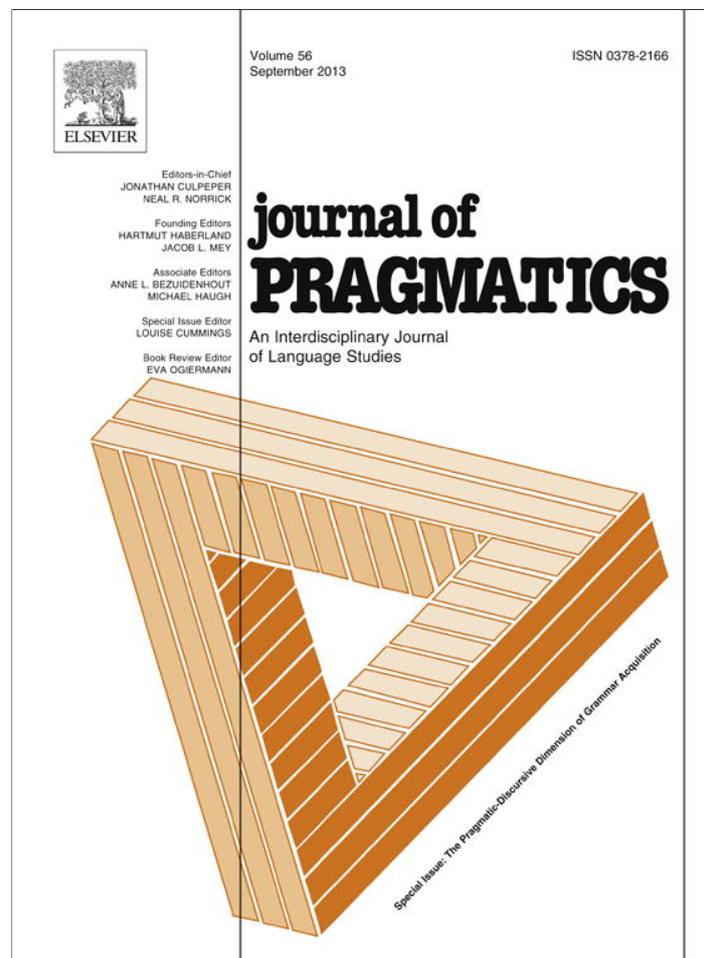


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Joint attention helps explain why children omit new referents

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Abstract

New referents are typically introduced into adult discourse with lexical nouns. This makes new referents maximally clear for listeners, and helps the listeners direct their attention appropriately. A different trend is observed in child language, where new referents may be realised with demonstratives or pronouns, or they may be omitted altogether. This has led some to claim that children are pragmatically immature and not sensitive to the perspective of their interlocutors. In this paper, we analyse a videotaped corpus of naturalistic spontaneous speech of four children acquiring Inuktitut (2;0–3;6) to examine the different ways in which they realise new referents. Our results show that in their realisation of new referents children are sensitive to the presence or absence of joint attention. Specifically, they tend to omit arguments when joint attention is present, and they use lexical forms when it is absent. Their use of demonstratives reflects similar sensitivity: they tend to use demonstrative clitics when joint attention is present but independent demonstrative forms when it is absent. The use of omitted forms in child language is thus not explained by any pragmatic deficiency; indeed, it shows that children adjust their messages for the interlocutor, strictly following the Gricean Maxim of Quantity.

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1. Introduction

In natural discourse, syntax is sensitive to context and constrains how information is structured for the immediate communicative needs of the interlocutors (Chafe, 1976; DuBois, 1987; Birner and Ward, 2009; Féry and Krifka, 2008). An example is argument realisation in the context of recency: adults tend to represent referents that are new to the discourse (i.e. they have not been linguistically mentioned previously) with overt forms (e.g. definite noun phrases), while those that are already established in discourse tend to be realised with reduced forms (e.g. pronouns), or, if the grammar allows it, they are omitted altogether (Chafe, 1976; Givón, 1983; DuBois, 1987). The use of overt forms makes discourse maximally clear to interlocutors, and helps to signal the relative accessibility of each piece of information so that interlocutors know where to direct their attention (Bock and Warren, 1985; Ariel, 2001).

Young children also show sensitivity to information structure in the way they realise new and old information with different referring expressions (e.g. Allen, 2000; Salazar Orvig et al., 2010; Hughes, 2011). For instance, while children use overt forms for only 9% of old referents, these forms are used for a significantly higher proportion (55%) of new referents in a study of child Inuktitut (Allen, 2000). What becomes clear, however, is that children often realise new referents with reduced or omitted forms. This is illustrated in the following example from Inuktitut (Allen, 1996):

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- (1) Ø *Kata-rar-qa?*
 Ø fall-INCP-INT.3sS¹
 'Did they drop?' (Elijah, 2;9)

In (1) above, the child introduces a new referent (i.e. a referent that has not been linguistically mentioned in the prior discourse). The utterance alone does not provide any detailed information about the intended referent. Using an underspecified form for the introduction of new referents may be ambiguous for the interlocutor and may lead to communication breakdown. This apparent insensitivity to the listeners' needs, and similar phenomena in other aspects of child syntax, has led some to claim that children have an "immature pragmatic system" (Schaeffer, 2000, p. 67), or that they are otherwise pragmatically deficient, at least with respect to encoding new information (e.g. Deutsch and Pechmann, 1982; Hyams and Wexler, 1993; Hamann and Plunkett, 1998; van Hout et al., 2010; De Cat, 2013).

This conclusion, however, does not sit well with numerous findings that in other situations children demonstrate a sophisticated awareness of both the wider context and the perspective of others. For example, even very young children adjust their requests depending on the knowledge state of their interlocutor (O'Neill, 1996, 2005; Liszkowski et al., 2008). More generally, even very young children show an awareness of what others know, and they use this to guide their behaviour in a variety of different situations (Baillargeon et al., 2010). It would thus be surprising if their linguistic production, including argument realisation, did not exhibit the same sensitivity to others' knowledge.

One specific type of situation that is likely to influence children's linguistic choices is joint attention. Joint attention refers to those situations in which a pair of interlocutors are visually attending to a referent, and both are aware that the other is doing so (Fig. 1). Joint attention is a triadic concept with two interlocutors and a referent, in contrast to standard attention (visual or otherwise) that can be simply dyadic with one individual and a referent. Consider the details in Fig. 1: joint attention can be absent in a variety of different ways (e.g. the interlocutor is not focused on the referent or child), but it is present if and only if the requisite conditions are satisfied. This requirement hence distinguishes joint attention from instances of 'visual perspective', when the child communicates about objects that are or are not occluded from the perspective of the interlocutor (e.g. Nadig and Sedivy, 2002). In the situation of 'visual perspective', the child's linguistic descriptions are influenced by what their addressee can or cannot see but not necessarily by whether or not the two are involved in a triadic interaction with mutual awareness of what the other is focused on.

The definition of joint attention in this paper is also distinct from 'focus of attention' or 'joint action' (e.g. Gundel et al., 1993; Chafe, 1994; Clark, 1996). While it may be that a recently mentioned referent is in the focus of attention of the discourse participants, it does not necessarily hold that this referent is also being visually jointly attended to by both interlocutors. This difference is illustrated in the following exchange between a mother and her child (Allen, 1996):

- (2) Mother: *Nipittajuurmi qaujimanngilatit?*
 'You don't know where the Scotch tape is?'
 Child: *Aah.*
 'I don't.'
 Child: *Qariamiikkuk!*
 'It's in the room.'
 Child: *Ailaurlaguu?*
 'Want me to go get it?'

In this exchange, the child and his mother talk about the Scotch tape. While the referent is the topic of the conversation for several utterances and thus in the focus of attention, the child and adult do not visually jointly attend to the referent at all points of the conversation. In fact, at the time of the child's final utterance, the mother is focused on another third entity. In essence, we consider joint attention to refer to a specific event or moment in a conversation, rather than a model of all potential referents in the history and present of the conversation that may be part of the interlocutors' common ground (Clark, 1996).

¹ The following abbreviations are used in the glosses in this article: 1sS = first person singular subject; 2sS = second person singular subject; 3sS = third person singular subject; 3pS = third person plural subject; 3sO = third person singular object; 1Ssg = first person singular possessor, singular possessed item; 2Sdu = second person singular possessor, dual possessed item; ABS = absolutive case; COP = copula; CTG = contingent mood; EMPH = emphatic; FUT = future; INCP = inceptive aspect; IMP = imperative; IND = indicative mood; INT = interrogative mood; MOD = modalis case; NEG = negative; PAR = participative mood (equivalent to indicative in this dialect of Inuktitut); PASS = passive; PERF = perfective aspect; POL = politeness (preceding imperative); PRE = prefix on demonstrative; SG = singular.

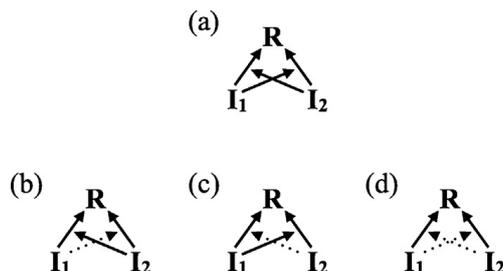


Fig. 1. *Joint attention*. Joint attention refers to those situations in which a pair of individuals (I_1 and I_2) attend to an object or event (R , for *Referent*), and both are aware that the other is doing the same (Tomasello, 1999). In this figure, solid lines indicate attention, and dotted lines indicate the absence of attention – so all four lines must be solid for the interaction to be a case of joint attention. So (a) is a case of joint attention, but none of (b)–(d) are joint attention. In particular, even if both individuals attend to the object, it is still not joint attention unless they are also attending to each other.

Joint attention, defined as a triadic activity, has been shown to play an important role in early language development (Tomasello, 2003). It provides a non-linguistic scaffolding for the young child's linguistic interactions (Clark, 2001), and functions as an important source for the identification of intended referents in early parent–child interactions. Children's involvement in joint attention is indeed positively related to their vocabulary development (e.g. Tomasello and Todd, 1983; Tomasello and Farrar, 1986; Baldwin, 1991; Carpenter et al., 1998). Furthermore, recent studies show that joint attention also influences children's early utterances in predictable ways. Skarabela (2007a,b) examined a corpus of 1890 third person subject and object arguments in child Inuktitut and found that children were more likely to omit arguments or use demonstratives when they were involved in joint attention. If children's early sentence production is sensitive to the perspective of others, then the presence or absence of joint attention can perhaps also account for the realisation of new referents. A preliminary study of child Inuktitut in fact examined the role of joint attention in a subset of 347 arguments that represented both new and old referents that were otherwise maximally accessible (Skarabela and Allen, 2002): all referents selected for the analysis were physically present in the discourse, the target referent was the only potential referent in the discourse that would fit the semantics of the verb, and the target referent was not in contrast with other referents. The results showed that children would omit new referents when they were involved in joint attention whereas they would use overt arguments when they were not.

In this paper, we build on these preliminary results that show that joint attention affects information structure of early utterances and further examine its mitigating effects on the production of new referents in child Inuktitut (Allen, 1996). The preliminary study described above was based on a subset of 83 new referents from the Inuktitut corpus; here, we include the complete set of new referents, including those that were not physically present in the discourse, that were contrastive, and/or that were in competition with other referents. The new dataset consists of 453 examples, including referents realised by demonstratives, which were not considered in the original analysis.

Our specific prediction is that children will be more likely to omit arguments realising referents new to the discourse when those referents are the subject of joint attention, and they will use lexical nouns when the new referents are not the subject of joint attention with their interlocutors. We also predict that demonstratives, just like omitted arguments, will be more often produced in the presence of joint attention, as these represent more reduced forms that do not provide as much information about the referent as lexical nouns. However, we further ask whether the presence or absence of joint attention might affect more subtle aspects of the realisation of new referents in the group of demonstratives. In Inuktitut, demonstratives can be realised either independently (3) or as clitics (4):

(3) *U-na pi-ga.*
 this.one-ABS.SG thing-ABS.1Ssg
 'This is mine.'

(4) *Pi-ga-u-na.*
 thing-ABS.1Ssg-this.one-ABS.SG
 'This is mine.'

Independent forms are, arguably, more salient than clitics, and hence may help identification of the intended referent more than clitics do. This is a subtle difference, but we are interested in whether children's sensitivity to the presence or absence of joint attention extends this far. We thus predict that, if children are indeed sensitive to the perspective of others, then independent forms would be more likely to be used in the absence of joint attention, and clitics in the presence of joint attention.

2. Data and methods

We examined the hypothesis that joint attention may influence children's selection of argument forms in new referents in a videotaped corpus of four children acquiring Inuktitut (Allen, 1996). In this section, we first describe the relevant structural properties of the language and then provide the details of the Inuktitut corpus, coding, and data selection for this study.

2.1. Structural properties of Inuktitut

Inuktitut is a polysynthetic, morphologically ergative language of the Eskimo-Aleut family, with SOV basic word order. It has rich inflectional morphology with nominal case-marking affixes and verbal cross-referencing affixes. An inflectional suffix completes each verb stem, encoding information about the verb mood and the person and number of the referent, i.e. a transitive-verb suffix encodes information about person and number of both subject and object, and an intransitive-verb suffix encodes information about the person and number of subject only. In some restricted colloquial contexts, these required suffixes may not be realised (see Crago and Allen, 2001; Swift and Allen, 2002a,b). The following schema illustrates the verb formation process (adapted from Swift and Allen, 2002a):

- (5) verb base + postbase suffixes + portmanteau inflectional suffix
atjiliur- tau-guma-nngi- tunga
 film- PASS-want-NEG- PAR.1sS
 'I don't want to be filmed.'

In this example, the verb base *atjiliur-*, 'film', is followed by several optional postbase suffixes. The inflectional suffix *-tunga* completes the word, representing a first person singular subject in the participative mood.

Subject and object omission is frequent and licensed in Inuktitut. This means that all cases of argument omission that we consider are grammatical, and hence are not the consequence of a failure to acquire the target grammar. Indeed, it was the study of null subject languages that highlighted the importance of the wider discourse context to argument realisation in general (Allen et al., 2008).

In order to explore the role of joint attention in how children express new referents, we restricted our analysis to third person arguments only. We excluded first and second person arguments for two reasons: (1) they refer to speech participants 'I' and 'you' and are as such considered always given (Chafe, 1976; DuBois, 1987); (2) they typically represent referents that are produced in the presence of joint attention because interlocutors are usually attending to each other and are aware of that attention. In contrast, third person arguments can refer to new or old information and the referents can be produced in the presence or absence of joint attention.

Third person referents can occur as omitted arguments, as in (6); as demonstratives, as in (7a–b); or as lexical nouns, as in (8). There are no third person pronouns in Inuktitut.

- (6) \emptyset *Ani-si-ju.*
 \emptyset go.out-INCP-PAR.3sS
 '(He) is leaving now.' (spoken by Paul's mother)
- (7a) *Su-sima-jur-u-na?*
 do.what-PERF-PAR.3sS-this.one-ABS.SG
 'What did this do?' (spoken by Elijah's mother)
- (7b) *U-na savi-jua-nngua-lik?*
 this.one-ABS.SG knife-big-imitation-item.having
 'This one has a big knife?' (spoken by Elijah's mother)
- (8) *Itiga-alu-tit siura-alu-u-mmata.*
 foot-EMPH-ABS.2Sdu sand-EMPH-COP-CTG.3pS
 'Because your feet are sandy.' (spoken by Elijah's mother)

We included all three categories of referring expressions in this study.

3. Results

3.1. The impact of joint attention on the realisation of new arguments

Our central question is whether the presence or absence of joint attention predicts how a new referent will be realised. Descriptive statistics are reported in Table 1.² It is worth noting that children produced about equal numbers of new referents in the two contexts of joint attention: 56% of arguments were produced in the absence of joint attention, and 44% in the presence. They introduced 30% of new referents with omitted arguments, 28% with lexical nouns and 42% with demonstratives.

The difference in distribution across the three argument forms in the presence and absence of joint attention was found statistically significant ($\chi^2(2) = 70.88, p < .0001$; Cramer's $V = .3956$). As predicted, new referents were more often realised with omitted forms when they were the focus of joint attention than when they were not; see Table 1 and Fig. 2. Lexical nouns were used more often in the absence of joint attention. Finally, demonstratives were used in the presence of joint attention more often than in the absence.

Table 1
Distribution of forms for new referents in presence and absence of joint attention ($N = 453$).

	Lexical nouns	Demonstratives	Omitted	Total
JA-Present	9% (17)	48% (97)	43% (87)	201
JA-Absent	43% (108)	37% (93)	20% (51)	252

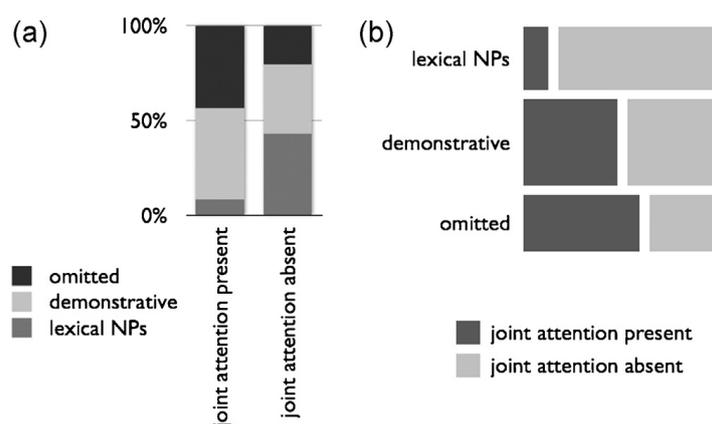


Fig. 2. (a) Distribution of argument forms in two contexts of joint attention. (b) Distribution of joint attention across three argument forms.

We illustrate this result in two ways. Fig. 2(a) compares the distribution of lexical NPs, demonstratives and omitted arguments for the realisation of new arguments in the presence and absence of joint attention. Fig. 2(b) presents the same data in a different way: it compares the distribution of joint attention across the different argument types. The heights of the different rows in Fig. 2(b) are proportional to the total number of each argument type in the data (i.e. overall, there were more demonstratives than omitted arguments, and more omitted arguments than lexical NPs).

The results strongly suggest that children take the presence of joint attention into account in their realisation of new referents. If joint attention is present, children are more likely to omit arguments or, to a lesser degree, use demonstratives. If children are not involved in joint attention, then they are more likely to use lexical nouns.

The following example illustrates argument omission for a new referent in the context of joint attention:

- (12) Paul is playing with his older brother at home. At one point he takes a ball and throws it in the direction of the person who is holding the video camera. Looking at the video camera, he smiles and says:

Ø *Ai-li-ruk!*
 Ø get-POL-IMP.2sS.3sO
 'Get it!' (Paul 2;10)

² We also tested these predictions in just the 324 utterances with an overt verb root (i.e. excluding examples with verbal material but without a verb root such as (11)) and reached the same results.

Here, the ball is a new referent that had not been mentioned previously, yet Paul refers to it with an omitted argument. The ball is the subject of joint attention because both Paul and the camera holder are attending to the referent and the action, and they know that the other is doing so.

In comparison, the following example illustrates the tendency to realise new referents with lexical nouns when joint attention is absent:

- (13) Lizzie is sitting on a couch next to her mother who is fixing a tent. She asks her mother:
Miqquti-mik pi-langa.
 needle-MOD.SG do-IMP.1sS
 'Hand me the needle.' (Lizzie 2;10)

In this example, the new referent, 'needle', is not the focus of joint attention, because the interlocutor is not attending to it, and neither interlocutor is attending to the other. Lizzie thus introduces this referent to the discourse with a lexical noun.

How far does the impact of joint attention extend? Given the above result that the presence or absence of joint attention predicts broad trends in argument realisation in children, we now consider the distribution of the two types of demonstratives in the two contexts of joint attention. The results are presented in Table 2 and Fig. 3.

Table 2
 Distribution of different demonstrative forms for new referents in presence and absence of joint attention ($N = 190$).

	Clitic	Independent	Total
JA-Absent	10% (9)	90% (84)	93
JA-Present	26% (25)	74% (72)	97

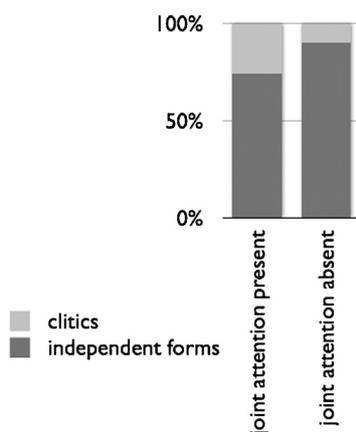


Fig. 3. Distribution of demonstratives in presence and absence of joint attention.

The dataset consisted of far more independent demonstratives (82%) than demonstrative clitics (only 18%). Nonetheless, our prediction was found to hold ($\chi^2(1) = 7.31, p < .01$; Cramer's $V = .2099$). Children used clitics more often when joint attention, which can help listeners identify target referents, was present. They were more likely to use independent forms when joint attention was absent. This suggests that children's awareness of the wider discourse context extends to their use of different demonstrative forms.

4. Discussion

When new referents are introduced into discourse, it is important that interlocutors make this clear, lest they be misunderstood. Adults tend to do this by using overt forms (e.g. definite nouns) (e.g. Ariel, 1985, 2001; Givón, 1983; DuBois, 1987; Prince, 1992). While children signal new and old information in different ways, they realise new referents with lexical nouns only gradually (e.g. Hughes, 2011). Attempts to explain this discrepancy have sometimes concluded that it is the result of a pragmatic deficit on the part of child (e.g. Hamann and Plunkett, 1998). Our analysis shows instead that children's realisation of new referents in fact demonstrates a significant degree of pragmatic competence. Specifically, children are far more likely to use omitted forms to refer to a new referent when that referent is the focus of

joint attention than when it is not. This shows that children's ability to engage in joint attention, and to recognise that joint attention will affect which aspects of discourse are readily accessible to interlocutors, helps to explain why they refer to new referents with reduced or omitted forms.

We also showed that the influence of joint attention extends even to the use of different demonstrative forms for new referents. We have seen that demonstratives as a group were used more often when the children were involved in joint attention. However, when we took into consideration that there are two types of demonstratives in the language and examined the forms separately, we found that the independent form was more often used in the absence of joint attention while the clitic was more often used in the presence of joint attention. This finding fits well with [Diesel's \(2006\)](#) proposal that demonstratives are a special class of linguistic expressions that must be kept separate from both content words (e.g. lexical nouns) and grammatical markers (e.g. pronouns and determiners). He argues that demonstratives are commonly used to coordinate or manipulate the interlocutors' joint focus of attention in two ways: either to direct the addressee's attention to a referent that previously was not in the shared attentional focus, or to direct the addressee's attention away from the current referent to a previously established referent or to differentiate between multiple referents that are already in the shared attentional focus. In some languages, there is in fact a distinct form of demonstrative for each of these functions ([Küntay and Özyürek, 2002](#)): in Turkish, for example, one form is used to shift focus to a new referent while another form is used to contrast between two referents that are already in the interlocutors' shared attentional focus. This pattern seems to extend to Inuktitut as well, at least to some extent, and even two-year-olds can employ this distinction in signalling new referents to their interlocutors.

Alongside previous research, our results thus suggest that children are (hyper)sensitive to several pragmatic aspects of discourse, and to the wider flow of information. For example, if a referent has been mentioned in prior discourse ([Salazar Orvig et al., 2010](#)), then children are likely to use reduced forms to realise it in their own speech. For new referents, the default expectation would be a lexical form. However, conversation builds on a complex set of signals that go beyond linguistic expressions ([Clark, 1996](#)). Factors in the physical and discourse context that may mitigate this influence include the absence of alternative referents ([Allen, 2000](#)) and the gestures that accompany speech ([So et al., 2010](#)). This paper establishes joint attention as another factor that children assume interlocutors can use to identify new referents. The presence of joint attention licenses the assumption that the referent is part of the common ground shared by the interlocutors, and hence that it need not be referred to explicitly, even if it has not been linguistically mentioned before and is, in this sense, new. The result of this awareness of their interlocutor's perspective is that children are somewhat ruthless in their expectations of others: if any other feature of the discourse context can be used to identify the referent, then children may use reduced or omitted forms, and expect the context to do the remaining work. In effect, they follow the Gricean Maxim of Quantity to the letter ([Gundel et al., 1993](#)).

These conclusions thus throw doubt on the claim that children are pragmatically immature (e.g. [Hyams and Wexler, 1993](#); [van Hout et al., 2010](#); [Schaeffer, 2000](#); [Grinstead, 2000](#)), and that it is this that explains why they realise new referents with reduced or omitted forms. On the contrary, they display a high degree of pragmatic awareness. Where they may differ from adults is not in their awareness of the wider context per se, but possibly in avoiding lexical nouns for new information when other contextual factors may allow an interlocutor to identify the intended referent. The use of overt nouns potentially makes adult discourse more robust, in that it provides an additional source of evidence for the intended referent, and/or acts as a check against any misunderstandings that might occur. This becomes particularly important when conversations become less grounded in the here and now of the face-to-face interactions of young children and when in fact conversations begin to build on abstract and physically or visually absent entities. Children's discourse is thus more 'fragile', but this is not because they are unaware of information flow. Instead, it appears that for young children, the default option with regards to the realisation of new referents is to build on the interaction and not to use lexical nouns unless the wider context renders it necessary to do so.

Spontaneous conversations and free play provide prime examples of co-constructing solutions to the problem of perspective together with the interlocutor ([Vygotsky, 1999](#); see [Salazar Orvig et al., 2010](#) for further discussion), and this should be kept in mind when comparing the results of this study with others. For example, some experimental studies have shown what has been interpreted as less sophisticated understanding of discourse-pragmatics (e.g. [De Cat, 2013](#); [van Hout et al., 2010](#)). However, we suggest that this may in fact simply reflect less reliance on contextual information for communication due to the unfamiliarity or lack of contextual scaffolding in the experimental setting.

In conclusion, this study shows that even though two- to three-year-old children do not always use a lexical NP to realise a referent newly introduced to discourse, they are nonetheless good at communicating new information to their interlocutors. In particular, they adjust their messages based on whether or not a new referent is in a focus of joint attention. Joint attention thus crucially affects information structure of early utterances. This observation, we argue, manifests children's sophisticated pragmatic competence and suggests that children's linguistic production builds on their understanding of the wider discourse.

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