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## **The writing strategies of graduate research students in the social sciences**

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**Summary.** A 35-item questionnaire concerning writing habits, experiences of writing and productivity was sent to 228 full-time, U.K. domiciled, social science research students. One hundred and one complete responses were received. Cluster analysis was used to identify three distinct groups of students in terms of the strategies they used when writing: “Planners”, who planned extensively and then made few revisions, “Revisers”, who developed content and structure through extensive revision, and “Mixed Strategy” writers, who both planned before starting to write and revised extensively as part of their writing processes. The Planners reported higher productivity than both the Revisers and Mixed Strategy Writers. Planners and Revisers did not differ significantly in how difficult they found writing to be; Planners found writing less difficult than did the Mixed Strategy Writers. We conclude that working from a plan can be an effective writing strategy for some, but that planning is neither a necessary nor a sufficient condition for writing success.

Academic writing is difficult. It requires a complex combination of generating ideas, selecting the ideas that are appropriate to the writing task, translating these into text and polishing the text to produce a presentable document. In doing this the writer has to attend not only to his or her own thoughts, but also to the content and style conventions of the community for whom the piece is being written.

For all but the simplest writing task, it is probably not possible to manage this number of constraints simultaneously (Bereiter 1980). Writing most documents will only be possible if the task is first divided up into more manageable sub-tasks. These sub-tasks may then be performed in series (rather than concurrently) to produce a finished piece of text. For the purposes of this paper we will call the way in which a particular writer partitions and sequences the writing process his or her “writing strategy”.

This paper examines the writing strategies of graduate research students with a view to exploring the relationship between writing strategy and success at thesis writing. Few new research students will have had previous experience of writing a document as long or as complex as a research thesis. Also, more so than with most undergraduate writing, a thesis should be written in a style that conforms to that expected by the academic audience at which it is aimed. It is likely, therefore, the process of writing a thesis will present a major challenge to most research students, and research suggests that an appreciable number of students find thesis writing very difficult (Rudd 1985; Torrance, Thomas and Robinson 1992). Despite this, however, writing instruction for graduate research students is often afforded a low priority within doctoral degree courses. Studying the writing strategies of research students is interesting, therefore, for two reasons. It offers insight into the writing

behaviour of a group of writers who are likely to be struggling with a writing task of a genre and scale that is new to them, and the results of such research may be of value in encouraging and improving graduate writing instruction.

Writing strategies vary both between novice and more expert writers, and among writers of similar competence. The writing strategies of novice writers typically involve generating content either prior to producing full text, often through the construction of a plan, or during the writing of the first draft (Sommers 1980; Perl 1979). Once a first draft is produced few changes are made to the text's content (Sommers 1980; Faigley and Witte 1981).

More experienced writers often use the writing process not only as a means of telling what they know, but also as a way of exploring and developing their ideas about the topic (Bereiter and Scardamalia 1987; Faigley and Witte 1981; Sommers 1980). How this is achieved varies considerably from writer to writer (Chandler 1992; Hartley and Branthwaite, 1989; Hartley and Knapper, 1984; Lowenthal and Wason, 1977). One approach is to focus effort on the pre-writing stage by producing a detailed written outline which is then used as the basis for a full draft. Traditional advice on how to write has usually advocated strategies based on this approach. An alternative is not to plan in advance but to develop one's thinking while writing and revising fully instantiated rough drafts (Wason 1970, 1985; Elbow 1973, 1981), an approach that is considerably facilitated by the use of a word-processor.

These two types of strategy, however, represent extremes and a variety of other permutations of the planning and revising sub-tasks are possible. The writing process of most experienced writers tends to be recursive rather than a simple linear progression starting with planning and finishing with revision (Nold 1981; Flower and Hayes 1981a; Matsuhashi 1987; de Beaugrande 1984). Most writers will, in the process of producing a document, go through several plan-draft-revise cycles as well as diverging into planning and revision whilst drafting is taking place (Matsuhashi 1987; Flower and Hayes 1981). The number of different strategies that are available to the writer is further increased by the fact that planning, drafting and revising, as functional components of the writing process, can themselves be exhibited as a range of different activities. Planning, for example, may entail writing detailed outlines of the intended content and structure for the text. However, it is also possible to construct plans mentally, and to plan content but not structure or structure without content (see, for example, Flower and Hayes 1981b).

Although there has been a recent growth in research on the writing process, only a few studies have described or assessed the efficacy of the different strategies adopted by academic writers. Kellogg (1987) found that the self-reported productivity of science faculty who wrote outlines (about half his sample) was significantly greater than for those who did not. Hartley and Branthwaite (1989), through cluster analysis of data from a survey of psychologists with good publication records, identified two distinct groups of writers. One group, the "Thinkers", tended to spend a long time thinking about how to structure a piece, rewrote substantially and produced several drafts. The other group, the "Doers" spent less time during the writing process developing structure. They rewrote less

and produced fewer drafts. Of the two groups, the Doers were significantly more productive than the thinkers. Interpreting the results of these studies is, however, complicated by the use in both cases of number of academic publications as the measure of productivity. Although productivity measured in this way may in part be directly dependent upon strategy, other factors are likely to independently influence both productivity and writing strategy.

This qualification aside, the results of these studies suggest that strategies characterised by minimal rewriting and, perhaps, the production of a written outline, may be more effective than strategies centred around multiple drafting without planning. If this is the case, then it may have implications for graduate level writing instruction. However, it is not necessarily true that the strategies used by the most productive academic writers to produce books and articles will be similarly effective if adopted by graduate research students for writing a thesis. Phillips and Pugh (1987), for example, suggested that, for at least some doctoral research students, re-writing is likely to play a central role in the development of their ideas and therefore, presumably, in the successful completion of their PhD. Rather than basing claims about the efficacy of particular writing strategies on intuition or on results from research on different populations, it would seem important to describe and examine the efficacy of the writing strategies used by graduate students themselves.

The data reported here were originally collected as part of a detailed survey of 110 social science research students studying at U.K. universities. A preliminary analysis of these data (reported fully in Torrance, Thomas and Robinson 1992) confirmed that research students differ from both novice and experienced writers in a number of ways (see also Sommers 1980). Unlike novices, the research students had learned that several revisions were often necessary to produce an acceptable text. Unlike experienced authors, however, the majority of research students regarded revision principally as a way of improving clarity and style, and thus they may not yet have become aware of the potential of writing and revision for bringing about advances in thought. Finally, more than 20% of the research students were worried that their difficulties with writing might jeopardize the completion of their PhD.

In the present paper we go beyond this analysis to examine differences between the strategies adopted. We then examine whether or not there is a relationship between writing strategy and the students writing success in terms of their reported productivity and the extent to which they find writing problematic.

## **The survey**

The survey consisted of 35 items divided into four groups: (1) questions relating to the students' writing strategy, (2) questions relating to the students' experience of writing and particularly whether or not they found writing problematic, (3) questions designed to assess the students' productivity and (4) background information (questions about year of study, gender, and so forth). Most of the

questions had a fixed response format to allow quantitative analysis of the student's responses. The wording of the questions was developed partly with reference to previous literature, and partly through our own pilot studies.

The strategy-related questions are detailed in Tables 1–4 below. The questions focused particularly on the activities that students engaged in when writing (Table 1), how clear they needed their thinking to be before starting to write (Tables 2 and 3), and their reasons for revising (Table 4).

*Table 1.* Writing strategy questions concerning writing activities, and the responses to these items of the members of the three clusters. Significance levels all derived from chi-square tests unless otherwise indicated.

Which of the following activities did you engage in when producing your last substantial piece of text? <sup>a</sup>					
	Planners ( <i>n</i> = 36)	Revisers ( <i>n</i> = 30)	Mixed ( <i>n</i> = 35)	Overall ( <i>n</i> = 101)	
Brainstorming	25 (69%)	26 (87%)	32 (91%)	83 (82%)	<i>p</i> = 0.04
Taking notes from literature	30 (83%)	19 (63%)	30 (86%)	79 (78%)	<i>p</i> = 0.06
Mindmapping	19 (53%)	16 (53%)	20 (57%)	55 (54%)	n.s.
Ordering notes	24 (68%)	15 (50%)	25 (71%)	64 (63%)	n.s.
Making an outline	27 (75%)	24 (80%)	32 (91%)	83 (82%)	n.s.
Drafting	35 (97%)	27 (90%)	34 (97%)	96 (95%)	n.s.
Revising	34 (94%)	28 (93%)	33 (94%)	95 (94%)	n.s.

  

How many drafts did you write when producing your last piece of text? <sup>b</sup>				
	Planners	Revisers	Mixed	Overall
	2.2 (1.0)	3.0 (1.5)	4.1 (2.0)	3.1 (1.7)

<sup>a</sup> Values are for the number of students who reported engaging in the activity on at least one occasion during the production of the document, with within group percentage in parentheses.

<sup>b</sup> Mean response, with standard deviation in parentheses. One way ANOVA,  $F(2,98) = 12.4$ ,

*Table 2.* Writing strategy questions concerning the stage at which content and sequence decisions were made, and the responses to these items of the members of the three clusters.

Generally speaking, at what point do you like to start writing? <sup>a</sup>				
	Planners	Revisers	Mixed	Overall
When both ideas and structure are clear in my head	19 (53%)	2 (7%)	6 (17%)	27 (27%)
When ideas are clear, but not the structure	7 (19%)	6 (20%)	16 (46%)	29 (29%)
Straight away, without complete clarity of thinking	4 (11%)	12 (40%)	3 (9%)	19 (19%)
When structure is clear, but not ideas	6 (17%)	10 (33%)	10 (29%)	26 (26%)

<sup>a</sup> Students circled one of four responses. Values are for number of students, within group percentage in parentheses. Chi-square = 32.4, with 6 d.f.,  $p < 0.001$ .

Table 3 General questions about writing strategies

	Planners	Revisers	Mixed	Overall	
I do not normally expect to make significant changes to my text by revising it	1.9 (1.0)	1.9 (1.2)	1.3 (1.3)	1.7 (0.96)	$p = 0.02$
It is only when I have written something that I feel I really understand my own arguments	2.6 (1.2)	4.1 (0.9)	2.8 (1.2)	3.1 (1.3)	$p < 0.001$
I can't think without writing	2.1 (1.0)	3.2 (1.1)	1.9 (0.9)	2.4 (1.1)	$p < 0.001$
It is absolutely vital, if my writing is to be successful, that I have my arguments clear before I start writing	3.6 (1.0)	1.8 (0.6)	2.4 (0.9)	2.7 (1.2)	$p < 0.001$

<sup>a</sup> Scored from 5 = definitely true to 1 = definitely not true. Mean rating with standard deviation in parentheses. Significance level derived from one way ANOVAs.

Table 4. Writing strategy questions concerning revision, and the responses to these items of the members of the three clusters<sup>a</sup>

What were your main reasons for revising your last piece of text? <sup>b</sup>					
	Planners	Revisers	Mixed	Overall	
Improving clarity	19 (53%)	15 (50%)	12 (34%)	46 (46%)	n.s.
Improving style	19 (53%)	9 (30%)	14 (40%)	42 (42%)	n.s.
Developing content	8 (22%)	12 (40%)	17 (49%)	37 (37%)	$p = 0.06$
Correcting errors	9 (25%)	11 (37%)	12 (34%)	32 (32%)	n.s.
Rearranging the text	6 (17%)	8 (28%)	12 (34%)	26 (26%)	n.s.
Reducing length	4 (11%)	6 (20%)	5 (14%)	15 (15%)	n.s.

<sup>a</sup> Significance levels all derived from chi-square tests.

<sup>b</sup> Students responded in their own words and were free to give more than one reason. Values are for number of students, with within group percentage in parentheses.

Questions relating to the students' experience of writing are detailed in Table 5. Responses were made on a five point scale from definitely true to definitely not true. In addition to these questions we also asked the students how satisfied they were with the last piece of text that they produced, how much they enjoyed writing it and how difficult they had found the writing process. These questions were scored from 1 = very satisfied, very enjoyable or very difficult to 5 = not at all satisfied, enjoyable or difficult.

To provide a measure of the amount of writing these students had done in the three months prior to their receipt of the questionnaire, we asked them to estimate how many words of thesis related text (plans, notes and thesis drafts) they had written and how many hours they had spent writing them.

Table 5. Students' responses to questions relating to their experience of writing by cluster membership

	Planners	Revisers	Mixed	Overall	
I find the process of writing highly stressful	13 (36%)	10 (33%)	13 (37%)	36 (36%)	n.s.
I find writing a frustrating process	6 (17%)	10 (33%)	13 (37%)	29 (29%)	n.s.
I would describe myself as a poor writer	4 (11%)	4 (13%)	5 (14%)	13 (13%)	n.s.
I worry so much about writing that it often prevents me from getting down to doing some	3 (8%)	5 (17%)	11 (31%)	19 (19%)	$p = 0.04$
I find writing hard work	17 (47%)	15 (50%)	18 (51%)	50 (50%)	n.s.
I gain a great sense of satisfaction from completing a piece of work	33 (92%)	28 (93%)	30 (86%)	91 (90%)	n.s.
I worry that my difficulty with writing will jeopardise my completing my PhD	6 (17%)	3 (10%)	12 (35%)	21 (21%)	$p = 0.04$
I gain a great deal of pleasure from writing	19 (53%)	17 (57%)	16 (46%)	52 (51%)	n.s.

\* Values are for the number of students who indicated that the item was fairly true or definitely true for them with inter-cluster percentages in parentheses. All significance levels are derived from chi-square tests.

Productivity, and not writing quality, was chosen as a measure of writing success for two reasons. First, productivity is both more readily quantifiable than writing quality and much more readily assessed in the context of a survey of graduate students. Furthermore, as a measure of writing success in research students who receive supervisor's comments on thesis drafts, productivity probably assumes a certain minimum level of quality. Second, productivity may be more appropriate than text quality as a measure of thesis writing competence. Research suggests that PhD failure, in the U.K. at least, occurs far more often as a result of failure to submit due to slow progress than through rejection of a thesis on the grounds of unacceptably low writing quality (Rudd 1984).

### Sample

The questionnaire was sent by post to 228 full-time U.K. domiciled social science research students at ten different British universities between October, 1989 and January, 1990. We received 110 responses of which nine were discarded because of incomplete data. This suggests a response rate of 44%. In reality, the rate may have been somewhat higher given that a number of questionnaires were likely to have been sent to out-of-date addresses obtained from university records.

The subjects were drawn from a broad range of social science disciplines,

broadly defined and including history and psychology. Thirty-six of the students were in their first year of study, 36 in their second year, and 29 in or beyond their third year. Forty of the students were female and 61 were male. Their ages varied between 20 and 56, with a median of 25 years. Some additional details of the sample can be found in Torrance, Thomas and Robinson (1992).

### *Analysis*

The data from the survey were analyzed in two stages. First, questions relating to writing strategy were cluster analyzed to identify groups of students who adopted approximately similar writing strategies. Second, productivity and the extent of problems with writing were compared between these strategy groups.

Cluster analysis is a data description technique (Everitt 1980) that can be used to identify groups of individuals, or “clusters”, on the basis of the similarity of, for example, their responses to a set of questions. Because no external criteria for allocation to a particular cluster are imposed, the composition of each cluster depends on patterns that exist within the data collected and not on a preconceived theoretical framework imposed by the researcher.

A measure of productivity was obtained by dividing the reported number of words by reported number of hours spent writing for each student. This measure is not directly comparable with either productivity measured in the publication rates of established academic writers (e.g., Kellogg 1986; Hartley and Branthwaite 1989) or with simple measures of fluency (the amount of text of any quality that can be produced in a given period of time). However, productivity calculated in this way would seem to give a reasonable indication of how smoothly the students writing is progressing whilst taking account of variation in the total amount of text produced at different times during a research degree programme.

## **Results**

### *Writing strategies*

The best solution to an agglomerative, hierarchical cluster analysis of the students' responses to the strategy questions in Tables 1–4 identified three distinct groups of 36, 30 and 35 students. This solution was selected because it gave a small number of clusters of roughly equal size. There were no serious competitors to the solution that we present. The responses of the three groups of students to the writing strategy questions are also presented in Tables 1–4.

Table 1 shows that several writing activities were common to members of all three clusters. Some form of written outline, for example, was reported by the majority of students in all three clusters. Almost all the students also wrote rough drafts that they subsequently revised. Perhaps more surprising were the relatively



large numbers of students in each cluster who reported using techniques such as mind-mapping for organizing content prior to writing.

The statistically significant differences between the clusters centred around two factors; first, the stage in the writing process at which students preferred to make content and structure decisions (Table 2) and second, the number of drafts written in producing a piece of text (Table 1). Of the 36 members of the first cluster, 26 (72%) stated that they preferred to have their ideas clear before starting to write (Table 2). They tended to write fewer drafts than the members of the other two clusters (Table 1), and only eight students in this group (22%) reported that a main reason for revising was changing content (Table 4). We will describe these students as “Planners”.

Of the 30 members of the second cluster, only eight (27%) stated that they preferred to plan content before starting to write (Table 2). Of the remaining 22 (73%), 9 (30%) gave developing content as their main reason for revising (see Table 4). Members of this cluster were significantly more likely than other groups to report that writing clarified their understanding of their own arguments (Table 3). They also tended to write more drafts than the Planners (Table 1). Although students in this cluster varied somewhat in the activities they engaged in, most used the act of writing as means of developing or changing ideas. We will describe these writers as “Revisers”.

Like the planners, twenty-two (63%) of the 35 members of the third cluster reported that they preferred to plan content before producing full text (Table 2). There was, however, a greater tendency for these students to plan ideas without planning structure. Unlike the planners, students in this cluster were also likely to report that they developed content when they revised (Table 4); seventeen (49%) out of the whole group, and 11 (50%) of those students who preferred to plan content before producing text, reported this as a main reason for revising. Members of this cluster tended to write more drafts than even the Revisers, but were less likely than the Revisers to report that writing helped them understand their own arguments. We will call this group the “Mixed Strategy” writers.

### *Writing strategies and productivity*

Retrospective self reports of writing productivity were employed although they suffer from some limitations. Response biases and simple difficulty in recalling amount of text written and time spent working are likely to introduce considerable error into retrospective estimates. For these reasons the absolute values reported by the students should be interpreted cautiously. Nevertheless, variations of this sort can reasonably be assumed to be present to the same extent in all three clusters. Therefore, we would argue that measures of writing performance obtained in this way can be useful as a means of making comparisons across the groups (see also Torrance, Thomas and Robinson, 1993). A further consideration was that alternatives to retrospective self report (such as direct observation of writing behaviour) would have been difficult to implement and so disruptive of research

students' normal working conditions that their validity would have been questionable.

In terms of these self report measures there were both similarities and differences among the three clusters in the writing productivity of students, and in their experiences of writing. There was no significant differences among the three clusters in the year of study, gender or age of the members. Word processor use was also approximately similar in all three groups. The majority of students in all three groups reported having done some thesis related writing in the three months prior to receiving the questionnaire with no significant differences among the three clusters (27 of the 36 Planners, 24 of the 30 Revisers and 33 of the 35 Mixed Strategy writers). The mean reported number of words written in the three months prior to receiving the questionnaire was 17800 across all three groups, with a standard deviation of 26500, suggesting a wide variation among the students in the amount of text that they had produced. This variation was expected because the demands of mean that amount of text produced fluctuates considerably from month to month. The differences among groups in the mean number of words written by those students who had done some writing were not statistically significant.

Although the groups did not differ significantly in total output, their productivity – measured in mean number of words written per hour – did differ significantly (Kruskall-Wallis one-way ANOVA by rank, chi-squared = 6.8,  $p = 0.03$ ). The actual productivity values were: Planners = 335 words per hour, s.d. = 235; Revisers = 216 words per hour, s.d. = 182; Mixed Strategy writers = 180 words per hour, s.d. = 126. Productivity was significantly greater for Planners than for the other two groups (Mann-Whitney  $U = 317$ , two-tailed  $p < 0.05$ ). There was no significant difference in productivity between the Revisers and the Mixed Strategy Writers.

Table 5 details the students' responses to questionnaire items concerning experiences of writing in general. (These responses were not included in the analysis to identify the three clusters.) The Mixed strategy writers were more likely than members of the other two groups to state that worry about writing prevented them from getting down to actually doing some. They were also more likely to see writing related difficulties as jeopardising the completion of their PhD's. There were, however, no significant differences among the clusters in enjoyment of writing, how stressful the students found the writing process, and how satisfied they were with the finished product.

There were no significant differences among the groups in the students' enjoyment of producing their last substantial piece of text, nor in how satisfied they were with the finished product. There were, however, significant differences among the groups in how difficult they had found the writing process (one-way ANOVA,  $F(2.98) = 3.77$ ,  $p = 0.03$ ). The mean scores on a scale from 1 = very difficult to 5 = not at all difficult were 3.03 (s.d. = 1.0) for the Planners; 2.6 (s.d. = 1.2) for the Revisers and 2.4 (s.d. = 0.9) for the Mixed Strategy Writers. Post hoc tests (Newman-Keuls,  $p < 0.05$ ) suggested that the Planners found writing significantly less difficult than did the Mixed Strategy Writers, but not significantly less difficult than did the Revisers.

## Discussion

The 44% response rate to the survey requires some comment. This response rate was rather better than that achieved for similar surveys of the writing behaviour of university academic staff (Hartley and Knapper 1984; Lowenthal and Wason 1977). We have no information about the non-respondents in our study, but Hartley and Knapper were able to determine from annual reports that the respondents to their survey of publishing psychologists were significantly more productive in terms of publications than were non-respondents. The sample in present survey may, therefore, be biased in favour of more conscientious and successful students. This presumption is consistent with the relatively high proportion (over 50%) of the actual sample reporting that they gain pleasure from writing. It should also be noted that the sample consisted only of students who were studying for research degrees in the social sciences. It is possible that our results do not generalise to the writing of arts or natural science theses.

Our cluster analysis identified three groups of writers who differed in some of the strategies that they adopted when writing, and we discuss these differences below. There were, however, some striking similarities in the writing related behaviour of the three groups. It is to be expected that taking notes from literature, writing drafts and revising should be reported by most students regardless of their writing strategy. The relatively large number in all three groups who reported using techniques for finding and organizing content prior to composing was more surprising. It would be of interest to know how frequently these techniques (brainstorming, mind-mapping, outlining) are actually used given that a recent study of examination essay writing has suggested that more undergraduate students claim to prepare written outlines for their essay answers than actually do so in an exam (Torrance, Thomas and Robinson 1991). It would also be useful to know why these techniques seem to be so popular (are they widely taught in schools?), and to discover whether they are as commonly used by more experienced academic writers as they seem to be by students.

The replies to our questions about the aims of revising also require comment. It is perhaps to be expected that many of the respondents should give improving clarity, correcting errors and improving style as aims of revision. Such aims are reported by both expert and inexperienced writers alike (see Sommers 1980) and are unlikely to discriminate between writers using different strategies. We expected, and the data confirmed, that using revision to change content might be a more sensitive marker for writing strategy (see below). Sommers (1980) has reported that using revision to develop thinking (and thus content) distinguishes experienced from inexperienced college level writers. Unfortunately, in the replies to our question we were unable to distinguish those for whom the act of revising had engendered content changes from those who used revision to make changes to content demanded by their supervisors. Nevertheless, the replies to this question do provide an indication of how successful initial planning of the text had been.

The factors that distinguish the three clusters of students centre on the point at which content decisions are taken and the use made of revision. We have

characterised these three groups as Planners, Revisers and Mixed Strategy writers. The Planners preferred to decide content at the beginning of the writing process and subsequently made few content related changes. The Revisers preferred not to decide content in advance of writing but tended to develop content as they wrote. The Mixed Strategy writers attempted to decide content in advance of writing, then changed content during subsequent revisions. These descriptions suggest greater homogeneity within the groups than actually existed, and it may have been that classification into only three clusters masked some more subtle distinctions. However, within each cluster sufficient numbers of students used the writing strategies that we have identified as typical of the cluster to suggest that differences in writing success among the clusters may be related to writing strategy.

We found significant differences among the three clusters both in how problematic the students found thesis writing to be and in their productivity. It is possible that the relative success of the Planners resulted directly from the think-then-write strategy that they tended to adopt. There is some experimental evidence to suggest that producing a written outline of content, or content and structure, before starting to write full text can sometimes have a positive effect both on productivity (Kellogg 1990) and on text quality (Kellogg 1987; Glynn et al. 1982). If this effect generalises from the production of written outlines to the mental planning of structure and content before starting to write, then it goes some way towards explaining the success of the Planners in our sample.

However, findings relating to the other two groups in our sample suggest that deciding content before starting to write, helpful though it may be, is neither a necessary nor sufficient condition for writing success. The Revisers, despite being less productive than the Planners, were no more likely to see writing difficulties as a threat to the completion of their theses. This was despite the fact that the Revisers tended not to plan content prior to writing. Conversely the Mixed Strategy writers, 63% of whom preferred to plan content before starting to write (compared with 72% of Planners and 27% of Revisers), were less productive than the Planners and were more likely to see writing difficulties as a threat to completing their theses.

There are possible parallels between the present findings on strategy effectiveness and those of Hartley and Branthwaite (1989). In some respects the Planners in our study resembled Hartley and Branthwaite's Doers (characterised by few drafts and high productivity), while the Revisers resembled Hartley and Branthwaite's Thinkers (many drafts and lower productivity than the Doers).

The existence of a statistical relationship between writing strategy and writing success does not, of course, necessarily imply that they are causally related. It may be that writing strategy itself results from factors associated with the nature of the writing task and the ability of the writer; factors that could also account for the observed differences in productivity. With this in mind, a more comprehensive way of accounting for the differences in writing success among the three clusters may be to see productivity as determined by an interaction between the strategy that the writer adopts and a combination of the demands of the writing task and the individual characteristics of the writer.

It is probably true that some strategies lend themselves to some writing tasks

better than others. Strategies that are appropriate when communicating well rehearsed content within a generally accepted rhetorical framework may well be very different from the strategies needed when writing a more creative or discursive piece. It is also probable that, for reasons associated with individual differences in memory or in cognitive style (e.g., Hudson 1968), writers vary in the ease with which they can implement different strategies. Our own experience of giving writing instruction to graduate students suggests that some find great difficulty in putting into practice one or other of the detailed planning or multiple drafting techniques (Torrance, Thomas and Robinson 1993). It is possible, therefore, that both the Planners and Revisers in our sample adopted strategies that were appropriate in light of the demands of the writing tasks with which they were faced and/or their abilities. The strategies adopted by the mixed strategy writers, however, unlike the strategies of the other two groups, appear to have been genuinely ineffective. These students approached the writing task in a way that is appropriate if there is to be little recursion in the rest of the writing process; the majority preferred to plan at least their ideas before starting to write. However, they also reported producing a relatively large number of drafts and that they changed content when they revised. This lapse into more recursive writing, may or may not have resulted from a conscious decision by the writer. In either case, however, it suggests that the plans that were developed at the beginning of the writing process were not sufficiently well developed to form the basis of an acceptable text. More specifically, their plans may have been inadequate in that they tended to specify ideas to be included within the text, but not how the text was to be structured. There is some evidence that this strategy is less effective than producing a full, sequenced outline (Kellogg 1990).

To have been successful, therefore, these writers would have needed either to plan with greater thoroughness before starting to write, or to intentionally adopt a think-write-revise strategy in which less attention is given to a plan. Persevering with the production of drafts based upon inadequately specified or inappropriate plans will, inevitably, prolong the writing process.

It is not, perhaps, surprising that some of the students in our sample should display problems of this sort. When strategy choice is addressed in writing instruction in the U.K. it almost invariably includes directions to "write a plan". However, a detailed account of how a plan should be constructed or what it should include is rarely offered. It is also rare for "think-while-you-write" strategies to be suggested as possible alternatives. Given this, it is probable that some students will attempt to sort out their ideas by producing a plan because they have been instructed to do so, and not because they have, personally, found this to be an effective writing strategy. This may, in part, explain the somewhat confused behaviour of the Mixed Strategy writers in our sample. Students like the Mixed Strategy writers may, therefore, be particularly helped by instruction that introduces them to a range of writing strategies from which each student can select those that he or she finds works for them.

In conclusion, therefore, our results suggest that both think-then-write and think-while-you-write strategies have utility in the context of academic writing. Whilst

the think-while-you-write strategy appears to be a slower approach to text production (see also Kellogg 1987; Hartley and Branthwaite 1989) it may be effective in circumstance where a think-then-write strategy is inappropriate, because of the nature and complexity of the writing task or the particular cognitive style of the writer.

Clearly, more research is needed to investigate the relationship between strategy and success in academic writing. This research should consider individual differences in cognitive style, memory capacity, and in rhetoric and content knowledge, and also differences in the nature of the writing task as constraints on strategy choice. Exploring the intricacies of the different strategies that writers adopt probably requires the use of research tools other than, or in addition to, questionnaires. The use, for example, of writing diaries and analysis of what students produce when writing (both plans and drafts) would alleviate some of the problems with both identifying strategy and determining productivity which we encountered in the present study. In particular, there is need for a clearer understanding of, for example, what it means to revise or what constitutes a “draft”, for more precise measures of productivity, and for assessment of the quality of the text that is produced. Until more data are available that throw light on these relationships, instruction on academic writing at a graduate level should not be too prescriptive. It should allow for variations in approach, and both plan- and rough draft-based writing strategies should be taught.

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