 months: Parents can begin to stretch feeds by half hour.	<i>“For those parents desperate and determined to get that good night’s sleep sooner rather than later, letting a baby cry it out almost always works. . . And while a younger infant cries to communicate basic needs, older babies are becoming more sophisticated in their motivations” (p. 350).</i>
Age to Start	4 months: Sleep training can begin. Authors give an overview of four approaches: cold turkey (6 mos.), graduated extinction, scheduled awakening, and reinforcing sleep rhythms. Suggests parents should choose the method that best fits the family.	
4 mos: Most interventions		
6 mos: Cold turkey		
4.	On Becoming Babywise.	Ezzo, G., & Bucknam. R. (2001).
Expectable Sleep Norms:	Suggested Method:	
By 7-9 weeks: 7-8 hrs. By 12 weeks: 10-11 hrs.	Parents institute a 2-1/2 to 3-hr. feed-wake-nap schedule This promotes regulation. The parent decides when naps start and end. Crying for 15 or 20 minutes before sleep is normal and will not hurt baby (p. 131). The authors suggest that with this schedule, the baby will begin sleeping through the night (with one late evening feeding) by 2 months and 10-11 hours (no nighttime feeds) by 3 months.	<i>“Healthy, full-term babies typically are born with the capacity to achieve seven to eight hours of continuous nighttime sleep between seven and nine weeks” (p. 43).</i>
Age to Start		
1 month		
19.	Secrets of the Baby Whisperer.	Hogg, T., & Blau, M. (2002).
Expectable Sleep Norms:	Suggested Method:	
By 10 lbs, there is no need for middle of the night feed.	1) Do cluster feed in evening; 2) Do “dream feed” before parents go to bed; 3) Allow baby to cry before going to sleep. Says that babies will do three crescendoes of screaming, then will go to sleep. Parents usually relent on the second peak; 4) Respond at night, but leave quickly.	<i>“What a good many people don’t realize is that babies need parents’ direction to establish proper sleep habits. In fact, the reason so-called sleep problems are common is because so many parents don’t realize that they, not their babies, control bedtime” (p. 168).</i>
Age to Start		
6 wks. and 10 lbs.		
NR	Solve Your Child’s Sleep Problems.	Ferber, R. (1986**).
Expectable Sleep Norms:	Suggested Method:	
Most infants will sleep through by 6 mos.	Keep a sleep log to understand baby’s normal sleep patterns. Begin by delaying response to crying by 5 minutes and gradually extend the time by 5 minute increments.	
Age to Start		
6 months		** A new edition of this book has been published, but was unavailable at the time of this writing.
New	12 Hours Sleep by 12 Weeks.	Giordano, S., & Abidin, L. (2006).
Expectable Sleep Norms:	Suggested Method:	
By 12 wks: Sleeping 12 hours without a feed.	Feed every 3 hours during the day. Allow to cry at night, but delay responding for 3-5 minutes. Goal is to eliminate nighttime feeds by giving more at regular intervals during the day. Ideal schedule is 4 feeds, 3 hours apart during the day and no nighttime feeds.	<i>“A baby must adapt to the existing family; the existing family does not adapt to a baby” (p. 16).</i>
Age to Start:		
1-6 wks: Institute 3-hr feeding interval.		
8 wks: Begin extinction of nighttime feeds.		

* The above represents only a sampling of available books on infant sleep. Rankings based on "top sellers" within Amazon.com's "Parenting: Babies & Toddlers" category as of May 12, 2006.

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