

## Project of Poster Demonstration

Authors : **MARTINS Daniel & WILHELM Alice**

Département de psychologie, Université Paris X – Nanterre  
200 Avenue de la République  
9201 Nanterre  
FRANCE

E mail [MARTINS-Daniel@wanadoo.fr](mailto:MARTINS-Daniel@wanadoo.fr)

Téléphone 01 45 45 94 22

FAX 01 45 45 75 11

### **TITLE**

## **Influence of text coherence's disruption on story memorisation and interestingness**

### 1 - Introduction

Most modern authors on text comprehension assume that readers generate at least three levels of mental representation on reading text : graphemic representation or surface representation, text-based representation and a situational or mental model (Johnson-Laird, 1983 ; Van Dijk & Kintsch, 1983 ; Kintsch, 1988).

Text-based representation bears on text information and is described under the form of propositions - semantic units composed of a Predicate and one or plus arguments - . Situation or mental models bears upon the situation text describes and not upon linguistic information per se.

One important goal's reader is to preserve both local coherence and global coherence ; local coherence is related to text-based representation and global coherence is related to situational or mental model. Local coherence is disrupted when there is no overlap between arguments in the sequence of propositions. When the local coherence is disrupted, reader tries to get information from his or her Long -Term Memory - by inferencing, for exemple -, in order to fill the gap between the propositions. Sometimes the text presents global incoherence. For exemple, Albrecht and O'Brien (1993) showed that reading times of target sentences, situated in the end of a story, were significantly longer when their meaning was inconsistent with the earlier description of the main character of this story. These Authors showed also that the resolutions of global inconsistencies improved memory for the regions of the text that involved these inconsistencies.

So the « good » reader tries to resolve both local and global incoherence in order to comprehend the text.

Interest is a factor that has not been studied very much in experimental studies of text comprehension. Kintsch (1980) distinguishes between cognitive interest and emotional interest, the former is related to optimal novelty of textual information and the later is related to interesting themes per se, like love, power, danger etc. Schank (1979) and Mandler (1982) have similar positions. All these Authors stress the idea that cognitive interest is caused by the inconsistency or incongruity or incoherence of textual information. Nevertheless Iran-Nejad

(1987) argued that interest arises only if the reader is successful to resolve the inconsistency of textual information.

More recently, Sung-il Kim (1999) showed that story versions (composed of four or five sentences) in which the cause of a target consequence sentence is omitted (implicit versions) are evaluated as more interesting than story versions in which this cause is overt stated (explicit versions). Moreover mean reading times of the target consequence sentence are higher in the implicit versions, this suggesting a mechanism of inference production in order to find the possible cause of the sentence consequence.

The goal of the present experiment is to examine if the cognitive interest is related to textual incoherence, when the description of the main character of the story is made in seven sentences, stated in the beginning on the text, the last two target sentences of the text being consistent, inconsistent or neutral in respect to the semantic content of the early seven sentences.

The hypothesis are : 1) reading time of the two target inconsistent sentences are significant longer than those ones of the two target consistent sentences ; 2) versions with inconsistent target sentences are rated as more interesting than the versions with the two target consistent sentences ; 3) inconsistent stories are better memorised than consistent and neutral ones. Versions with neutral target sentences are considered as control version conditions.

## 2 – Method

### 2 - 1 Participants

Thirty undergraduates of the University of Paris X – Nanterre were voluntary participants to the experiment.

### 2 – 2 Materials

Eighteen experimental texts (six in the inconsistent condition, six in the consistent condition and six on the neutral condition) are presented on the screen of a computer to be read. Each experimental text is composed of 11 sentences.

The two first sentences were introductory sentences that served to introduce the character and the global situation ; next seven sentences described the traits of the character, for exemple as somebody who likes very much, or hates, or is indiferent with domestic animals ; who is vegetarian, or who likes and eats frequently red meat, or eats anything ; finally the last two target sentences are presented. The two target sentences were identical in the three conditions ; for exemple : « she entered in a restaurant and ordered a cheeseburger (target sentence 1) ; she appreciated the meat that was very tender (target sentence 2) ».

Eighteen another texts – non experimental texts - without consistency or incosnsistency were presented to participants and were mixed to the experimental texts in order to avoid strategic and conscious processing of the inconsistency information.

### 2 – 3 Procedure

Participants were instructed to read in order to comprehend the text and not in order to memorise it ; participants read every sentence of each text at their own pace and press one key of the keyboard to pass from one sentence to the next sentence .

After reading every text, participants rated the text in a scale of interest, going from 1 ( non interesting at all) to 6 (very interesting).

Finally after reading all the 36 texts participants have been submitted to a recognition task of 36 sentences to explore their text memorisation : they must to say if every sentence presented on the screen belonged or not to the texts read ; in fact, 18 sentences belonged to target sentences of the experiemntal texts (truht response is Yes) and 18 sentences were new sentences that were related to the non experimental texts (truth response is NO).

## 2 – 4 Dependent variables and Design

The dependent variables are : scores of interest by text ; reading times of target sentences ; correct responses of recognition (Yes) and time reaction to correct response of recognition (Yes).

The design is : S x C3, i. e., all participants pass in the three conditions (consistent, inconsistent and neutral conditions), all subjects read all texts and all experimental texts have been presented equally in the three conditions.

## 3 - RESULTS

The results are presentend in Table 1 (mean reading times of first target sentence and second target sentence in the 3 conditions), in Table 2 (mean interestingness ratings in the 3 conditions), in Table 3 (mean percentages of correct responses in the recognition task) and in Table 4 ( reaction times to correct responses in the recognition task).

1 – Table 1 : Mean reading times (milliseconds) of target sentences in consistent, inconsistent and neutral conditions.

	Consistent condition	Inconsistent condition	Neutral condition
Target sentence 1	2781 ms	3201 ms	3120 ms
Target sentence 2	2730 ms	2851 ms	2747 ms
MEAN	2756 ms	3026 ms	2934 ms

Anova shows that the type of the consistency has a significant effect ( $F_{2/58} = 11,327$ ,  $p < .000$ ) ; reading times are longest in the inconsistent condition and reading times of the consistent condition are the lowest ; the reading time of the first target sentence is longer than the second target sentence ( $F_{1/29} = 48,785$   $p < .000$ ), and the interaction is also significant ( $F_{2/58} = 7,091$   $p < .001$ ).

The effect of consistency is significant in the first target sentence ( $F_{2/58} = 14,559$   $p < .000$ ) but not in the second target sentence.

Planned comparisons - in the first target sentence - show that there is significant difference between consistent and inconsistent conditions ( $F_{1/29} = 22, 505$ ,  $p < .000$ ) and between consistent and neutral conditions ( $F_{1/29} = 22,793$   $p < .000$ ). These differences go on the expected direction.

Table 2 : Means of Interestingness ratings

Conditions	Consistent	Inconsistent	Neutral
	3,244/6	3,528/6	2,783/6

Anova shows that the type of consistency has a significant effect ( $F_{2/58} = 12,528$   $p < .000$ ). Globally inconsistent condition arises more interest than the other conditions.

Planned comparisons show a difference in the expected direction between consistent and inconsistent conditions ( $F_{1/29} = 3,165$   $p < .085$ ) ; the neutral condition is less interesting than consistent condition ( $F_{1/29} = 10,003$   $p < .003$ ) and than inconsistent condition ( $F_{1/29} = 26,408$   $p < .000$ ).

Table 3 : Mean percentages of correct responses (YES)

Conditions	Consistent	Inconsistent	Neutral
	88%	87%	83%

The mean percentages of correct responses are globally similar.

Table 4 : Reaction times (milliseconds) of correct responses (Yes)

Conditions	Consistent	Inconsistent	Neutral
	3231	3291	2970

Planned comparisons by Anova show a significant difference between neutral and consistent conditions ( $F_{1/29} = 4,381$   $p < .045$ ) and between neutral and inconsistent conditions ( $F_{1/29} = 4,272$   $p < .047$ ); globally the responses yes in the neutral condition are lower than in the two other experimental conditions.

#### 4- Discussion

Results show that inconsistent target sentences reading times were significant longer than those of the consistent and neutral target sentences. This results confirm those of Sung-il Kim (1999) but on more elaborated texts, with 11 sentences and three different conditions. The results confirm also those of Albrecht and O'Brien (1993) showing that inconsistency sentences need more time to process. It is possible that this extra time is necessary to find the possible reasons and causes of the inconsistent information in order to construct a local and global mental representation of the character and of the situation where he or she acts. In the present experiment inconsistent information is not better memorised than consistent or neutral one. It is possible that the recognition test is too easy to access memorised information; a recall test may in future be employed. Results confirm also, globally, the classical experimental results and theoretical assumptions about interest; interestingness is higher for inconsistent information than for neutral and consistent information. It is possible that cognitive interest is related to the possibility of generate inferences necessary to resolve inconsistency.

Further research is necessary to examine how the local and global inconsistency (in relation to situation or mental model) determine cognitive interest; in fact, in the present experiment the target sentences immediately followed the last seventh sentence that described the character, so the local and global coherence are confounded. Second it appears necessary to know what reader exactly does when he or she processes inconsistent information; one possible technique is to ask him to think aloud when reading. Finally it is important to examine what inconsistency really is. Inconsistency can bear on logic relations, predictive contexts, background knowledge and pragmatic expectations.

#### References

- Albrecht, J. E. & O'Brien, E. (1993). Updating a mental model : maintaining both local and global coherence. *Journal of Experimental Psychology ; Learning, Memory and Cognition*, 19, 5, 1061-1070.
- Iran-Nejad, A. (1992). Cognitive and affective causes of interest and liking. *Journal of Educational Psychology*, 79, 120-130.
- Johnson-Laird P.N. (1983). *Mental models*, Cambridge, Cambridge University Press.
- Kintsch, W. (1980). Learning from text, levels of comprehension, or : Why would read a story anyway. *Poetics*, 9, 87-98.
- Kintsch, W. (1988). The role of knowledge in discourse comprehension : A construction – integration model. *Psychological Review*, 95, 363-394.
- Mandler, G. (1982). The structure of value : accounting for taste, In M.S. Clark et S. T. Fiske (Eds), *Affect and Cognition ; The seventeenth Symposium of Cognition*, Hillsdale, N.J., Lawrence Erlbaum Associates.
- Shank, R. C. (1979). Interestingness : Controlling inferences. *Artificial Intelligence*, 12, 273-297.
- Sung-il Kim (1999). Causal bridging inferences : A cause of story interestingness. *British Journal of Psychology*, 90, 57-71.
- Van Dick, T.A. & Kintsch, W. (1983). *Strategies of discourse comprehension*. New York, Academic Press.

