Acquisition of Pragmatics

OUP Bibliographies

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Introduction

How do children learn to bridge the gap between the literal, semantic meaning of words and the intended, pragmatic meaning of an utterance? The acquisition of pragmatics is the topic of an experimental field of study that investigates this question. According to an influential pragmatic theory proposed by the philosopher Paul Grice, communication is a collaborative effort governed by specific rules (or "maxims"). A collaborative speaker is expected to be as informative as required by the purpose of the communicative exchange (maxim of Quantity), truthful (maxim of Quality), relevant (maxim of Relation), and unambiguous (maxim of Manner). A collaborative listener makes inferences about the speaker's intentions based on the assumption that the speaker is being cooperative and following the conversational rules. Later pragmatic theories such as Dan Sperber and Deirdre Wilson's Relevance Theory have offered important alternatives to the Gricean framework but share several foundational assumptions with Grice's approach, including the idea that human communication involves representing the speaker's beliefs and goals. Whether young children are capable of making such inferences about the speaker's mental states and how aspects of this ability might develop are the most important questions in the study of children's pragmatic development. For many years, it was believed that children before the age of 5 or 6 were not able to entertain pragmatic inferences about the speaker's intentions or knowledge state. However, more recent theoretical advancements in the semantics-pragmatics interface and the development of new methodological tools have led to a reconsideration of older findings. It appears increasingly likely that the skills required for pragmatic reasoning are in place from a very young age but the process of applying those skills in communication is effortful, highly task-dependent and develops until late childhood. This bibliography focuses on prominent work on the acquisition of children's pragmatic abilities in three areas that have generated a considerable body of data: reference, implicature, and figurative language.

General Overviews

Grice 1975 and Sperber and Wilson 1995 are seminal pieces of work introducing two different pragmatic theories that nevertheless converge on the idea that human communication involves a species of intention recognition. This key idea is further explored and contrasted to findings from animal cognition in Tomasello, et al. 2005. The theoretical foundations introduced in these publications have inspired much current research on the acquisition of pragmatics, as the remaining papers in this section show. Grigoroglou and Papafragou 2017 provides a cohesive review of the

acquisition of pragmatics that can serve as a first introduction to the topic. For the more invested reader, Matthews 2014 provides a comprehensive collection of chapters on many different areas of developmental pragmatics written by prominent researchers in each field. Zufferey 2015 is a textbook on pragmatic development covering both theoretical background on different pragmatic phenomena and recent experimental findings.

Grice, H. Paul. 1975. “Logic and conversation”. In *Syntax and semantics: Speech acts* (Vol. 3). Edited by Peter Cole and Jerry L. Morgan. New York: Academic Press.

Highly influential philosophical paper on the foundational principles of human communication. This work has inspired the bulk of research on the acquisition of pragmatics.

Grigoroglou, Myrto, and Anna Papafragou. 2017. Acquisition of Pragmatics." In *Oxford Research Encyclopedia of Linguistics*. Edited by Mark Aronoff. Online edition: Oxford University Press.

Recent review of the literature on developmental pragmatics, with special emphasis on reference, implicature and figurative language. It corresponds closely to research covered in the present bibliography.

Matthews, Danielle. (ed.). 2014. *Pragmatic Development in First Language Acquisition*. Amsterdam/Philadelphia: John Benjamins Publishing Company.

A recent volume featuring a comprehensive list of topics on children’s pragmatic development, also including less standard topics such as the development of humor and cross-cultural perspectives.

Sperber, Dan, and Deirdre Wilson. 1995. *Relevance: Communication and cognition* (2d ed.). Cambridge: Harvard University Press.

Highly impactful book introducing Relevance Theory, a major alternative to the Gricean pragmatic framework.

Tomasello, Michael, Malinda Carpenter, Josep Call, Tanya Behne, and Henrike Moll. 2005. Understanding and sharing intentions: The origins of cultural cognition. *Behavioral and Brain Sciences* 28: 675 – 691.

Overview of a framework that views human language and culture as grounded in the ability to interpret and share intentions. Very useful background for researchers interested in pragmatic development.

Zufferey, Sandrine. 2015. *Acquiring Pragmatics: Social and Cognitive Perspectives*. New York: Routledge.

Textbook on the acquisition of pragmatics covering different aspects of social and cognitive pragmatic abilities, as well as atypical development.

Reference

Assigning reference (e.g., figuring out what the speaker means by "Fido", "that dog" or "it") is a core feature of linguistic communication as it links the abstract system of language to objects, properties, events, or other entities in the world. Assigning reference is a profoundly pragmatic process, as it requires an understanding of other people's intentions and informational needs. Because of these two characteristics, reference assignment has been a privileged field of study for Gricean pragmatics in very young children. Developmental research on reference has focused on how infants and toddlers learn new words and how preschoolers and school-aged children produce and comprehend referring expressions. Here we review important work on both domains of investigation.

Word Meaning and Reference

For very young children, an important step in assigning linguistic reference involves learning the meaning of new words. Decades of research show that children use different types of social-pragmatic information during word learning. Baldwin 1991 is a classic study demonstrating that 19-month-olds consult the speaker's direction of gaze when learning new words. Brooks and Meltzoff 2005 and Carpenter, et al. 1998 draw links between the ability to consult the speaker's direction of gaze in word learning and long-term language development. Southgate, et al. 2010 shows that 17-month-old infants use the speaker's epistemic state in word learning. However, the word-learning literature is not devoid of debates. Akhtar, et al. 1996 demonstrates that 2-year-old children consult discourse novelty when inferring the speaker's referential intent. Samuelson and Smith 1998 contests these findings and instead suggests a "mechanistic" account of word learning, according to which domain-general cognitive mechanisms (i.e., memory and attention) suffice to explain word learning in children. Responding to this study, Diesendruck, et al. 2004 directly compares the "mechanistic account" to a "pragmatic account" and concludes that 2-year-olds use pragmatic reasoning to interpret the speaker's referential intentions. De Marchena, et al. 2011 casts doubt on a purely pragmatic account of word learning: the authors show that children and adolescents with autism, whose social-pragmatic abilities are impaired, were able to assign reference to novel labels by avoiding referential overlap with known labels (similarly to typically developing peers), and this ability did not correlate with their social-pragmatic abilities. In a recent eye-tracking study, Yurovsky and Frank 2017 sets out to reconcile the two accounts of word learning by suggesting that children are sensitive to social cues from a very early age but their ability to use these social cues appropriately when mapping labels to objects depends on the development of domain-general cognitive abilities that may itself be protracted.

Akhtar, Nameera, Malinda Carpenter, and Michael Tomasello. 1996. “The Role of Discourse Novelty in Early Word Learning.” *Child Development* 67 (2): 635–45. doi:10.1111/j.1467-8624.1996.tb01756.x.

Classic study on word learning showing that infants consult complex social-pragmatic factors such as discourse novelty when learning new words.

Baldwin, Dare A. 1991. “Infants’ Contribution to the Achievement of Joint Reference.” *Child Development 62* (5): 875. doi:10.2307/1131140.

One of the first papers that demonstrated the contribution of eye-gaze monitoring to children’s word learning.

Brooks, Rechele, and Andrew N. Meltzoff. 2005. “The Development of Gaze Following and Its Relation to Language.” *Developmental Science* 8 (6): 535–43. doi:10.1111/j.1467-7687.2005.00445.x.

A developmental study comparing eye-gaze monitoring in 9-, 10- and 11-month old infants, as well as the relation between eye-gaze monitoring and language development.

Carpenter, Malinda, Katherine Nagell, Michael Tomasello, George Butterworth, and Chris Moore. 1998. “Social Cognition, Joint Attention, and Communicative Competence from 9 to 15 Months of Age.” *Monographs of the Society for Research in Child Development* 63 (4): doi:10.2307/1166214.

A classic read on joint attention in infancy and its importance for children’s cognitive and linguistic development. Includes two experimental studies and is followed by commentaries.

de Marchena, Ashley, Inge-Marie Eigsti, Amanda Worek, Kim Emiko Ono, and Jesse Snedeker. 2011. “Mutual Exclusivity in Autism Spectrum Disorders: Testing the Pragmatic Hypothesis.” *Cognition* 119 (1): 96–113. doi:10.1016/j.cognition.2010.12.011.

A well-thought-out test of competing accounts of mutual exclusivity.

Diesendruck, Gil, Lori Markson, Nameera Akhtar, and Ayelet Reudor. 2004. “Two-Year-Olds’ Sensitivity to Speakers’ Intent: An Alternative Account of Samuelson and Smith.” *Developmental Science* 7 (1): 33–41. doi:10.1111/j.1467-7687.2004.00320.x.

A study supporting a pragmatic account of mutual exclusivity that directly contested the Samuelson and Smith 1998 findings.

Samuelson, Larissa K, and Linda B Smith. 1998. “Memory and Attention Make Smart Word Learning: An Alternative Account of Akhtar, Carpenter, and Tomasello.” *Child Development* 69 (1): 94–104. doi:10.1111/j.1467-8624.1998.tb06136.x.

A study challenging the idea that word learning relies on Gricean intention-recognition.

Southgate, Victoria, Coralie Chevallier, and Gergely Csibra. 2010. "Seventeen-Month-Olds Appeal to False Beliefs to Interpret Others' Referential Communication." *Developmental Science* 13 (6): 907–12. doi:10.1111/j.1467-7687.2009.00946.x.

This study argued that very young infants use the speaker's epistemic state to draw inferences about the speaker's referential intentions.

Yurovsky, Daniel, and Michael C. Frank. 2017. "Beyond Naïve Cue Combination: Salience and Social Cues in Early Word Learning." *Developmental Science* 20 (2): e12349. doi:10.1111/desc.12349.

Recent eye-tracking study bridging purely pragmatic and purely mechanistic explanations of children's word learning.

Referential Communication

As children become more mature communicators, they develop the ability to produce and comprehend different types of expressions to refer to objects and other entities in the world. As suggested by the very influential work Clark and Marshall 1981, the choice and interpretation of referential expressions in communication largely depends on expectations of informativeness (Grice's maxim of Quantity), constrained by assumptions about what information is shared or not with a conversational partner. The literature on children's referential communication breaches out in several directions. An important body of research has focused on whether children can take the perspective of their interlocutor when producing or understanding referring expressions. This line of research points to several cases where young children take into account the knowledge of their communicative partner. O'Neil 1996 provides evidence that 2-year-old children are able to adjust their referential devices to the knowledge of a communicative partner in the context of a hide and seek game. Matthews et al. 2006, using an event description task, finds similar results with 3- and 4-year-olds (but not 2-year-olds). In a very well-known study with older children, Nadig and Sedivy 2002 shows that 5- to 6-year-olds successfully adjust their referential descriptions to match what their listener knows (even if this contradicts their own privileged knowledge) and use the speaker's knowledge when interpreting sentences (even when these, from their own perspective, are ambiguous). Other work points to important limitations in children's referential communication abilities. In a classic demonstration, Deutsch and Pechmann 1982 finds that children often produced under-informative descriptions of objects, even as late as age 9. Similarly, on the comprehension side, Epley, et al. 2004, in a paradigm similar to Nadig and Sedivy 2002, finds that 4- to 12-year-olds were more likely to interpret ambiguous utterances by consulting their own egocentric perspective rather than the speaker's. Nilsen and Fecica 2011, in a critical review paper, proposes a synthesis of these discrepant findings and identified specific methodological features that affected children's success in referential tasks. A second line of work has focused on whether individual differences in

cognitive skills can explain children's inconsistent referential communication abilities. In an early investigation of this topic, Nilsen and Graham 2009 examines the relation between children's referential communication abilities and general cognitive abilities (for a comprehensive review of the relation between pragmatic skills and cognitive abilities see Matthews et al. 2018). A third line of research examines children's referential communication abilities when the communicative partner is allowed to offer feedback, as in naturalistic conversations. In two well-known studies, Deutsch and Pechmann 1982 and Matthews, et al. 2007 demonstrate that, when the listener gave feedback (e.g., asked a clarification question), children were able to offer informative repairs of their initial, ambiguous referential attempts. More recent work investigates children's referential communication skills more broadly, beyond typical manipulations of interlocutors' visual perspectives. Khu, Chambers, and Graham, 2018 examines children's ability to integrate an interlocutor's emotional perspective when interpreting ambiguous referential expressions. Grigoroglou and Papafragou, in press investigates how different types of interactions with listeners affect preschoolers' referential production.

Clark, Herbert H., and Catherine R. Marshall. 1981. "Definite Reference and Mutual Knowledge." In *Elements of Discourse Understanding*, edited by A.H. Joshi, B.I. Webber, and I. A. Sag, 10–63. Cambridge University Press.

Seminal paper on the notion of *common ground*, the mutual knowledge shared by speaker and listener that is the basis of communication.

Deutsch, Werner, and Thomas Pechmann. 1982. "Social Interaction and the Development of Definite Descriptions." *Cognition* 11 (2): 159–84. doi:10.1016/0010-0277(82)90024-5.

One of the earliest developmental studies on referential communication exploring ideas that remain highly relevant for today's research.

Epley, Nicholas, Carey K. Morewedge, and Boaz Keysar. 2004. "Perspective Taking in Children and Adults: Equivalent Egocentrism but Differential Correction." *Journal of Experimental Social Psychology* 40 (6): 760–68. doi:10.1016/j.jesp.2004.02.002.

Classic citation for the "egocentric" view of communication in both children and adults.

Grigoroglou, Myrto, and Anna Papafragou. In press. "Interactive contexts increase informativeness in children's referential communication." *Developmental Psychology*. doi: 10.1037/dev0000693

Recent study investigating how the nature of the interaction with a communicative partner affects informativeness in children's event descriptions.

Khu, Melanie, Craig Chambers, and Susan A Graham. 2018. “When You’re Happy and I Know It: Four-Year-Olds’ Emotional Perspective Taking During Online Language Comprehension.” *Child Development* 89 (6): 2264–81. doi:10.1111/cdev.12855.

Recent eye-tracking study investigating children’s sensitivity to other people’s emotional states when interpreting ambiguous utterances.

Matthews, Danielle, Hannah Biney, and Kirsten Abbot-Smith. 2018. “Individual Differences in Children’s Pragmatic Ability: A Review of Associations with Formal Language, Social Cognition, and Executive Functions.” *Language Learning and Development* 14 (3): 186–223. doi:10.1080/15475441.2018.1455584.

Very recent review of the long and complicated individual-differences literature on the relation between children’s pragmatic abilities and their cognitive and linguistic skills.

Matthews, Danielle, Elena Lieven, Anna Theakston, and Michael Tomasello. 2006. “The Effect of Perceptual Availability and Prior Discourse on Young Children’s Use of Referring Expressions.” *Applied Psycholinguistics* 27 (03): 403–22. doi:10.1017.S0142716406060334.

An important developmental paper exploring how visual co-presence with a listener or information shared with a listener in prior discourse shape the informativeness of children’s referential expressions.

Matthews, Danielle, Elena Lieven, and Michael Tomasello. 2007. “How Toddlers and Preschoolers Learn to Uniquely Identify Referents for Others: A Training Study.” *Child Development* 78 (6): 1744–59. doi:10.1111/j.1467-8624.2007.01098.x.

A training study investigating children’s improvement of referential strategies under different conditions.

Nadig, Aparna S., and Julie C. Sedivy. 2002. “Evidence of Perspective-Taking Constraints in Children’s on-Line Reference Resolution.” *Psychological Science* 13 (4): 329–36. doi:10.1111/j.0956-7976.2002.00460.x.

Seminal paper on children’s referential communication abilities in production and comprehension that links developmental literature to debates in adult psycholinguistics.

Nilsen, Elizabeth S., and Agnieszka M. Fecica. 2011. “A Model of Communicative Perspective-Taking for Typical and Atypical Populations of Children.” *Developmental Review* 31 (1): 55–78. doi:10.1016/j.dr.2011.07.001.

Careful and comprehensive review paper on referential communication in typical and atypical development.

Nilsen, Elizabeth S., and Susan A. Graham. 2009. “The Relations between Children’s Communicative Perspective-Taking and Executive Functioning.” *Cognitive Psychology* 58 (2): 220–49. doi:10.1016/j.cogpsych.2008.07.002.

One of the first papers to test the relation between children’s referential communication skills and general cognitive and linguistic abilities.

O’Neill, Daniela K. 1996. “Two-Year-Old Children’s Sensitivity to a Parent’s Knowledge State When Making Requests.” *Child Development* 67 (2): 659-677. doi:10.2307/1131839.

A classic paper showing that infants are able to adjust their referential devices (i.e., pointing, verbalizations) based on the knowledge of a conversational partner (i.e., their parent).

Implicature

Implicatures are components of non-literal meaning that arise when one (or more) of the Gricean maxims are violated. Here we focus on the development of children’s understanding of scalar and relevance implicature, two types of implicature that have attracted considerable experimental interest by developmental researchers.

Scalar Implicature

Scalar implicatures are pragmatic inferences that arise when the speaker violates the Gricean maxim of Quantity by using an informationally weaker scalar term (e.g., “some” instead of “all”: “Some dogs bark”). Scalar implicature is one of the best-studied topics in developmental pragmatics. A wide range of research on different experimental paradigms, languages and scalar terms has shown that children have persistent difficulties deriving scalar inferences. Noveck 2001 is one of the earliest studies showing that French-speaking 5-, 7-, and 9-year-olds tended to accept under-informative sentences containing weak scalar terms in a binary felicity judgement task. Huang and Snedeker 2009 demonstrates similar failures with English-speaking 5-year-olds in an eye-tracking paradigm, where children did not have to make explicit sentence judgments. Despite these difficulties, other work has shown that children are able to compute implicatures when certain task-specific parameters are changed. Papafragou and Musolino 2003 demonstrates that 5-year-olds were much more likely to compute scalar implicatures when trained in detecting pragmatic infelicity and offered a strong supporting context. Katsos and Bishop 2011 shows successful implicature derivation when 5-year-olds were offered more response options than the standard binary judgment task. Stiller, et al. 2015 demonstrates that even 4-year-olds were able to compute implicatures (from context-dependent/ad-hoc scales) in a paradigm inspired by referential communication. Different theories currently exist to explain the nature of children’s difficulties with scalar inferences. Katsos and Bishop 2011 proposes that children fail to reject under-informative statements with weak scalar terms because, unlike adults, they are tolerant to pragmatic violations. Pouscoulous, et al. 2007 suggests that children have processing difficulties. In an explanation that has received more

experimental support, Barner et al. 2011 suggests that children have problems accessing stronger scalar alternatives (e.g., “all”) when they only hear the weaker term (e.g., “some”), a step which is required for successful implicature derivation. More recent developments suggest a different possibility: Skordos and Papafragou 2016 demonstrates that children not only have problems with the accessibility of the stronger alternative but also with realizing how this alternative is relevant for implicature derivation. Finally, a new direction of research explores whether children can integrate speaker knowledge when they compute implicatures in accordance with a fully Gricean model. Hochstein, et al. 2014 and Papafragou, et al. 2017 show that 5-year-olds (but not 4-year-olds) were able to use speaker knowledge in implicature derivation. More research is currently underway on this fascinating topic.

Barner, David, Neon Brooks, and Alan Bale. 2011. “Accessing the Unsaid: The Role of Scalar Alternatives in Children’s Pragmatic Inference.” *Cognition* 118 (1): 84–93. doi:10.1016/j.cognition.2010.10.010.

Proposed that children’s failures with scalar implicature are due to difficulties in spontaneously accessing lexical alternatives. To support this proposal, the study compared logical, context-independent scales (“some”/“all”) to ad-hoc, context-dependent scales where the stronger alternative is highly salient.

Hochstein, Lara, Alan Bale, Danny Fox, and David Barner. 2014. “Ignorance and Inference: Do Problems with Gricean Epistemic Reasoning Explain Children’s Difficulty with Scalar Implicature?” *Journal of Semantics* 0: 1–29. doi:10.1093/jos/ffu015.

This study investigated the role of speaker knowledge in scalar implicature computation in children. Results showed that 5-year-olds were somewhat successful at computing speaker knowledge but 4-year-olds failed.

Huang, Yi Ting, and Jesse Snedeker. 2009. “Semantic Meaning and Pragmatic Interpretation in 5-Year-Olds: Evidence from Real-Time Spoken Language Comprehension.” *Developmental Psychology* 45 (6): 1723–1739. doi:10.1037/a0016704.

Eye-tracking study investigating incremental processing of scalar expressions in 5-year-olds. Children had difficulties with scalar implicature, even though no explicit pragmatic felicity judgements were involved.

Katsos, Napoleon, and Dorothy V.M. Bishop. 2011. “Pragmatic Tolerance: Implications for the Acquisition of Informativeness and Implicature.” *Cognition* 120 (1): 67–81. doi:10.1016/j.cognition.2011.02.015.

Proposed that children are aware of pragmatic infelicity but they just not penalize it as much as adults. In support of this proposal, the study showed that 5-year-old children compute

implicatures if the binary truth-judgment task is replaced with a more gradient (ternary response) judgment task.

Noveck, Ira A. 2001. “When Children Are More Logical than Adults: Experimental Investigations of Scalar Implicature.” *Cognition* 78 (2): 165–88. doi:10.1016/S0010-0277(00)00114-1.

Seminal work on children’s scalar implicature computation showing persistent failures with different lexical scales (i.e., quantifiers, modals) as late as age 9.

Papafragou, Anna, Carlyn Friedberg, and Matthew L. Cohen. 2017. “The Role of Speaker Knowledge in Children’s Pragmatic Inferences.” *Child Development*. doi:10.1111/cdev.12841.

Recent study on children’s ability to calculate speaker knowledge in scalar implicature computation, showing that 5-year-olds match speaker knowledge with utterance informational strength but 4-year-olds cannot reliably make this link. The study drew connections between the scalar implicature findings and other pragmatic domains where computing speaker knowledge is required (e.g., word learning, referential communication).

Papafragou, Anna, and Julien Musolino. 2003. “Scalar Implicatures: Experiments at the Semantics–Pragmatics Interface.” *Cognition* 86 (3): 253–82. doi:10.1016/S0010-0277(02)00179-8.

This highly-cited paper was the first to show that children’s computation of scalar implicature can increase depending on the task. The study also discovered an asymmetry in implicature derivation between numbers and quantifiers that bears on major theoretical issues in the study of scalar implicature.

Pouscoulous, Nausicaa, Ira A Noveck, Guy Politzer, and Anne Bastide. 2007. “A Developmental Investigation of Processing Costs in Implicature Production.” *Language Acquisition* 14 (4): 347–75. doi:10.1080/10489220701600457.

Multi-experiment study inspired by Relevance Theory showing how task-related demands can modify the likelihood of children computing implicatures.

Skordos, Dimitrios, and Anna Papafragou. 2016. “Children’s Derivation of Scalar Implicatures: Alternatives and Relevance.” *Cognition* 153. Elsevier B.V.: 6–18. doi:10.1016/j.cognition.2016.04.006.

Experimental evidence in favor of the view that children’s frequent failures to derive scalar inferences are due not simply to their inability to access stronger alternatives but to assess relevance (or the Question under Discussion).

Stiller, Alex J., Noah D. Goodman, and Michael C. Frank. 2015. “Ad-Hoc Implicature in Preschool Children.” *Language Learning and Development* 11 (2): 176–90. doi:10.1080/15475441.2014.927328.

Showed that young children can successfully compute scalar implicatures from contextual scales within a fairly simplified experimental paradigm inspired by referential communication.

Relevance Implicature

Relevance implicatures arise when the Gricean maxim of Relation is violated ("Did John come to the party?" - "He was busy."). Developmental research on relevance implicature is much more limited compared to work on scalar implicature and falls under two broad domains of investigation: (more or less conventional) indirect requests and novel, non-conventional relevance implicatures. Beginning with indirect requests, Ervin-Tripp et al. 1987 finds that 3-, 5- and 7-year-old children generally do not have problems complying with different types of indirect requests in naturalistic conversations, (although younger children are more successful with less indirect requests). Similarly, in more recent work, Tribushinina 2012 and Schulze, et al. 2013 find that 3-year-olds seemed able to infer a speaker's preference based on a seemingly unrelated assertion. One problem of studies that test children's compliance with an indirect request is that children's early successes may not involve relevance implicature generation but less sophisticated inferences justified by the context and the conventional form of the request. To address this issue, Bernicot and Legros, 1987, Elrod 1983, and Ervin-Tripp, et al. 1987 investigate children's ability to interpret indirect requests in stories as third parties, as opposed to complying with the experimenter's requests as conversational participants. These studies found that 5- to 6-year-olds were significantly better at explaining the speaker's intentions behind indirect requests compared to 3- to 4-year-olds. Still, because these studies require a greater degree of metalinguistic ability and perspective-taking skills compared to the compliance studies, it is not clear that younger children lack the ability to draw pragmatic inferences; alternatively, the greater task demands might underestimate younger children's true pragmatic competence. Another line of research that has investigated children's ability to derive novel, non-conventional relevance implicatures supports the more pessimistic view on young children's pragmatic sophistication. Bucciarelli, et al. 2003, de Villiers, et al. 2009 and Verbuk and Shultz 2010 demonstrate that children before the age of 6 were not able to compute novel relevance implicatures. However, because these studies required strong metalinguistic skills as well as world-knowledge that young children may lack, further research is needed to investigate whether young preschoolers have the ability to derive relevance implicatures.

Bernicot, Josie, and Suzanne Legros. 1987. *"Direct and Indirect Directives: What Do Young Children Understand?[http://www.scopus.com/inward/record.url?eid=2-s2.0-38249033458&partnerID=tZOtx3y1]*." *Journal of Experimental Child Psychology* 43 (3): 346–358.

Early work on children's comprehension of direct and indirect, non-conventional directive speech acts in stories. Unlike other work at the time, this study showed limited pragmatic abilities in 3- to 4-year-olds.

Bucciarelli, Monica, Livia Colle, and Bruno G Bara. 2003. “How Children Comprehend Speech Acts and Communicative Gestures.” *Journal of Pragmatics* 35 (2): 207–41. doi:10.1016/S0378-2166(02)00099-1.

Investigated children’s ability to comprehend various types of pragmatic inference (relevance implicature, irony, deceit) in both verbal and non-verbal (gestural) communication. Included a useful analysis of the inferential and cognitive load required for deriving each type of pragmatic meaning.

de Villiers, Peter. A., de Villiers, Jill G., Coles-White, D’Jaris, and Carpenter, Laura. 2009. “Acquisition of relevance implicatures in typically-developing children and children with autism.” In *Proceedings of the 33th Annual Boston University Conference on Language Development*. Edited by Jane Chandlee, Michelle Franchini, Sandy Lord, and Gudrun-Marion Rheiner. Somerville: Cascadilla Press.

Short, conference proceedings paper on the comprehension of novel relevance implicatures in typically developing children and children with autism using a story-based paradigm.

Elrod, Mimi M. 1983. “Young children's responses to direct and indirect directives.” *The Journal of Genetic Psychology: Research and Theory on Human Development* 143(2): 217-227. doi:10.1080/00221325.1983.10533555

Examined comprehension of indirect requests in 3- to 6-year-olds in a story-based paradigm.

Ervin-Tripp, Susan M., Amy Strage, Martin Lampert, and Nancy Bell. 1987. “Understanding Requests.” *Linguistics* 25 (1). doi:10.1515/ling.1987.25.1.107.

Early developmental work on various types of requests with native speakers and learners of English. Included both a naturalistic paradigm and a story-based investigation of children’s abilities to comprehend requests.

Schulze, Cornelia, Susanne Grassmann, and Michael Tomasello. 2013. “3-Year-Old Children Make Relevance Inferences in Indirect Verbal Communication.” *Child Development* 84 (6): 2079–93. doi:10.1111/cdev.12093.

More recent, multi-experiment study on 3-year-olds’ ability to comply with indirect requests and 3- and 4-year-olds’ ability to derive a novel relevance implicature.

Tribushinina, Elena. 2012. “Comprehension of Relevance Implicatures by Pre-Schoolers: The Case of Adjectives.” *Journal of Pragmatics* 44 (14): 2035–44. doi:10.1016/j.pragma.2012.09.018.

Examined 3- and 5-year-olds’ compliance with direct and indirect requests in a paradigm similar to Schulze et al. 2013.

Verbuk, Anna, and Thomas Shultz. 2010. “Acquisition of Relevance Implicatures: A Case against a Rationality-Based Account of Conversational Implicatures.” *Journal of Pragmatics* 42 (8). Elsevier B.V.: 2297–2313. doi:10.1016/j.pragma.2010.01.005.

Study of how 5- to 8-year-olds derive novel relevance implicatures, equivalent non-linguistic inferences and scalar implicatures.

Figurative Language

Children’s understanding of figurative speech has received less attention than other domains of pragmatics and its onset and developmental trajectory are highly debated. Several reasons have contributed to this picture. First, figurative language includes a wide range of phenomena (e.g., metaphor, irony, metonymy, hyperbole, etc.) which are highly variable and possibly implicate different sets of abilities. At the same time, individual phenomena (with irony being the most characteristic example) may, in turn, involve different component skills that are acquired at different points in development. Second, there is little agreement in terms of the appropriate methodologies to measure comprehension of figurative speech, with some studies underestimating children’s abilities (e.g., because they used stimuli that required advanced world knowledge or were presented out of context), while others overestimating it (e.g., because they used forced-choice paradigms, where one option was highly unlikely). Here we review literature on children’s understanding of metaphor and irony, as two characteristic examples of figurative speech with a considerable body of developmental research.

Metaphor

Early studies on children’s comprehension of metaphor demonstrated very limited abilities even in school age children. In one demonstration, Winner, et al. 1976 finds that before the age of 10 children were not able to explain the meaning of metaphorical sentences. Later work in simpler paradigms, where metaphors were presented in the context of stories and involved forced choice responses yielded more successful performance. Waggoner and Palermo 1989 finds that 5-year-olds demonstrated an understanding of metaphors embedded in stories even though only older children (7- and 9-year-olds) were able to explain their choice. Similarly, Özçalişkan 2005 finds that from age 4 children reliably chose interpretations that were compatible with metaphors presented in stories and from age 5 children were also able to explain their choices. However, in these forced-choice paradigms, it was not clear whether children genuinely grasped metaphorical meanings or made reasonable inferences based on context. Given the limited evidence in favor of preschooler’s successful metaphor interpretation, there is a debate about the nature of children’s difficulties with metaphor comprehension. Pouscoulous 2011 and Vosniadou et al. 1984 suggest that preschoolers’ failures with metaphor comprehension are due to the heavy metalinguistic load of experimental tasks. Vosniadou and Ortony 1983 suggests that before age 4 children lack the ability to distinguish

between literal and metaphorical meanings and that children's success with metaphor comprehension depends on their familiarity with a given conceptual domain. In a more recent study, Rubio-Fernández and Grassmann 2016 proposes that preschoolers fail with metaphor not because they do not possess the ability to draw analogies between two conceptual domains but because children have problems assigning secondary labels to objects. Although the nature of children's difficulties with metaphor comprehension is still unclear, in a recent investigation of adolescents and adults, Carriedo, et al. 2016 shows that metaphor understanding is still developing until young adulthood and is linked to individuals' relational verbal reasoning ability and executive functioning. Norbury 2005 demonstrates that semantic knowledge (i.e., knowledge of synonyms, idioms, etc.) was the most reliable predictor for metaphor comprehension in atypically developing children (as opposed to Theory of Mind or severity of autistic symptoms).

Carriedo, Nuria, Antonio Corral, Pedro R. Montoro, Laura Herrero, Patricia Ballestrino, and Iraia Sebastián. 2016. "The Development of Metaphor Comprehension and Its Relationship with Relational Verbal Reasoning and Executive Function." *PLOS ONE* 11 (3): e0150289. doi:10.1371/journal.pone.0150289.

Recent study investigating the verbal and cognitive abilities involved in metaphor comprehension in 11-, 15- and 21-year-olds.

Norbury, Courtenay Frazier. 2005. "The Relationship between Theory of Mind and Metaphor: Evidence from Children with Language Impairment and Autistic Spectrum Disorder." *British Journal of Developmental Psychology* 23 (3): 383–399. doi:10.1348/026151005X26732.

Investigated the role of Theory of Mind and semantic knowledge in 8- to 15-year-olds with communication disorders.

Özçalişkan, Şeyda. 2005. "On Learning to Draw the Distinction between Physical and Metaphorical Motion: Is Metaphor an Early Emerging Cognitive and Linguistic Capacity?" *Journal of Child Language* 32 (2): 291–318. doi:10.1017/S0305000905006884.

Showed successful metaphor comprehension in preschoolers in a forced choice task.

Pouscoulous, N. (2011). "Metaphor: For adults only?". *Belgian Journal of Linguistics* 25: 64–92. doi:10.1075/bjl.25.04pou

Review paper arguing in favor of the view that preschoolers may be able to compute metaphorical meanings.

Rubio-Fernández, Paula, and Susanne Grassmann. 2016. "Metaphors as Second Labels: Difficult for Preschool Children?" *Journal of Psycholinguistic Research* 45 (4): 931–44. doi:10.1007/s10936-015-9386-y.

Recent experimental study with 3- and 4-year-olds arguing that children's problems with metaphor have to do with difficulties assigning additional (i.e., second) labels to entities that already have known labels (e.g., understanding the metaphor "Juliet is the sun" requires assigning the label "star" to Juliette, while children know that Juliet is a "person").

Vosniadou, Stella, and Andrew Ortony. 1983. "The Emergence of the Literal-Metaphorical-Anomalous Distinction in Young Children." *Child Development* 54 (1): 154–61.

Often-cited older work investigating prerequisites for metaphor comprehension (i.e., the ability to distinguish between literal, metaphorical and nonsensical meanings).

Vosniadou, Stella, Andrew Ortony, Ralph E. Reynolds, and Paul T. Wilson. 1984. "Sources of Difficulty in the Young Child's Understanding of Metaphorical Language." *Child Development* 55 (4): 1588–1606. doi:10.2307/1130028.

Nicely conducted older experimental work investigating different factors affecting metaphor comprehension in 4-, 6- and 8-year-olds.

Waggoner, John E., and David S. Palermo. 1989. "Betty Is a Bouncing Bubble: Children's Comprehension of Emotion-Descriptive Metaphors." *Developmental Psychology* 25 (1): 152–63. doi:10.1037/0012-1649.25.1.152.

Nicely crafted study with 5-, 7- and 9-year-olds showing coarse metaphorical understanding even in the youngest age group.

Winner, Ellen, Anne K Rosenstiel, and Howard Gardner. 1976. "The Development of Metaphoric Understanding." *Developmental Psychology* 12 (4): 289–97. doi:10.1037//0012-1649.12.4.289.

Characteristic example of older experimental work on metaphor comprehension. Metaphorical sentences were presented to children out of context and were not understood before age 10.

Irony

In the literature, the age at which children begin to understand irony is highly debated. In an early study, Demorest et al. 1984 finds that children could not reliably comprehend ironic remarks even at age 13. Similarly, in more recent work, Filippova and Astington 2008 finds that 9-year-olds were not adult-like in terms of irony comprehension. However, Ackerman 1983 and Winner and Leekam 1991 find that children could appreciate some aspects of ironic meaning at around age 6. Different reasons for these discrepancies have been proposed. In a review paper, Creusere 1999 attributes the discrepancies to methodological differences across studies (e.g., differences in the types of irony tested), while Filippova and Astington 2008, Pexman and Glenwright 2007, and Winner and Leekam 1991 to the fact that irony appreciation involves different cognitive abilities that children acquire at different stages of development (e.g., distinguishing between irony and other types of false

utterances, mentalizing skills, etc.). Filippova and Astington 2008 tests this possibility with 5-, 7- and 9-year-olds and Pexman and Glenwright 2007 with 6- to 10-year-olds. These studies find a clear developmental sequence of skills related to irony comprehension, with the ability to understand the speaker's true belief arising earlier than the ability to understand the speaker's intent or attitude. Winner and Leekam 1991 links aspects of irony understanding in 5- to 7-year-olds to different orders of mentalizing skills. Happé 1993 finds correlations between children's performance in false belief tasks and irony comprehension in children with autism. Beyond social-cognitive aspects, the comprehension of irony also involves the understanding of its role in the discourse (e.g., whether irony is used to amuse, criticize, etc.). Filippova and Astington 2010 finds that, although there was a clear developmental sequence in the social-cognitive components of irony understanding, there were no age-related differences in terms of children's understanding of the discourse function of irony. Similarly, Dews et al. 1996 finds that 5- and 6-year-old children showed an early understanding of the discourse function of irony. Another domain of debate concerns whether there is a specific "ironic" prosody that could potentially facilitate irony comprehension. Capelli, et al. 1990 and Demorest et al. 1984 find evidence in favor of this possibility but Ackerman, 1983, Filippova and Astington 2008 and Winner and Leekam 1991 do not. The reader can also consult Creusere 1999 and Filippova 2014 for interesting reviews of this complex literature.

Ackerman, Brian P. 1983. "Form and Function in Children's Understanding of Ironic Utterances." *Journal of Experimental Child Psychology* 35 (3): 487–508. doi:10.1016/0022-0965(83)90023-1.

Early study on children's comprehension of irony focusing on different component processes.

Capelli, Carol A., Noreen Nakagawa, and Cary M. Madden. 1990. "How Children Understand Sarcasm: The Role of Context and Intonation." *Child Development* 61 (6): 1824–1841. doi:10.1111/j.1467-8624.1990.tb03568.x.

Study investigating detection of sarcasm in 8- to 9-year-olds, 11- to 12-year-olds and adults. Results showed that children relied heavily on intonation and less on context for detecting sarcasm, whereas adults used both cues.

Creusere, M. 1999. "Theories of Adults' Understanding and Use of Irony and Sarcasm: Applications to and Evidence from Research with Children." *Developmental Review* 19 (2): 213–62. doi:10.1006/drev.1998.0474.

Interesting review combining theoretical issues in the study of irony, processing findings from adults and developmental findings.

Demorest, Amy, C Meyer, Ellen Phelps, Howard Gardner, and Ellen Winner. 1984. "Words Speak Louder than Actions: Understanding Deliberately False Remarks." *Child Development* 55 (4): 1527–1534. doi:10.2307/1130022.

Investigation of 6- 9- and 13-year-old children's ability to distinguish between sincere, deceitful and ironic remarks with a focus on the age at which each distinction develops.

Dews, Shelly, Ellen Winner, Joan Kaplan, Elizabeth Rosenblatt, Malia Hunt, Karen Lim, Angela McGovern, Alison Qualter, and Bonnie Smarsh. 1996. "Children's Understanding of the Meaning and Functions of Verbal Irony." *Child Development* 67 (6): 3071-3085. doi:10.2307/1131767.

Examined children's appreciation of the discourse function of ironic and literal utterances.

Filippova, Eva. 2014. "Irony Production and Comprehension." In Danielle Matthews (ed.). *Pragmatic Development in First Language Acquisition*. Amsterdam/Philadelphia: John Benjamins Publishing Company.

Recent comprehensive review on children's production and comprehension of different types of irony.

Filippova, Eva, and Janet Wilde Astington. 2008. "Further Development in Social Reasoning Revealed in Discourse Irony Understanding." *Child Development* 79 (1): 126–138. doi:10.1111/j.1467-8624.2007.01115.x.

Often-cited work focusing on different cognitive processes involved in irony comprehension in 5-, 7- and 9-year-olds.

———. 2010. "Children's Understanding of Social-Cognitive and Social-Communicative Aspects of Discourse Irony." *Child Development* 81 (3): 913–28. doi:10.1111/j.1467-8624.2010.01442.x.

Another frequently cited paper from the same authors focusing on children's appreciation of the discourse function of irony.

Happé, Francesca G.E. 1993. "Communicative Competence and Theory of Mind in Autism: A Test of Relevance Theory." *Cognition* 48 (2): 101–119. doi:10.1016/0010-0277(93)90026-R.

Well-known study looking at how different types of figurative speech (i.e., simile, metaphor, irony) are understood and how they relate to mentalizing skills in children with autism.

Pexman, Penny M., and Melanie Glenwright. 2007. "How Do Typically Developing Children Grasp the Meaning of Verbal Irony?" *Journal of Neurolinguistics* 20 (2): 178–96. doi:10.1016/j.jneuroling.2006.06.001.

Study investigating the developmental trajectory of children's understanding of different component skills of irony (speaker belief, intent and attitude) in 6- to 10-year-old children.

Winner, Ellen, and Sue Leekam. 1991. “Distinguishing Irony from Deception: Understanding the Speaker’s Second-Order Intention.” *British Journal of Developmental Psychology* 9 (2): 257–270. doi:10.1111/j.2044-835X.1991.tb00875.x.

Focused on the relation between different components of irony understanding and mentalizing skills in 5- to 7-year-olds.