

## **The science of baby laughter**

**Caspar Addyman**, Birkbeck, University of London

**Ishbel Addyman**

### **Abstract**

‘The Baby Laughter’ project (<http://babylaughter.net>) is a research programme in developmental psychology that uses online surveys and parent submitted videos to study baby laughter. We discuss how infant laughter has been neglected in the study of both humour and of developmental psychology. We describe our surveys and research methodology, together with some of the questions we hope they can address. Some preliminary results are presented together with illustrative comments from parents who took part. These results show that the topics of infant laughter track other cognitive developments, that it is an important form of communication and bond between parent and child and a marker of social and emotional engagement. We conclude by suggesting that the highly important role of laughter in early development has until now been underestimated.

### **Keywords**

Infancy, developmental psychology, laughter, social development, humour, parenting

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How many babies does it take to change a lightbulb?

What's laai-bub?

Babies laugh a lot but what are they finding so funny? 'The Baby Laughter' project (<http://babylaughter.net>) is an online research programme that aims to take laughing babies seriously. In short, we think that babies laugh when they 'get the joke' and so studying the things that make babies laugh can tell us about their cognitive and social development. This article describes the motivations behind the project, its aims and methods and some of the questions that we hope it will answer. Data collection is still underway but we present some preliminary results and offer some early conclusions.

### **What can we learn from laughing babies?**

There are two things we could potentially learn from the laughter of babies. We could learn about laughter and we could learn about babies. These are both serious fields of research but perhaps are not regarded as such by outsiders. This leaves the study of laughing babies at a double disadvantage and, indeed, this might explain why the topic has been neglected on all sides. As we shall see, infants have been largely ignored in the study of laughter and humour while laughter and humour have been largely ignored in the study of infants. This project comes from within the field of developmental psychology so we shall primarily be interested in what laughing babies can tell us about babies. But research with babies is not just about what it is like to be a baby, infancy is a window into adulthood. Studying the considerable efforts that babies must go to acquire skills like language, social interaction or even walking has changed psychology's perspective on

adult abilities that would otherwise be taken for granted. We hope that the scientific study of baby laughter will inform theories of adult laughter and humour.

It is also important to emphasize that this is a scientific study. This brings its own challenges. Laughter and babies are both incredibly tricky to study in a scientific setting. Laughter is spontaneous, capricious and idiosyncratic, babies no less so. Getting babies to laugh is relatively easy but getting them to laugh on demand is just as hard as stand-up comedy. Furthermore, it is always very difficult to untangle the social and the cognitive aspects of laughter. Is this person or baby laughing at me or with me? Finally, a lot of scientists would think that laughter isn't an appropriate topic for 'serious' investigation. We disagree strongly and hope to prove that when laughing babies really do get the joke.

### **Infant laughter in the study of humour**

No one can fail to notice that babies laugh more than the rest of us but the academic study of humour and laughter does not often consider laughing babies to be very relevant. Sigmund Freud normally had a lot of time for the unseen influence of the infantile on the adult. But when it came to humour, he took a very Victorian approach that children should be seen and not heard. In Freud's 1905 book *Jokes and their Relation to the Unconscious*, it was the intellect rather than the infantile that was the source of amusement. In Freud's view 'children do not strike us in any way comic' ([1905] 1976: 287) and 'children are without a feeling for the comic' ([1905] 1976: 288). He admits that children's laughter can be an expression of playfulness or pure pleasure. But he makes a very adult interpretation of much of children's laughter, imaging it a form of superiority

or even *Schadenfreude* at the expense of the person seeming to do something wrong. Suggesting that children's laughter is an expression of mastery then leads Freud into the somewhat circular and illogical position that adult humour might be found in 'Those things are comic which are not proper for an adult' ([1905] 1976: 292). In other words, children laugh when they feel grown up and grown-ups laugh when they feel childish.

Of course, Freud is a soft target. He was working over 100 years ago at a time when psychology was in its own infancy and the birth of developmental psychology was 40 to 50 years away. Perhaps more surprisingly, Robert Provine's landmark book *Laughter: A Scientific Investigation* (2000) barely mentions babies or children at all. The book is based in large part on Provine's own research into laughter. His research has helped draw a clearer distinction between laughter and humour. Eavesdropping on student conversations in college cafeterias, he showed that much laughter is social in origin (Provine 1993). It happens when friends interact and is usually not tied to any particular joke or punchline. Provine does suggest that the origins of laughter might be found in the interaction between mother and infant, albeit a chimpanzee mother and infant. Chimpanzee mothers generally ignore their babies but when prompted by their infants they engage in play and tickling with laughter and 'play-face' from their infants serving to regulate the interaction (Plooij 1979). Amazingly, Provine describes this research but does not speculate or look for any evidence that laughter is an important part of the relationship between human mothers and their babies.

A more recent book *Inside Jokes: Using Humor to Reverse-Engineer the Mind* (M. M. Hurley et al. 2011) fares no better. Despite the cognitive science credentials of its authors it follows the tradition of Freud, taking a highly intellectual approach to humour where children and especially babies are ignored. However, there are exceptions. In his 1979 book, *Humor: Its Origin and Development* developmental psychologist Paul McGhee made great use of the work done by developmental psychologists in that decade (see below). He saw the creation and appreciation of humour as a special form of play that tracks the cognitive development from the very earliest ages (McGhee 1979). Missing from that account was a clear role for the undoubtedly important social aspects of humour. But more recent work begins to address this. Vasudevi Reddy (2001) lists the many ways in which an infant interacting with an adult resembles a clown. Reddy (2001) presents evidence from parental reports of infants under a year intentionally acting in an exaggerated or ‘silly’ manner or violating norms in order to elicit laughter. While in their excellent article, in the first ever issue of *Comedy Studies*, I. Wilkie and M. Saxton speculate that interactions between adults and young child contain the ‘essence of comic performance’ (2010: 21). They track how different aspects of the comic (e.g. nonsense, incongruity, superiority, etc.) can be found in the very early interactions between parent and child, with both parties contributing to the performance.

The laughter shared by a parent and child is not some incidental side-effect of their interaction. Rather this interactive, social element of humour is likely to be a key part of their learning and nurturing relationship. And, as such, it is also likely to be central to any truly comprehensive theory of why we laugh when we do. We hope that ‘The Baby

Laughter' project will provide some data to help support this view. But the project also has another purpose. To look down the other end of the scope and see if infant laughter really does play a role in their cognitive development. As babies are learning to laugh, are they laughing to learn?

### **Infant laughter in developmental psychology**

Early laughter is a strangely neglected topic in developmental psychology. Developmental psychology starts with Jean Piaget in the 1920s. But, with respect to infant laughter, honourable mention must go to Charles Darwin. Darwin's 1872 book *The Expression of the Emotion in Man and Animals* was far ahead of its time in equating the fearful and happy expressions of animals with those of man. Chapter 8 was focused on joyful emotions including laughter and drew parallels between humans and other apes. Then in 1877, Darwin published a paper on his careful observations of his infant son Doddy. A game of peek-a-boo elicits an 'incipient laugh' at 110 days (1877: 289). Three or four weeks earlier than this

he received a little pinch on his nose and cheeks as a good joke. I was at first surprised at humour being appreciated by an infant only a little above three months old, but we should remember how very early puppies and kittens begin to play. (Darwin 1877: 289)

Starting in the 1920s Piaget took up this idea. Like Darwin, Piaget observed his own children and thought smiles and playfulness were signs of cognitive mastery. According

to his theory (Piaget [1945] 1951), learning in early childhood is a continual cycle of accommodation and assimilation. Accommodation is the serious and effortful adaptation of the child's mental model to new facts about world. Assimilation is the pleasurable experimentation and exploration that takes place in light of this new knowledge. A baby in a phase of assimilation will laugh and smile at his or her newfound skill. In the process they would be likely to discover something new and stimulating, prompting a further round of accommodation. By Piaget's theory, laughter too should track cognitive development. But oddly enough, as T. R. Shultz (1976) observes, 'Piaget didn't appear to be at all interested in laughter or in humor' (Shultz 1976: 23) despite noting that laughter accompanied all instances of symbolic play in his own children aged 18–24 months. Nevertheless, Piaget's theory of accommodation and assimilation, together with his stage theory of development (Piaget [1936] 1952) was hugely influential and formed the basis for most infant psychology until well into the 1990s.

Interestingly, Shultz was the only researcher to empirically test the idea that smiles accompany cognitive mastery in infancy. Shultz and E. Zigler (1970) presented either a stationary or moving clown stimulus to very young infants (between 8 and 18 weeks old). Infants were slower to smile in reaction with the moving (swinging) puppet than the stationary one, supporting the idea that smiles come after a period of accommodation. Combined with other similar results (McCall 1972; Zelazo 1971; 1972), this led Shultz (1976) to conclude, contrary to the indifference of Piaget, that infant's laughter was indeed a sign of pleasure at cognitive mastery.

Around the same time, L. A. Sroufe and J. P. Wunsch (1972) quizzed 150 infants under a year old with a wide range of games and actions (peek-a-boo, silly voices, bouncing the

baby, etc.). Nothing was universally popular, although ‘chasing the baby’ came close. But they found some clear developmental trends. Generally babies laughed more as they got older and the sophistication of their ‘humour’ increased too; simple visual and tactile stimuli worked best for the youngest babies (4–5 months) but more involved social games caused older babies to laugh. Sroufe and Wunsch imagined that laughter was a regulatory mechanism for the infant. Partly, this regulates the interaction with the caregiver but it also has a cognitive purpose. ‘Laughter signifies the occurrence of an important transaction between the infant and his environment’ (Sroufe and Wunsch 1972: 1341). They imagine laughter being a ‘tension-discharge’ (Sroufe and Wunsch 1972: 1341) mechanism in the face of mounting incongruity, recalling H. Spencer’s ([1863] 1892) physiological theory. M. K. Rothbart (1973, 1976) attempted to elaborate these internal processes in the infant as a box and arrow flowchart, so beloved of researchers of that era. The model itself does not add much in itself and is only half the story, as Rothbart acknowledges. Equally important is the feedback loop between infant and environment, especially the caregiver who ensures that ‘laughter games are... gauged to the child’s level of cognitive and emotional development’ (Rothbart 1973: 255).

After that original research on infant laughter pretty much stopped for three decades. Laughter and smiling were no longer considered useful measures of infant cognition. Boredom or rather ‘visual habituation’ (Fantz 1964; Cohen 1969) became the dominant paradigm. Measuring infants’ changing looking times in response to repeated or changing stimuli was more suitable tool for studying infants in the laboratory. In the next few decades there were only a few studies that looked at infant laughter, and these were largely confined to recording the physiological features of infant laughs (Nwokah et al.



1994) and smiles (Kawakami et al. 2006) without any social or cognitive interpretation. Very recently this is changing. G. Mireault et al. (2012) were the first researchers to directly test the idea that humour might be a bonding mechanism. Challengingly, they found a negative correlation; lower humour at 6 months led to greater attachment at a year, suggesting that ‘less good-humored infants elicit greater parental engagement’ (Mireault et al. 2012: 797). Meanwhile, E. Hoicka and N. Akhtar (2012) built on the work of Reddy (2001). They showed that babies under a year will copy humorous productions of others but as they get older infants increasingly create more and more novel ‘jokes’ of their own.

This renewed academic interest in infant laughter and humour is a good thing, more especially as it comes at the topic from a more social and emotional perspective. Baby laughter is a neglected empirical area and there is no clear theory that fits in with other modern developments in our understanding of infancy. But as the millions of viewers on YouTube can attest, baby laughter has never gone out of fashion in the non-academic world. With ‘The Baby Laughter’ project website <http://babylaughter.net>, we aim to use public interest and the Internet to kickstart research. We are running online surveys of large numbers of parents and also encouraging them to send us videos of their own laughing babies – all in the name of science.

### **‘The Baby Laughter’ project**

The most exciting phrase to hear in science, the one that heralds new discoveries, is not ‘Eureka’ but ‘That’s funny...’. (Isaac Asimov)

‘The Baby Laughter’ project is a set of online surveys for parents of babies and toddlers to see if there are developmental changes in what makes babies laugh at different ages. The aims are two-fold. First, to see how laughter changes in the first two years of life and second, to see if those changes track other milestones in cognitive development. By conducting a large global survey of what makes babies laugh, we first hope to establish that babies do in fact laugh as they are learning and then use this as a new window onto what we already know about early cognitive development. Parental reports and funny YouTube videos are no substitute for controlled laboratory experiments. But they can give us more immediate and more convincing evidence that a baby understands a particular concept. We also expect to confirm the findings in the adult literature (Provine 2000) that most laughter is primarily social in nature, By finding out what situations, people and events babies find most amusing and entertaining at different ages, we hope to provide a new perspective on infants’ social and emotional development.

### ***Participants***

The participants are parents of babies (2 years old and under). They will be recruited online via the project website itself (<http://babylaughter.net>). To date, over 500 parents from over 25 countries have taken part in our surveys.

### ***Methods***

Parents can provide information in one of three ways:

*Full survey – the causes of infant laughter* (nine sections, 60 questions, fifteen–30 minutes to complete) Includes questions about baby and family background, causes of

laughter, funny situations, places, times of day, interactions with people. In addition to the questions prepared specifically for this survey, participants can optionally answer a set of standard questions about infant temperament (Very Short Infant Behaviour Questionnaire (Gartstein and Rothbart 2003))

*Short 'field report'* (six questions, two to five minutes to complete) A very short survey asking the parent to describe a single incident of infant laughter. Questions ask for infant age, details of who was present, where and when the event took place and what happened.

*Submit a video* – parents can submit a link to a video of their baby laughing together with information about what happened and who was present.

### ***Analysis***

From the quantitative survey questions, we hope to discover what toys, games, sensations and interactions cause babies to laugh the most. How early does social laughter start? What are the primary causes of laughter in infancy? Do these change with cognitive development? Is laughter influenced by, family size, socio-economic status, temperament, etc. From the free-form responses we hope to accumulate evidence in support of the hypothesis that babies laugh most at events and activities for which they are just starting to understand the relevant features of the world. For instance, is knocking over blocks funniest for babies who are just establishing a naïve theory of gravity?

Obviously, we must not overlook the fact that laughing is a highly social experience. We will be looking at where, when and with whom babies laugh the most (and the least), and

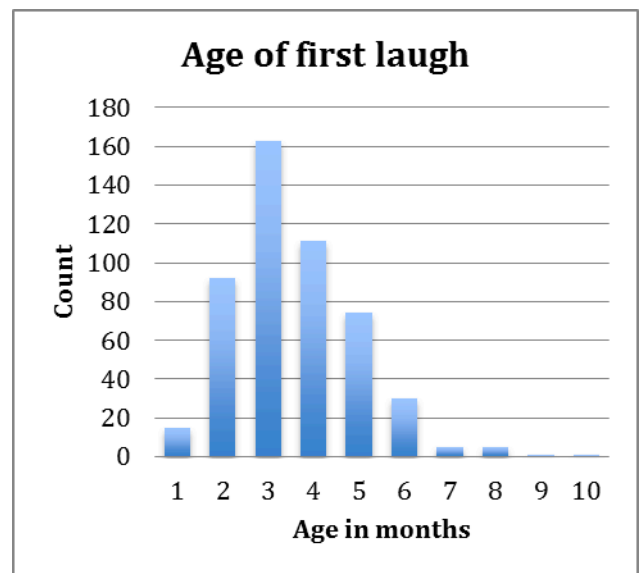
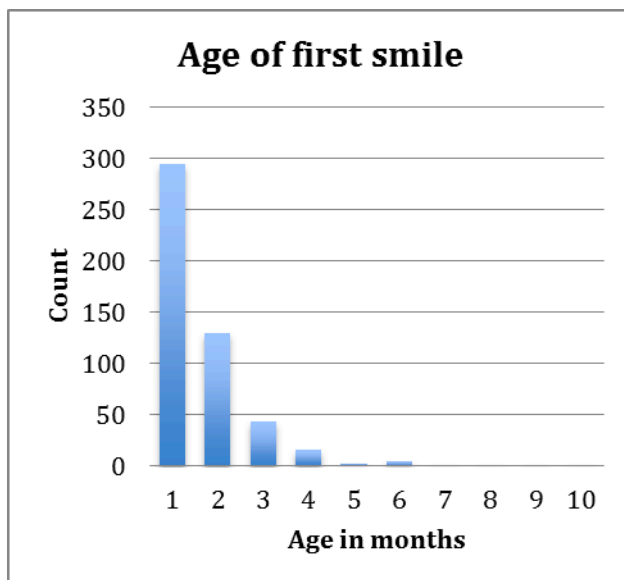
seeing if there are differences between babies. Does a baby's laughter relate to other aspects of their temperament? Are there cultural differences?

### *Preliminary results*

Data collection is ongoing and a full analysis will appear in due course in a developmental psychology journal. But here we present a representative selection of early findings arranged according to age or cognitive domain.

#### *When does laughter start?*

The majority of babies smile in the first month (Figure 1a) and although most babies start laughing around their third month (Figure 1b) there is a surprisingly large age range for the first laugh. The pattern for first social smiles was somewhere in between and we believe this shows that its a myth that early smiles are just trapped wind.



**Figure 1:** Responses to the questions what age did your baby: (a) first smile and (b) first laugh?.

*What are the causes of laughter?*

We asked parents about the causes of infant laughter. They rated happiness, excitement, physical sensations, surprise, social causes highly, bonding and communication less highly and dismissed the idea that laughter is a release of tension or happens when fear is averted. But we have yet to break these results down by age of the infant. Meanwhile, parents' free-form responses showed a wide range of motivations and causes. For example:

- 'When something out of the ordinary happens' (Female – 4 months)
- 'To express his emotions... That he's feeling happy, in a good mood, social, interactive, bonding' (Male – 6 months)
- 'When she achieves something difficult' (F – 10 months)
- 'To express genuine comic silliness' (M – 17 months)

- ‘Because she is being engaged with in a fun and exciting way’ (F – 19 months)

### *Physical sensations and naïve physics*

Young babies have a slowly dawning awareness of their bodies that precedes other awareness. From very young ages the babies in our survey loved being tickled and dangled upside down. Babies also seemed to laugh as they understood the physical world.

Most remarkable in this area were two videos sent to us by parents. In the first an 11 month old delights in discovering that a light switch makes it goes dark.

<sup>1</sup> In the second some parents tried to replicate the popular finding on YouTube that babies love ripping paper. Their son was shocked at first then laughed.<sup>2</sup> Remarkably their son was only 3 months at the time.

### *Peek-A-Boo – from surprise to social graces*

Our survey confirms Darwin’s (1877) suspicion that peek-a-boo is the ultimate in baby entertainment. It is the most popular game with babies of all ages and all nationalities. It starts off as a very simple game but gradually gets more complex as layers of sophistication are added to the baby’s ability to interact with others. It is likely that very young babies (under 6 months) are genuinely surprised by a reappearing face. While older babies (under a year) start to understand the social elements of the game. By the time they are toddlers, they are so good at it that it is almost as if they are playing mainly for your benefit. We feel that this universal love of peek-a-boo points to a deep universal truth; Humans are hugely social creatures.

### *Clowning around*

Our findings are corroborating the work Reddy (2001) and Hoicka and Akhtar (2012) and confirming the suspicions of Wilkie and Saxton (2010). Infants love being the centre of attention and will make a performance out of anything. Little children will play the clown and hardly need any encouragement to do so. Nor for that matter do parents. But laughter is the icing on the cake.

- ‘Laughter is a positive noise she can give. Crying is usually to get our attention if she feels she doesn’t have it, but laughter appears to come from sheer joy of having our undivided attention’ (F – 6 months)
- ‘She really seems to enjoy it and it gets her lots of attention. We make quite a lot of effort to be silly etc to make her laugh. There is a lot of laughter around her’ (F – 7 months)
- ‘The first time she laughed hysterically was when a friend pretended she had smelly feet. My little girl kept putting her feet to everyone's noses, laughing so much, this went on for about 20mins’ (F – 10 months)
- ‘Playing peek-a boo at really close quarters with silly noises and silly facial expressions is sure to make her laugh’ (F – 12 months)
- ‘Daddy and mummy were imitating his favourite character from a TV show. He clapped his hands and burst out in laughter and he made us do it over and over again’ (M – 18 months)

- ‘Because to him I’m the most hilarious person in the world, and I think his laughs say “mum you’re great!” At least that’s what I hope anyway!’ (M – 14 months)

## **Conclusion**

‘The Baby Laughter’ project is only just getting started. We already we have a rich source of data on the role of laughter in development that we will be begin analysing in depth shortly and the project website will continue to collect further data indefinitely and provide feedback to parents who have taken part. At this stage, it is too early to make grand conclusions. But we can say with certainty that laughter is central component in early development and it is likely that our sense of humour starts to form far earlier than most theories of humour currently admit. Furthermore, there appears to be greater variety and subtlety in the sources and purposes of laughter than was previously thought. By taking laughter seriously, we believe that psychologists can gain many new insights into the first few years. We believe the same is also true for parents. Babies can laugh long before they can talk or communicate in other ways. Smiles and laughter are not only the welcome relief that help parents (and babies) cope with the tears and confusion. They are also a shared celebration of all the triumphs and achievements in an infants’ life.

This also highlights the importance for parents and children of staying happy and positive throughout the wild ride that is parenting in the early years. Not only is shared laughter the quickest way to connect two people but perhaps the secret to happiness is retaining a childlike ability to laugh at the world. We think the shortest answer to the question why do babies laugh is ‘because they are happy’.



Recently we went to the swimming pool and after we took a shower, he was standing under the shower, laughing with pure happiness. It was so sweet. (M – 14 months)

## References

Cohen, L. B. (1969), 'Observing responses, visual preferences, and habituation to visual stimuli in infants', *Journal of Experimental Child Psychology*, 7:3, pp. 419–33.

Darwin, C. (1872), *The Expression of the Emotions in Man and Animals*, London: John Murray.

\_\_\_\_\_. (1877), 'A biographical sketch of an infant', *Mind. A Quarterly Journal of Psychology and Philosophy*, 2:7, pp.285–94.

Fantz, R. L. (1964), 'Visual experience in infants: Decreased attention to familiar patterns relative to novel ones', *Science*, 146:3644, pp. 668–70.

Freud, S. ([1905] 1976), *Jokes and their Relation to the Unconscious*, vol. 6, London: The Pelican Freud Library and Penguin Books.

- Hoicka, E. and Akhtar, N. (2012), 'Early humour production', *British Journal of Developmental Psychology*, 30:4, pp.586–603.
- Gartstein, M. and Rothbart, M. (2003), 'Studying infant temperament via the revised infant behavior questionnaire', *Infant Behavior and Development*, 26:1, pp.64–86.
- Hurley, M. M., Dennett, D. C. and Adams Jr, R. B. (2011), *Inside Jokes: Using Humor to Reverse-Engineer the Mind*, Cambridge, MA: The MIT Press.
- Kawakami, K., Takai-Kawakami, K., Tomonaga, M., Suzuki, J., Kusaka, T., & Okai, T. (2006). Origins of smile and laughter: A preliminary study. *Early Human Development*, 82(1), 61–66.
- McCall, R. B. (1972), 'Smiling and vocalisation in infants as indices of perceptual-cognitive processes', *Merrill-Palmer Quarterly*, 18, pp. 341–47.
- McGhee, P. E. (1979), *Humor: Its Origin and Development*, San Francisco, CA: W.H.Freeman and Company
- Mireault, G., Sparrow, J., Poutre, M., Perdue, B. and Macke, L. (2012), 'Infant humor perception from 3- to 6-months and attachment at one year', *Infant Behavior and Development*, 35:4, pp.797–802.

Nwokah, E., Hsu, H., Dobrowolska, O., & Fogel, A. (1994). The development of laughter in mother-infant communication: Timing parameters and temporal sequences *Infant Behavior and Development*, 17(1) pp. 23–35.

Piaget, J. ([1936] 1952) *La naissance de l'intelligence chez l'enfant/The Origins of Intelligence in Children*, New York: International Universities Press.

\_\_\_\_ ([1945] 1951), *La formation du symbole chez l'enfant; imitation, jeu et reve, image et representation/Play, Dreams, and Imitation in Childhood*, New York: Norton.

Plooij, F. (1979), 'How wild chimpanzee babies trigger the onset of mother-infant play – and what the mother makes of it', in M. Bullowa (ed.), *Before Speech: The Beginning of Interpersonal Communications*, Cambridge: Cambridge University Press, pp. 223–43.

Provine, R. R. (1993), 'Laughter punctuates speech: Linguistic, social and gender contexts for laughter', *Ethology*, 95:4, pp. 291–98.

\_\_\_\_ (2000), *Laughter: A scientific investigation*, London: Faber and Faber.

Reddy, V. (2001), 'Infant clowns: The interpersonal creation of humour in infancy', *Enfance*, 53:3, pp. 247-256.

Rothbart, M. K. (1973), 'Laughter in young children', *Psychological Bulletin*, 80:3, pp. 247–56.

\_\_\_\_ (1976), 'Incongruity, problem-solving and laughter', in A. J.Chapman and H. C. Foot (eds), *Humor and Laughter: Theory, Research and Applications*, London: Wiley, pp. 37–54.

Shultz, T. R. (1976), 'A cognitive-developmental analysis of humor', in A. J.Chapman and H. C. Foot (eds), *Humor and Laughter: Theory, Research and Applications*, London: Wiley, pp. 11–36.

Shultz, T. R. and Zigler, E. (1970), 'Emotional concomitants of visual mastery in infants: The effects of stimulus movement on smiling and vocalizing', *Journal of Experimental Child Psychology*, 10:3, pp.390–402.

Spencer, H. ([1863] 1892), 'The physiology of laughter', in *Essays – Scientific, Political and Speculative*, vol. 2, New York: Appleton, pp.452-466

Sroufe, L. A. and Wunsch, J. P. (1972), 'The development of laughter in the first year of life', *Child Development*, 43:4, pp. 1326–44.

Wilkie, I. and Saxton, M. (2010), 'The origins of comic performance in adult-child interaction', *Comedy Studies*, 1:1, pp.21–32.

Zelazo, P. (1971), 'Smiling to social stimuli: Eliciting and conditioning effects', *Developmental Psychology*, 4:1, pp. 32–42.

\_\_\_\_\_ (1972), 'Smiling and vocalisation: A cognitive emphasis', *Merrill-Palmer Quarterly*, 18:4, pp. 349–65.

### **Contributor details**

Caspar and Ishbel are brother and sister. They are currently working together on a book about laughing babies.

Caspar Addyman is a developmental psychologist working in the Babylab at Birkbeck, University of London. He studies cognitive development in infants with particular interest in concept learning, time perception and language acquisition. His first novel *Help Yourself* was published in 2013 and is about a failed stand-up comedian.

Ishbel Addyman is a writer and mother of two young children. Her first book *Cyrano: The life and legend of Cyrano de Bergerac* was published by Simon & Schuster in 2008.

Contact:

Centre for Brain and Cognitive Development, Birkbeck, University of London, Malet Street, London, WC1E 7HX, UK.

E-mail: [c.addyman@bbk.ac.uk](mailto:c.addyman@bbk.ac.uk)

The Old Rectory, King Edward Place, Wheathampstead, Hertfordshire, AL4 8FG

E-mail: [ishbel.addyman@gmail.com](mailto:ishbel.addyman@gmail.com)

Notes

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<sup>1</sup> <http://babylaughter.net/videos/2013/05/13/your-babies-014-light-goes-on-light-goes-off/>.

<sup>2</sup> <http://babylaughter.net/videos/2013/04/05/your-babies-013-youngest-ever-fan-of-ripping-paper/>.