

The effects of different types of planning on the writing of argumentative text

Nathalie Isnard and Annie Piolat
University of Provence, Aix en Provence

Analysis of aloud protocols (Hayes & Flower, 1980) as well as drafts (Sharples & Pemberton, 1990) show that writers differently generate and organize their oncoming propositions. Few experimental attempts have been carried out to assess the effect of such procedures on the quality of writing (Kellogg, 1979). Our experiment was aimed at demonstrating the role of three types of planning, free association of ideas vs. outlined organization vs. diagrammatic organization. Similarities and differences between drafts and final texts are stressed.

1 Theoretical background

Planning is a complex, anticipatory process (Hayes & Flower, 1980) whose function is to generate information via memory retrieval, organize that information, and set a goal for the final text which complies with the production context.

Authors in this field have stressed that mastery of the writing process depends largely on the writer's ability to produce plans of various types (a doing plan, a saying plan, a composing plan), whether in mind or on paper. However, they adhere to varying degrees to the Flower and Hayes (1981) view according to which planning, sentence generating, and revising are carried out by writers in a recurrent fashion. Some authors who analyze the effects of text type contend above all that planning serves as a strict guide to sentence generation (Dolt & Schneuwly, 1989; Espéret, 1984). Others who have found a wide variety of writing strategies which depend on the production conditions and the writer's expertise grant a more flexible supporting role to such plans (Bisseret, 1987; Burtis et al., 1983; Bridwell-Bowles et al., 1987; Eigler et al., 1990; Scardamalia & Bereiter, 1987; Sharples & Pemberton, 1990; Piolat & Belorgey, 1991).

However, little research has been devoted to analyzing the ideas expressed in the rough drafts of a text, and the impact they could have on the final text, as if the study of what expert writers say they do were sufficient for understanding the requirements for effective writing. Two exceptions are the studies by Gould, Conti, and Hovanyecz (1983) and Kellog (1988), the only researchers who experimentally examine the role of different types of rough drafts and their effects on the final composition. Furthermore, analyses of the linguistic and nonlinguistic marks produced by writers throughout the draft-writing process (for a typology, see Sharples & Pemberton, 1988; Piolat, Isnard, & Della Valle, 1993) have only dealt with the manuscripts of great writers (e.g. Grésillon et al., 1991).

Thus, the purpose of the present study was to require adults to organize their ideas in different ways during the draft-writing stage of an argumentative essay in order to assess the effects on the final text produced. More specifically, the first goal was to determine whether requiring the subjects to produce a rough draft in graphic or outline form, rather than allowing free-form draft writing, would cause a clear change in how they focus their thought processes as they write. A structured organization mode should lead to the enhanced control of certain aspects of the idea processing step (the development and structuring of content) and cause subjects to set aside semantic and syntactic formatting and spelling checks during the draft-writing stage.

Our second goal was to evaluate the different types of guidance provided by rough drafts by analyzing the concrete effects of the mandatory organization modes on idea management (measured by the number of ideas retained, eliminated, and added between two successive drafts and differences in the writing order of ideas in the successive text versions).

2 Method

2.1 Subjects and essay topic

Thirty-nine psychology students were divided into three groups. Subjects in each group were asked to compose an argumentative essay at least two pages long. The topic of the essay, which did not require any specific knowledge, was as follows: "Do you think that dressing fashionably is a necessary behavior? Base your ideas on clearly constructed argumentation, supported by meaningful examples."

This literary genre was chosen because it requires the writer to retrieve and coordinate ideas into arguments and counterarguments, in addition to defending a thesis (see Adam, 1992).

2.2 Experimental conditions, testing procedure, and factors

The subjects performed the writing task alone in the same room, one group at a time, in the presence of the experimenter (cf. Figure 1). The task lasted an hour and a half and was divided into three phases of fixed length. However, subjects who finished phase 3 in advance were allowed to turn in their work before the allotted time had expired. Subjects were timed. Each phase was preceded by instructions and the, distribution of specific pencil-and-paper materials.

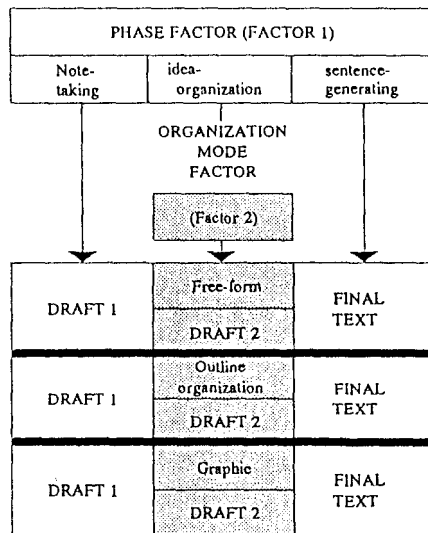


Figure 1. Procedure of the experiment

Phase 1 was called the 'note-taking' phase and lasted 15 minutes. Its purpose was to promote the retrieval of ideas from memory. Phase 2 was called the 'idea-organization' phase and lasted 30 minutes. Its function was to structure the writer's ideas. Phase 3 was the 'sentence-generating' phase, which lasted 60 minutes. It was aimed at composition of the final text.

The intermediate phase (idea-organization) was different for the three groups. It involved either (a) free organization of ideas, (b) organization of ideas into an outline, in which case the writers were instructed to produce an outline like the example provided (which included various levels), or (c) graphic organization of ideas, where subjects were instructed to produce one or more diagrams or charts which related their ideas to each other as in the samples provided.

The sample outlines and diagrams used for organization modes (b) and (c) were purely figurative and void of content. The subjects kept all rough drafts with them throughout the entire task and could modify them at will. When the task was completed, all used sheets of paper were to be turned in to the experimenter.

Two experimental factors were manipulated in this study: (1) composition phase, which had three modalities (phases 1, 2, and 3), and (2) idea-organization mode, which also had three modalities (free-form, outline, and graphic).

2.3 Dependent variables

The development of ideas during the composition phase was studied via several different measures. In order to obtain a list of potential ideas, the contents of all texts produced were analyzed. With all three phases and all subjects pooled a total of forty different ideas were produced.

Based on this list, the following measures were calculated: *number of ideas* per text in each phase, *number of ideas retained* across phases (3 possible counts: phase 1 vs. phase 2, phase 1 vs. phase 3, and phase 2 vs. phase 3), *number of ideas eliminated* across phases (3 counts), *number of ideas added* across phases (3 counts), and '*distance*' between two stages, of a text in terms of the writing order of ideas common to both. This last variable was designed to assess differences in writing order across writing phases (for free-form and outline organization only, where a conventional reading order is defined; there is no point in talking about ideas evocation order in the case of graphic condition). Ideas common to two stages of a text were labelled. A time series was then set up for each stage to account for the order of occurrence of the ideas. The time series method (Guercin et al., 1989) can be used to compare data organized in sequential format. This 'distance'

ranged from 0 (two identical time series) to 1 (two completely different time series).

The effect of the organization mode imposed during the rough draft phase (phase 2) on final sentence generation was assessed by means of the following measures: *sentence generation time* in phase 3, *final text length* (in number of words).

3 Results

3.1 Effect of composition phase

Text length (number of words). The subjects wrote more words during the final sentence-generation phase (583.3) than during the note-taking phase (195.4) and the idea-organization phase (311.8; $F_{1/27}=513.7$, $p < .001$).

Number of ideas. The writers produced more ideas during the sentence-generation phase (10.58) than during the note-taking phase (8.1) and the idea-organization phase (8.28, $F_{1/36}=59.7$, $p < .001$).

Number of ideas retained. The mean number of ideas retained between the note-taking phase and the idea-organization phase (4.79) was significantly smaller than the number retained between the idea-organization phase and the sentence-generation phase (5.71; $171136=17.39$, $p < .001$; cf. Figure 2). The mean number of ideas retained between the note-taking phase and the idea-organization phase (4.79) was significantly smaller than between the note-taking phase and the sentence-generation phase (5.3; $F_{1/36}=4.53$, $p < .04$). Finally, the mean number of ideas retained between the idea-organization phase and the sentence-generation phase (5.71) was significantly greater than between the note-taking phase and the sentence-generation phase (5.3; $F_{1/36}=5.076$, $p < .03$).

Number of ideas eliminated. The number of ideas eliminated between the note-taking phase and the idea-organization phase (3.48) was significantly greater than the number eliminated between the idea-organization phase and the sentence-generation phase (2.23; $171136=14.36$, $p < .001$; cf. Figure 2). The mean number of ideas eliminated between the note-taking phase and the idea-organization phase (3.48) was significantly greater than between the note-taking phase and the sentence-generation phase (2.63; $171136=12.66$, $p < .001$). There was no significant difference in the number of ideas eliminated between the organization phase and the sentence-generation phase and

the number eliminated between the note-taking phase and the sentence-generation phase.

Number of ideas added. The number of ideas added between the note-taking phase and the idea-organization phase (3.53) was significantly smaller than the number added between the idea-organization phase and the sentence-generation phase (4.51; $F_{1/36}=4.33$, $p < .04$; cf. Figure 2). The number of ideas added between the note-taking phase and the idea-organization phase (3.53) was significantly smaller than between the note-taking phase and the sentence-generation phase (5.22; $F_{1/36}=33.85$, $p < .001$). Finally, the mean number of ideas added between the idea-organization phase and the sentence-generation phase (4.51) was significantly smaller than between the note-taking phase and the sentence-generation phase (5.22; $F_{1/36}=4.39$, $p < .04$).

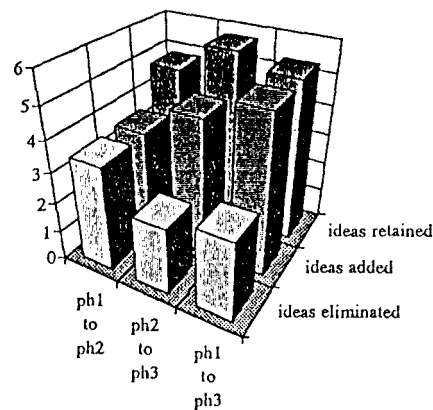


Figure 2. Effect of composition phase

Common-idea writing-order distance. The difference in the writing order of common ideas between the note-taking phase and the idea-organization phase (0.205) was significantly smaller than the difference in order between the note-taking phase and the sentence-generation phase (0.54; $F_{1/24}=9.03$, $p < .006$). The writing-order distance between the idea-organization phase and the sentence-generation phase (0.27) was significantly smaller than the

distance between the note-taking phase and the sentence-generation phase (0.54 ; $F1/24=4.05$, $p<0.05$). There was no significant difference in the writing-order distance between the note-taking phase and the idea-organization phase and between the idea-organization phase and the sentence-generation phase.

3.2 Effect of idea-organization mode

Number of ideas added across phases. The number of ideas added across phases was significantly smaller in the free-form organization condition (3.89) than in the outline condition (5.20 ; $F1/36=4.89$, $p<0.03$; cf. Figure 3). Subjects organizing their ideas in outline format tended to add more ideas (5.20) than those working in the graphic mode (4.17 ; $F1/36=3.01$, $p<0.09$). In contrast, there was no significant difference between the graphic and free-form organization modes.

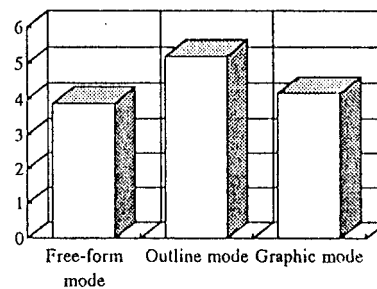


Figure 3. Effect of idea-organization mode on number of ideas added across phases

Sentence generation time offinal text. Writers in the free-form organization condition spent significantly less time (46.92 min.) composing the final essay than those working in the outline condition (55.76 min.) or in the graphic condition (56.7 min.; $ts=2.4$, $p<0.02$ and $ts=2.6$, $p<0.01$, respectively).

Final text length. The length of the final text did not vary significantly between the different modes employed to organize ideas.

Number of ideas of final text. The organization mode also did not have a significant effect on the number of ideas in the final text (free-form: 10.30; outline: 10.80; graphic: 10.69).

4 Discussion

The *composition phase* factor had important effects on the different stages of the texts, both in text length and number of different ideas produced.

The significantly greater length of the final text may come from two sources. It is of course due to the fact that the final essay contained complete sentences (constructed in compliance with the semantic and syntactic constraints of the language) which preserve overall text cohesion, connectivity, and coherence. But it is also due to an increase in the number of ideas added. The sentence generation process requires searching in long-term memory for specific lexical units and appropriate propositional structures. This search may lead to the discovery of new ideas through semantic association.

Regardless of the type of rough draft (imposed-form or free-form), fewer ideas were retained (number of identical ideas in both stages) between the note-taking phase and the idea-organization phase than between the idea-organization phase and the sentence-generation phase. Similarly, the number of ideas eliminated between the note-taking phase and the idea-organization phase was smaller than it was between the idea-organization phase and the sentence-generation phase. Thus, the idea-organization phase appears to play a crucial role in the development of text content. During this phase, the ideas generated while notes were being taken are evaluated and perhaps eliminated, leading to changes in the text's content. The irrelevance of certain previously retrieved ideas becomes apparent as the writer attempts to grant overall coherence to the text. In contrast, during the final draft stage, writers seem to retain previously organized ideas. They also add ideas at this stage. As they enter into the sentence-generation phase, they do not appear to limit themselves to the ideas just organized (or composed in sentence form in the free-form draft condition). They insert new ideas in the course of the sentence-generation phase, appearing to sporadically apply the knowledge-telling strategy as previously written ideas lead to the retrieval and generation of new ideas.

Finally, for the free-form and outline conditions, there was less difference in the writing order of common ideas between text stages 1 and 2 than between stages 1 and 3. Similarly, there was less difference between stages 2 and 3 than between stages 1 and 3. It appears as though, between note taking (phase 1) and idea organization (phase 2), writers slightly modify the order in which ideas are expressed; they further modify this order during final composition (phase 3). As a whole, the linearization order of the ideas in the final text is very different from the idea retrieval order established during note taking. Thus, the idea-organization phase plays an essential role in the framing and organization of ideas into a hierarchical and temporal structure.

The idea-organization mode had important effects on the final writing process and on the number of ideas added.

Writers who had made free-form rough drafts wrote their final texts faster than those who had produced a structured rough draft in outline or graphic format. During phase 2, the free-form subjects generated sentences outright (making semantico-syntactic choices at that point). During the final writing phase, they settled for quickly copying over their rough drafts.

Although the final length of the texts did not differ for writers in the three conditions, the imposed organization modes (outline and graphic drafts) led to an increase - with respect to free-form drafts - in the number of ideas added between phases 2 and 3, and did so to a greater extent in the outline condition than in the graphic condition. This result can be ascribed to the fact that the structured draft writers were forced to establish more coherent relationships between their previously retrieved ideas than the free-form draft writers were. To do this, they had to analyze the various semantic facets of each idea and search for linking elements that could be used to structure the ideas into a coherent whole. In all, these subjects explored more information as they performed the first two subtasks. In addition, because they were required to begin by reflecting upon the semantic organization of the text they would write, they temporarily ignored superficial linguistic aspects and concentrated on improving content. This is reflected by the number of ideas generated.

The outline mode of organization appears to have been the most effective way of increasing idea generation processes (without an effect on final text length and final number of ideas). The creation of a 'table of contents' is a

familiar way for writers to organize their ideas. In contrast, attempts to organize ideas in the graphic mode, an uncommon approach, was accompanied by the attribution of meaning via nonlinguistic devices (boxes, arrows, circling, etc.). Writers in this situation may have remained at a superficial level of idea organization. They appear to have simply distributed the ideas in the diagrams, relating them semantically to each other without discovering any new ideas.

In conclusion, these results indicate that the exploration of a text's content during the writing process may be influenced by the idea-organization mode used. Moreover, our experimental division of the task into three successive phases showed that texts change content as they progress from one stage to the next. Note that writers who are not forced to organize their ideas in a given fashion do not perform in-depth reorganization, and pass directly from the jotting down of a few unorganized and undeveloped ideas to the writing of an elaborated final text. Mandatory structuring, on the other hand, allows writers to discover new ideas. It remains to be seen whether these 'discoveries' enhance the quality of the final text as a whole. Indeed, while the total number of ideas in the final text did not vary significantly as a function of the idea-organization mode used during the rough draft stage, we have yet to determine whether or not the nature and structure of the new ideas leads to overall text improvement.

References

- Adam, J.M. (1992). *Les textes: Types et prototypes*. Paris: Nathan.
- Bridwell-Bowles, L.S., Johnson, P., & Brehe, S. (1987). Computers and composing: case studies of experienced writers. In A. Matsuashi (Ed.), *Writing in real time: Modelling production processes* (pp. 81-107). New York: Longman.
- Burtis, B., Bereiter, C., Scardamalia, M., & Tetroc, J. (1983). The development of planning in writing. In G. Wells & B. Kroll (Eds.), *Explorations in the development of writing* (pp. 153-174). New York: Wiley.
- Dolz, J. & Schneuwly, B. (1989). *Communicative planning in different text types written by children aged 10 and 14*. Paper presented at the Third European Conference for Research on Learning and Instruction. Madrid, 4-7 September.

- Eigler, G., Jechle, T., Merziger, G., & Winter, A. (1991). Writing and Knowledge: Effects and Re-effects. *European Journal of Psychology of Education, 6*, 225-232.
- Espéret, E. (1989). Micro- and macrostructural planning and control in production: Approaches to the storytelling situation. In H. Mandl, E. de Corte, S.N. Bennet & H.F. Friedrich (Eds.), *Learning and Instruction (Vol. 2 & 3)*. Oxford: Pergamon.
- Flower, L., & Hayes, J.R. (1981a). A cognitive process theory of writing. *College composition and Communication, 32*, 365-387.
- Flower, L., & Hayes, J.R. (1981b). Plans that guide the cognitive process of composing. In C. Frederiksen, & J. Dominic (Eds.), *Writing: the nature development, and teaching of written communication: Vol. 2. Writing: Process, development, and communication (pp. 39-58)*. Hillsdale NJ.: Erlbaum.
- Gould, J., & Grischkowsky, N. (1984). Doing the same work with hard copy and CRT terminals. *Human Factors, 26*, 323-337.
- Guercin F., Roussey J.Y. & Piolat A. (1990). Time series: A tool for analyzing complex cognitive activities. Application to the study of text revising strategies. *Cahiers de Psychologie Cognitive/European Bulletin of Cognitive Psychology, 1*, 79-110.
- Grésillon, A., Lebrave, J-L., & Fuchs, C. (1991). Flaubert: "Ruminer Hérodias". Du cognitif au verbal-textuel. In D. Ferrer & J-L. Lebrave (Eds.), *L'écriture et ses doubles (pp. 29-109)*. Paris: Editions du CNRS
- Hayes, J.R., & Flower, L.S. (1980a). The dynamics of composing: making plans and juggling constraints. In L.W. Gregg & E.R. Steinberg (Eds.), *Cognitive Processes in Writing (pp. 31-50)*. Hillsdale: Erlbaum.
- Kellog, R.T. (1988). Attentional overload and writing performances: effects of rough draft and outline strategies. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 14*, 355-365.
- Piolat, A., Isnard, N., Dellavalle, V. (in press). *Traitement de Texte et Stratégies Rédactionnelles*.
- Scardamalia, M., & Bereiter, C. (1987) . Knowledge telling and knowledge transforming in written composition. In S. Rosenberg (Eds.), *Advances in applied psycholinguistics (Vol. 1, pp. 142-174)*. New York: Cambridge University Press.

Sharpies, M., & Pemberton, L. (1990). *Starting from the writer: Guidelines for the design of user-centred document processors* (Cognitive Science Research Paper, Serial n° CSRP 154).