

# Humor, Abstraction, and Disbelief

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## Abstract

We investigated humor as a context for learning about abstraction and disbelief. More specifically, we investigated how parents support humor understanding during book sharing with their toddlers. In Study 1, a corpus analysis revealed that in books aimed at 1- to 2-year-olds, humor is found more often than other forms of doing the wrong thing including mistakes, pretense, lying, false beliefs, and metaphors. In Study 2, 20 parents read a book containing humorous and non-humorous pages to their 19- to 26-month-olds. Parents used a significantly higher percentage of high abstraction extra-textual utterances (ETUs) when reading the humorous pages. In Study 3, 41 parents read either a humorous or non-humorous book to their 18- to 24-month-olds. Parents reading the humorous book made significantly more ETUs coded for a specific form of high abstraction: those encouraging disbelief of prior utterances. Sharing humorous books thus increases toddlers' exposure to high abstraction and belief-based language.

*Keywords:* Humor; Abstract language; Beliefs; Parent–child communication

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If you say something right, it's not a joke. (Leon Soyinka Sinden; age: 3 years, 6 months)

## 1. Introduction

Humor is seriously difficult. Because incongruity is the basis of humor, understanding a humorous statement requires recognizing that a person has said or done something wrong (or at least not entirely right); that this error is intentional; and that the intention of the error is not to deceive or mislead, but instead to entertain. Despite this complexity, understanding that others intend to do the wrong thing occurs as early as 25 months through understanding humorous intentions (Hoicka & Gattis, 2008), earlier than understanding the intention to pretend (Rakoczy, Tomasello, & Striano, 2004)<sup>1</sup>, the intention to lie (e.g., Siegal & Peterson,

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1996, 1998), and false beliefs (e.g., Perner, Baker, & Hutton, 1994). The aim of the studies reported here was to investigate how parents support toddlers' early understanding of humorous statements in a book-sharing context.

Book sharing between parents and children has many benefits for a child's intellectual development. For example, de Jong and Leseman (2001) found that opportunities for literacy interactions during the child's first year of school was positively correlated with children's vocabulary comprehension and word decoding during reading. Bus, van IJzendoorn, and Pellegrini (1995) conducted meta-analyses on the effect of book reading on language, reading skills, and reading achievement. They found that reading to children had a medium to large effect on children's language and reading performance, accounting for 8% of the total variance.

The benefits of book sharing are not uniform, however, because different parents have different reading styles, and reading style impacts children's cognitive abilities. Parents vary in the number of utterances they make during book reading, the reference of utterances, and the abstraction of utterances (Hammett, Van Kleeck, & Huberty, 2003). Parents also vary in whether or not they use a dialogic style during book sharing, including asking children open-ended questions and questions to extend the story beyond the confines of the book. More important, differences in parental reading style are linked to differences in language acquisition and reading development, with high levels of abstract language (including metalingual language) and a dialogic style being linked to higher levels of language and reading achievement (Deckner, Adamson, & Bakeman, 2006; Reese & Cox, 1999; Van Kleeck, Gillam, Hamilton, & McGrath, 1997; see also Fletcher & Reese, 2005, for a review).

Differences in parental reading style can affect not only the development of abstraction abilities, but also abilities in social cognition. Adrian, Clemente, Villanueva, and Rieffe (2005) found that when parents used more cognitive and emotional terms, and a wider variety of cognitive terms when speaking to their 4- to 5-year-old children, the children performed better on the false-belief task.

Parents change their book-sharing behaviors as the context of reading changes. Van Kleeck and Beckley-McCall (2002) compared how parents read to their two toddlers—one aged 0;9 to 1;3, and the other aged 2;8 to 4;9—both separately and together. They found that when parents read to the youngest child alone, linguistic complexity and abstraction were low; whereas when reading to the eldest child alone, linguistic complexity and abstraction were higher; and when reading to both children, it fell in between. Thus, the age of the child, and whether older and younger children are read to at the same time or independently, changes how parents share books.

Given that the way in which parents share books affects children's later cognitive abilities, and that reading context changes how parents share books with their children, we investigated whether and how book content influences parents' conversations with toddlers. First, we were interested in finding out how prevalent humor is in books for 1- to 2-year-olds as compared to other violations of intention, convention, or fact including mistakes, pretense, lying, false belief, and metaphors. In Study 1, we conducted a corpus analysis on children's books to investigate this question.

Next, across two studies, we compared parents' extra-textual utterances (ETUs) during book sharing of humorous and non-humorous content. We were interested in how humor shapes

parent–child interactions because we reasoned that humor is a complex mental state that involves understanding that someone else intends to say something wrong, but does not intend for the audience to believe what they have said (what Kotthoff, 2003, called perspective and counter-perspective). At the same time, humor is pleasurable and rewarding for both parents and children, so we expected that it is a likely early context for learning about complexity in the world.

In Study 2, parents read a book to their 19- to 26-month-olds, which contained both humorous and non-humorous pages. We compared the ETUs across these page types to ascertain whether humorous material encourages parents to use a higher percentage of high abstraction ETUs. In Study 3, we rewrote two versions of a book: one humorous and one not. Parents read one of the two books to their 18- to 24-month-olds. As humor needs to provide a counter-perspective (Kotthoff, 2003), we sought to ascertain whether humorous material leads to more disbelief statements. To test this hypothesis, we coded the number of ETUs in which parents showed that they intended for their child to disbelieve that a past declarative sentence was conveying accurate information about the social or physical world. We also coded children's laughter and number of utterances in order to see how these were affected by book type and parental interactions.

We chose storybook reading as the experimental paradigm for studying how parents support humor understanding and teach their toddlers about abstraction and disbelief because it is an enjoyable setting that would naturally constrain the conversations that parents have with their toddlers. We chose to study 18- to 26-month-olds because, according to McGhee (1979), toddlers start to appreciate humor in general at 18 months, but do not start to appreciate verbal humor until 2 years, making this a perfect window for parents to scaffold the concept of verbal humor.

## 2. Study 1

Humor, by definition, is based on incongruity and is, therefore, a form of *wrongness* (e.g., Attardo, 1997; Deckers & Kizer, 1975; Forabosco, 1992; Hillson & Martin, 1994; McGhee, 1979; Nerhardt, 1976; Shultz, 1974, 1976; Wicker, Thorelli, Barron, & Ponder, 1981). We define wrongness as a violation of intention, convention, or fact. For example, a recent humorous book aimed at parents as much as children, "Baby Make Me a Drink," violates both the facts of infant capabilities and social conventions about parental behavior (Brown, 2005). Obviously, not everything that is a violation of intention, convention, or fact need be humorous: Mistakes, pretense, lying, false belief, and metaphors all involve violations of intention, convention, or fact, but none of these forms of wrongness are humorous. Mistakes are violations of intention and sometimes of convention: Mistakes occur when a person intends to do one action, but instead does another, such as pouring tea on the table instead of in a cup (Hoicka & Gattis, 2008). Pretense is a violation of fact because it involves using an object as if it had affordances that it does not (Leslie, 1987; Lillard, 1993). Pretending a banana is a phone is a violation of the fact that a banana does not transmit sounds across distances. Lying is a violation of fact, combined with the intention to deceive (Leekam, 1991). If a child says that he has not eaten cookies when he has, his utterance is wrong because it is a

violation of fact, uttered with the intention to deceive. False beliefs are violations of fact, but in the absence of true knowledge and of any intention to deceive (Wimmer & Perner, 1983). Metaphors are violations of fact because they are not literally true (Glucksberg, 2003). Even the messiest person is not literally a pig, and in this sense metaphors are a form of wrongness as well. Any of these forms of wrongness have the potential to allow parents to convey the abstraction inherent to wrongness, as well as convey their disbelief that the wrongness should occur.

We conducted a corpus analysis to identify the relative frequency of each of these forms of wrongness in children's books. We reasoned that humor would be the most frequent form of wrongness used in books aimed at toddlers because (a) it requires fewer cognitive abilities than other forms of intentional wrongness (pretense, lying, false belief; Hoicka & Gattis, 2008), and (b) it is a more enjoyable form of conveying wrongness than mistakes (as well as, perhaps, lying, false belief, and metaphor) because it conveys positive emotion.

Twenty books were randomly selected from a list of library-recommended books for 1- to 2-year-olds. Books were coded for whether or not they contained each of the following forms of conveying wrong information about the physical or social world: (a) humor, (b) mistakes, (c) pretense, (d) lying, (e) false belief, and (f) metaphor. Where the nature of the story was make-believe, such as talking animals, the book was coded as pretense.<sup>2</sup> Twenty percent of the sample (4 books) was second-coded by a rater naïve to the hypotheses of the corpus analysis. Raters had 100% agreement.

A Friedman analysis, which detects nonparametric, within-group differences between multiple categories, was run across the six categories; and a significant result was found,  $\chi^2(5, N = 20) = 35.75, p < .001$ . *Post-hoc* Wilcoxon Signed Ranks Tests, which detect nonparametric, within-group differences between two categories, revealed that significantly more books contained humor than mistakes,  $z = 2.24, p = .025$ ; pretense,  $z = 2.89, p = .004$ ; lying,  $z = 3.32, p = .001$ ; false belief,  $z = 3.0, p = .003$ ; and metaphor,  $z = 3.32, p = .001$ . Fig. 1 shows the number of books containing each type of wrongness.

Thus, humor is the most frequent form of wrongness within storybooks for 1-to 2-year-olds to gain access to counter-perspectives. Indeed, of the 13 books containing any form of wrong information, only two did not contain humor.

### 3. Study 2

In our second study, we investigated whether humor leads to greater abstraction during parent-toddler conversations surrounding book reading. Like pretense, metaphor, and other forms of creative expression, humor involves representing a situation, utterance, or object in two ways at the same time. All of these contexts involve representing a specific content, and at the same time representing an attitude toward that content. Comprehending pretense, for instance, involves recognizing what an object is and how it is normally used (a banana is for eating), and an actor's attitude toward that object in this particular situation (the banana is now being used as a telephone). Humor comprehension similarly involves understanding at a literal level what another person has said or done, and understanding the speaker or actor's attitude toward what has been said or done. On this basis, we reasoned that parents reading to

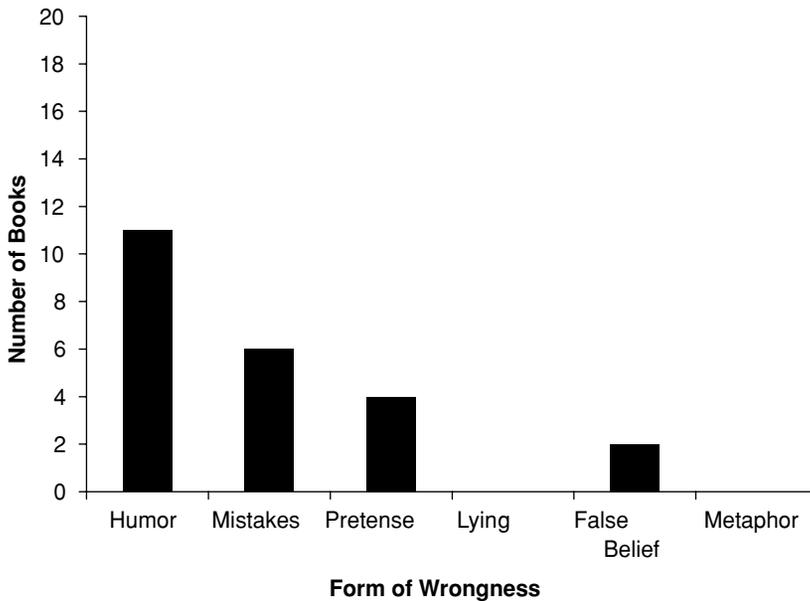


Fig. 1. Number of books containing different forms of wrongness.

toddlers might make more abstract comments to toddlers when reading humorous sentences compared to non-humorous sentences.

Van Kleeck and colleagues (1997) differentiated four levels of abstraction to measure the nature of parental scaffolding of abstract concepts. In Level-1 utterances, the parent labels perceptual items in the book. In Level-2 utterances, the parent relates multiple perceptual items in the book. In Level-3 utterances, the parent relates the story to the real world. In Level-4 utterances, the parent uses imagination or inference. We expected parents to use a higher percentage of high level abstract ETUs when sharing humorous pages.

### 3.1. Method

#### 3.1.1. Participants

Fifteen mother–toddler dyads and 5 father–toddler dyads participated. Ten toddlers were boys, and 10 were girls. The infants were aged 19 through 26 months, with a mean age of 21 months and 24 days. No participants dropped out of the study. Participants were recruited through day care centers, play groups, and libraries.

#### 3.1.2. Materials

The book used in this study was *One Gorgeous Baby* by Martine Osborne and Ingrid Godon (2004; see Appendix A. Appendix material is available at <http://www.cogsci.rpi.edu/CS-Jarchive/Supplemental/index.html>). A Sony digital video camera, a Sony DV cam recorder, and a mixing board were used to record the reading session. Materials also included a questionnaire that asked for humor ratings (0–9) for each page of the book.

### 3.1.3. Design

This was a within-subjects design. The independent variable was whether pages had high or low humor ratings. The dependent variables were the percentages of parental ETUs for each level of abstraction (1–4), as well as the percentages of parental ETUs for high abstraction in general (Levels 3 and 4).

### 3.1.4. Procedure

Parents signed consent forms and were asked to read a book to their child as they would at home. The parent was given the book to read alone before reading aloud to the child. Parent–toddler dyads were brought into the lab and asked to sit on the sofa and to read the book when ready. When they were done reading, parents filled out a questionnaire asking them to rate each page for humor (0–9). Parents were debriefed.

### 3.1.5. Coding

Each video file was transcribed. Each ETU that related to the content of the book was categorized for level of abstraction (abstraction level definitions based on Danis, Bernard, & Leproux, 2000; and Van Kleeck et al., 1997):

- Level 1 (perceptual identification): The utterance refers solely to one object pictured in the book. This level includes object labelling either at the basic, subordinate, or superordinate levels. It also includes stating an intrinsic property of the object (e.g., color) or drawing attention to the object or one of its properties. Examples are “What’s that?,” “Where is the chicken?,” “Look how big it is,” and “It’s a car.”
- Level 2 (perceptual relationship): The utterance links two objects or events that are both represented in the picture. The link may involve an intrinsic property (same color), spatial relation (left of, above), a common action (X and Y produce something, or X acts on Y), or a common feeling. Examples are “This shoe is like this other shoe,” “All the green peas are in their pods,” and “She’s wearing a blue jumper.”
- Level 3 (displaced reference): The utterance links a pictured object or event with an object or event that is absent either in space (spatially displaced reference) or time (past talk), typically including subjective experiences with the object. Examples are “This apple is green like your bike,” “Do you remember the swans you saw in the park?,” and “It’s scary in the woods, it’s all dark.”
- Level 4 (inference): The utterance conveys one or several inferences, including logical reasoning and imaginary description, or states some social knowledge. Examples are “He’s saying, ‘I like my pyjamas’ isn’t he,” “What do you think he’s feeling now?,” and “Where is the rabbit going to go next?”

An independent rater coded 25% of the participant scripts, randomly selected. The interrater reliability was good, with a Cohen’s kappa of 0.69. Appendix B (Appendix material is available at <http://www.cogsci.rpi.edu/CSJarchive/Supplemental/index.html>) gives examples of category ETUs at different levels of abstraction in the transcripts.

### 3.2. Results

The numbers of ETUs for each abstraction category were summed across the three most humorous pages and the three least humorous pages, as rated by the parents.

Because 1 parent made no ETUs, her data were eliminated from the analyses. Parents used a significantly higher percentage of Level-4 ETUs during the humorous pages ( $M = 11.70\%$ ,  $SD = 23.06\%$ ) than during the non-humorous pages ( $M = 2.95\%$ ,  $SD = 5.48\%$ ),  $t(18) = 2.92$ ,  $p = .009$ . No difference was found for percentage of Level-1 (humorous:  $M = 44.56\%$ ,  $SD = 34.27\%$ ; non-humorous:  $M = 59.00\%$ ,  $SD = 25.38\%$ ), Level-2 (humorous:  $M = 17.41\%$ ,  $SD = 17.01\%$ ; non-humorous:  $M = 23.28\%$ ,  $SD = 20.91\%$ ), or for Level-3 ETUs (humorous:  $M = 26.33\%$ ,  $SD = 28.13\%$ ; non-humorous:  $M = 14.78\%$ ,  $SD = 15.04\%$ ).

Means for the percentage of high abstraction ETUs (Levels 3 & 4) for each humor level can be found in Fig. 2. Parents used a significantly higher percentage of high abstraction ETUs during the humorous pages than during the non-humorous pages,  $t(18) = 2.82$ ,  $p = .011$ .

### 3.3. Discussion

When parents read humorous pages compared to non-humorous pages, they used a higher percentage of high abstraction ETUs. Abstract ETUs could help toddlers understand that what parents are saying is intended to be humorous by pointing toddlers toward the basis for humor,

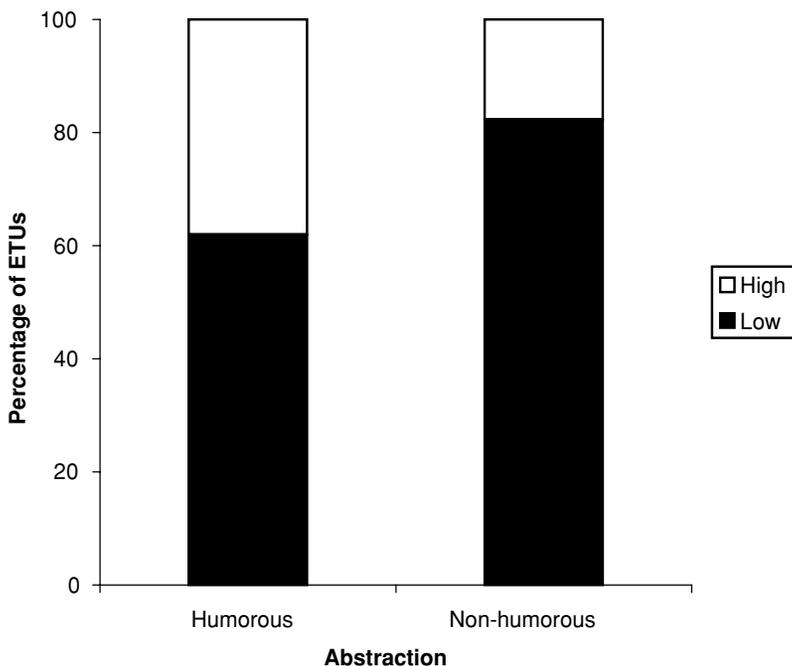


Fig. 2. Percentage of high and low abstraction extra-textual utterances (ETUs) for humorous and non-humorous pages.

the violations of convention, or fact inherent to humor. For example, when reading the page, “four clean nappies” (see Appendix A), one parent said, “Do you throw nappies around?,” thus pointing out the violation of social convention that served as the basis for humor in that scenario.

Although the current study showed that parents used a higher percentage of abstract language when reading humorous pages of a book, we were interested in finding out more specifically how humor leads to this difference. As humor involves violations of convention or fact, we would expect parents reading humorous texts to use more ETUs to indicate counter-perspective by communicating disbelief, cuing toddlers not to interpret humorous statements literally. We reasoned that disbelief statements might be underlying the increase in abstraction by referring to ideas outside of the book, including general social knowledge. Our third study investigated this possibility.

#### **4. Study 3**

According to Raskin (1998), joke telling is “a mode in which the speaker is not committed to the truth of what is being said and the hearer is aware of this non-commitment” (p. 99). Parents and toddlers are, therefore, faced with a conundrum when reading humorous books. Books are normally read to convey information, and reading books to children normally involves a commitment to the truth of what is said in the book. However, humorous books include information that conflicts with the child’s prior knowledge or beliefs. Thus, when parents are reading humorous books, they need to signal to children that this information is not literally true. As toddlers are only beginning to understand jokes (McGhee, 1979), parents should offer toddlers cues to make them aware of the parents’ non-commitment to the truth in this specific context. A book-sharing context is particularly ideal for parents to make such statements as Devescovi and Baumgartner (1993) have suggested that adults naturally scaffold the child’s understanding to appreciate incongruities more in the storybook reading context than in real life. We predicted that parents reading humorous texts would ask questions and make statements to provide counter-perspective, pointing out the conflicts with prior knowledge and beliefs and letting their toddlers know that previous humorous statements were not intended to be interpreted literally.

More specifically, we predicted that parents reading a humorous book versus a non-humorous book would make more ETUs that could cue toddlers that the parents did not intend for them to believe previous declarative sentences to be accurate depictions of the physical and social worlds. Furthermore, we predicted that parents’ use of disbelief statements would reflect the humorous nature of the sentence rather than the wrong nature of the sentence only. Thus, we predicted that the quality of parents’ disbelief statements following humorous sentences and mistakes (spontaneously made by either parents or toddlers) would differ. Finally, we predicted that toddlers would be able to (a) differentiate the book types; and (b) differentiate when parents did or did not use disbelief statements through laughter (in recognition of humor), utterances (showing engagement in book reading), or both.

## 4.1. Method

### 4.1.1. Participants

Forty-five mother–toddler dyads and one father–toddler dyad participated. Five mother–toddler dyads were dropped from the study because the children were restless, leaving 40 mother–toddler dyads and 1 father–toddler dyad. Toddlers were aged 18 to 24 months, with a mean age of 20 months and 9 days. Twenty-seven of the toddlers were girls, and 15 were boys. Twenty-two of the parents participated in the humorous condition, and 19 participated in the non-humorous condition. Parents were recruited as in Study 2.

### 4.1.2. Materials

The books used in this study were edited versions of “One Gorgeous Baby” by Martine Osborne and Ingrid Godon (2004). The book for the non-humorous condition was renamed “One Lovely Baby,” which contained non-humorous sentences (e.g., “Baby loves mummy’s cuddle”; see Appendix C. Appendix material is available at <http://www.cogsci.rpi.edu/CSJarchive/Supplemental/index.html>). The book for the humorous condition was renamed “One Funny Baby,” which contained humorous sentences (e.g., “Mummy drinks baby’s bottle”; see Appendix D. Appendix material is available at <http://www.cogsci.rpi.edu/CSJarchive/Supplemental/index.html>). Some pictures in the humorous condition were altered to correspond to sentence content.

The nature of the humor in the humorous book was varied and based on past research. Because Hoicka and Gattis (2008) found that 19- to 24-month-olds understand that incongruous actions on objects are humorous, one page depicted the father putting a banana on the baby’s head. Because Johnson and Mervis (1997) recorded a child joking by using nonsense words at 22 months, one page displayed this humor type (“Giraffe says, ‘Oo boogle boo.’”). Johnson and Mervis also recorded a child joking by making a wrong animal noise (incongruous attribute), thus we also included the joke, “The ducks say, ‘Moo.’” Finally, Sroufe and Wunsch (1972) found that 10- to 12-month-olds laughed at social stimuli (e.g., mother putting a bottle in her mouth), thus two of the jokes involved this form of humor (Mummy drinking a bottle; Mummy feeding a toy zebra).

### 4.1.3. Design

This was a between-subject experiment. The between-subject independent variable was whether the book contained humorous or non-humorous sentences and images. The dependent variables included (a) the total number of non-humor specific parental disbelief statements, (b) the total number of humor-specific parental disbelief statements, and (c) the total number of story content-related declaratives not described as (a) or (b). Details of the categories are in the coding section.

A categorical analysis was also run. The independent variable was whether the declarative sentence for which a non-humor specific disbelief statement had been said was humorous or a spontaneous mistake by a parent or toddler. The dependent variable was whether the disbelief statement was a question or statement.

In order to detect differences in children’s responses, independent variables were whether the book was humorous or non-humorous, and whether the parents had used non-humor

specific disbelief statements. The dependent variables were whether the child ever laughed during book reading, and how many utterances each child made.

#### 4.1.4. Procedure

This was the same as Study 2, except that parents did not rate the pages of the books for humor.

#### 4.1.5. Coding

Parents' and children's utterances were transcribed from video. Utterances were coded into three categories. First, parents' non-humor specific disbelief statements were coded as any questions or statements made by parents that conveyed that they did not believe that a previous story content-related declarative was an accurate portrayal of the physical or social world, either using explicit negation (e.g., "Ducks don't say moo") or implicit negation (e.g., "What are ducks supposed to say?"; "Ducks really say quack"). Second, parents' humor-specific disbelief statements (e.g., "That's *silly*") were coded by running a word search on humor-specific words (funny, silly, humor, joke, and variations thereof) through the transcripts. Third, parents' story content-related declaratives not classified as (a) or (b)—for example, "You like strawberries"—were coded. This was a selective coding system: All other utterances including utterances that did not relate to the book (e.g., asking the child to sit down), commands, questions that were not disbelief statements, unfinished sentences, and non-declarative comments such as "um" or "yeah" were not coded. Videos were watched while coding to resolve potential ambiguities.

For secondary analyses, non-humor specific disbelief statements were subdivided into questions and statements. We then coded sentences prior to non-humor specific disbelief statements as jokes or mistakes. Jokes were sentences in the humorous book, whereas spontaneous mistakes were utterances not contained in the book, which generally consisted of the child mislabelling animals, animal noises, objects, or people. For example, one child pointed at a giraffe and said, "horse." See Appendix E (Appendix material is available at <http://www.cogsci.rpi.edu/CSJarchive/Supplemental/index.html>) for more examples of mistakes. For child response analyses, videos were coded for whether children laughed during book reading, and the number of utterances made by the children.

Twenty percent of the transcripts (randomly selected) were coded for disbelief statements and declaratives by a rater blind to the hypotheses of the study. Agreement between the raters was good to excellent (Cohen's  $\kappa = 0.75$ ). Twenty percent of the videos (randomly selected) were coded for child laughter by a rater blind to the hypotheses of the study. There was 100% agreement between the raters.

## 4.2. Results

Levene's Test of Equality of Variances was significant when comparing the number of disbelief statements that were non-humor specific,  $F = 28.40$ ,  $p < .001$ ; and humor specific,  $F = 40.35$ ,  $p < .001$ , between conditions. When equal variance was not assumed, parents reading the humorous book made significantly more disbelief statements that were

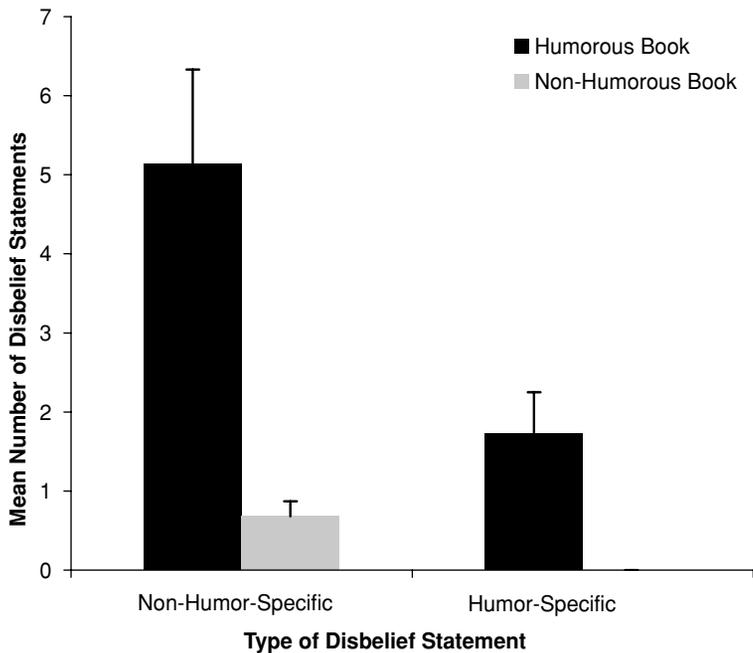


Fig. 3. Number of humor-specific and non-humor specific disbelief statements made by parents reading the humorous and non-humorous books. *Note:* Error bars represent standard deviations.

non-humor specific,  $t(22.05) = 3.69$ ,  $p = .001$ ; and humor specific,  $t(21.00) = 3.30$ ,  $p = .003$ , than parents reading the non-humorous book. See Fig. 3 for means. See Appendix E for examples of disbelief statements. Parents did not significantly differ in the number of story content-related declarative statements made between the humorous ( $M = 30.95$ ,  $SD = 13.84$ ) and non-humorous books ( $M = 29.05$ ,  $SD = 13.31$ ),  $t(39) = 0.45$ ,  $p = .658$ .

A Mann–Whitney  $U$  test, which reveals nonparametric differences between two groups, revealed that if a disbelief statement followed a joke rather than a mistake, it was significantly more likely to be in question than in statement form ( $U = 1,111.50$ ,  $p = .004$ ). See Fig. 4 for percentages.

A Mann–Whitney  $U$  test revealed that toddlers were significantly more likely to laugh when read the humorous book ( $U = 144.00$ ,  $p = .018$ ). Book type (humorous vs. non-humorous) was the only predictor of toddlers' laughter. See Fig. 5 for percentages.

An independent samples  $t$  test measuring the effect of parents' use of non-humor specific disbelief statements on the number of children's utterances violated Levene's Test for Equality ( $F = 9.02$ ,  $p = .004$ ). When equal variance was not assumed, toddlers spoke significantly more often if their parent uttered non-humor specific disbelief statements,  $t(38.75) = 3.60$ ,  $p = .001$ . Parents' use of non-humor specific disbelief statements was the only predictor of toddlers' frequency of speech. See Fig. 6 for means.

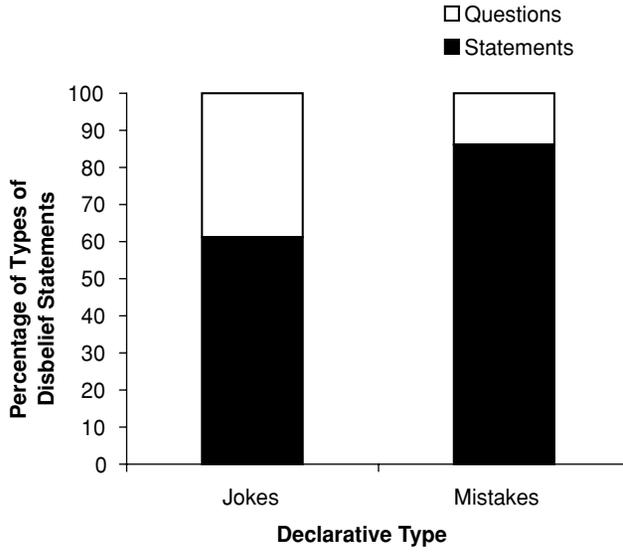


Fig. 4. Percentage of non-humor specific disbelief statements in the forms of questions and statements for jokes and mistakes.

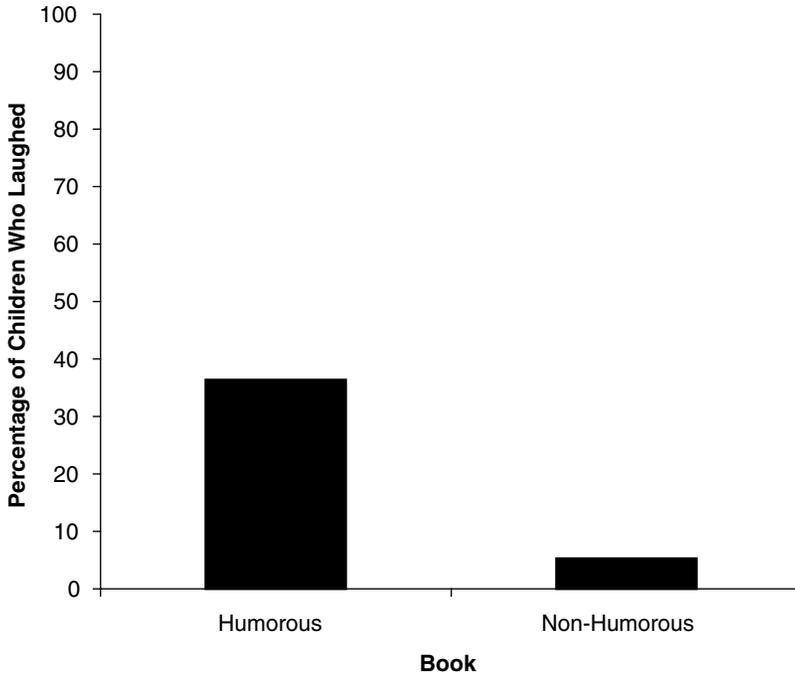


Fig. 5. Percentage of children who laughed when being read the humorous versus non-humorous book.

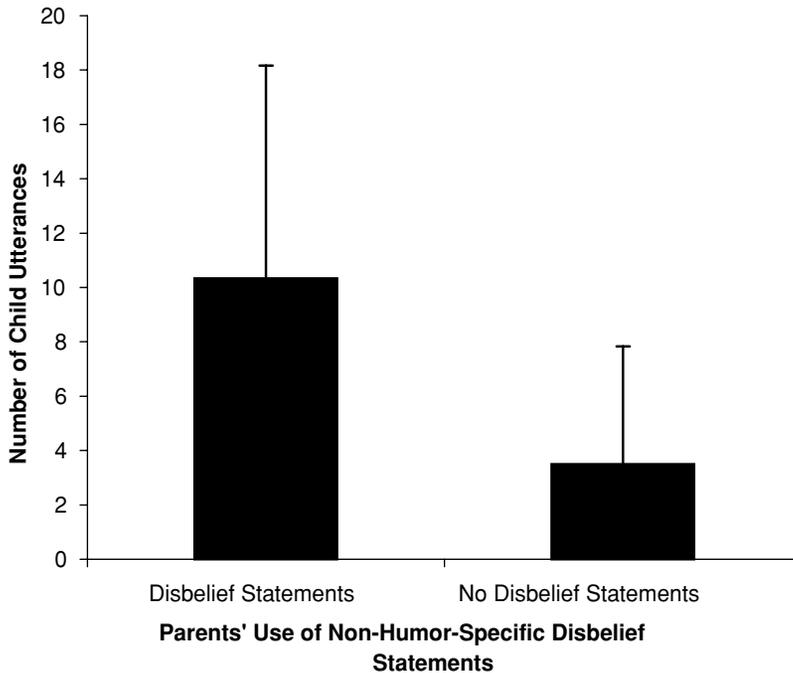


Fig. 6. Number of utterances by children whose parents either did or did not use non-humor specific disbelief statements. *Note:* Error bars represent standard deviations.

#### 4.3. Discussion

The third study found that parents used significantly more non-humor specific and humor-specific disbelief statements when reading the humorous book. Furthermore, parents used the same number of story content-related declaratives in both conditions. Parents differentiated their feedback between humorous sentences and spontaneous mistakes by requesting proportionally more information from the children after a humorous sentence was said versus when either the child or parent had spontaneously made a mistake during book reading or the accompanying conversation.

The analyses also revealed that toddlers can differentiate humorous and non-humorous books, as toddlers who were read humorous books were significantly more likely to laugh. Toddlers whose parents uttered non-humor specific disbelief statements also spoke more themselves. It is interesting to note that the parents' efforts had no effect on whether or not the child laughed, whereas the book type itself did; the parents' use of disbelief statements, increased by reading humorous books, had an effect on toddlers' number of utterances, whereas book type itself did not. Thus, the presence of humor seems to determine laughter, whereas the type of parental talk seems to determine the child's talkativeness.

## 5. General discussion

The current studies investigated humor as a context for learning about abstraction and disbelief, and more specifically how parents support humor understanding during book sharing with their toddlers. In the first study, we found that humor is the most prevalent form of wrongness in books aimed at 1- to 2-year-olds. In the second study, we investigated whether parents would make more abstract comments when book content was humorous. In the third study, we examined whether parents would increase the use of a specific type of abstraction when book content was humorous—namely, comments indicating that the toddler should disbelieve a past statement due to its conflict with physical or social norms.

The second study found that when parents read humorous book pages, they use a significantly higher percentage of high level abstract ETUs. Torreano, Cacciari, and Glucksberg (2005) reported that the level of abstraction of verbs serves as a cue to metaphor. In their study, adults were more likely to judge a sentence as metaphorical when the verb could be interpreted abstractly. Our results suggest that humor may be similar to metaphor. Parents may use abstract language as a means of cuing toddlers to the presence of humor.

An alternate explanation for why parents might use high abstraction language when reading the humorous pages is that they might expect their toddlers to find the humorous pages to be difficult, and so use high abstraction language to help them understand a difficult (abstract) concept, rather than humor, *per se*. However, in Study 3, a significantly higher percentage of children laughed at the humorous book as compared to the non-humorous book, suggesting that they did indeed understand the book to be humorous rather than difficult. Furthermore, if parents were to use disbelief statements, a form of abstraction, when the child found the joke to be difficult, one would expect that parents would use disbelief statements when their children did not laugh, as a lack of laughter may indicate difficulty. However, there was no relation between the use of disbelief statements and the laughter of children being read the humorous book. Thus, it is unlikely that parents used abstract language as a response to children's behavior or because they had noticed that the children found the jokes to be difficult.

The third study found that when parents read humorous book pages, they used significantly more non-humor specific and humor-specific ETUs that express that they intended for their toddler to disbelieve a past declarative sentence as being an accurate depiction of the physical or social world. Furthermore, parents did not differ in the number of general declarative sentences used between the different book types, showing that the increase was not due to increased talking in general.

Several theorists of humor have proposed that humor involves a framing effect in which something is said, and then is placed in perspective by a subsequent comment or other cognitive adjustment (Kotthoff, 2003; Yus, 2003). A mature listener may be able to appreciate this framing and make subsequent adjustments in meaning on their own. Our results demonstrate that parents expose toddlers to this difficult framing task by making extra-textual comments that clearly communicate that an incongruous, humorous statement or situation is not meant to be believed as an accurate depiction of the physical or social world, but should be relabelled as humorous.

### *5.1. Humor versus mistakes*

One could argue that parents' increased use of non-humor specific disbelief statements was not due to the humorous nature of the sentences, but to the misinformation contained within them. However, comparing humorous sentences to spontaneous mistakes, another way in which to give misinformation, the analysis showed that parents requested, rather than stated, proportionally more information from their children after a humorous sentence. Thus, toddlers have more opportunities to use independent divergent and convergent thinking after a humorous sentence than after a mistake. Furthermore, humor is the most prevalent form of wrongness within books for 1- to 2-year-olds, as demonstrated in the corpus analysis, and so is the most prevalent form in which parents have an opportunity to comment on wrongness—even more prevalent than mistakes.

### *5.2. Children's responses*

The analyses of children's responses revealed that, although humorous book content caused children to laugh, the content of parental talk did not. This difference indicates that toddlers could detect and appreciate book humor. Second, children spoke more if their parents uttered non-humor specific disbelief statements, but book content had no effect. This suggests that talking about humor elicits conversational participation from toddlers. Further research is needed to determine how well children comprehend new jokes with the aid of non-humor specific disbelief statements.

### *5.3. Implications*

One important practical implication of these results is that book content can indeed change the way in which adults speak to their children, and more specifically that reading humorous books increases abstraction in parents' conversation with their toddlers. Our results are consistent with Sorsby and Martlew's (1991) report that parents made comments higher in abstraction in abstract tasks than in concrete tasks, but also demonstrated that increasing abstraction in conversation can be inherently rewarding. Reading humorous books provides an important opportunity for parents to shape children's cognitive development in a context that is pleasurable and rewarding for both parents and children.

A second possible implication of our results is that exposure to humorous reading materials may increase toddlers general abstraction abilities later in life. Van Kleeck et al. (1997) found that the children of parents who used more high abstraction utterances when reading books developed better abstraction abilities later in development. This suggests that if parents were to read more humorous books, their children would hear more high abstraction language, and would therefore better develop their general abstraction abilities. Future research should investigate this possibility.

The percentage at which parents use high abstraction language in the humorous condition is ideal for scaffolding abstract language comprehension and production in toddlers. Hammett et al. (2003) suggested that the ideal level at which to scaffold abstract language is at 70% low abstraction and 30% high abstraction. Indeed, children of parents who use this percentage of

low and high abstraction had greater gains in Level-4 abstraction 1 year later (Van Kleeck et al., 1997). The percentage of high abstract language that parents used when reading humorous pages was 38% compared to 18% for non-humorous pages. Thus, humorous book-reading materials create an ideal environment for toddlers to learn abstract language.

In the third study, parents supported the idea that one can intentionally say the wrong thing. Tomasello (2003) stated that, “Negation . . . clearly reflects a speaker’s attitude” (p. 226). Thus, by negating previous humorous sentences (either explicitly or implicitly), parents reveal that what they said is not what they believe to be accurate in the physical or social world. Intentionally saying or doing the wrong thing is an important aspect of understanding other intentional states such as pretending, lying, and false beliefs (Leekam, 1991). Hoicka and Gattis (2008) found that toddlers understand humorous intentions from 25 months of age—earlier than they understand intentions of pretense (Rakoczy et al., 2004), lying (Siegal & Peterson, 1996, 1998), and false beliefs (Perner et al., 1994). Parents’ use of language to indicate that they intended a previous utterance to be disbelieved as accurate information could be an initial cue used by toddlers to understand that others can intend to say or do the wrong thing in general.

Finally, in figuring out what the right scenario is after hearing a humorous sentence, toddlers can develop their creative thinking skills. For example, after hearing the humorous sentence, “The ducks say moo,” and the disbelief statement, “Ducks are supposed to say quack,” the toddler has an opportunity to practice divergent thinking, abstracting up to categories befitting ducks (animals) and moo (animal noises), followed by an opportunity for convergent thinking—that is, linking the correct information from the two categories (i.e., “Ducks say quack,” allowing the toddler to reject the previous wrong statement). These are abstract thought processes linked to creative thought, also used in art and science (Koestler, 1966).

#### *5.4. Future directions*

This study tells us what extra information children are exposed to when parents read humorous books. Past research suggests that high abstraction language should increase toddlers’ later abstraction abilities (Hammett et al., 2003; Van Kleeck et al., 1997); thus, future research should look into a direct link between humorous experience and later abstraction abilities. Future research should also investigate whether exposure to disbelief statements has a positive effect on toddlers’ understanding of others’ beliefs and intentions.

#### *5.5. Conclusions*

The current study found that humor is the most prevalent form of wrongness in books aimed at 1- to 2-year-olds. The current study also found that parents use more high abstraction language when reading humorous storybook content to their toddlers. More specifically, parents increase their use of disbelief statements when reading a humorous book. Together, these studies suggest that humor naturally lends itself to the use of abstract language and, more specifically, belief-based language in parent–child conversation.

## Notes

1. Although Rakoczy and Tomasello (2006) found that 22-month-olds understand the intention to pretend, it is possible that their results were due to a training effect during the warm-up.
2. Talking animals in books may not be pretense, to the extent that many parents do not comment on this violation of fact, but instead accept it as a special context. We coded talking animals as pretense because this is the most conservative way to code it given our hypothesis.

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## References

- Adrian, J. E., Clemente, R. A., Villanueva, L., & Rieffe, C. (2005). Parent-child picture-book reading, mothers' mental state language and children's theory of mind. *Journal of Child Language*, *32*, 673–686.
- Attardo, S. (1997). The semantic foundations of cognitive theories of humor. *Humor: International Journal of Humor*, *10*, 395–420.
- Brown, L. (2005). *Baby make me a drink*. San Francisco: McSweeney's.
- Bus, A. G., van IJzendoorn, M. H., & Pellegrini, A. D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research*, *66*(5), 1–21.
- Danis, A., Bernard, J. M., & Leproux, C. (2000). Shared picture-book reading: A sequential analysis of adult-child verbal interactions. *British Journal of Developmental Psychology*, *18*, 369–388.
- Deckers, L., & Kizer, P. (1975). Humor and the incongruity hypothesis. *The Journal of Psychology*, *90*, 215–218.
- Deckner, D. F., Adamson, L. B., & Bakeman, R. (2006). Child and maternal contributions to shared reading: Effects on language and literacy development. *Journal of Applied Developmental Psychology*, *27*, 31–41.
- de Jong, P. F., & Leseman, P. P. M. (2001). Lasting effects on home literacy on reading achievement in school. *Journal of School Psychology*, *39*, 389–414.
- Devescovi, A., & Baumgartner, E. (1993). Joint-reading a picture book: Verbal interaction and narrative skills. *Cognition and Instruction*, *11*, 299–323.
- Fletcher, K. L., & Reese, E. (2005). Picture book reading with young children: A conceptual framework. *Developmental Review*, *25*, 64–103.
- Forabosco, G. (1992). Cognitive aspects of the humor process: The concept of incongruity. *Humor: International Journal of Humor*, *5*, 45–68.
- Glucksberg, S. (2003). The psycholinguistics of metaphor. *Trends in Cognitive Sciences*, *7*, 92–96.
- Hammett, L. A., Van Kleeck, A., & Huberty, C. J. (2003). Patterns of parents' extra-textual interactions during book sharing with preschool children: A cluster analysis study. *Reading Research Quarterly*, *38*, 442–468.
- Hillson, T. R., & Martin, R. A. (1994). What's so funny about that?: The domains-interaction approach as a model of incongruity and resolution in humor. *Motivation and Emotion*, *18*, 1–29.
- Hoicka, E., & Gattis, M. (2008). Do the wrong thing: How toddlers tell a joke from a mistake. *Cognitive Development*, *23*, 180–190.

- Johnson, K. E., & Mervis, C. B. (1997). First steps in the emergence of verbal humor: A case study. *Infant Behavior and Development*, 20, 187–196.
- Koestler, A. (1966). *Act of creation*. London: Pan.
- Kotthoff, H. (2003). Responding to irony in different contexts: On cognition in conversation. *Journal of Pragmatics*, 35, 1387–1411.
- Leekam, S. (1991). Jokes and lies: Children's understanding of intentional falsehood. In A. Whiten (Ed.), *Natural theories of mind* (pp. 159–174). Oxford, England: Basil Blackwell.
- Leslie, A. M. (1987). Pretense and representation: The origins of "theory of mind." *Psychological Review*, 94, 412–426.
- Lillard, A. S. (1993). Pretend play skills and the child's theory of mind. *Child Development*, 64, 348–371.
- McGhee, P. E. (1979). *Humor: Its origin and development*. San Francisco: Freeman.
- Nerhardt, G. (1976). Incongruity and funniness: Towards a new descriptive model. In A. Chapman & H. Foot (Eds.), *Humour and laughter: Theory, research and applications* (pp. 55–62). London: Wiley.
- Osborne, M., & Godon, I. (2004). *One gorgeous baby*. London: Campbell Books.
- Perner, J., Baker, S., & Hutton, D. (1994). Praelief: The conceptual origins of belief and pretence. In C. Lewis & P. Mitchell (Eds.), *Children's early understanding of mind* (pp. 261–286). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Rakoczy, H., & Tomasello, M. (2006). Two-year-olds grasp the intentional structure of pretense acts. *Developmental Science*, 9, 557–564.
- Rakoczy, H., Tomasello, M., & Striano, T. (2004). Young children know that trying is not pretending: A test of the "behaving-as-if" construal of children's early concept of pretense. *Developmental Psychology*, 40, 388–399.
- Raskin, V. (1998). The sense of humor and the truth. In W. Ruch (Ed.), *The sense of humor: Explorations of a personality characteristic. Humor research 3* (pp. 95–108). Berlin: de Gruyter.
- Reese, E., & Cox, A. (1999). Quality of adult book reading affects children's emergent literacy. *Developmental Psychology*, 35, 20–28.
- Shultz, T. R. (1974). Development of the appreciation of riddles. *Child Development*, 45, 100–105.
- Shultz, T. R. (1976). A cognitive-developmental analysis of humour. In A. Chapman & H. Foot (Eds.), *Humour and laughter: Theory, research and applications* (pp. 11–36). London: Wiley.
- Siegal, M., & Peterson, C. C. (1996). Breaking the mold: A fresh look at children's understanding of questions about lies and mistakes. *Developmental Psychology*, 32, 322–334.
- Siegal, M., & Peterson, C. C. (1998). Preschoolers' understanding of lies and innocent and negligent mistakes. *Developmental Psychology*, 34, 332–341.
- Sorsby, A., & Martlew, M. (1991). Representational demands in mothers' talk to preschool children in two contexts: Picturebook reading and a modelling task. *Journal of Child Language*, 18, 373–395.
- Sroufe, L. A., & Wunsch, J. P. (1972). The development of laughter in the first year of life. *Child Development*, 43, 1326–1344.
- Tomasello, M. (2003). *Constructing a language*. Cambridge, MA: Harvard University Press.
- Torreano, L. A., Cacciari, C., & Glucksberg, S. (2005). When dogs can fly: Level of abstraction as a cue to metaphorical use of verbs. *Metaphor and Symbol*, 20, 259–274.
- Van Kleeck, A., & Beckley-McCall, A. (2002). A comparison of mothers' individual and simultaneous book sharing with preschool siblings: An exploratory study of five families. *American Journal of Speech Language Pathology*, 11, 175–189.
- Van Kleeck, A., Gillam, R. B., Hamilton, L., & McGrath, C. (1997). The relationship between middle-class parents' book-sharing discussion and their preschoolers' abstract language development. *Journal of Speech and Hearing Research*, 40, 1261–1271.
- Wicker, F. W., Thorelli, I. M., Barron, W. L., & Ponder, M. R. (1981). Relationships among affective and cognitive factors in humor. *Journal of Research in Personality*, 15, 359–370.
- Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition*, 13, 103–128.
- Yus, F. (2003). Humor and the search for relevance. *Journal of Pragmatics*, 35, 1295–1331.