EXPERIMENTAL EVIDENCE FOR PRESCHOOLERS' MASTERY OF 'TOPIC'

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1. Introduction*

Since the 1970's, evidence has suggested that preschool children's encoding of information differs from that of adults in some respects (e.g. Maratsos 1974; Karmiloff-Smith 1979). Some differences have recently been argued to be due to an immature pragmatic system (Schaeffer & Matthewson 2005). Delayed pragmatic competence has also been invoked to explain various phenomena, from binding errors (Chien & Wexler 1991) to the use of null subjects with finite verbs (Wexler 1998). On the other hand, research has also demonstrated infant's ability to distinguish new from old information (Baker & Greenfield 1988). The degree of informativeness of referents has since been shown to play a significant role in the realisation of arguments in early acquisition (Allen 2001). In an attempt at reconciling the two, it has recently been proposed that target-deviance in this area is not caused by a delay in pragmatic competence, but by the excessive processing demands arising from the *interaction* of discourse and narrow syntax (Serratrice, Sorace & Paoli 2004).

This paper focuses on the acquisition of topic by monolingual children. Topic is a key discourse/pragmatic notion, whose mastery has often been argued to be deficient in early acquisition (Chien & Wexler 1991; Wexler 1998). It is also the interface phenomenon *par excellence*, as it requires the integration of up to three components of the language faculty: discourse/pragmatics, syntax and phonology (De Cat 2007). Given preschool children's processing limitations and their well-documented impact on language (Reinhart 2004), one might expect that topic structures be problematic in early acquisition. However, topic structures appear in spontaneous production from the onset of expressive syntax and children do not make commission errors in the encoding of topics (De Cat 2003, 2007). In this paper, I present experimental evidence confirming these findings, showing that, at least as early as 2;6, children correctly identify and encode topics.

2. The notion of topic and its acquisition

The notion of topic is a discourse primitive (Reinhart 1981; Erteschik-Shir 1997), generally defined as 'what the sentence is about'. In spoken French, topics must be dislocated (as in (1)) if they are expressed by more than a weak (pronominal) element (Lambrecht 1981; De Cat 2007).

(1) Les cochons$_i$, ils$_i$ se sont enfuis.
the pigs they REFL are fled
'The pigs have fled.'

Because of this, sentences with a "heavy" (i.e. non-pronominal) subject (as in (2)) are only possible in contexts where the subject is not topic, such as *thetic* contexts, where the whole sentence is in focus. Thetic contexts are typically triggered by questions like *What happened?* The categorical realisation of subjects as dislocated if topic vs. not dislocated if not topic in spoken French provides the ideal testing ground to study the acquisition of this core discourse notion.

(2) Les cochons se sont enfuis.
the pigs REFL are fled
'The pigs have fled.'

3. Elicitation study

The aim of this study was to elicit sentences containing a "heavy" NP, in contexts requiring either a topic or a focus interpretation of that NP. 45 monolingual children participated – 15 per group. The mean ages were: 2;11 (Group A: 2;6.22 - 3;3.28), 4;0 (Group B: 3;5.17 - 4;5.28) and 5;2 (Group C: 4;6.10 - 5;6.15). Unfortunately, most of the 15 adult controls used formal French due to the testing situation. The structural encoding of information is different in formal French, so the data was not comparable with that of the children and will not be discussed here. (For a corpus study of the use of dislocated structures in adult informal French, see De Cat 2007.)

Each child was presented in turn with 13 sets of pictures. In the topic condition, contexts had to be summoned in which a referent is obligatorily topic (which requires a certain degree of relevance and salience), but not *so* salient that encoding it with a mere clitic could be deemed sufficient. To achieve this, 3 target referents were presented simultaneously, so that

the use of a clitic alone would be ambiguous. The first picture introduced a group of 3 agents (a family, a group of dogs,...). Each member was briefly described to individualise them. The next page showed each of the agents involved in a different activity and the child was asked: *Qu'est-ce qu'ils font maintenant ?* 'What are they doing now?'. This aimed to prompt three sentences in which the target referents would be addressed in turn. Because the focus was on them in the previous picture and they were clearly the centre of attention in the test picture, they were relevant enough so that the child would want to predicate something *about* them (forcing a topic reading). Because each agent was involved in a different activity, there would be a need to distinguish them (as a *contrastive* topic), hence requiring identification by more than just a clitic, i.e. a dislocated NP.

In the focus condition, the first picture introduced a scene (a beach, a room,...). In the second picture, a new character appeared (a cow on a boat, a child on a bike,...). The child was asked: *Qu'est-ce qui se passe maintenant ?* 'What is happening now?'. This prompted for a sentence in which all the information would be new (i.e. in focus).

3.2. Identifying 'errors'

In this experimental setup, a structure is illicit (i) if it compatible with a topic interpretation of the target referent but is uttered in a context requiring a focus interpretation, or (ii) if it is compatible with a focus interpretation of the target referent but is uttered in a context requiring a topic interpretation. A topic interpretation is obligatory whenever the referent is dislocated, as in (3). Dislocated elements were diagnosed using a combination of factors: presence of a resumptive element, prosody, apparent disruption of the canonical word order (De Cat 2004).

(3) **Le singe**$_i$, i(l)$_i$ (se) réveille.
the monkey he (REFL) wakes-up
'The monkey wakes up.'

However, if the child considered the referent to be sufficiently salient in the context, (s)he could equally omit the dislocated element and use just a clitic to express the target referent, as in (4).

(4) Là, i(l) va dans l'eau.
there he goes in the water
'There, he goes in the water.'

Many of the children were still at the null subject stage, so in some cases the subject clitic was missing. The significance of using a (null) clitic to encode the target referent in the topic condition is discussed in section 4.

A focus interpretation is required if the target referent occupies the canonical subject position, as in (5); if it appears on its own, as a *fragment* (De Cat & Tsoulas 2006), as in (6); or if it appears in the *il y a* existential construction, as in (7). An existential reading is obligatory in (6) and (7) because the indefinite is mentioned for the first time in the context.

(5) Maintenant la petite fille joue aux balles.
now the little girl plays at-the balls
'Now the little girl is playing with balls.'

(6) Une vache!
a cow
'(There's) a cow!'

(7) Il y a une voiture qui arrive.
there is a car that arrives
'A car arrives.'

Utterances like (3) and (4) are licit in the topic condition, but illicit in the focus condition, while utterances like (5), (6) and (7) are licit in the focus condition, but illicit in the topic condition.

One type of structure that had to be discarded in the topic condition. If the child focused on the set (e.g. the family) rather than its members, the set itself qualified as a topic in the next picture. Each target referent therefore needed reintroducing as a d(iscourse)-linked indefinite, as in (8). In this informational structure (*subordinate update* – Erteschik-Shir 1997), a referent is identified (via focus) among a d-linked set, and is thereby promoted as the sentence topic. Because of the hybrid status of the target referent in such structures, they had to be discarded from the analysis.

(8) Et i(l) y en a un qui fait dodo.
and there is one who makes sleep
'One of them is asleep.'

3.3. Results

Table 1 shows the total number of tokens for each of the experimental conditions (topic vs. focus), by age group.

Age group / Condition	Group A Top	Group A Foc	Group B Top	Group B Foc	Group C Top	Group C Foc
1. Dislocated NP (3)	94	0	120	1	173	0
2. Subject clitic (4)	94	3	108	1	33	0
3. Null subject	29	1	32	1	0	0
4. Heavy subject (5)	0	10	3	6	3	9
5. Fragment (6)	2	42	0	40	0	24
6. *Il y a*/cleft + exist. indef. (7)	11	19	0	34	0	54
7. *Il y a* + definite	5	3	3	1	8	0
8. *Il y a* + d-linked indef. (8)	0	0	15	0	77	0
9. *Il y a* + unclear	8	5	1	0	1	0
10. Unclear	2	4	2	0	0	0
Total	245	87	284	84	295	87
+ Void items	68	3	31	6	20	3

Table 1: Structural position and nature of the target referent

Tokens are classified (vertically) according to the structural position and nature of the target referent. The numbers in parentheses correspond to illustrative examples in the text. The bottom row represents the number of items for which there was no data: either the child failed to mention one of the target referents, or the interviewer made a mistake.

The light shaded cells indicate 'correct' answers: the target referent was encoded as a topic in the topic condition (rows 1-3), or as a focus in the focus condition (rows 4-6). The dark shaded cells indicate the 'errors': the target referent was encoded as a topic in the focus condition (rows 1-3), or it was encoded as a focus in the topic condition (rows 4-6). All the shaded cells correspond to the utterances in which the information structural status of the target referent is unambiguously topic or focus. Below, I treat the structures of type '*Il y a* + definite NP' (row 7) on a par with row 6 because such structures are thetic (Lambrecht 1994). A topic interpretation is therefore ruled out. The use of a definite in this structure was licit in the focus condition: the 4 instances observed were licensed via *bridging*, which allows the use of a definite on first mention via inference from a combination of knowledge available from the context and knowledge of the world (see e.g. Avrutin & Coopmans 2000).

Notice the striking parallel between the use of null subjects and subject clitics to encode the target referent. Null subjects disappear in Group C, simultaneously to a dramatic drop in the use of subject clitics. The use of clitics and null subjects is almost exclusive to the topic condition, similarly to dislocated NPs. This justifies treating them on a par.

Table 2 summarises the results for the subset of data including all clear cases (corresponding to rows 1-7 in Table 1). For each age group, the difference between the use of a topic vs. a focus construction in each condition was statistically significant (for each group a Chi-square test yielded $p<0.0001$).

Age group	**Group A**		**Group B**		**Group C**	
Condition	**Topic**	**Focus**	**Topic**	**Focus**	**Topic**	**Focus**
Target encoded as topic (cf. rows 1-3)	217 (92%)	4 (5%)	260 (98%)	3 (4%)	206 (95%)	0 (0%)
Target encoded as focus (cf. rows 4-7)	18 (8%)	74 (95%)	6 (2%)	81 (96%)	11 (5%)	87 (100%)
Total	235	78	266	84	217	87

Table 2: Encoding of target referent as topic or focus in each condition

In the focus condition, children used almost exclusively focus-compatible encoding of target referents, with an error margin of 3% (7/249 tokens). In the topic condition, topic-compatible encoding of target referents was used almost exclusively, with an error margin of 5% (35/718 tokens). 'Errors' included 11 *il y a* + existential indefinite (all from the same child from Group A): perhaps an attempt by that child to use a d-linked indefinite structure when the clitic *en* has not yet been acquired. (All d-linked indefinites produced by children in Groups B and C are as in (8), with *en* summoning the d-linked set). The slightly higher number of errors in Group C's topic condition is due to a larger number of *il y a* + definites.

All the children used dislocated NPs to encode the target referent in the topic condition. There was only 1 instance where a dislocated NP was erroneously used in the focus condition. Children never used existential indefinites (nor indeed any indefinite) in a dislocated position, confirming that they are 'aware' of the topic status of dislocated NPs and of the fact that existential indefinites can never be topics (Reinhart 1981).

This experiment brings overwhelming evidence for the mastery of the discourse notion of topic by preschoolers, even in the youngest age group.

4. Children's evaluation of salience

Children in Groups A and B were relatively reluctant to use full NPs to encode the target referent, as shown in Table 1. However, children only avoided full NPs when it was informationally licit to do so: apart from a

tiny error margin (2%, i.e. 6/258 tokens), they never used a mere clitic or a null subject to encode the target referent in the focus condition. This demonstrates their awareness of the information status of referents: they (almost) always encoded new, focused referents as full NPs. Within the topic condition, the younger children relied extensively on the 'reduced' option, expressing the target referent with a clitic or a null subject more than half of the time: they encoded topics with a full NP (dislocated) only 43% of the time (94/217). In Group B, they did so only 46% of the time (120/260), compared with 84% (173/206) in Group C.

In the adult language, topics can be encoded with just a clitic when their referent is sufficiently salient in the context. Salience is sufficient when the hearer can identify it effortlessly in the discourse or situational context. This is evaluated by the speaker on the basis of their assumptions regarding the hearer's knowledge state. In our experimental conditions, there were 3 target referents in each case, and the use of a simple clitic to identify them would in principle have led to ambiguity for the hearer. Children may have been aware of this ambiguity to an extent, because they often used deixis (i.e. pointing, often accompanied by a locative adverb) to identify each of the referents. Only a relatively small proportion of clitics or null subjects lacked any form of disambiguation: 12% (26/217) in Group A, 23% (60/260) in Group B and 9% (19/206) in Group C. However we have no proof that the *intention* behind the pointing was indeed disambiguation for the sake of the hearer. To be able to assess their listener's needs, children have to be able to appreciate that (s)he might have a different perspective from their own. This ability is acquired as part of Theory of Mind development.

5. Salience evaluation and Theory of Mind

A Theory of Mind (ToM) test based on O'Neill (1996) was carried out on the same day, on the same children. The child was invited to choose two animal puppets, and asked to identify them. One of them (e.g. the lion) went to bed and slept for the duration of the test. A box was introduced, and the active puppet (e.g. the monkey) looked inside. In the first condition, the child was also allowed to look inside the box. In the second condition, (s)he could not see what was in the box. Then (in both conditions) the child was asked the following questions in turn: Did the lion see what is inside the box? Did the monkey see what is inside the box? Does the lion know what is in the box? Does the monkey know what is in the box?

All the children but one (age 5;4.12) correctly judged whether the active puppet had looked inside the box. From 3;6, all children correctly made that judgement about the sleeping puppet. The lateness of this threshold may be due to the verbal nature of the test. Non-verbal tests have shown that 2-3 year olds monitor whether another person sees something happen or not (O'Neill 1996). From the age of 4, 18/21 children passed the seeing-leads-to-knowing test in both conditions, indicating that they can judge accurately the knowledge state of both puppets, irrespective of their own knowledge state. Before 4;0, only 2/20 children passed the test in both conditions. The threshold of 4;0 corresponds to the age at which children are generally reported to master false belief, the definite test of mental-state understanding (Wellman, Cross & Watson 2001).

Based on this, the data from the topic experiment was reorganised in 2 groups (under 4;0 and over 4;0), so that the children from Group 2 have the prerequisite cognitive abilities to evaluate the knowledge state of their listener and therefore can appreciate that (s)he may need help to identify the referents they are talking about. In other words, children in Group 2 should be able to evaluate the salience of discourse referents, based on their ToM development. And indeed, they do use full NPs to encode topics much more often than children in Group 1. Yet we find that Group 2 still do use just clitics to identify the target referents in the topic condition 29% of the time (96/329), without deixis to help the listener in 17% of cases (57/329). This suggests that they fail to appreciate that using a clitic is not sufficient to let their listener know which of the three target referents they are talking about. ToM thus cannot be the determining factor underlying the use full forms (vs. clitics) to meet the salience requirement.

Age group	**Group 1 (under 4;0: 23 children)**		**Group 2 (4;0 and above: 22 children)**	
Condition	**Topic**	**Focus**	**Topic**	**Focus**
Dislocated NP	154 (44%)	1	233 (71%)	0
Subject clitic	145 (31%)	4	90 (27%)	0
Null subject	55 (16%)	2	6 (2%)	0
Total of topics	354	7	329	0

Table 3: Target referents encoded as topics in each condition

What is at stakes here is quite subtle. All the children in this study *are* able to evaluate the salience requirement for topic licensing: they never encode new referents as topics. What they fail to appreciate, especially before 4;6, is that a heavy NP is sometimes needed to avoid ambiguity. Instead of relying on linguistic encoding for that purpose, children tend to

rely on the physical context. Exploiting joint attention, they bank on what is visible to them and their addressee to reduce the amount of information encoded linguistically. Initially, the physical context seems to be their preferred (sub-)domain of reference (an idea proposed by Krämer 2005), and they only express linguistically what is essential information.

6. Conclusions

This study clearly shows that preschool children as young as 2;6 already possess the discourse/pragmatic competence necessary to encode topics. This requires them to be able to evaluate the information status of discourse referents, their relevance, and, up to a point, their salience.

By the age of 4, children's awareness of other minds is established, and yet children older than 4 were found to use clitics rather than full NPs to encode topics that were not quite salient enough to avoid ambiguity. ToM can therefore not be the determining factor in the evaluation of subtle salience distinctions. Children appear to rely maximally on joint attention to minimise what to express with overt syntax. But crucially, this (almost) never violates the linguistic rules of topic encoding.

The early mastery of the discourse notion of topic, at an age of well-documented processing limitations, implies that the integration of information from syntax and discourse is not *per se* too demanding.

7. References

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