

An Electrophysiologic Study: Can Semantic Context Processes Be Mobilized in Patients With Thought-Disordered Schizophrenia?

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Objective: The aim of this study was to test the hypothesis that reinforcing the structuring of verbal material may bring about an improvement in contextualization processes in patients with formal thought-disordered schizophrenia.

Method: A total of 38 schizophrenia patients with formal thought disorders and 24 matched healthy control subjects performed 2 lexical decision tasks, involving 2 levels of contextual structuring (with 16.7% and 33% of related words, respectively). The event-related potentials, N400 and late positive component (LPC), and behavioural variables (reaction times and error percentages) were analyzed.

Results: A context-structuring effect was observed on LPC, but not on N400. In subjects with schizophrenia, the N400 anomalies (that is, increase in amplitude for the related words and reduction of the N400 effect) persisted in both context-structuring conditions. Similarly, a reduction in LPC amplitude for the unrelated word category, as well as a decrease in the LPC effect, was observed in these patients.

Conclusions: The schizophrenia patients with formal thought disorders did not benefit from the structuring of the context to implement context integration strategies. This deficit appears to be stable. The results are discussed within the framework of a previously published model of language comprehension.

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Clinical Implications

- The impairment of the integrative processes that are involved in the processing of context is confirmed in patients with thought-disordered schizophrenia.
- This deficit appears to be stable and does not benefit from any cognitive remediation.
- The hypothesis proposed in this article—that the predictive processes are preserved while the integrative contextualization processes are impaired—makes efforts at cognitive rehabilitation conceivable.

Limitations

- The proposed hypothesis; namely, that there is a deficit in the integrative context-processing strategies in schizophrenia patients and that the predictive strategies are preserved will have to be tested directly.
- The ecologic nature of the investigated processes will have to be confirmed in situations closer to that of natural language (for example, using a phrasal context).

Key Words: schizophrenia, thought disorders, language, context processing, N400, late positive component

The deficit in semantic context use has been regularly identified in numerous studies of language in schizophrenia patients, and its psychopathological relevance to the study of thought and communication disorders in schizophrenia has been stressed on many occasions.

Thanks to their high level of temporal resolution, the event-related potentials (ERPs) simultaneously provide researchers with an accurate measure of on-line language processing and a direct manifestation of brain activity. The N400 component appears approximately 250 milliseconds to 500 milliseconds after the presentation of a potentially significant stimulus (1). Further, its amplitude varies systematically during semantic processing and can be reduced by various factors that increase an item's predictability within the local context or by the presence of semantic links between the words.

The N400 amplitude is extremely sensitive to the immediate context in which the word appears, whether this context consists of a word or a sentence (2). Generally, N400 reflects the integration of the context: integration is easier and N400 amplitude is lower when the word is congruent with the context ("N400 effect"). Likewise, it has been demonstrated that N400 is sensitive to the ease with which subjects can access the information stored in semantic memory, independently of the plausibility and the predictability of the item within the local context in relation to the semantic links between the words (3).

N400 is habitually followed by a late positive component (LPC) which, like N400, has proved to be sensitive to semantic congruence (4,5). This effect, however, exhibits an inverse polarity: incongruent words evoke a more highly positive potential than do congruent words. Although the functional significance of LPC and its relation with N400 have not yet been clearly identified, the predominant opinion is that LPC reflects an additional stage in the processing of the stimulus, occurring after evaluation and before the choice of the response, that is related to the updating of working memory (6). In a somewhat similar vein, Van Petten and others consider that LPC reflects a more elaborative processing of the stimulus and its integration in memory (5). Finally, for Halgren, N400 and LPC reflect different stages in the same cognitive process (7).

The influence of the semantic context on word processing can be studied using the lexical decision paradigm. In this task, subjects decide whether or not the target word exists in their language. The presence of a semantic or associative link between the target and the prime word that precedes it has been systematically found to reduce the time required to make this lexical decision. This phenomenon has been termed "semantic priming" (8). The 3 electrophysiologic studies that have used the lexical decision in subjects with schizophrenia

report a normal N400 effect in these patients (9–11). These results are particularly unexpected because they contradict most behavioural studies (12), and because almost all N400 studies that have used semantic judgement tasks in a sentence context have found an anomaly of this ERP component (reduction or absence of the N400 effect and [or] an increase in amplitude in the congruent or related condition) (4,13–22).

What the 3 lexical decision studies have in common is the high level of structuring of the semantic context, with the overall material containing over 30% related words. The absence of a deficit in schizophrenia patients could therefore be explained through the mobilization of context-processing strategies, owing to the highly structured verbal material used in these studies.

At the same time, behavioural studies have clearly established that the semantic priming anomaly specifically concerns patients with thought-disordered schizophrenia (23). Several electrophysiologic studies have also revealed a correlation between formal thought disorders and N400 anomalies (20), or even between such disorders and N400 and LPC anomalies conjointly (24). This clinical variable, however, was not considered in the studies that used lexical decision. Finally, the studies that have investigated LPC in patients with schizophrenia have identified anomalies in this component, which have taken the form of a general reduction in amplitude and the congruence effect (4,16,20,22,24). To provide a more finely honed functional analysis of the processes that were mobilized in our experiments, we consider the data relating to LPC.

Thus, the main aim of the current study was to compare the behavioural and electrophysiologic results obtained from a group of schizophrenia patients with formal thought disorders in a lexical decision task, using different levels of structuring of the context. In light of the data reported in the literature, we hypothesized that the reinforcement of the contextual constraints (high proportion of related words) should allow patients with schizophrenia to mobilize semantic context-processing strategies, which should be evidenced by the semantic priming effect and an N400 effect, comparable with those observed in a group of healthy control subjects. Conversely, in a weakly structured lexical decision task (low proportion of related words), the group of schizophrenia patients should be characterized by the absence of semantic priming and by N400 anomalies.

Methods and Materials

Subjects

A total of 38 patients (including 10 women) were recruited from Pr JF Chevalier's Psychiatric Department at Versailles Hospital. All subjects were characterized by a period of

Table 1 Demographic, cognitive, and clinical data for the subgroups as a function of the experimental conditions

	Schizophrenia patients		Control subjects	
	Highly structured <i>n</i> = 19 Mean (SD)	Weakly structured <i>n</i> = 19 Mean (SD)	Highly structured <i>n</i> = 12 Mean (SD)	Weakly structured <i>n</i> = 12 Mean (SD)
Age	31.28 (8.98)	30.11 (8.27)	29.92 (6.63)	30.92 (8.72)
Education (years)	12.61 (3.48)	12.68 (3.09)	12.00 (2.63)	12.67 (2.53)
Vocabulary	27.22 (6.56)	24.37 (6.40)	26.33 (5.52)	26.42 (4.76)
PANSS total score	85.26 (16.73)	79.79 (21.45)	—	—
PANSS Positive scale	21.63 (6.22)	20.26 (7.15)	—	—
PANSS Negative scale	23.16 (4.84)	21.32 (6.26)	—	—
TLCDS	14.56 (6.18)	13.32 (7.38)	—	—
Neuroleptics ^a	725.05 (506.47)	673.23 (442.11)	—	—

PANSS = Positive and Negative Syndrome Scale; TLC = Thought, Language, and Communication Disorders Scale
^aChlorpromazine equivalent

Table 2 Mean amplitude (μV) of the medial electrodes (Fz, Cz, and Pz) for the related and unrelated words in the 2 groups as a function of the level of structuring of the context

	Schizophrenia patients		Control subjects	
	Highly structured	Weakly structured	Highly structured	Weakly structured
250 millisecond to 450 milliseconds				
Related words	0.6	0.4	2.5	1.5
Unrelated words	0.0	-0.8	0.4	-0.4
450 milliseconds to 650 milliseconds				
Related words	1.0	1.6	0.5	2.0

symptomatic stability. Psychotic symptomatology had been evaluated using the Positive and Negative Syndrome Scale (PANSS) (25). The formal thought disorders were evaluated using the Thought, Language, and Communication Disorders Scale (TLCDS) (26). All patients were receiving neuroleptic treatment, and the daily dosage was converted into a chlorpromazine equivalent (27).

The control group consisted of 24 healthy control subjects (including 15 women), who were matched on age, academic level, and vocabulary level with the patients who suffered from schizophrenia (28). All subjects spoke French as their native language and had normal or corrected-to-normal vision. The exclusion criteria for the 2 groups of subjects were as follows: age under 20 years or over 50 years, neurological antecedents, alcoholic intoxication, or regular or recent use of toxics.

Stimuli

The material consisted of 4 lists, each comprising 300 pairs of items. Each list contained 150 word–nonword pairs and 150 word–word pairs. Of the lists, 2 were highly structured and contained 100 pairs of related words, including 50 pairs of fillers (that is, the same characteristics but excluded from analyses) and 50 pairs of unrelated words (that is, 33% of related words). The other 2 lists were weakly structured and contained 50 pairs of related words and 100 pairs of unrelated words, including 50 pairs of fillers (that is, 16.7% of related words). For each of these lists, the order of item presentation was fixed, following randomization. All subjects saw the same target words and the

same nonwords; the lists were constructed by counterbalancing the presentation of the material (that is, the target words that appeared in the related condition in one list appeared in the unrelated condition in the other, and vice versa).

The type of semantic link within the pairs consisted of an antonym relation or membership of the same semantic category, or constituted a part or whole relation. All words were common, and the word length varied between 3 and 7 letters (mean 5 letters per word). To eliminate any bias because of the way the lists were constructed, the material was tested on 10 healthy subjects who did not take part in the study. Two training lists, with 90 items each, were constructed on the basis of the same rules.

Procedure

Of the 2 structuring conditions, 1 was randomly assigned to the subjects. A total of 19 patients and 12 control subjects

Table 3 Rao R values of the MANOVAs for N400 and LPC at the medial sites (Fz, Cz, and Pz)

Effect	df	Rao R	<i>P</i>
Relatedness	2,57	21.54	< 0.0001
Electrode	4,55	14.08	< 0.0001
Group x relatedness	2,57	7.80	< 0.001
Structuring x relatedness	2,57	11.17	< 0.0001

df = degrees of freedom; LPC = late positive component; MANOVA = multivariate analysis of variance

were tested in each of the experimental conditions. The patients and the control subjects in each condition were compared on the basis of the demographic, cognitive, and clinical criteria (Table 1). All subjects were informed of the general aims of the study and had signed a written consent form. They were seated comfortably, approximately 80 centimetres in front of a computer screen. They were told that they would see 2 sequences of letters and that they had to decide as quickly and accurately as possible whether the second sequence of letters was or was not a French word. They gave their response using their dominant hand, positioned on a 2-button mouse. The first stimulus was presented in black, lower-case characters against the white computer screen for a period of 200 milliseconds; the screen then became white again for 250 milliseconds before the second stimulus was displayed for 1200 milliseconds (stimulus-onset asynchrony [SOA] of 450 milliseconds, interstimulus interval [ISI] of 2000 milliseconds). The subjects took part in a training session before performing the task. The total recording period was approximately 30 minutes.

ERP Recording and Analysis

To record the EEG, 12 electrodes were arranged on the scalp according to standard international practice: 3 electrodes in the frontal region (F3, Fz, and F4), 3 in the central region (C3, Cz, and C4), 3 in the parietal region (P3, Pz, and P4), 2 in the left (T3) and right (T4) temporal regions, and 1 in the occipital zone (Oz). We used 4 electrodes to record the electrooculogram (EOG): 2 at the level of the external canthi and 1 above and 1 below the eye. All the impedances were held below 1.8 kilohms. The EEG was continuously recorded using the InstEP system, with a frequency of 512 points per second, and the eye movements were then corrected off-line using an automatic program. Finally, the data were digitally filtered using a bandpass of 0.80 hertz to 12 hertz.

Average waveforms were calculated separately for each subject and stimulus type with reference to the 200-millisecond prestimulus baseline. The data were analyzed by calculating, separately for each subject and recording site, the mean ERP amplitude for each stimulus type over two 200-millisecond epochs: 1) 250 milliseconds to 450 milliseconds after stimulus

onset for N400 and 2) 450 milliseconds to 650 milliseconds after stimulus onset for LPC. These epochs were selected after visual inspection of the waveforms.

The response times and error percentages were analyzed separately using analyses of variance (ANOVAs), with group and structuring as intergroup factors and relatedness as intragroup factor. The ERP data analyses focused on the midline recording site (Fz, Cz, and Pz). Multivariate analyses of variance (MANOVAs) were performed using group and structuring as intergroup factors and relatedness and electrode site as intragroup factors. The significant interactions were analyzed separately using post hoc Scheffé tests.

Results

Behavioural results

The results of the response time analyses reveal a main effect of group ($F_{1,58} = 25.61$; $P < 0.0001$), which indicates that response times were generally longer in schizophrenia patients (774 milliseconds) than in control subjects (619 milliseconds), together with an effect of relatedness ($F_{1,58} = 23.53$; $P < 0.0001$), with response times shorter for related (684 milliseconds) than for unrelated words (709 milliseconds). Likewise, the analysis of the error percentages reveals an effect of group ($F_{1,58} = 17.34$; $P < 0.0001$), with the error percentage significantly higher among the subjects who had schizophrenia (13.42%) than among the control subjects (2.67%). No effect of structuring or any interaction with this factor was observed.

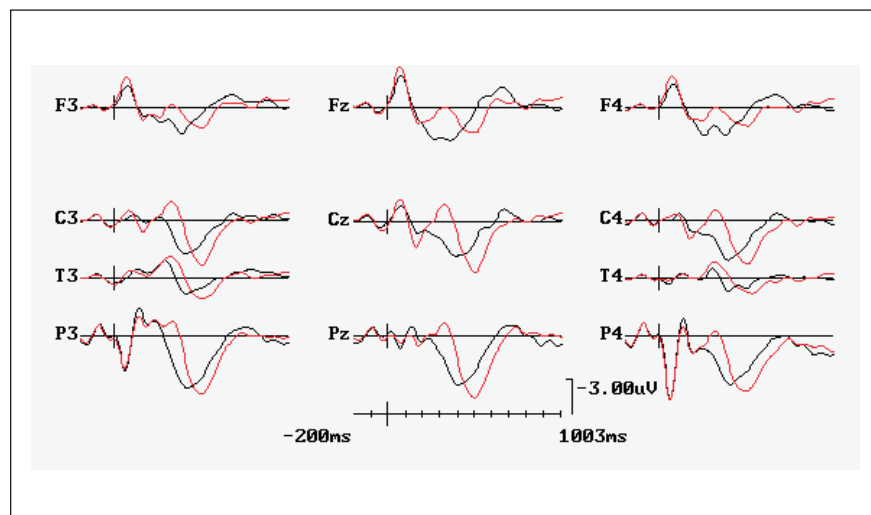
Electrophysiologic Results

Figures 1a, 1b, 2a, and 2b present the average waveforms for each task and stimulus type for the 2 diagnostic groups separately. Table 2 indicates the mean amplitudes for the midline recording sites for the N400 and LPC epochs. Table 3 summarizes the main results of data analyses.

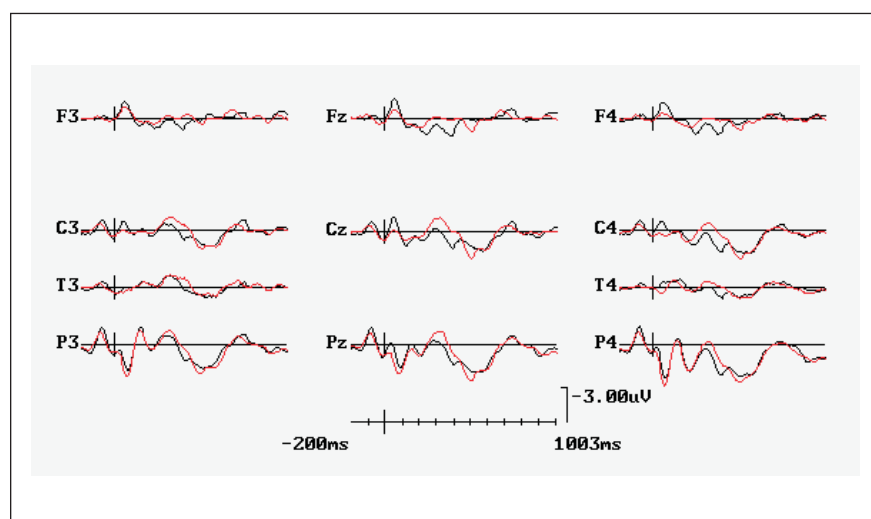
The results indicate the presence of a main effect of semantic relation. Analyses of this effect reveal that, in the N400 epoch, the amplitude of the related words is more positive than that of the unrelated words (related word: 1.3 microvolts; unrelated words: 0.2 microvolts; $F_{1,58} = 37.99$; $P < 0.0001$).

We also observed a main effect of electrode, explained by a difference in amplitude between the electrodes in the LPC window ($F_{2,116} = 29.68$; $P < 0.0001$) with maximum positive amplitudes at Pz (2.1 microvolts), compared with Cz (1.6 microvolts; $P < 0.04$), and at Cz, compared with Fz (0.4 microvolts; $P < 0.0001$).

The group x relatedness interaction was also significant. The analyses show that patients with schizophrenia exhibit an increase in N400 amplitude on related words, compared with control subjects (schizophrenia patients, 0.5 microvolts; control subjects, 2.0 microvolts; $F_{1,58} = 6.15$; $P < 0.02$) and a

Figure 1a ERPs for control subjects in the highly structured task

ERPs = Event-related potentials; uV = microvolts; ms = milliseconds

Figure 1b ERPs for schizophrenia patients in the highly structured task

decrease in LPC amplitude for unrelated words (schizophrenia patients, 1.0 microvolts; control subjects, 1.9 microvolts; $F_{1,58} = 6.49$; $P < 0.01$).

Finally, the analyses reveal the presence of a significant structuring x relatedness interaction. The N400 effect is significant in the 2 context-structuring conditions. In contrast, the amplitudes for related and unrelated words differ significantly in the LPC window in the highly structured task only (related words, 0.8 microvolts; unrelated words, 1.8 microvolts; $F_{1,58} = 22.42$; $P < 0.0001$).

Owing to the absence of a main effect of structuring or of any interaction between this factor and the diagnostic group, we will not conduct separate analyses for each context-structuring condition.

Difference Waveform

Difference waveform, obtained after subtracting the mean waveforms for the related words from those of the unrelated words (Figure 3), was calculated for 9 electrodes: F3, Fz, and F4 for the frontal region; C3, Cz, and C4 for the central region; and P3, Pz, and P4 for the parietal region. The MANOVAs were performed using group and level of structuring as intergroup factors and topography (frontal, central, and parietal) and electrode (left, medial, and right) as intragroup factors.

The results reveal a main effect of group (Rao $R_{2,57} = 8.32$; $P < 0.0007$), which indicates a reduction in the amplitude of the N400 effect ($F_{1,58} = 6.55$; $P < 0.01$) and the LPC effect ($F_{1,58} = 7.05$; $P < 0.01$) in patients who suffer from schizophrenia, compared with control subjects (schizophrenia patients, 0.7 microvolts and 0.2 microvolts, respectively; control subjects: 1.8 microvolts and 0.6 microvolts, respectively).

We also observed an effect of electrode (Rao $R_{4,55} = 10.11$; $P < 0.0001$), which indicates that the N400 effect is at its maximum for the midline electrodes (-1.5 microvolts), compared with the left hemisphere (-1.1 microvolts) and the right hemisphere (-1.1 microvolts) electrodes. The anterior and posterior distribution of the effects did not differ.

Discussion

Results for the Control Subjects

In accordance with the data reported in the literature, we observed a modulation in N400 amplitude by the presence of a semantic relation in a lexical decision task that involved different levels of context structuring. The manipulation of the proportion of related words did not affect the N400 effect, which exhibited the same order of magnitude in the 2 lexical decision tasks. This result is similar to that obtained by Silva-Pereyra and others (29), who also failed to observe any effect of context structuring on the N400 effect (13% vs 36% of related words).

Conversely, we observed an effect of this structuring on LPC: in the highly structured task, the unrelated words evoked more highly positive amplitudes than did related words, whereas in the weakly structured task, we observed a persistence of the N400 effect in the LPC window, with the related words evoking greater positive amplitudes. This result indicates that the

Figure 2a ERPs for control subjects in the weakly structured task

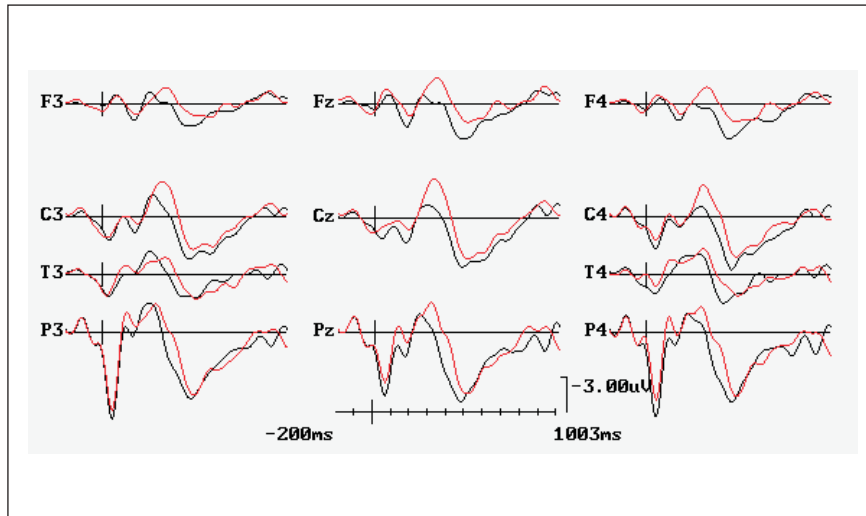


Figure 2b ERPs for schizophrenia patients in the weakly structured task

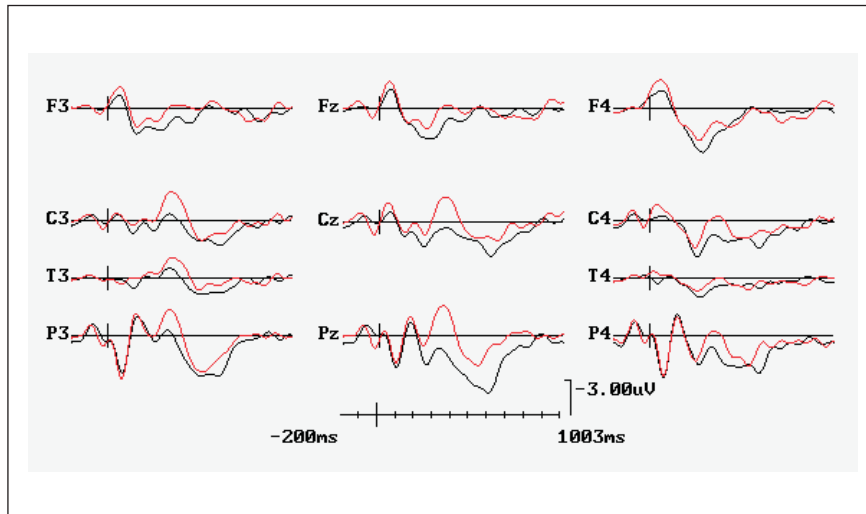
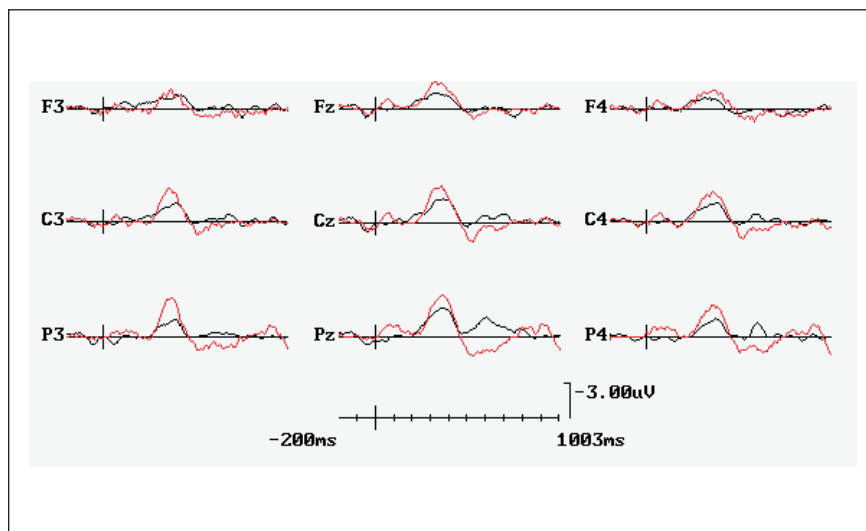


Figure 3 Difference wave form for control subjects and schizophrenia patients



2 lexical decision tasks did not mobilize the same cognitive processes. The highly structured task seems to have been processed at a deeper, more elaborative level than the weakly structured task. Further, the words that were unrelated to the context were the object of additional integrative processing.

Results for Patients with Schizophrenia

The main result of our study is that N400 anomalies persist in schizophrenia patients, even when the structure of the context is enhanced. In fact, we observed a decrease in the N400 effect in this group of patients, owing to the evocation of a high-amplitude N400 for the related words. The increase in N400 amplitude for words that semantically relate to the prime or that are congruent with the sentence context has been widely reported in the literature (4,16–18,22), reflecting a deficit in the use of the context provided by the preceding word (30). In this respect, our results confirm those previously reported in the literature.

Contrary to our hypotheses, we observed N400 anomalies not only in the weakly structured task but also in the highly structured one. Thus, it appears that, in a group of patients with formal thought-disordered schizophrenia, the reinforcement of the contextual constraint, as operationalized in our study, does not permit the mobilization of contextual processes. Likewise, it should be noted that an examination of ERPs reveals that the N400 anomalies are lower in the weakly structured task, probably because of the more superficial level at which this task is processed.

The results obtained in our highly structured task differ from those reported by Koyama and others (10,11), even though the proportions of related words are comparable. There are certain notable differences, however, between these studies and our own—first, concerning the clinical characteristics of the patients and second, concerning the nature of the semantic relation and the SOA duration.

As we mentioned in our introduction, the semantic priming and N400 anomalies do not seem to affect all schizophrenia patients but only the subgroup characterized by the presence of formal thought disorders. The divergence between our results and those obtained by Koyama and others could be due to the clinical heterogeneity of the patients, itself underpinned by a cognitive heterogeneity.

Should we conclude that the deficit in contextualization processes in schizophrenia patients with formal thought disorders is stable? Should we seek to explain those studies based on behavioural variables that have reported comparable semantic priming effects in schizophrenia patients with formal thought disorders and in control subjects (31,32)?

The functional analysis of the experimental tasks makes it possible to advance a complementary hypothesis: perhaps, our highly structured task did not solicit the same type of context processes as those mobilized by studies in which a context effect was reported. In fact, 3 types of mechanism have been proposed to explain the semantic priming effect (33). These are the automatic spreading of activation through the semantic network, a prelexical mechanism for the generation of expectations, and a postlexical mechanism for the verification of semantic compatibility. According to the classic opposition of automatic and controlled processes, the first of these mechanisms should be automatic and be independent of the experimental conditions, whereas the other 2 should be controlled and closely linked to the characteristics of the material and the task.

In their verbal material, Koyama and others used only antonymic relations. The pregnancy of the antonymic relations—coupled with the precise anticipations that they permit, the high proportion of related words, and the long SOA (greater than 1000 milliseconds)—likely favoured the mobilization of the prelexical mechanism for the generation of expectations (34). This observation also applies to the studies conducted by Henik and others (31,32) who employed all the conditions that are conducive to the expectation generation mechanism.

Conversely, our verbal material used various semantic relations. Our experimental conditions, which employed a less pregnant semantic relation and a shorter SOA (450 milliseconds), did not call on the expectation-generation mechanism but instead on the postlexical-integration mechanism, known to operate independently of SOA and to have effects that increase as a function of the proportion of related words (34). The persistence of N400 anomalies under these conditions may indicate a stable deficit in the postlexical integrative strategies in schizophrenia patients with formal thought disorders.

The value of distinguishing between prelexical predictive strategies and postlexical integrative strategies in a study of contextualization deficits in schizophrenia patients is also reflected in the general language comprehension model recently proposed by Kutas and Federmeier (35). According to this model, the processing of context is thought to

preactivate the perceptual and semantic characteristics of the most coherent item or of the most highly predictable item within the given context. Activation then spreads through the semantic network to related concepts, and when the presented item corresponds to the predictions, it is recognized more easily. When this proactive strategy proves defective, the integrative strategy is used. The subject needs to allocate additional attentional resources to compare the characteristics of the target with those of the context (that is, to search for an association with the context words or semantic compatibility) and to integrate the word into the representation of the context stored in working memory. It seems permissible, then, to think that it is precisely this retroactive recourse to the contents of working memory and the additional cognitive effort it involves that is reflected in the LPC amplitude increase following N400.

A literature review on schizophrenia patients, in light of this dual-process model, suggests that, whenever it is possible to use the predictive strategy, patients with schizophrenia exhibit a priming effect that is equivalent to, or sometimes greater than, that observed in control subjects. This is the case, for example, in lexical decision tasks that use a highly structured context or in lexical decision tasks containing ambiguous words whose nondominant meaning is strongly induced by the context. Similarly, when the experimental conditions do not necessitate a recourse to the postlexical integrative strategies (that is, passive reading tasks), schizophrenia patients do not exhibit N400 anomalies (4,24).

Notably, in our study, the LPC anomaly in the schizophrenia patients was specific to the unrelated condition. (The same result was also obtained by Strandbour and others [22].) Taken together, the N400 anomalies in the related condition only and the LPC in the unrelated condition only could indicate that subjects with schizophrenia, unlike the control subjects, are unable to use a semantic relation to facilitate word processing (that is, an increase in N400 amplitude). Further, these subjects do not make the additional effort that is required to integrate unrelated words (that is, a reduction in LPC amplitude).

We can also observe that the ERP anomalies seen in our study in individuals with schizophrenia do not appear to relate to neuroleptic treatment. We witnessed no correlation between the daily dosage (measured in terms of chlorpromazine equivalent) on the one hand and the N400 or LPC amplitude on the other. This result is in line with those reported in several different studies (14,18–20,24). Moreover, the only study published to date that compares the N400 pattern in a group of schizophrenia patients receiving treatment (haloperidol) with that of a group of untreated schizophrenia patients and a healthy control group on a lexical decision task has revealed the presence of a significant N400 effect in the control group and in the treated patient group, but not in the untreated patient group (9). These results indicate that conventional neuroleptics actually tend to improve the effect of semantic context on N400 amplitude in schizophrenia patients.

Conclusion

The absence of any improvement in the processing of context in a condition that facilitated the mobilization of postlexical

integrative strategies suggests that the deficit in these processes is stable in schizophrenia patients. This deficit may relate to working-memory anomalies in schizophrenia (20,21,31). These results, taken together with the absence of N400 anomalies observed under conditions that strongly solicit the predictive strategies, lead us to believe that schizophrenia patients process language on the basis of the proactive anticipations induced by the context. They experience difficulties, however, when they have to revise these expectations via the retroactive recourse to the integration of meaning. The weakening of the associations, the loss of goal, and the associations based on assonance or semantic contiguity (that is, the disorganization of language and thought in schizophrenia) could be the clinical expression of this cognitive disorder. The hypothesis that the predictive strategies are preserved while only the integrative strategies are impaired remains to be tested in later research.

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Résumé : Une étude électrophysiologique : peut-on mobiliser les processus du contexte sémantique chez les patients souffrant de schizophrénie avec trouble de la pensée?

Objectif : Cette étude visait à vérifier l'hypothèse selon laquelle le renforcement de la structure du matériel verbal pourrait apporter une amélioration des processus de conceptualisation chez les patients souffrant de schizophrénie avec trouble de la pensée déclaré.

Méthode : Un total de 38 patients schizophrènes avec trouble de la pensée déclaré et 24 sujets témoins assortis en santé ont effectué 2 tâches de décision lexicale, comprenant 2 niveaux de structure contextuelle (avec 16,7 % et 33 % de mots reliés, respectivement). Les composantes N400 du potentiel lié aux événements, la composante positive tardive (LPC) et les variables comportementales (temps de réaction et pourcentages d'erreur) ont été analysées.

Résultats : Un effet de structuration du contexte a été observé dans les LPC, mais pas les N400. Chez les sujets schizophrènes, les anomalies des N400 (accroissement d'amplitude pour les mots reliés et réduction de l'effet N400) ont persisté dans les deux conditions de structuration du contexte. De même, une réduction de l'amplitude des LPC dans la catégorie de mots non reliés ainsi qu'une réduction de l'effet LPC ont été observées chez ces patients.

Conclusions : Les patients schizophrènes avec trouble de la pensée déclaré n'ont pas profité de la structuration du contexte afin de mettre en oeuvre des stratégies d'intégration du contexte. Ce déficit semble être stable. Les résultats sont discutés dans le cadre du modèle publié antérieurement sur la compréhension du langage.