Children’s understanding and production of verbal irony in family conversations

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This study examined how children use and understand various forms of irony (sarcasm, hyperbole, understatement, and rhetorical questions) in the context of naturalistic positive and negative family conversations in the home. Instances of ironic language in conversations between mothers, fathers, and their two children (Mages = 6.33 and 4.39 years) were recorded during six 90-min observations for each of 39 families. Children’s responses to others’ ironic utterances were coded for their understanding of meaning and conversational function. Mothers were especially likely to ask rhetorical questions and to use ironic language in conflictual contexts. In contrast, fathers used hyperbole and understatement as frequently as rhetorical questions, and employed ironic language in both positive and conflictual contexts. Children also showed evidence of a nascent ability to use ironic language, especially hyperbole and rhetorical questions. Family members used rhetorical questions and understatement proportionately more often in a negative interaction context. Finally, older siblings understood irony better than younger siblings, and both children’s responses revealed some understanding of ironic language, particularly sarcasm and rhetorical questions. Overall, the results suggest that family conversations in the home may be one important context for the development of children’s use and understanding of ironic language.

Ironic language constitutes one type of utterance for which the speaker’s literal and intended meanings are not the same. Humans are experts at indirectly communicating their attitudes and opinions in ways that help them to negotiate the complexities of interpersonal relationships (Dews, Kaplan, & Winner, 1995; Harris & Pexman, 2003). In this respect, ironic language is useful in the service of various conversational functions, such as criticizing, teasing, and joking. Although, there is a considerable literature on adults’ and children’s understanding of ironic language in laboratory

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settings (see Creusere, 1999), very few studies have examined ironic language during naturalistic conversations. Irony may be a particularly difficult form of language for children to acquire, given that its intended meaning is not stated directly. The goal of this paper was to describe how ironic language is used and understood by young children in family conversations in the home. Studying the development of ironic language may help illuminate one critical aspect of how children become competent adult conversationalists.

**Features of verbal irony**
Non-literal language is a broad term for utterances in which the literal and intended meanings are not the same. Although, this describes many forms of language (such as metaphor, simile, and indirect directives), in the case of ironic language, literal and intended meanings differ specifically in terms of their *strength* or *valence*. Some commonly studied forms of ironic language are sarcasm, hyperbole, understatement, and rhetorical questions (Gibbs, 2000). For sarcasm, the intended meaning is to some degree the opposite of the literal meaning, a difference in valence (e.g., saying ‘Thanks a lot’ to someone who let a door slam in your face). In contrast, the literal and intended meanings of hyperbole and understatement differ in strength but not valence. Compared to the intended meaning, the literal meaning of hyperbole is exaggerated (e.g., ‘I have the biggest sandwich in the world’) and the literal meaning of understatement is muted (e.g., ‘I’m just a tiny bit angry at you right now’). Finally, rhetorical questions are those for which an explicit response is not expected, or for which the intended response differs from that suggested by the question. The intended meanings of these questions typically imply an evaluative message stronger than that of the surface meaning (e.g., ‘How many times do I have to tell you to stop?’).

Using ironic language entails a risk that one’s remark will be misunderstood (Pexman & Zvaigzne, 2004). Despite this risk, verbal irony is used because it can accomplish various conversational goals. Theorists have argued that the prototypical function of irony is to criticize rather than compliment (Sperber & Wilson, 1981). Thus, irony may be used most often, although not exclusively, in contentious or conflictual interactions to indicate anger/irritation. However, Kreuz, Long, and Church (1991) identified a variety of other conversational functions of irony, including humor (e.g., playing, being silly), and engaging in social hedging (e.g., saving face, being modest). Indeed, the relative frequency of these functions depends on the context in which the utterance is made. For example, irony is used for social hedging when the listener has performed poorly and the speaker wants to mute a negative evaluation, allowing the listener to save face (Dews et al., 1995). Family members adopt particular roles during interactions that correspond with varying interaction goals. When interacting with their children, mothers are more managerial and didactic than fathers, whereas fathers are more playful (Parke, 2002). Thus, the relative frequencies of ironic language in particular contexts may vary in predictable ways as a function of parents’ interaction goals. That is, fathers may use ironic language in more playful ways during positive interactions, whereas mothers may use ironic language as an indirect disciplinary and didactic strategy.

**Research on children’s understanding of ironic language**
Previous research on children’s understanding of ironic language reveals that it is a relatively late-developing skill. Laboratory studies suggest that children do not
demonstrate even a nascent understanding of ironic language until 6–10 years of age (e.g., Pexman & Glenwright, 2007). This is not surprising, given the complexity of reasoning required to differentiate literal and deceptive statements from irony. There are a number of distinct inferences required to grasp the meaning and function of ironic language (Ackerman, 1983; Filippova & Astington, 2008; Winner & Leekam, 1991). To illustrate this point, imagine that a child spilled her juice on the floor and continued to play without cleaning it up. Then, suppose her mother made the sarcastic comment, ‘Thanks a lot for cleaning that up’. To understand this statement, the child would first need to detect the incongruity with the context (i.e., I didn’t actually clean up the juice). Next, she would need to infer why her mother is stating something untrue: Does mom believe I cleaned up the juice (a mistake)? If not, does she want me to be misled by her statement (a lie)? Or does she know that I won’t believe her (sarcasm)? If she is saying something untrue that she knows I won’t believe, why is she doing such a thing?

Past research has assessed children’s ability to make each of these distinctions by presenting them with hypothetical scenarios ending in non-literal statements. In one classic study, Demorest, Silberstein, Gardner, and Winner (1983) read stories to children that ended in various types of ironic statements. Children were then asked to indicate what the statement meant, and why the speaker had made the statement. Only 8-year-olds correctly recognized the discrepancy between literal and intended meanings, and it was not until after age 10 that children understood the communicative function of irony. Further, children’s understanding of sarcasm was better than hyperbole and understatement (see also Winner et al., 1987). Demorest et al. (1983) argued that sarcasm was easier to understand because of the greater discrepancy between literal and intended meanings. When children made errors, they misinterpreted ironic statements equally often as mistakes and lies. However, the nature of errors differed between irony types – children more often interpreted understatement as literal, whereas they interpreted sarcastic utterances as lies. Hyperbolic statements were mistaken for either mistakes or lies (Demorest et al., 1983; Winner et al., 1987).

In addition, Andrews, Rosenblatt, Malkus, Gardner, and Winner (1986) found that there was a clear shift in children’s ability to differentiate sarcasm from mistakes and lies between first and third grade. Their results suggested two important conclusions about the developmental progression of children’s understanding of ironic comments. First, children initially recognized that a statement was incongruent with its conversational context before developing the ability to distinguish between mistakes, lies, and irony. Second, children understood intended meaning before they grasped ironic intent (i.e., to be mean, to be nice; see also Filippova & Astington, 2008). Understanding of the humour and teasing functions of irony appears to develop especially late, around 8–10 years (Pexman, Glenwright, Krol, & James, 2005).

Unfortunately, with the exception of a few early studies, research has focused primarily on children’s understanding of sarcasm, and so less is known about their understanding of other forms of ironic language. An additional limitation of previous research is that children’s understanding of ironic language has been tested almost exclusively using hypothetical scenarios in a laboratory task. Given that these stories lack the rich contextual support of actual interactions, children may not perform as well as in more meaningful contexts with familiar partners. Chandler, Fritz, and Hala (1989) showed that children demonstrate precocious performance on false-belief tests when they themselves are engaged in the task. Further, Dunn (1996) suggested that children reveal early ‘understanding-in-action’ for a variety of social-cognitive skills when they are engaged in interesting, emotionally-relevant interactions with familiar others.
(e.g., parents, siblings). Similarly, Nelson (1986) argued that children’s advanced performance in naturalistic settings stems not only from their unfamiliarity with laboratory tasks, but also from the fact that their knowledge is inherently connected to their everyday experiences. Indeed, Carpendale, and Lewis (2004) have claimed that children come to understand language via social interaction. Specifically, they propose that the foundations for children’s later explicit understanding of ironic language are formed during their early participation in conversations in which this language is used. In sum, all of these social constructivist arguments imply that (a) early in life, children are exposed to ironic language in interpersonal interactions, (b) children’s ability to use and respond to ironic language in naturalistic interactions will exceed their performance on laboratory assessments, and (c) the understanding suggested by children’s responses to ironic language in early conversations will mirror the patterns in children’s later performance on more formal measures. Our study was an initial descriptive attempt to test these three assumptions.

Research on production of ironic language
Although there is a large body of research on children’s and adults’ irony understanding, only a few studies have examined the incidence of irony production by adults, and no quantitative studies have examined this question for children. Tannen (1984) found that during one conversation around the dinner table, a group of 20- to 30-year-old friends used irony/humour in 7% of all conversational turns. However, the author did not differentiate between ironic and nonironic humour in computing this proportion. Nevertheless, this incidence is corroborated by Gibbs (2000), who reported that college students used irony in 8% of conversational turns during talk with friends. Analyses included over sixty 10 min conversations recorded by students; sarcasm was most frequent, followed by hyperbole, then rhetorical questions, and finally understatement. Using a task specifically designed to elicit irony in conversations between strangers, Hancock (2004) reported similar rates of ironic language use. Thus, at least in conversations between adults, verbal irony appears to occur fairly frequently.

Only a few studies of parents’ use of non-literal language with their children have been conducted to date. Sell, Kreuz, and Coppenrath (1997) observed parents during a half-hour laboratory free-play task with their children. Although, parents used a number of non-literal speech forms during these interactions (e.g., indirect directives, metaphors), no utterances were coded as ironic. However, given the common parental belief that ironic talk to children is harmful (Dyer-Seymour & Callanan, 2005), parents may have avoided using this type of language because they were conscious of being recorded in the laboratory. In contrast, Recchia, Howe, and Alexander (2005) found that mothers did use some ironic language with their preschool children in the home. Even these young children occasionally responded to ironic utterances in ways that demonstrated an understanding of the discrepancy between literal and intended meanings and/or an understanding of the conversational function of the utterances. However, this study was based on less than 2 h of observation for each of 32 families. As such, this study did not include reliable estimates of the relative frequencies of particular types of ironic language in various contexts (e.g., conflict, positive interactions), nor did it include comparisons between mothers’ and fathers’ ironic language. Qualitative studies also provide suggestive evidence of children’s early production of certain forms of ironic language. Varga (2000) reported clear examples of hyperbole in preschoolers’ language play with their peers, and Ely and McCabe (1994) noted instances of both
hyperbole and sarcasm in kindergarten children’s classroom interactions. However, no studies have systematically measured the frequency of children’s use of different forms of ironic language in the family context.

The current study
This study was designed to address a number of gaps in the existing literature. A large observational data set was employed to examine the use of four types of ironic language (sarcasm, hyperbole, understatement, and rhetorical questions) by parents and their 4- and 6-year-old children during interactions in the home. Further, children’s responses to others’ ironic language were coded for their understanding of the implied meaning and conversational functions of verbal irony. Based on the literature, the youngest children in this study would not be expected to pass formal laboratory tests of ironic language understanding. However, we sought evidence of their early attempts to participate in ironic conversations, and of their early responses to this form of communication. We also examined the interaction contexts (i.e., positive interaction vs. conflict) of families’ use of ironic language to investigate whether contextual differences in ironic language use varied between parents and children, as well as between different types of irony.

Summary of hypotheses
Theory suggests that irony may be most frequently used to criticize rather than compliment (Sperber & Wilson, 1981), therefore, overall, we expected ironic utterances to be used proportionately more often in a negative than a positive conversational context. However, compared to mothers, we expected fathers to use more ironic language in playful, positive interactions, given the roles that they adopt in family interactions (Parke, 2002). With regards to developmental differences, we expected 6-year-olds to use irony more often and for their responses to indicate better understanding of the meanings and conversational functions of ironic utterances than their 4-year-old younger siblings. When children did make mistakes in their understanding of others’ irony, we expected the nature of their errors to reflect the pattern of errors revealed in laboratory assessments of older children (Demorest et al., 1983; Winner et al., 1987). Specifically, we expected sarcastic utterances to be misinterpreted as mistakes or lies, for understatement and rhetorical questions to be interpreted literally, and for hyperbole to be interpreted sometimes literally and sometimes as mistakes or lies.

Method
Participants
Data were taken from the second time point of a longitudinal study that included extensive observations of family interactions (Ross, Filyer, Lollis, Perlman, & Martin, 1994). Forty families were recruited from a mid-sized community in Ontario, Canada via birth announcements in the local newspaper. At Time 1, all families consisted of two parents and two children. Before the second time point (2 years later), one participating family moved out of the region and two sets of parents were separated or divorced. Thus, 39 families participated in the second wave of data collection, however, data were only available for 37 fathers.
At Time 2, firstborn children’s ages ranged from 5.42 to 7.00 years (\(M = 6.33\) years) and secondborn children’s ages ranged from 3.83 to 4.75 years (\(M = 4.39\) years). The sample included 21 same-gender (10 female and 11 male) and 18 mixed-gender dyads (9 older female and 9 older male). Families’ ethnic background (Caucasian), parental ages (25–50 years) and parental education (ranging from some high school to university degree) were representative of the sampled population.

**Procedure**

For 32 participating families, data were based on six 90-min home observations at Time 2. Five of the other participating families were observed 7 times in their homes, one was observed five times, and one was observed three times. Thus, a total of 352.5 h of recorded home observations were included in this study.

For approximately half of the observations, both mothers and fathers were present, while in the remaining sessions only mothers and the two children were present. These two constellations of family members were chosen because they were thought to represent the two most common family contexts. For the two single-parent families, six mother-only observations were included in analyses. To account for differences in the number of recorded hours of observation between families, data were prorated by the number of sessions, and are presented as frequencies per 90 min session. It should be noted that data for fathers were based on a consistently smaller number of observations than reported estimates for other family members.

Observations of family interactions were recorded on audiotape and interactions involving both children were transcribed for later coding. That is, parental speech was only transcribed during interactions with the children. Further, an observer was present during each session and provided a running account of all interactions between the children and any parental behaviours relevant to the children’s interaction. A detailed verbal and non-verbal coding system was used to categorize each interactional unit of family behavior (see Ross et al., 1994). For example, verbal codes included Agree, Insult, Justify, etc. For our purposes, these verbal interactional units were used to account for the total amount of talk by each family member. Families were asked to engage in their normal routines and children were instructed not to interact with the observer. Major distractions such as television and video games were not allowed. Children had to be in the same room and parents had to be near the children for observations to proceed, although absences of up to 2 min were permissible in either case.

**Coding**

**Ironic language coding**

The first step in coding was to identify instances of ironic language use. Coders first identified each verbal line of the transcripts as either literal (i.e., the intended and literal meanings of the utterance are identical) or non-literal (i.e., the intended and literal meanings of the utterance differ in some way). Inter-rater reliability of this initial identification of lines was established between two raters on 30% of the data (70 sessions; \(\kappa = 0.68\), \(M\) agreement = 84%). These decisions were not always clear-cut, as the non-literal nature of the utterance had to be inferred from the context. Contextual information was based on the family behavior coding system described above. Importantly, the child’s response was not used to determine the non-literality of the preceding utterance. However, for example, a literal attempt to teach the child...
(e.g., ‘Why should you stop hitting your brother?’) could be potentially misclassified as a rhetorical question, also leading to difficulties for coding children’s responses to this utterance. As such, coders took a conservative approach in which a line was not coded as non-literal unless both raters agreed that a literal interpretation was not possible. If there was any doubt that the speaker might be speaking literally (e.g., ‘I want to use every single piece of Lego in the house’) or engaging in pretense (e.g., ‘Then I slept all day and all night’), the line was not coded. Even after inter-rater reliability had been established, all non-literal judgments for which a coder was not entirely certain were resolved through discussion and consensus.

Following this initial step, each non-literal utterance was further categorized as hyperbole, understatement, sarcasm, rhetorical question, or jocularity. Definitions and examples of each of these codes are presented in Table 1. For the purpose of further analyses, the first four categories were considered to be forms of irony. The category of jocularity did not meet the specific definition of ironic (in which the literal and intended meanings differ in strength or valence). This type of non-literal utterance reflected a more general tendency to play or tease using language, and thus was not included in analyses. Inter-rater reliability for categories of non-literal language was established on 30% of the data (κ = .88, M agreement = 88%).

Each instance of the four types of ironic language was further coded for speaker (mother, father, older sibling, or younger sibling; κ = .93; M agreement = 92%), target of speech (any combination of family members; κ = .91; M agreement = 91%) and conversational context (κ = .92; M agreement = 93%). Specifically, context was coded as positive (pretense, games, and other conversation) or negative (conflict). These codes were drawn from the coding system used in the original study (see Ross et al., 1994).

Finally, each child’s responses to others’ ironic utterances were coded. Responses could be made either verbally or nonverbally (examples of non-verbal responses included initiating or stopping a behaviour, laughing, or whining). First, coders noted whether the child responded or did not respond to a particular utterance (κ = .72; M agreement = 86%). These judgments were made using counterfactual reasoning; if the child would not have spoken/acted if the ironic utterance had not been made, the response in question was coded. In other words, if the child’s remark could be interpreted as following from an adjacent non-ironic utterance by the speaker, it was not coded as a response. For the cases in which coders judged that the child did respond directly to an ironic utterance, coders assessed the extent to which the child understood the discrepancy between literal and intended meanings (κ = .62; M agreement = 81%) and conversational function (κ = .70; M agreement = 85%) of the ironic statement or question.

Specifically, literal responses were coded when the child’s response appeared to follow directly from the surface meaning (as opposed to intended meaning) of the statement, and they showed no indication of understanding the critical or humour conversational function of the ironic remark. In contrast, the child was coded as understanding discrepancy of meaning if their response indicated awareness that the surface meaning of the statement was incongruent with the conversational context. Alone, this code did not differentiate mistakes, lies, and irony (all of which constitute instances in which the speaker’s meaning is discrepant from the context). However, in combination with the discrepancy of meaning code, the conversational function code did differentiate mistakes and lies from irony. Children were coded as understanding the conversational function of the remark if they responded to the perceived critical function (e.g., by protesting, defending themselves, or complying) or humour function
Table 1. Definitions and examples of categories of ironic and non-literal language

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperbole</td>
<td>An utterance in which the literal meaning of the statement was an exaggeration of the intended meaning</td>
<td>‘She was using it a hundred times’ ‘You never give me an allowance even when I’m good’</td>
</tr>
<tr>
<td>Understatement</td>
<td>An utterance in which the literal meaning of the statement was an understatement of the intended meaning</td>
<td>‘Oh, I guess this’ll cook better if I turn the oven on’ ‘I think you guys are being just a wee bit on the silly side here’</td>
</tr>
<tr>
<td>Sarcasm</td>
<td>An utterance in which the literal and intended meanings of the statement differed in valence (i.e., are opposite to some degree)</td>
<td>(Sam spills marbles) ‘Oh, really nice, Sam’ ‘Thanks a lot, now you wrecked my collection’</td>
</tr>
<tr>
<td>Rhetorical question</td>
<td>A question for which an explicit answer was not expected (most often, a behavioural response was expected in its place), or for which the content of the question was incongruent with the interaction context</td>
<td>‘Do you want soap in your mouth?’ ‘How many times do I have to tell you to stop?’</td>
</tr>
<tr>
<td>Jocularity (not included in analyses)</td>
<td>Non-literal statements that included mocking imitation, teasing, joking, and playful personification of objects</td>
<td>‘You little faker!’ ‘The last one up is a rotten egg’ ‘My bike doesn’t like me’</td>
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</table>
(e.g., by laughing, responding playfully, or teasing) of the ironic remark. Thus, to
demonstrate a full understanding of irony, responses needed to indicate both an
understanding of meaning and conversational function. Codes for children’s responses
and examples are presented in Table 2.

Results
For omnibus analyses, statistical significance was assessed using two-tailed tests with
alpha levels set at \( p = .05 \). The Bonferroni correction was used for all post hoc tests, and
the Greenhouse–Geisser correction was applied when sphericity assumptions were
violated in analyses of variance. The first set of analyses assessed the features of ironic
language use in family conversations and the second examined children’s degree of
understanding of irony.

Features of ironic language use in family conversations
Overall, frequencies indicated that ironic language was used in all 39 families. More
specifically, all older siblings made at least one ironic remark, as did 38 mothers,
26 fathers, and 37 younger siblings. In total, 1,661 ironic utterances were included in
analyses.

Preliminary analyses were conducted to examine child gender effects on family use
of ironic language. ANOVAs did not reveal any unique or interactive effects of children’s
gender on their own use of any of the four types of ironic language. Similarly, an ANOVA
examining parental use of irony (with parent, type of ironic language, and older/younger
target as within-family factors and each child’s gender as between-family factors) did not
reveal that mothers’ or fathers’ use of any type of irony varied as a function of their
children’s gender. As such, to simplify subsequent analyses of families’ production of
ironic language, child gender effects were not considered further.

Frequencies of ironic language in family conversations
First, we conducted analyses to examine, (a) overall rates/session of each family
member’s use of the four types of ironic language, (b) whether family members differed
in their relative use of the four types of language, and (c) whether differences in ironic
language across positive and negative contexts were the same for each family member.
Specifically, we conducted a \( 4 \times 4 \times 2 \) within-family ANOVA with actor (father, mother,
older sibling, and younger sibling), type of ironic language (hyperbole, understatement,
sarcasm, and rhetorical questions), and context (positive and negative) as factors. This
analysis revealed main effects of actor, \( F(1.85, 66.65) = 3.24, p < .05, \eta^2 = .08, \) type,
\( F(2.12, 76.45) = 49.43, p < .001, \eta^2 = .58, \) and context, \( F(1, 36) = 25.93, p < .001, \eta^2 = .42. \) However, these main effects were qualified by two-way interactions between
actor and type, \( F(4.03, 145.19) = 6.61, p < .001, \eta^2 = .16, \) and context,
\( F(2.45, 88.34) = 5.01, p < .01, \eta^2 = .12, \) as well as between type and context,
\( F(2.23, 80.19) = 13.55, p < .001, \eta^2 = .27. \) The three-way interaction between these
variables was not significant.

A comparison of the relative frequencies of the types of irony by each actor revealed
distinct patterns for each actor (see Table 3). Fathers used rhetorical questions more
often than sarcasm (all other contrasts \( ns \). Mothers used rhetorical questions more
frequently than all other types. In turn, understatement and hyperbole were used
<table>
<thead>
<tr>
<th>Type of response</th>
<th>Description</th>
<th>Example</th>
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<tbody>
<tr>
<td>Literal</td>
<td>The ironic remark was interpreted literally; there was no evidence of an</td>
<td>(M makes a suggestion and Y repeats the suggestion)</td>
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<tr>
<td></td>
<td>understanding that the surface meaning of the remark was incongruent with</td>
<td>M: <em>Is there an echo in here?</em> (RHETORICAL QUESTION)</td>
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<tr>
<td></td>
<td>the conversational context. Further, the response did not reveal an</td>
<td>O: (makes noises to test whether there is in fact an echo)</td>
</tr>
<tr>
<td></td>
<td>understanding of the remark's humorous or critical conversational function(s)</td>
<td></td>
</tr>
<tr>
<td>Discrepancy of meaning understood</td>
<td>The response suggested an understanding that the meaning of the utterance</td>
<td>Y: <em>Here is the biggest spider in the world.</em> (HYPERBOLE)</td>
</tr>
<tr>
<td></td>
<td>was incongruent with the meaning suggested by the context, but this</td>
<td>O: No, it's not</td>
</tr>
<tr>
<td></td>
<td>incongruity was misinterpreted as a lie or a mistake</td>
<td></td>
</tr>
<tr>
<td>Conversational function understood</td>
<td>Response suggested an understanding of the speaker's conversational goal in</td>
<td>(O deals out cards for a game very slowly)</td>
</tr>
<tr>
<td></td>
<td>making the ironic statement but there was not enough evidence to determine</td>
<td>F: <em>Oh man, I'm falling asleep.</em> (HYPERBOLE)</td>
</tr>
<tr>
<td></td>
<td>whether they had also understood the discrepancy of meaning. Included</td>
<td>O: It takes a lot of time for me to deal these out</td>
</tr>
<tr>
<td></td>
<td>responding to either perceived criticism and/or humorous intent</td>
<td></td>
</tr>
<tr>
<td>Both discrepancy of meaning and</td>
<td>Response suggests an understanding of both the discrepancy of meaning and</td>
<td>O: Get it and throw it before I get home. (runs to home base)</td>
</tr>
<tr>
<td>conversational function understood</td>
<td>conversational function(s) of the utterance</td>
<td>You lost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y: Well, I thowred there before you goted there</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O: Sure. (SARCASM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y: Yes I did...I did</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th></th>
<th>Father</th>
<th>Mother</th>
<th>Older sibling</th>
<th>Younger sibling</th>
<th>Total family use in negative context</th>
<th>Total family use in positive context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperbole</td>
<td>0.74 (0.26)</td>
<td>0.45 (0.08)</td>
<td>1.15 (0.11)</td>
<td>0.65 (0.09)</td>
<td>0.79 (0.13)</td>
<td>2.20 (0.25)</td>
</tr>
<tr>
<td>Understatement</td>
<td>0.38 (0.10)</td>
<td>0.50 (0.07)</td>
<td>0.13 (0.03)</td>
<td>0.08 (0.03)</td>
<td>0.46 (0.08)</td>
<td>0.63 (0.10)</td>
</tr>
<tr>
<td>Sarcasm</td>
<td>0.16 (0.05)</td>
<td>0.19 (0.04)</td>
<td>0.31 (0.07)</td>
<td>0.06 (0.02)</td>
<td>0.19 (0.05)</td>
<td>0.52 (0.09)</td>
</tr>
<tr>
<td>Rhetorical questions</td>
<td>0.86 (0.21)</td>
<td>1.07 (0.15)</td>
<td>0.76 (0.13)</td>
<td>0.31 (0.05)</td>
<td>1.34 (0.19)</td>
<td>1.66 (0.20)</td>
</tr>
<tr>
<td>Total actor use in negative context</td>
<td>0.75 (0.21)</td>
<td>1.05 (0.16)</td>
<td>0.65 (0.15)</td>
<td>0.33 (0.06)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total actor use in positive context</td>
<td>1.40 (0.34)</td>
<td>1.15 (0.18)</td>
<td>1.68 (0.20)</td>
<td>0.78 (0.10)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. All means are expressed as frequencies per 90-min observation.*
equally frequently. Mothers used sarcasm less frequently than all the other types of ironic language. Older and younger siblings both used hyperbole most frequently, followed by rhetorical questions. For both siblings, sarcasm and understatement were used less frequently than hyperbole and rhetorical questions. However, older siblings employed sarcasm more frequently than understatement, whereas younger siblings used sarcasm and understatement equally infrequently.

When family members’ overall use of ironic language was examined in positive and negative contexts, mothers showed a distinctive pattern compared to other family members. Although fathers and both children used ironic language more frequently in positive than negative contexts, mothers used irony equally frequently in positive and negative contexts (see Table 3).

The types of ironic language used also varied by context. Hyperbole and sarcasm were used more frequently in positive than negative interaction contexts. Understatement also tended to be used more frequently in positive contexts, although, the effect was only marginally significant \( p < .06 \). In contrast, rhetorical questions were used equally frequently in positive and negative contexts (see Table 3).

**Proportions of ironic language use relative to total talk in positive and negative interactions**

It is important to note that families engaged in verbal interactions more frequently in positive than negative interaction contexts. On average, only 16% of families’ utterances (i.e., verbal interactional units, as described above) occurred in negative interactions \( \text{range} = 3 - 44\% \). As such, we were interested in further examining whether family members used ironic language selectively in negative contexts, relative to their total amount of talk. To do so, we proportionalized each family member’s use of each type of ironic language in a particular context by their total number of utterances in that context.

With data proportionalized in this manner, a 4 (actor) × 4 (type) × 2 (context) ANOVA revealed main effects of actor, \( F(1.19, 36.73) = 8.62, \ p < .01, \ \eta^2 = .22 \), type, \( F(1.14, 35.21) = 7.61, \ p < .01, \ \eta^2 = .20 \), and context, \( F(1.31) = 9.01, \ p < .01, \ \eta^2 = .23 \). Overall, mothers (\( M = 0.012, SE = 0.001 \)) and fathers (\( M = 0.014, SE = 0.004 \)) used ironic language proportionately most frequently relative to their total amount of talk in a given context. Older siblings (\( M = 0.003, SE = 0.0004 \)) used ironic language proportionately less often than their parents, followed by their younger siblings, who employed this language least frequently (\( M = 0.002, SE = 0.0003 \)).

The main effects of type and context were qualified by a two-way interaction between these variables, \( F(1.21, 37.62) = 4.20, \ p < .05, \ \eta^2 = .12 \). Interestingly, rhetorical questions and understatement were observed more frequently in a negative (\( Ms = 0.03 \) and \( 0.01 \), respectively) than a positive (\( Ms = 0.01 \) and \( 0.003 \), respectively) conversational context. In contrast, hyperbole and sarcasm were used proportionately equally across negative and positive contexts.

**Children’s responses to family members’ ironic utterances**

The next set of analyses examined how children responded to others’ ironic utterances and what their responses revealed about their understanding of the discrepancy between the literal and intended meanings of ironic language, as well as the conversational functions of these statements. Birth order and gender effects on children’s responses were also investigated.
All younger siblings and 38/39 older siblings responded to at least one ironic remark; the data set included a total of 747 responses. Each of the five possible response types (i.e., failure to respond, literal, understanding discrepancy of meaning, understanding conversational function, or understanding both discrepancy and function) were computed as proportions of the number of times a child had an opportunity to respond to a particular type of ironic language. (i.e., the number of ironic utterances to which they were exposed).

In repeated measures ANOVAs, a case is excluded if data are not available in every cell. This meant that to conduct planned analyses simultaneously examining birth order, type of ironic language, and response type, each child in a family had to have the opportunity to respond at least once to all of the four types of ironic language. There were 22 families (i.e., 56% of the total sample) who met this requirement. This subsample included 11 same-gender pairs (7 male and 4 female) and 11 mixed-gender pairs (4 older male and 7 older female). The data from this subset of participants consisted of 234 responses by the older sibling and 262 responses by the younger sibling (i.e., 496 responses, 66% of the response data set).

A mixed-model ANOVA was conducted on this subsample with birth order, type of ironic language, and response (i.e., failure to respond, literal, understand discrepancy, understand function, or understand discrepancy and function) as within-subjects factors, and each child's gender as between-subject factors. The analysis revealed a significant main effect for response, $F(1,91, 34.35) = 471.45, p < .001, \eta^2 = .96$, that was qualified by a marginally significant interaction between type and response, $F(4.14, 74.53) = 2.35, p < .06, \eta^2 = .12$. Mean proportions are presented in Table 4. Children were more likely to respond literally to rhetorical questions than to understatement. In turn, children’s responses indicating an understanding of conversational function were more frequent for hyperbole than for sarcasm or rhetorical questions. Finally, children’s responses indicating an understanding of both discrepancy of meaning and conversational function were more frequent for rhetorical questions than for hyperbole and understatement. All other pairwise comparisons were $ns$. Children’s responses indicating an understanding of discrepancy of meaning alone (and their failure to respond to ironic language) did not differ between types of ironic language.

The analysis also revealed an interaction between birth order and response, $F(2.32, 41.72) = 3.33, p < .05, \eta^2 = .16$. Younger siblings ($M = .75, SE = .02$) failed to respond to ironic statements more often than older siblings ($M = .67, SE = .03; p < .05$). In contrast, older siblings ($M = .09, SE = .02$) were marginally more likely to respond with an understanding of both discrepancy and function than their younger counterparts ($M = .05, SE = .01; p < .06$). There were no other significant effects, and gender did not moderate any of the above associations.

**Discussion**

This study is one of the first to describe quantitatively the features of ironic language in naturalistic family conversations, as well as the understanding revealed by children’s

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1 An examination of the mean proportions for children’s responses in the complete data set revealed that the differences reported in this subsample were consistent with the pattern of means in the total sample. As such, children’s responses in these 22 families appeared to be representative of the overall pattern in the sample of 39 families.
Table 4. Means and SE (in parentheses) of children’s responses to family members’ ironic utterances ($N = 22$ families)

<table>
<thead>
<tr>
<th>Type of response</th>
<th>Literal</th>
<th>Understand discrepancy of meaning</th>
<th>Understand conversational function</th>
<th>Understand discrepancy and function</th>
<th>No response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperbole</td>
<td>0.07 (0.01)</td>
<td>0.03 (0.01)</td>
<td>0.14 (0.02)</td>
<td>0.03 (0.01)</td>
<td>0.73 (0.03)</td>
</tr>
<tr>
<td>Understatement</td>
<td>0.07 (0.01)</td>
<td>0.02 (0.01)</td>
<td>0.14 (0.03)</td>
<td>0.04 (0.01)</td>
<td>0.74 (0.03)</td>
</tr>
<tr>
<td>Sarcasm</td>
<td>0.07 (0.02)</td>
<td>0.04 (0.03)</td>
<td>0.06 (0.02)</td>
<td>0.12 (0.04)</td>
<td>0.70 (0.05)</td>
</tr>
<tr>
<td>Rhetorical</td>
<td>0.15 (0.02)</td>
<td>0.01 (0.01)</td>
<td>0.08 (0.02)</td>
<td>0.10 (0.01)</td>
<td>0.67 (0.03)</td>
</tr>
</tbody>
</table>

Note. Means are expressed as proportions of the total number of opportunities to respond to a particular form of ironic language.
responses to this language. The results suggest a number of interesting patterns in irony use within families, as well as some developmental effects in children's production of this language. Further, children exhibited differing levels of understanding of the meanings and conversational functions of the various forms of irony, and children's understanding of ironic language varied as a function of birth order. Each of these sets of associations will be discussed in turn.

**How and why do parents use ironic language with their children?**

Perhaps, unsurprisingly, our estimates reveal that verbal irony was proportionately less prevalent in adults' talk to young children than has been recorded previously in conversations between adult friends (Gibbs, 2000; Tannen, 1984). Our irony coding was purposely conservative and certain forms of non-literal speech (i.e., jocularity and teasing) were not included in our estimates. However, parents may also be less inclined to use this language in conversations with children than with adult friends. Mothers generally do not condone the use of irony with children because of negative perceptions of this language (Dyer-Seymour & Callanan, 2005). In addition, many 4- and 6-year-old children may not yet be capable of understanding ironic language (see Creusere, 1999), and thus parents may also avoid it for this reason.

Nevertheless, parents certainly did use irony in some conversations with their children. When data were analysed as frequencies, it was clear that children were exposed more frequently to hyperbole, understatement, and sarcasm in positive conversational contexts than during conflict. However, when data were proportiona-\[\text{ilized by the total amount of speech in a given context, analyses revealed that family members were proportionately more likely to use understatement and rhetorical questions in a conflictual context. This context effect suggests that the four subtypes of ironic language may differ somewhat in their conversational functions. That is, although, our results suggested that understatement and rhetorical questions may indeed be used selectively to serve critical as opposed to complimentary functions (Sperber & Wilson, 1981), our findings were less conclusive for hyperbole and sarcasm. Indeed, families frequently used these statements in their games and playful interactions, supporting the assertion that irony serves conversational functions beyond simply rule/norm enforcement (Kreuz *et al.*, 1991).}

Of the four types of ironic language, mothers used rhetorical questions most frequently and sarcasm least frequently. Further, although other family members used ironic language more frequently in positive contexts, mothers used this language equally often in positive and conflictual contexts. Given mothers' typical roles as teachers and managers (Parke, 2002), rhetorical questions may be a less harsh and more didactic tool than is sarcasm. While sarcastic utterances tend to have an explicit victim (Kreuz & Glucksberg, 1989), rhetorical questions do not necessarily attack the child directly but rather highlight the parental message or lesson more subtly. Grusec and Goodnow (1994) suggest that indirect techniques such as humour or irony may be effective parenting tools, because they may promote greater internalization of values by (a) avoiding the anger and resentment that follows from direct confrontation and/or (b) by necessitating greater cognitive effort by the child to construe the message. It remains to be seen whether these speculations will be corroborated by studies that more directly examine ironic language as a disciplinary or teaching tactic.

In contrast, the role of fathers in family interactions has been described as more playful than that of mothers (Parke, 2002). Fathers used ironic language more often than
mothers in a positive conversational context. Thus, fathers may have employed irony to tease or joke in addition to using this language to manage children’s behavior. Also consistent with this interpretation, fathers used rhetorical questions, hyperbole, and understatement equally frequently, suggesting that they used non-literal language in more varied ways than mothers. Nevertheless, given that fathers were observed on fewer occasions and tended to interact less with their children than mothers, this initial pattern of findings should be interpreted cautiously.

How and why do young children use ironic language?
Even the youngest children in our study occasionally used verbal irony in family conversations, which is in-line with prior work that employed smaller samples (Recchia et al., 2005) as well as qualitative studies (Ely & McCabe, 1994; Varga, 2000). Social constructivist theorists have claimed that this early participation in ironic conversations may be one means whereby children develop a more refined understanding of the meaning and functions of this linguistic tool (Carpendale & Lewis, 2004). As expected, the 6-year-old firstborns used irony more frequently than their 4-year-old younger siblings. This was true whether data were represented as frequencies or as proportions of children’s total talk. We were not able to distinguish between age and birth-order effects, thus, there are various processes that could be contributing to this difference, such as developmental effects, characteristics of conversational partners, and complementary roles in family interaction. As such, it remains an open question whether, if tested at the same chronological age, firstborn or secondborn children would be more proficient at using ironic language.

In contrast to their parents, children used hyperbole more than any of the other types of irony, followed by rhetorical questions. A qualitative study examining conversations in a group of preschoolers suggested that hyperbole is used in young children’s linguistic play competitively for one-upmanship (Varga, 2000). An examination of the cases of hyperbole in our dataset suggests that this device was employed for similar purposes in sibling conversations (e.g., ‘I have the biggest sandwich in the world!’). Children also appeared to use hyperbole to emphasize grievous injustices by their sibling and parents (see examples in Table 1). One possibility is that young children’s experiences with pretend play may facilitate their acquisition of this form of irony, as they become experts at developing fantastical and exaggerated narratives (Lillard, 2002). However, this is as yet an untested but interesting hypothesis.

It is also intriguing that children often used rhetorical questions, the type of irony that was used most frequently by their parents. It is possible that children’s exposure to this language in family conversations may have promoted their ability to use these questions, although, our data do not allow us to test causal relationships between parents’ and children’s use of ironic language. For instance, parents may have used rhetorical questions more often because children’s own talk demonstrated their ability to understand this language form. In contrast, understatement and sarcasm were employed infrequently by children. Understatement may be a difficult form of irony for children to master, as it is often characterized by complex sentence constructions, the use of modifiers, and the difference between its literal and intended meanings is fairly subtle (see examples in Table 2). Yet it is surprising that children used sarcasm less frequently than hyperbole. Past literature suggests that sarcasm may be easier to detect than other forms of irony because of the greater divergence between literal and intended meanings (Demorest et al., 1983), and thus greater incongruity with conversational
context. However, children may have had fewer occasions to use sarcasm in their interactions. For all family members, sarcasm was the least-used form of irony, suggesting that it may not be a common linguistic tool in family conversations. However, when sarcasm is employed, it may be a salient form of ironic language. As such, there may be no direct link between the frequency of sarcasm in family conversation and children’s understanding of this linguistic device. We now turn to this issue, namely, children’s understanding of different forms of ironic language.

**What do children’s responses reveal about their understanding of ironic language?**

Certainly, inferring children’s understanding of others’ ironic utterances by examining their spontaneous responses is less precise than asking them clearly defined questions in a laboratory setting (e.g., Dunn, 2006). When children do not respond, we cannot infer why, and when they do respond, their responses may not always reveal their true level of understanding. Yet there is much to be gained from examining children’s understanding of irony in their real-life interactions. In particular, examining children’s contributions to conversations with familiar others may provide insight into the early experiences that precede their later, more explicit, understanding of irony (Carpendale & Lewis, 2004; Dunn, 1996; Nelson, 1986).

Notwithstanding the above, we found a small birth-order effect, such that 6-year-old older siblings more often demonstrated a full understanding of ironic language than 4-year-old younger siblings. Thus, as expected, our results suggest that the developmental effects on children’s comprehension of ironic language observed in laboratory studies (e.g., Pexman & Glenwright, 2007) may also be revealed in children’s naturalistic responses to others’ ironic language. This birth-order effect was partly driven by the fact that younger siblings more often simply failed to respond to ironic language. However, this may indicate that younger siblings are unsure about how to respond, and is also consistent with a developmental explanation.

Children’s responses to others’ ironic remarks also suggested that their understanding of irony varied between types. Specifically, for hyperbole and understatement, children rarely demonstrated an understanding of the discrepancy between literal and intended meanings. Thus, responses indicating an understanding of conversational function alone were especially frequent for these types of ironic language. When children made errors, they misinterpreted these utterances as literal. This is not surprising, because the difference between literal and intended meanings for these irony forms is one of strength rather than valence, and as such is less extreme than for sarcasm and rhetorical questions. Our results are consistent with laboratory studies of understatement, but not hyperbole (Demorest et al., 1983; Winner et al., 1987). That is, when older children were tested using formal laboratory measures, they typically misinterpreted hyperbolic statements as mistakes or lies, rather than as literal errors. However, the discrepancy between literal and intended meanings may be greater in laboratory studies because prototypical examples of hyperbole are chosen. In contrast, naturalistic uses of these forms of irony in our study may exhibit greater variability in the discrepancy between literal and intended meanings. Further, as compared to sarcasm or rhetorical questions, it was difficult for children to demonstrate verbally an understanding of discrepancy of meaning for hyperbole or understatement, precisely because of the more subtle difference between their literal and intended meanings. As such, this effect may be partly methodological in nature.
In contrast, for sarcasm and rhetorical questions, children more often demonstrated a simultaneous understanding of both discrepancy and function. When children did respond to ironic language, 29% of their responses to rhetorical questions and 41% of their responses to sarcasm suggested that they had correctly understood these utterances. When children did not fully understand rhetorical questions, they often responded literally; however, this was less true for sarcasm. Our results are consistent with laboratory studies of older children revealing a better understanding of sarcasm than hyperbole/understatement (Demorest et al., 1983). The literal meanings of these statements, especially for sarcasm, were clearly discrepant with the conversational contexts in which they occurred, perhaps facilitating understanding. In sum, as expected, our data revealed that the sophistication of 4- and 6-year-olds’ responses to naturalistic ironic language surpassed performance on laboratory tests (Pexman & Glenwright, 2007).

Notably, the low proportion of responses indicating an understanding of discrepancy of meaning alone suggested that, when children made errors, these errors were literal rather than misinterpretations of irony as mistakes/lies. The differences between literal and intended meanings in these conversational uses of irony may have been less extreme than the irony prototypes used in laboratory studies, making literal errors more likely. Further, family members, especially parents, may be seen as credible speakers, in that they are perceived as knowledgeable and honest conversation partners. However, with a larger database, it would be interesting to compare whether children’s misinterpretations of siblings’ and parents’ ironic statements exhibit the same patterns, given that siblings often deceive each other (Wilson, Smith, & Ross, 2003).

**Limitations and future directions**

Even with 9 h of observation for each family, ironic language rates were relatively low, and thus data on children’s responses were often based on small frequencies. Only a subset of our sample had sufficient data on which to conduct planned analyses of children’s responses. Yet, only two younger siblings failed to produce an ironic remark and only one older sibling failed to respond at least once to a family member’s ironic statement. Thus, our findings have advanced our knowledge about children’s early use of and responses to ironic language. In future, using a more intensive record of a few children’s conversational interactions over time may be a more effective way to capture developmental changes in children’s irony understanding. Further, this study was based on an exclusively Caucasian Anglophone sample and is not generalizable to other ethnic or linguistic groups. It would be useful to determine whether family use of irony varies as a function of cultural differences in attitudes towards this linguistic device as well as differences in conversational indirectness (Holtgraves, 1997).

In our sample, there was a great deal of variability across families in their use of ironic language. If children’s understanding of irony is fostered by their exposure to this language, then there should be predictable individual differences between families in children’s use and understanding as a function of the frequencies of parents’ and older siblings’ use of irony. Furthermore, variables that predict children’s social-cognitive understanding in general, such as internal state language, engagement in pretense, and conflict strategies, may also be associated with individual differences in children’s irony use and understanding. As such, these would all be fascinating avenues for future research. Finally, studies should combine observational and laboratory assessments to examine how children’s experiences in the family are associated with their performance on more formal tests.
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