The on-line interpretation of pronouns and repeated names in seven-year-old children

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1   Referential cohesion is one of the main features that differentiate a discourse from a set of sentences. Different forms of anaphoric expressions serve as cohesion markers between sentences and ensure the referential continuity of discourse: Zero anaphora, reflexives, definite and indefinite pronouns, demonstratives, definite noun phrases and proper names (Ariel, 1990; Kleiber, 1994). The different forms of anaphor vary in terms of their lexical specificity and the degree to which their interpretation is governed by the surrounding text. Thus, compared to repeated noun phrases or repeated proper names (full anaphoric forms), pronouns are reduced anaphoric forms, morphologically marked for gender, number and case, but characterized by a low lexical specificity. Their interpretation is highly dependent on the structure of the text. They are mainly used to maintain reference across clauses or sentences (Charolles, 2002; Hickmann, 2003).

2   The interpretation of pronouns and repeated noun phrases in children

3   In developmental studies, the acquisition of anaphoric expressions has been mainly investigated in the production of narratives, with a functional approach stressing the role of semantic and pragmatic-discursive factors, and the impact of cross-linguistic variations (Hickmann, 1995; 2003). Hickmann and Hendriks (1999) conducted a cross-

linguistic study with subjects from four different age groups (4-to-5 year-old children, 7 year olds, 10 year olds and adults) and from four different languages (English, French, German and Mandarin Chinese). As regards the maintenance of the animate referents, results showed that in all languages and in all ages, the subjects used pronominal forms more frequently than nominal forms to establish coreference between clauses. These pronominals were mainly produced in subject position to refer to subject referents, S-S relation, rather than other referents, O-S relation (e.g., <u>The horse is running and **he** comes to a fence</u>*vs*<u>There's a horse in a meadow. **He** is running to a fence</u>, Hickmann & Hendriks, 1999, p. 441). Such results illustrated the functional specificity of pronouns to ensure the referential continuity of narratives. Although young children (by age four or five) are sensitive to this property, the discourse functions of language continue to develop in all languages until ten or eleven years.

4   In contrast to discourse production, few investigations have addressed the development of the interpretation of different forms of anaphor in discourse comprehension. In a series of experiments conducted with three groups of children (5, 7 and 10 year olds) and one group of adults, Tyler (1983) investigated the on-line processing of pronouns and repeated noun phrases in subject position, in a listening situation, using a mispronunciation detection task. The two forms of subject anaphor referred to the protagonist in object position in the preceding sentence: O-S relation (e.g., <u>Mother saw the postman coming from a distance. **He/The postman** brought a **leffer** from Uncle Charles who lives in Canada, p. 314)</u>. Results showed that detection times decreased as a function of age. Detection times varied as a function of form of anaphor in five-year olds but not in older children. Seven- and ten- year-old children behaved essentially as adults: Times were similar for the pronoun and the repeated noun. In five-year olds, detection times were slower for the pronoun than for the repeated noun. In another experiment, each pair of sentences that tested the processing of anaphor was preceded by two or three sentences, thus making a short story. In five-year-old children, detection times were similar for the pronoun and the repeated noun for the stories including a main protagonist which was also the pronoun referent. For the stories without any main protagonist, times were slower for the pronoun than for the repeated noun. No such difference between the two sets of stories was observed in older children and adults. For Tyler (1983), five-year olds interpret pronouns as devices which maintain the thematic subject of the discourse. When the story has no clear thematic subject, they rely primarily on the semantic plausibility of referents and do not consistently use the lexical cues (gender and number) of the pronoun. The older children are able to take advantage of three sources of information – the lexical properties of pronouns, the thematic organization of the discourse and also the semantic plausibility of the potential referents – to interpret on-line pronouns.

5   On the whole, Tyler's(1983) results did not provide evidence on behalf of the specificity of pronouns compared to repeated nouns. However, experiments did raise several methodological problems. Arnold, Novick, Brown-Schmidt, Eisenband and Trueswell (2001) and Arnold, Brown-Schmidt and Trueswell (2007) noted that the mispronunciation task required disruption of the interpretation process to make a judgement about the surface form of the stories. These authors investigated the role of pronoun gender and order-of-mention of potential referents in young children. They recorded the eye movements of five-year olds while they simultaneously listened to a short story and viewed a scene depicting it. The analysis of the frequency and time-course of fixations on

the two potential referents showed, unlike to Tyler's (1983) findings, that children used rapidly gender information to interpret pronoun. By contrast, they did not exploit the order-of-mention of the referents.

6   Song and Fisher (2001; 2005) used the notion of the prominence of potential referents in order to investigate the on-line interpretation of pronouns and repeated nouns, in three-year-old children. The prominence of potential referents was defined in the model developed for adults by Gordon and Hendrick (1998). Prominence is dependent on the order-of-mention and the syntactic role of potential referents. Using a preferential-looking comprehension task, the authors registered the eye fixations to two distinct pictures showing two protagonists with the same gender. In pronoun condition, children looked at the prominent referent (that was mentioned first and in subject position in the context sentences) more than the non prominent one. In the repeated noun condition, the proportion of fixations on the correct pictures was very high and was not affected by the prominence of protagonists.

7   The preferential-looking task used by Song and Fisher (2005) showed the influence of the prominence of potential referents when the anaphor was a pronoun. However, it was not well suited to study whether children interpret a pronoun as a specific anaphoric expression in comparison with a full noun phrase such as the repeated noun. The authors used the sentences with repeated nouns as fillers, to reduce the difficulty of the task and to confirm that children were engaged in the task. Moreover, as in Arnold et al (2001; 2007)'s studies, the pictures which were presented simultaneously to the linguistic materials facilitated the understanding of stories. Another paradigm was therefore needed to investigate how children process on-line pronouns and repeated nouns to integrate information in spoken language, and more particularly to test one of the main effects predicted from the Gordon and Hendrick's model (1998): The repeated name penalty.

8   Gordon and Hendrick borrowed the concepts from Centering theory developed within computational linguistics (Grosz, Joshi, & Weinstein, 1995). Centering theory states that the entities in utterances serve as discourse centers which are linked together to make a discourse coherent. Each noninitial utterance in a discourse segment contains two kinds of centers: A single backward-looking center (Cb) and a set of forward-looking centers (Cf). The Cb provides a link back to the immediate preceding utterance. According to the theory, it is crucial that it be realized as a pronoun rather than a repeated noun. The set of Cf provides potential links to the subsequent utterance. It contains all the entities realized in an utterance, ranked in terms of prominence. The prominence of an entity within the set of Cf is determined by such factors as syntactic position, surface order and accent. It influences the ease with which an entity can be the Cb of the subsequent utterance. In particular, the first pronoun in a utterance will be interpreted as referring to the most prominent Cf of the previous utterance.

9   In a series of experiments using self-paced reading and conducted with adults, Gordon and colleagues tested the predictions from Centering theory. They provided evidence for the repeated name penalty showing that reading time is increased when the Cb is realized as a repeated name rather than a pronoun (Gordon & Chan, 1995; Gordon, Grosz, & Gilliom, 1993; Gordon & Scearce, 1995). This effect is not limited to proper names; it can be observed with repeated nouns (Gordon & Hendrick, 1998). An interesting point is that the repeated name penalty was dependent on the coreferential relations between the successive sentences. Using short texts, Gordon et al. (1993, experiment 4) compared two

conditions: In continue condition, the same entity occurred in subject position in the successive sentences and this entity was highly prominent. In shift condition, two different entities occurred in subject position. In other words, in continue condition, the coreferential relation was a S-S relation, whereas in shift condition, it was an O-S relation. In each condition, the Cb was realized as a pronoun or a repeated name. An example of material was as follows (from Gordon et al. 1993, p.334-334):

10   George jumped out from behind a tree and frightened Debbie.
      He was surprised at her hysterical reaction.
      3a. **He / George** never thinks about how others might feel.
      3b. **She / Debbie** screamed loudly and ran away.
      4.   Practical jokes are not always fun for everyone.

11   The test sentences 3a and 3b were in continue condition (S-S relation) and shift condition (O-S relation), respectively. Results showed that the main effect of form of anaphor was significant: Reading time for the test sentence was slower for repeated name than for pronoun. The main effect of continue / shift manipulation was not significant, but the interaction between the two factors was significant: The repeated name penalty was observed only in continue condition. Such results suggested that a pronoun is preferentially interpreted as coreferential with the subject of the preceding sentence which is the more prominent entity in the discourse model. The repeated name penalty was also observed by Fossart (1999) in French speaking adults.

The present experiment

12   The purpose of the present experiment was to test the repeated name penalty in seven-year-old children in a listening situation. At this age level, children are able to process on-line different types of cues: lexical, syntactic, semantic, in order to identify the referent of anaphor. Children were presented with short texts containing two sentences. The repeated name penalty was tested in two conditions of coreferential relations: S-S and O-S, with a design similar to that in Gordon et al. (1993, experiment 4). In order to track on-line the interpretation of anaphor, we used a cross-modal naming task developed in adults by Marslen-Wilson, Tyler and Koster (1993) and adapted in children (mean age: 7;8) in investigations focused on the processing of pronouns in skilled and less-skilled comprehenders by Megherbi and Ehrlich (2005).

13   Children heard a text containing two sentences: A context sentence (1) mentioning two protagonists (A and B) of different gender and a test sentence (2) containing a subject anaphor (a pronoun or a repeated name) and a verb phrase which was semantically neutral with respect to the two protagonists. The test sentence was incomplete, the last word being presented as a visual probe. This probe was either an appropriate word or an inappropriate one, relatively to the meaning of the sentences. The task of children was to listen to the sentences with the purpose of understanding them and to read aloud the visual probe as quickly as possible. Naming latencies were measured. Following the Marslen-Wilson et al (1993)'s reasoning, it was assumed that the on-line interpretation of anaphor lead children to expect a probe that is appropriate. Consequently, naming latency for an appropriate probe should be faster than naming latency for an inappropriate one. The appropriateness effect measured by the difference between the

naming latencies to the two probes serves as an indicator of the anaphor resolution. The lack of a significant appropriateness effect indicates that the anaphor is not solved.

14   One example of pair of sentences showing the two conditions of coreferential relations S-S (2a) and O-S (2b) was as follows:

15   1. <u>Après un long voyage autour du monde, Elodie a diné avec Sébastien dans un restaurant</u>.
2a.**Elle / Elodie** <u>parlait gaiement avec</u> ... visual probe: <u>lui, elle</u>
2b.**Il / Sébastien** <u>parlait gaiement avec</u> ... visual probe: <u>lui, elle</u>
(1. <u>After a long trip around the world, Elodie had dinner with Sébastien in a restaurant</u>).
(2a. **She / Elodie** <u>chatted cheerfully</u> with ...) visual probe: <u>him,her</u>
(2b. **He / Sébastien** <u>chatted cheerfully with</u> ...) visual probe: <u>him,her</u>

16   In S-S condition (2a), the subject anaphor refers to the subject protagonist A. In O-S condition (2b), it refers to the other protagonist B. The last word of the sentence, presented as a visual probe, is an indirect object pronoun which refers unambiguously (as regards the gender cue) to the protagonist B (<u>lui ; him</u>) or the protagonist A (<u>elle; her</u>). In the case of S-S condition (2a), the prominence of subject protagonist and the lexical cue of anaphor (gender cue in the case of pronoun) converge on protagonist A (<u>Elodie</u>) as the agent of the action. The other protagonist B (<u>Sébastien</u>) is therefore the appropriate recipient of the action. The on-line interpretation of anaphor should lead children to expect a visual probe referring to protagonist B. Consequently, naming latency in response to the object pronoun <u>lui</u> (<u>him</u>), which is appropriate, should be faster than the latency to <u>elle</u> (<u>her</u>) which is inappropriate. In O-S condition (2b), the processing of the lexical cue of the anaphor should lead to the identification of the protagonist B as the agent of the action and influence the naming latency of the two visual probes.

17   If children are able to identify on-line the referent of anaphor, we would expect a significant appropriateness effect whether the anaphor is a pronoun or a repeated name, in both conditions, S-S and O-S. If children interpret the pronoun as a specific marker of coreference, we would expect a repeated name penalty similar to this observed in Gordon et al. (1993): Faster naming times when the subject anaphor was a pronoun rather than a repeated name in S-S condition, and similar naming times for pronoun and repeated name in O-S condition.

Method

Participants

18   Sixty-six first-grade children ranged from 6;2 to 7;6 (mean age: 6 years 8 months; 39 boys and 27 girls) were recruited from a larger sample of one hundred and six first-grade children (ranged from 6;2 to 7;7, mean age: 6;8) who participated (in June) to a more extensive study on the relationships between decoding ability, listening and reading comprehension (Megherbi, Seigneuric, & Ehrlich, 2006). These children came from five classes in three elementary schools in Paris and were all native French speakers. They did not repeat the grade and had no behaviour difficulties according to their teachers.

19   Given the cross-modal naming task used in the present experiment required children to read the visual probe, children who were poor decoders were discarded from the group. Decoding ability was assessed by means of a subset of 16 nonwords from the <u>Nonword Reading MIM test</u> (Mousty & Leybaert, 1999; Mousty, Leybaert, Alegria, Content, &

Morais, 1994). The number of nonwords read accurately and the total time spent to read the nonwords were registered. Children were identified as poor decoders when their performance (accuracy and time) was at least one standard deviation distant from the mean observed in the whole sample (N=106). Among the sixty-six children running the experiment, fifteen were poor decoders and they were discarded from the group. Thus data from fifty-one children (31 boys and 20 girls) were taken into consideration.

Materials

20 The materials consisted of 16 experimental texts, each containing two sentences. In half of the texts, the two protagonists were proper names and in the other half, the two protagonists were definite noun phrases. An example of a text with proper names was presented in the introduction. Another example with definite noun phrases is as follows:

21 1. Tous les matins, la coiffeuse rencontre le facteur qui distribue le courrier.
2a. **Elle / La coiffeuse** bavarde volontiers avec ...   Probe: lui / elle
2b. **Il / Le facteur** bavarde volontiers avec ...   Probe: elle / lui
(1.Every morning, the hairdresser meets the postman who distributes the mail)
(2a. **She / The hairdresser** chatters readily with ...   Probe: him / her)
(2b. **He / The postman** chatters readily with ...   Probe: her / him)

22 All texts shared the same structure. The first sentence supplied the context. It began with a prepositional phrase or a subordinate clause and mentioned two protagonists of different gender: A first protagonist A in subject position (La coiffeuse; The hairdresser), and a second protagonist B in another position (object or complement) (Le facteur; The postman). This context sentence ended with a prepositional phrase or a subordinate clause, in order to introduce a distance between the protagonist B and the anaphor beginning the second sentence. This sentence contained a subject anaphor and a verb phrase. The anaphor could take two forms: An unambiguous pronoun or a repeated name (or a repeated noun phrase). In S-S condition (2a), the subject anaphor referred to protagonist A as the agent of the action; In O-S condition (2b), the subject anaphor referred to protagonist B as the agent. The verb was neutral with respect to the two protagonists. This means that the agent of the verb could be either protagonist A or protagonist B, the recipient being the other protagonist. The last word of this sentence, presented as a visual probe, was an indirect object pronoun which referred unambiguously (as regards the gender cue) to one or other protagonist (lui;elle / him; her). For each condition, two probes were used: An appropriate probe (lui;him in condition 2a; elle;her in condition 2b) and an inappropriate probe (elle;her in condition 2a; lui;him in condition 2b)[1].

23 The final set of 16 experimental texts was selected from an original set of 35 texts. These texts were pre-tested with 18 children (mean-age 7;6) in order to examine whether the verb of the second sentence was neutral with respect to the two protagonists. Children were tested individually. In this pre-test, the texts had the above described structure, but the anaphors in the test sentence were definite repeated noun phrases or proper names corresponding to protagonists A and B. The context sentence was followed by the test sentence presented with two forms: Protagonist A as subject and protagonist B as object (form 1) or the reverse (form 2). The child's task was to decide which form was consistent with the context sentence: (1), (2) or both. A text was selected as an experimental text if 17 children out of 18 (95 %) had decided that both forms of test sentences were consistent

with the context sentence. Eight of the 16 experimental texts contained a female protagonist A and a male protagonist B, and in the 8 others, it was the other way round. As a result, half the probes were masculine (lui;him) and half were feminine (elle;her). When the protagonists were noun phrases, they were preceded by a definite masculine or feminine determiner.

24   Sixteen filler texts were constructed to obscure the regularities of the experimental texts. They reduced the expectation that the probe word would be an object pronoun and would occur in the same position. They consisted of one, two or three sentences mentioning two protagonists of different genders. In some texts, the second or third sentence contained a verb biased towards one of the two protagonists. The last word, which served as a visual probe, was always a noun phrase. Half the filler probes were consistent with the meaning of the text and half were inconsistent.

25   A further set of 9 training texts was constructed. Five texts were based on the model of the experimental texts and 4 on the model of the fillers.

Design and Procedure

26   A mixed design was used. The two forms of anaphor (pronoun and repeated name) were crossed with the two conditions (S-S and O-S) and with the two visual probes (appropriate and inappropriate), yielding eight experimental conditions for each text. Eight lists were constructed, each consisting of 16 experimental texts interspersed with the 16 filler texts. In each list, there were two instances of each of the eight experimental conditions carried out with different texts.

27   Each child was tested individually and received one list. The order of presentation of texts was randomised within the list. The session lasted approximately 30 minutes. The materials - with the exception of the probe words - were recorded at a normal conversational rate by a French female speaker. They were recorded by means of a digital audio tape and were put onto a computer sound card (Sound Blaster). The visual probe appeared exactly at the offset of the auditory sentence. Simultaneously with the onset of the probe, a timing pulse (which the children could not hear) initiated a timing device which measured the latency to naming the probe by means of a voice key. Texts were presented to the children over headphones and loudspeakers, and the visual probe was displayed on a computer screen. At the beginning of the experiment, the children were told that they would hear short stories, each of which would be followed by a single word shown on the screen in front of them. They were informed that some stories would be correct, while others would not be. No information about the grammatical form of the probe word was given. The children had to listen to the stories with the purpose of understanding them and read aloud the word presented on the screen as rapidly as possible. The experimenter checked that they could read the word correctly. Sometimes, she asked a comprehension question (approximately a total of 10 questions), usually about the context sentence, to make sure that the children were focalised on the comprehension of the sentences. The questions were easy and none of the participants was discarded because of the failure in this task. The children were familiarised with the task by means of the training texts.

Results

28   The dependent variable was the naming latency to the visual probe. Some data (0,96 %) were discarded because of premature or incorrect responses, or because the voice key did not trigger. The individual means for each cell were computed. Individual means that were higher or lower than 2 standard deviations were replaced by cell mean. Following this criteria, data from four children were discarded because they provided many extreme values (20% or more). For the forty-seven children remaining in the group (28 boys and 19 girls), 4,25 % of the values were replaced.

29   The mean latencies to appropriate and inappropriate probes for pronouns and repeated names in S-S and 0-S conditions, are shown in figure 1.

30   Figure 1: Mean latencies (ms) to appropriate (Ap.) and inappropriate (Inap.) probes for pronouns and repeated names in Subject-Subject condition and in Object-Subject condition.
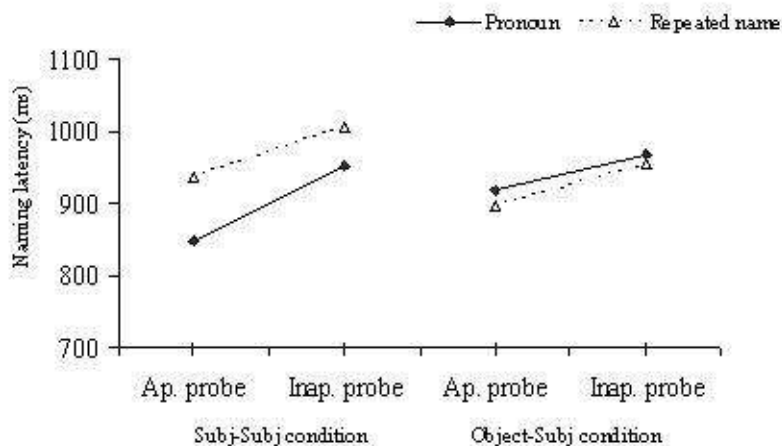
31   An analysis of variance was computed using a 2 (forms of anaphor) x 2 (S-S $\underline{vs}$ O-S condition) x 2 (visual probe) design, these three factors being within-subjects factors. The main effect of probe was highly significant ($\underline{F}(1,46)$ = 16.93, $\underline{MSE}$ = 26769, $\underline{p}$ = .0001). In agreement with the expected appropriateness effect, latencies were faster for appropriate probes than for inappropriate probes (899 ms $\underline{vs}$ 969 ms). Neither the probe x anaphor interaction nor the probe x condition interaction were significant ($\underline{F}$ <1 and $\underline{F}$ $(1,46)$ = 1.07, $\underline{n.s.}$, respectively). These results suggested that children were able to identify on-line the referents of pronouns and also the referents of repeated names, in both conditions, S-S and O-S. The main effect of anaphor was not significant ($\underline{F}(1,46)$ = 2.19, $\underline{n.s}$.) (921 ms for pronouns $\underline{vs}$ 947 ms for repeated names). The main effect of condition was not significant ($\underline{F}$ < 1) (935 ms in S-S $\underline{vs}$ 933 ms in O-S). As expected, the anaphor x condition interaction was significant ($\underline{F}(1,46)$ = 4.66, $\underline{MSE}$ = 41195, $\underline{p}$ = . 036). Planned

comparisons showed that the difference between pronouns and repeated names was significant in S-S condition ($\underline{F}(1,46)$ = 6.00, $\underline{MSE}$ = 40336, $\underline{p}$ = . 018), but not in O-S condition ($\underline{F}$ < 1). The anaphor x condition x probe interaction was not significant ($\underline{F}$ < 1).

32   As it is shown in figure 1, data supported our hypothesis: Children showed a repeated name penalty in S-S condition, latencies being faster for pronouns than for repeated names (899 ms $\underline{vs}$ 971 ms), and not in O-S condition, latencies being similar for the two forms of anaphor (942 ms $\underline{vs}$ 924 ms).

Discussion

33   The purpose of the present experiment was to test the repeated name penalty in children (mean age: 6;8) in a listening situation. According to the Gordon and Hendrick's model (1998), pronouns are good vehicles for coreference, whereas repeated names (and repeated nouns) serve mainly to introduce new entities into a discourse representation. The functional specificity of the two forms of anaphor leads to a faster interpretation for pronouns than for repeated names in S-S condition (repeated name penalty) and not in O-S condition. A cross-modal naming task was used to reveal on-line the resolution of anaphor. The difference between the naming latencies to an appropriate probe and an inappropriate one, was an indicator of the resolution of the anaphor.

34   Results supported our hypotheses: First, a significant appropriateness effect was observed for pronouns and for repeated names, in both conditions S-S and O-S. This effect indicated that children are able to identify on-line the referent of the two forms of anaphor. These results are in agreement with findings reported by Arnold et al (2001; 2007) in five-year-old children and by Tyler (1983) in seven-year olds.

35   Secondly, the repeated name penalty (faster naming times for pronouns than for repeated names) was observed in S-S condition and not in O-S condition. In agreement with Gordon and Hendrick's model (1998), these findings suggested that children clearly differentiate the two forms of anaphor: They interpret on-line the pronoun as a specific marker referring to the more prominent protagonist of the preceding sentence. For Song and Fisher (2005), such sensitivity to prominence in pronoun interpretation can be observed in three-year-old children. The repeated name penalty observed here in seven-year-old children was very similar to this observed in adults by Gordon et al. (1993, experiment 4). However the materials used in both experiments differed in several ways. First, the texts submitted to adults including two context sentences (1 and 2) before the critical sentence (3a or 3b), and the same protagonist appeared in these two sentences as the syntactic subject in initial position (see example in introduction section). Thus, this protagonist was highly prominent, due to the effect of several factors. In another experiment, Gordon et al. (1993, experiment 5) showed that syntactic function and surface position contributed separately to the repeated name penalty. In our texts, only one context sentence preceded the critical sentence. This context sentence began with a prepositional phrase or a subordinate clause. Thus, the prominence of the protagonist A could be mainly attributed to its syntactic function. The repeated name penalty observed in the S-S condition with such texts suggests that syntactic function is a key factor determining the prominence of protagonists in seven-year old children.

36   A second difference between the texts used by Gordon et al. (1993) and us is the type of protagonists. For the first authors, protagonists are always proper names. However,

Gordon and Hendrick (1998) specified that their model deals with proper names and also with definite noun phrases. In our experiment, in order to vary the texts presented to children and stimulate their attention, the two protagonists in each context sentences were proper names in half of the texts and definite noun phrases in the other half. Our findings suggested that repeated name penalty can be observed when the lists included repeated names and repeated nouns. They are consistent with data from acceptability judgements for coreference showing that definite noun phrases revealed a similar pattern of judgements to proper names (Gordon & Hendrick, 1999). The number of our experimental texts was smaller to analyse the influence of type of protagonists. This issue would deserve a further investigation.

37   A third difference between the two experiments should be noted. Gordon et al. (1993) investigated the comprehension of written texts and repeated name penalty was observed by means of reading times. They claimed that the principles of Centering theory should extend naturally to the comprehension of the spoken language. Such a view is supported by the present data which provide a clear evidence of repeated name penalty in a listening situation, the on-line interpretation of anaphor being investigated by means of a cross-modal naming task.

38   To conclude, the repeated name penalty observed in the present experiment illustrates the functional specificity of pronouns in the on-line interpretation of spoken language in seven-year old children. This finding is consistent with data observed in the production of narratives showing that children use pronominal forms more frequently than nominal forms to ensure the referential continuity (Hickmann & Hendriks, 1999). Further longitudinal investigations should be conducted to study the course of development of the ability to interpret on-line the specific functionality of pronoun

BIBLIOGRAPHY

Ariel, M. (1990). *Accessing noun phrases antecedents.* London: Routledge.

Arnold, J.E., Novick, J.M., Brown-Schmidt, S., Eisenband J.G. & Trueswell, J. (2001). Knowing the difference between girls and boys: The use of gender during on-line pronoun comprehension in young children. In A.H. Do, L. Dominguez & A. Johansen (Eds), *Proceedings of the 25 th Boston University Conference on Language Development* (pp. 59-69). Somerville, MA: Cascadilla Press.

Arnold, J.E., Brown-Schmidt, S., & Trueswell, J. (2007). Children's use of gender and order-of-mention during pronoun comprehension. Language and Cognitive Processes, 22, 527-565.

Charolles, M. (2002). *La référence et les expressions référentielles en français.* Paris: Ophrys.

Cloître, M., & Bever, T. (1988). Linguistic anaphors, levels of representation and discourse. *Language and Cognitive Processes, 3,* 293-322.

Fossart, M. (1999). Traitement anaphorique, et structure du discours. Etude psycholinguistique des effets du « focus de discours » sur la spécificité de deux marqueurs référentiels : le pronom anaphorique « il » et le nom propre répété. *In Cognito, 15,* 33-40.

Gordon, P.C., & Chan, D. (1995). Pronouns, passives and discourse coherence. *Journal of Memory and Language*, *34*, 216-231.

Gordon, P.C., Grosz, B.J., & Gilliom, L.A. (1993). Pronouns, names and the centering of attention in discourse. *Cognitive Science, 17,* 311-347.

Gordon, P.C., & Hendrick, R. (1998). The representation and processing of coreference in discourse. *Cognitive Science, 22(4)*, 389-424.

Gordon, P.C., & Hendrick, R. (1999). Non definite NP anaphora: A reappraisal. In M.C. Gruber, D. Higgins, K.S. Olson, & T. Wysocki (Eds.), *CLS34: The main session* (pp. 95-210). Chicago, IL: Chicago Linguistics Society.

Gordon, P.C., & Scearce, K.A. (1995). Pronominalization and discourse coherence, discourse structure and pronoun interpretation. *Memory and Cognition, 23*, 313-323.

Grosz, B.J., Joshi, A.K., & Weinstein, S. (1995). Centering: A framework for modelling the local coherence of discourse. *Computational Linguistics, 21*, 203-226.

Hickmann, M. (1995). Discourse organization and the development of reference to person, space and time. In P. Fletcher and B. Mac Whinney (Eds). *Handbook of child language* (pp. 194-218). Oxford: Blackwell.

Hickmann, M. (2003). *Children's Discourse. Person, space and time across language.* Cambridge: Cambridge University Press.

Hickmann, M., & Hendriks, H. (1999). Cohesion and anaphora in children's narratives: A comparison of English, French, German and Mandarin Chinese. *Journal of Child Language, 26*, 419-452.

Kleiber, G. (1994). *Anaphores et pronoms.* Louvain-la-Neuve: Duculot.

Marslen-Wilson, W.D., Tyler, L.K., & Koster, C. (1993). Integrative processes in utterance resolution. *Journal of Memory and Language, 32*, 647-666.

Megherbi, H., & Ehrlich, M.F. (2005). Language impairment in less skilled comprehenders: The on-line processing of anaphoric pronouns in a listening situation. *Reading and Writing*, *18*, 715-753.

Megherbi, H., Seigneuric, A., & Ehrlich, M.F. (2006). Reading comprehension in French 1st and 2nd grade children: Contribution of decoding and language comprehension. *European Journal of Psychology of Education, XXI (2),* 135-147.

Mousty, P., & Leybaert, J. (1999). Evaluation des habiletés de lecture et d'orthographe au moyen de BELEC: Données longitudinales auprès d'enfants francophones testés en 2è et 4è années. *Revue Européenne de Psychologie Appliquée, 49*, 325-342.

Mousty, P., Leybaert, J., Alegria, J., Content, A., & Morais, J. (1994). Batterie d'évaluation du langage écrit et de ses troubles. BELEC. In J. Grégoire et B. Piérart (Eds.), *Evaluer les troubles de la lecture* (pp. 127-145). Bruxelles : De Boeck Université.

Mimura, M., Verfaellie, M., & Milberg, W.P. (1997). Repetition priming in an auditory lexical decision task: Effects of lexical status. *Memory and Cognition, 25*, 819-825.

Song, H. & Fisher, C. (2001). Young children's use of discourse cues in language comprehension. In A.H. Do, L. Dominguez & A. Johansen (Eds), *Proceedings of the 25 th Boston University Conference on Language Development* (pp. 720-731). Somerville, MA: Cascadilla Press.

Song, H., & Fisher, C. (2005). Who's "she"? Discourse Prominence influences preschoolers' comprehension of pronouns. *Journal of Memory and Language, 52, 29-57.*

Tyler, L.K. (1983). The development of discourse mapping processes: The on-line interpretation of anaphoric expressions. *Cognition, 13*, 309-341.

NOTES

1. In French language, the subject pronoun and the indirect object pronoun preceded by a preposition take one of two lexical forms (il/lui) in the masculine, but share the same form (elle) in the feminine. Consequently, in some cases (condition 2a and inappropriate probe, in the above example), the pronoun elle appeared both as the subject pronoun and the probe. This morphological identity could act as a kind of repetition priming, which facilitates the naming of the probe (Cloître & Bever, 1988). However, the prime and the probe were pronouns which were presented in two different modalities and the interval between them was relatively long. In these conditions, we would expect there to be only minimal repetition priming (Mimura, Verfaellie & Milberg, 1997). It would therefore facilitate the naming of the inappropriate probe, contradicting the hypothesis that predicts an appropriateness effect.

ABSTRACTS

Seven-year-old children performed a cross-modal naming task, in order to investigate the on-line interpretation of subject pronouns and repeated names. Children had to listen to short texts containing two sentences and to read a visual probe which represented the last word of the second sentence. This second sentence began with a subject anaphor which was either a pronoun or a repeated name, and referred either to the subject referent (Subject-Subject condition), or to the object referent (Object-Subject condition) of the first sentence. In agreement with the repeated name penalty predicted from the Gordon and Hendrick's model (1998) developed for adults, children showed faster naming times for pronouns than for repeated names in Subject-Subject condition, whereas they showed similar naming times to solve pronouns and repeated names in Object-Subject condition. These results suggest that children interpret on-line the pronoun as a specific marker of referential continuity.

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Keywords: Anaphor interpretation in children, pronoun, repeated name, Spoken language comprehension

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