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# Patterns of Cognitive Self-Regulation of Adolescent Struggling Writers

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## Abstract

This study examines the relationship between patterns of cognitive self-regulatory activities and the quality of texts produced by adolescent struggling writers ( $N = 51$ ). A think-aloud study was conducted involving analyses of self-regulatory activities concerning planning, formulating, monitoring, revising, and evaluating. The study shows that the writing processes of adolescent struggling writers have much in common with “knowledge telling” as defined by Bereiter and Scardamalia (1987). Nevertheless, there are interesting differences among the individual patterns. First, it appears that adolescent struggling writers who put more effort in planning and formulation succeed in writing better texts than do their peers. Furthermore, self-regulation of these better-achieving writers is quite varied in comparison to the others. Therefore, it seems that within this group of struggling writers, self-regulation does make a difference for the quality of texts produced. Consequently, some recommendations can be made for the stimulation of diverse self-regulatory activities in writing education for this special group of students.

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Learning to write well is a necessity for young people (Graham & Perin, 2007). Along with reading comprehension, writing skill is an important factor for academic and professional success and a basic requirement for participation in the current information society. Yet, studies in a range of countries have signaled that many adolescents struggle with literacy and that large numbers of adolescents are unable to write at the levels required by the school curriculum and future employers (Alliance for Excellent Education, 2006; Baumert et al., 2001; Hofman, Spijkerboer, & Timmermans, 2009; Inspectie van het Onderwijs, 2008; Organization for Economic Cooperation and Development, 2003). A great deal of research has focused on writing processes (Alexander, Graham, & Harris, 1998; Bereiter & Scardamalia, 1987; Englert, Raphael, Fear, & Anderson, 1988; Graham, 2006; Hayes & Flower, 1980; McCutchen, 1995). Nevertheless, few studies focus on adolescent writers with poor writing skills (Juzwik et al., 2006). Consequently, there is little understanding of what differences within this group of struggling writers exist and whether differences in approaching writing are related to differences in the quality of writing. In this study, we explore frequencies and patterns of cognitive self-regulatory activities in relation to the quality of the text produced. We focus on the cognitive aspects of self-regulation, as it is an important element of writing and studies have shown that writers need to employ a diversity of cognitive self-regulatory activities (Bereiter & Scardamalia, 1987; Englert et al., 1988; Graham & Harris, 2000). This study not only makes a contribution to the literature on writing processes and the role of cognitive self-regulation but also offers insights in designing educational interventions to improve the writing of struggling adolescent writers.

**Cognitive Self-Regulation**

Writing is commonly viewed as a difficult and demanding problem-solving task requiring skills of text production (handwriting and spelling), knowledge of genres and writing conventions, and extensive self-regulation to manage the writing environment, the constraints imposed by the writing task, and the processes involved in composing (Graham & Harris, 2000). Particularly, the writing models of Hayes and Flower (1980) and Bereiter and Scardamalia (1987) emphasize the cognitive and self-regulatory aspects

of composing. Hayes and Flower, for instance, noted that “a great part of the skill in writing is the ability to monitor and direct one’s own composing process” (p. 39). Cognitive processes are the mental operations employed during writing, and they are divided into the subprocesses of planning, formulating, and reviewing. Writers monitor these subprocesses and decide when to go from one to the other (Hayes, 1996; Hayes & Flower, 1980). The strategies for executing and coordinating writing processes are referred to as cognitive self-regulation (Torrance, Fidalgo, & Garcia, 2007; Zimmerman & Risemberg, 1997). From the existing studies on self-regulation, a variety of cognitive self-regulatory activities have been identified that writers use for planning (establishing goals, selecting and organizing contents), formulation (translation of ideas into language), monitoring (checking whether writing goals are met), reviewing (checking the text produced so far), revising (modifying text), and evaluating (assessing the quality of the text written; Graham & Harris, 2000).

In addition, writing is commonly viewed as a recursive process in which writers monitor the success of activities conducted and continuously modify what they are doing, based on the outcome of this process. Van den Bergh and Rijlaarsdam (1999) emphasize that the different self-regulation activities do not occur in a random order. The authors stress that the nature of the writing process depends on how text composing proceeds and that different types of self-regulation are dominant during different stages of the writing process. They found that writers who planned in the beginning of their writing process wrote better texts than those who planned at later moments in the writing process. In studying writing processes, it is therefore important to examine not only the type and frequencies of self-regulatory activities but also the moment and distribution of the different types of self-regulation over the writing processes. In this light, it is informative to look at sequential patterns of self-regulatory activities next to exploring the frequency of separate processes.

## **Differences Between Less and More Proficient Writers**

A great deal of research has been done regarding writing processes and texts produced by writers of diverging proficiency. Some studies were directed to the comparison of novice and expert writers (Bereiter & Scardamalia, 1987; Graham, 2006; Sitko, 1998). Other studies focused on specific grades or age groups and compared the writing processes and products of peers with lower and higher writing proficiency (Graham, Schwartz, & MacArthur, 1993;

van den Bergh & Rijlaarsdam, 1999; van Gelderen, 1997). Still other studies focused on individuals with high writing proficiency, identified as expert or professional writers (Hayes & Flower, 1980; Ransdell & Levy, 1996; Wellington, 2010), or writers with low writing proficiency, referring to struggling or disabled writers (De La Paz, Swanson, & Graham, 1998; Englert et al., 1988; Graham, 1997).

From these different types of studies three general tendencies are visible. First, proficient writers (in both same-age and different-age comparisons) know more about aspects of writing than do less proficient writers. They know more about the topics they are writing about (Kellogg, 1987), have more knowledge about genres and writing conventions (Englert et al., 1988; Graham et al., 1993; McCutchen, 1986), and know more about the use of language as a symbol system, including spelling, grammar, and punctuation (Applebee, Langer, Jenkins, Mullis, & Foertsch, 1990). Some researchers also argue that linguistic fluency (i.e., lexical and grammatical fluency) reduces the cognitive load associated with formulation, allowing writers to spend more attention to text quality (van Gelderen & Oostdam, 2005; van Gelderen, Oostdam, & van Schooten, 2011) and produce longer stretches of language without pausing (Chenoweth & Hayes, 2003; Hayes & Chenoweth, 2007).

Second, developing writers become more self-regulated with age and schooling. Older writers are more experienced and competent in writing than younger ones, resulting in a more extensive repertoire of self-regulative strategies and knowledge about writing and an increase in self-regulatory activities. As writers gain competence, both quantitative and qualitative shifts are observed. Self-regulatory activities that were initially inefficient are refined to make them more effective (Alexander et al., 1998). Furthermore, some studies suggest that the use of self-regulatory control directed at lower-level aspects of task execution declines because these lower-level activities are becoming automatized, whereas the use of other self-regulatory activities increases as a result of the increase in complexity and difficulty of tasks (Alexander et al., 1998).

Third, individual differences in self-regulation are related to individual differences in the quality of the text written. Writers with fewer self-regulatory activities typically produce texts of poorer quality than do more self-regulated writers (Bereiter & Scardamalia, 1987; Braaksma, Rijlaarsdam, van den Bergh, & van Hout-Wolters, 2004; Graham et al., 1993). Differences were primarily found in the activities of planning and revision. More proficient writers devote more attention to planning their writing. They plan not

only what they write but also how to write it, establish goals for writing, organize ideas, and consider the needs of the intended readers. For less proficient writers, it is not uncommon to start writing immediately or to spend little time on planning (Bereiter & Scardamalia, 1987; McCutchen, 1995). When these writers are prompted to plan, their plans are limited. Like planning, revision plays a limited role in the writing process of less proficient writers. More proficient writers (in both same-age and cross-age comparisons) revise for meaning and make sentence- and topic-related changes, whereas the revisions of less proficient writers are limited to lower-level aspects, such as spelling and grammar (van Gelderen, 1997).

The writing of less proficient writers is often characterized by the model of knowledge telling (Bereiter & Scardamalia, 1987). Knowledge telling basically involves retrieving content relevant to the topic from long-term memory and writing it down (Harris et al., 2009). In the stage of generating and formulating ideas, little attention is directed to rhetorical goals, constraints imposed by the assignment, needs of intended readers, or text organization. This is not to say that this knowledge-telling process is thoughtless. Rather, it is primarily forward moving with little recursive interplay among writing processes observed with proficient writers (Graham & Harris, 2000; Hayes & Flower, 1980).

It seems likely that the writing processes of adolescent struggling writers show much similarity to the knowledge-telling process. This expectation is largely based on research directed at rather heterogeneous populations in terms of age and proficiency. Consequently, there is little in-depth understanding of differences in self-regulative activities employed *within* the group of adolescent struggling writers. Therefore, it is also not clear whether there are differences within this group of writers that are related to differential quality of their writing. If so, it is of interest to know which self-regulated activities are used by writers who write texts of better quality and whether these differences are limited to activities directed to planning and revision or they also involve other self-regulatory activities (directed to formulation, monitoring, or evaluation). Most studies have focused only on planning and revision.

This study aims at the relationship between the frequency of cognitive self-regulatory activities and the quality of texts produced by adolescent struggling writers. In addition, it explores the sequential patterns of cognitive self-regulation activities of these writers that are related to the quality of their performance.

## Research Questions

The following questions were studied:

1. Which cognitive self-regulation activities are adolescent struggling writers most frequently engaged in prior to and during text production?
2. What are the relationships between frequency of different cognitive self-regulation activities and text quality for adolescent struggling writers?
3. What sequential patterns of cognitive self-regulation discriminate adolescent struggling writers who write texts of highest, average, and lowest quality?

We are particularly interested in the degree to which the cognitive self-regulation activities of these adolescent struggling writers reveal signs of knowledge telling, as described above, and whether there are differences among these students as related to the quality of texts they produce (e.g., in frequency of planning or revision activities or the timing of these activities in relation to other types of cognitive self-regulation).

## Method

### *Participants*

Adolescent struggling writers in this study were Dutch students in the lowest 30th percentile of general academic skills as measured by an academic aptitude test (language, reading, and mathematics) taken prior to admission of secondary education. In the Netherlands, these struggling writers are enrolled in the lowest tracks of prevocational secondary education. The study involved a sample of 51 students (22 girls and 29 boys) from 10 eighth-grade classes from nine ethnically mixed schools in the lowest track of secondary prevocational education in the Netherlands. The students were between 13 and 15 years old ( $M = 14.7$ ). Students diagnosed with a learning or behavioral disorder (e.g., dyslexia, attention-deficit/hyperactivity disorder) were not included in our sample, to ascertain that cognitive self-regulation patterns observed were related to poor writing proficiency per se and not to these specific behavioral disorders.

### *Writing Assignment*

For the investigation of cognitive self-regulation, a think-aloud study was conducted that involved the detailed analysis of videotapes of students

executing a writing assignment. This assignment involved a task quite representative of tasks in the school curriculum of these students. The assignment consisted of a text and a writing task in which students were asked to express their opinion by writing a piece for the school paper. The text was designed according to the principles of good study texts (Land, Sanders, & van den Bergh, 2008): involving a current topic, appealing to the interests of boys and girls, and including facts and figures (photographs and map). The text was a newspaper article about the war in Afghanistan in which special attention was given to the nature and state of the Dutch military mission in the province of Uruzgan in Afghanistan.

Each student wrote a text with think-aloud instruction. Prior to the experiment, all students received a think-aloud instruction. To clarify, a short demonstration was shown in which a young man reads another newspaper article and verbalizes what he is doing and thinking. When students kept silent for more than 5 seconds, the experimenter encouraged them to report their thoughts. Prompting to think aloud was hardly necessary, because students rarely fell silent. In providing feedback, the experimenter avoided steering or influencing the course of the reading and writing process. Each student wrote a persuasive text about the continuation or ending of the Dutch military mission in Afghanistan. Students were allowed to use the newspaper article, a dictionary, and scratch pad. In addition, they were told that they were completely free in how they wanted to proceed, what to do first, and what means to use. The students were told that we were interested in their usual approach toward such writing assignments for school. Students could take as much time as they wanted to complete the task. All sessions were individual and took place in scheduled hours during a school day. The average length of the texts produced was 50 words ( $SD = 24$ ). The complete writing process lasted 285 seconds on average ( $SD = 156$ ), of which the stage before text writing lasted 78 seconds on average ( $SD = 59$ ) and the stage during text writing lasted 208 seconds on average ( $SD = 128$ ).

### Scoring and Analyses

The complete writing process was registered using videotapes and subsequently analyzed using codes for each indicator of self-regulatory activity that was audible or visible. A scheme was developed describing all of these indicators of self-regulation. The indicators of self-regulation included both verbalized behavior (e.g., "I see that my text does not consist of 10 lines") and nonverbalized behavior (e.g., watching the pictures in the newspaper article or using the dictionary). For coding, the writing process was divided into two stages: (1) self-regulation indicators displayed before the stage of

actual text production (e.g., reading the assignment or asking questions about it) and (2) self-regulation indicators displayed from the moment that the writer started writing. The coding scheme was inspired by previous analyses of writing processes, such as those of McCutchen (1995) and van den Bergh and Rijlaarsdam (1999). In addition, we carried out a pilot study among 10 adolescent struggling writers who did not participate in the present study to track down specific indicators of self-regulatory activities that may occur in the specific assignment used (e.g., reading the assignment, forming an opinion, consultation of newspaper article, rereading text fragment). All of these indicators were added to our coding scheme to ensure a full coverage of all occurring self-regulative activities. First, we coded all activities in categories that described them as literally as possible, as in the examples given above. Verbal activities were scored on the utterance level (each complete utterance was scored as one instance of an activity); nonverbal activities were scored as one complete instance. Second, we attached labels to the specific activities, representing more general processes of self-regulation (planning, formulating, monitoring, revising, and evaluating). To reconstruct a complete overview of all writing activities, two codes were added to the scheme. First, the code *silence* was included for the moments in which students fell silent for more than 3 seconds. Second, the code *transcription* was included when students were transcribing the text on paper. These codes indicate activities of the writer that are not directly regarded as cognitive self-regulation but are useful for reconstructing the sequential nature and patterns of self-regulatory activities. By coding transcription, it was possible to analyze how often text production was interrupted by self-regulatory activities, which is an important indicator for the degree to which knowledge-telling processes occur. Overviews and examples of the codes are displayed in Tables 1 and 2. The videotapes of 10 students were coded by two independent trained research assistants. The agreement was fairly high. For the indicators of self-regulation, silence, and transcription, 89% were identically coded. Differences in coding were resolved after discussion.

For the evaluation of text quality, we used a method based on primary trait analysis (Lloyd-Jones, 1977). Primary trait analysis enables a holistic view of text quality derived from the objective stated in the writing assignment under investigation. This method probably alleviates problems with the holistic scoring of writing products, such as low construct validity, low interrater reliability, sequencing effects, and stability (Tedick & Mathison, 1995). First, a primary trait was defined describing the ideal text in regard to goal orientation, structure and organization, audience orientation, and language and style. Next, we constructed a 5-point interval scale consisting of five texts selected



from all texts produced, adopting a procedure described in Blok (1986) and applied in van Gelderen et al. (2011). Every text received a score on the primary trait by comparison to the five texts, forming a “ruler” with fixed scores of 10, 25, 50, 75, and 90. Two trained research assistants marked all texts independently. The correlation between the scores of raters was high (.91). In the final rating (the mean of the scores of the two raters), scores ranged between 4.5 and 95.5. The average score was 36.1 ( $SD = 24.7$ ). Figure 1 presents English translations of the texts with the highest (Text 1), average (Text 2), and lowest (Text 3) scores. These examples illustrate the writing ability of the adolescent struggling writers in our sample and give an impression of the differences that exists among them.

## Results

### *Self-Regulation in the Stage of Prewriting*

We first examined the types and frequencies of all indicators of cognitive self-regulation observed prior to text production. The types of indicators coded in this stage of task execution, as well as their frequency, range, and mean, are presented in Table 1.

Table 1 shows that from the 313 self-regulatory indicators before writing, 302 were directed to planning. The most frequent planning indicator was *forming of opinion*. The number of indicators for *forming of opinion* ranges from 0 to 14, meaning that at least one student did not show any indication of *forming of opinion* whereas at least one student did so 14 times. The mean number of *forming of opinion* equals 3.0. Furthermore, Table 1 shows that the different types of self-regulatory indicators are not equally frequent in the prewriting stage; *reading assignment*, *informing about the task purpose*, and *local planning of the writing process* were clearly more frequent than the other planning indicators. Relatively few indicators were found that students planned the writing process in a more advanced way by orientation on the organization of the text, the type of discourse, the medium for publication, or the needs of intended readers. These findings indicate that the students were primarily generating ideas and orienting on what to write down next. Additionally, Table 1 shows that few indicators of monitoring were found. Monitoring became manifest by utterances of (in)comprehension, comments on own task execution, and asking for feedback.

**Table 1.** Self-Regulatory Indicators in the Prewriting Stage ( $N = 51$ )

	Frequency	Range	$M$ ( $SD$ )
Planning	302	0-17	5.8 (4.0)
Forming of opinion (e.g., "I think it is up to the soldiers whether they want to risk their lives for the people in Afghanistan")	156	0-14	3.0 (3.7)
Reading assignment	58	0-3	1.12 (.6)
Informing task purpose (e.g., "Do I have to write a text on my opinion?")	36	0-3	0.69 (0.9)
Local planning writing process (e.g., "First, I am going to read the assignment")	33	0-3	0.60 (0.9)
Planning text structure (e.g., "Because this is a school paper article, I start with a heading and the place-name, and then I give my opinion")	5	0-3	0.10 (0.5)
Commenting on task (e.g., "I execute such writing tasks not so often")	4	0-2	0.08 (0.3)
Activating prior knowledge (e.g., "Usually, these texts start with a heading")	3	0-3	0.06 (0.4)
Exploring pictures newspaper	3	0-3	0.06 (0.4)
Goal setting (e.g., "Thus, I have to write a text on my opinion about the Dutch military mission in Afghanistan")	3	0-1	0.06 (0.2)
Exploring task quickly	2	0-1	0.04 (0.2)
Exploring newspaper quickly	1	0-1	0.02 (0.1)
Monitoring	9	0-3	0.17 (0.6)
Utterance of (in)comprehension assignment (e.g., "Okay, I understand")	5	0-3	0.10 (0.5)
Commenting on own task execution (e.g., "This is what I can think of right now, maybe I will think of more during writing")	3	0-2	0.06 (0.3)
Asking for feedback on activities performed (e.g., "Did I skip anything?")	1	0-1	0.02 (0.1)
Total	313	0-18	6.08 (4.3)
Other indicator			
Being silent	9	0-2	0.17 (0.4)

### *Self-Regulation in the Stage of Text Production*

Table 2 shows the descriptive statistics for all indicators of self-regulation (as well as the episodes in which students fell silent or were busy transcribing) coded during text production—that is, after students started composing their first sentence.

**Table 2.** Self-Regulatory Indicators in the Text Production Stage ( $N = 51$ )

	Frequency	Range	$M$ ( $SD$ )
Planning	135	0-20	2.6 (3.7)
Forming of opinion (e.g., "I think that whether the soldiers should stay or leave depends on what they have accomplished so far" or "I think that the soldiers should stay in Uruzgan, because they should protect the innocent people of Afghanistan")	97	0-18	1.9 (3.2)
Consulting newspaper article	14	0-2	0.27 (0.5)
Questioning goal of the task (e.g., "Do I need to write more than this?")	6	0-2	0.12 (0.4)
Reading newspaper article	6	0-3	0.12 (0.5)
Examination of pictures in newspaper article	4	0-1	0.08 (0.3)
Reading the assignment	3	0-1	0.06 (0.2)
Planning of text structure (e.g., "I start this text with a title")	3	0-2	0.06 (0.3)
Planning of the writing process (e.g., "Shall I write this down here already?")	1	0-1	0.02 (0.1)
Prior knowledge activation (e.g., "I think of Afghanistan, of what I can write about it")	1	0-1	0.02 (0.1)
Formulation	33	0-5	0.63 (1.1)
Translating ideas into language (e.g., "The Dutch people, oh no I need to say the Dutch troops")	23	0-5	0.45 (1.0)
Consultation of orthography in dictionary or newspaper article	10	0-1	0.19 (0.4)
Monitoring	88	0-7	1.7 (1.9)
Rereading own text	35	0-5	0.67 (1.0)
Commenting on writing process (e.g., "I do not know what I can write apart from this")	28	0-3	0.54 (0.9)
Asking for feedback on activities performed (e.g., "I need to say 'fighting,' isn't it?")	8	0-2	0.15 (0.5)
Asking for help or explanations (e.g., "Is this one sentence or do I need to split it up?")	4	0-2	0.08 (0.3)
Signaling (in)comprehension of the assignment (e.g., "Um, wait a minute I read it again")	4	0-1	0.08 (0.3)
Counting the number of lines own text	2	0-1	0.04 (0.2)
Signaling (in)comprehension own text (e.g., "I need to read it again because I do not understand what I have written")	2	0-1	0.04 (0.2)

*(continued)*

**Table 2. (continued)**

	Frequency	Range	<i>M</i> ( <i>SD</i> )
Signaling (in)comprehension newspaper article (e.g., "Um, 'dilemma' refers to the choice of the soldiers to stay or leave")	1	0-1	0.02 (0.1)
Revision	18	0-3	0.35 (0.7)
Revisions on word or sentence level (local)	14	0-2	0.27 (0.6)
Revisions on a more global level	4	0-1	0.08 (0.3)
Evaluation	54	0-3	1.04 (0.7)
Commenting on own text (e.g., "Um, I am something forgotten")	48	0-3	0.92 (0.7)
Commenting on assignment (e.g., "It looks like a language game")	3	0-2	0.06 (0.3)
Commenting newspaper article (e.g., "The newspaper article contained few difficult words")	3	0-1	0.06 (0.2)
Total indicators of self-regulation	328	0-27	10.25 (6.3)
Other indicators			
Transcribing text	175	1-9	3.50 (2.0)
Copying draft text	1	0-1	0.02 (0.1)
Being silent	54	0-6	1.04 (1.3)

Table 2 shows that indicators of planning were the most frequent. In this stage, the planning indicators consisted mainly of activities that we can assume to be directed to content generation (forming of opinion, consultation of the newspaper article, reading parts of the newspaper article, and examination of the pictures in the newspaper article). Occasionally, the assignment was reread, or there were indicators of planning the text structure. Table 2 also shows that we found some indicators of self-regulation directed to formulation (translating ideas into language and consultation of sources for orthography). Several students used the newspaper article to find out how to write "Afghanistan" correctly, for example. Table 2 shows that few indicators of monitoring were found. Monitoring processes during writing were manifested by rereading the text written so far and by commenting on the writing process. With regard to revision, Table 2 shows that indicators of revision were also quite rare. When they are found, they consisted of local revisions directed to a word or, at most, a sentence. Revisions on a global level were rarely found. Indicators of evaluation were less rare than indicators of revision, but they were brief. Evaluation was directed to the text as a whole, and it expressed that the writers were satisfied with the result.

<p>Text 1 - Best Achieving (95.5 points)</p> <p><b><i>Neverending war ...</i></b></p> <p><i>For many years Afghanistan and America make war. When will this stop? When do you think when there will be peace between America and Afghanistan? And what about the Dutch people in Afghanistan? Despite that there are many people killed should they stay there or not? I think that the Dutch soldiers should return to The Netherlands, because the Afghan soldiers are capable to take care of the safety of their own citizens. What do you think? Send your response to us</i></p>	<p>Text 2 - Average Achieving (32 points)</p> <p><i>It is okay that they stay in Afghanistan, but it is also very dangerous there.</i></p> <p><i>It is okay that they stay there to help.</i></p> <p><i>But that they come home to be with their family and friends every period.</i></p>
	<p>Text 3 - Lowest Achieving (4 points)</p> <p><i>They should stayed, because it is going very miserable over there. it is the soldiers' own problem (choice)</i></p>

**Figure 1.** Translations from Dutch (including language errors) of the texts with the highest (Text 1), average (Text 2), and lowest quality scores (Text 3)

### Relationships With Text Quality

To answer the second research question, Pearson correlations were computed between text quality and the sum scores of the main self-regulatory processes. The results are reported in Table 3.

The results show that struggling writers that were more active in self-regulation of whatever sort composed texts of better quality ( $r = .37, p < .01$ ). If we look in more detail to the type of self-regulatory activities that make a difference, the results show that planning activities are associated with (or related to) the writing process of adolescent struggling writers ( $r = .36, p < .01$ ), particularly in the prewriting stage. Furthermore, a significant correlation exists between self-regulatory activities directed to formulation and text quality ( $r = .41, p < .01$ ) indicating that the more that students paid attention to problems of formulation (translating ideas into continuous language and attention to orthography), the better the quality of their texts. Finally, for monitoring, revision, and evaluation, correlations with text quality are of negligible magnitude. The findings indicate that within the group of

**Table 3.** Correlations of Indicators of Cognitive Self-Regulation With Text Quality ( $n = 51$ )

	Total	Prewriting	Text Production
All indicators of self-regulation	.37**	.26 <sup>a</sup>	.28*
Planning	.36**	.26 <sup>b</sup>	.21
Formulation			.41**
Monitoring	-.03	.06	-.02
Revision			-.00
Evaluation			-.09

<sup>a</sup> $p = .07$ .

<sup>b</sup> $p = .06$ .

\* $p < .05$ . \*\* $p < .01$ .

adolescent struggling writers, monitoring, revision, and evaluation are not related to text quality.

### *Patterns of Self-Regulation*

To shed light on the sequential patterns of the self-regulatory activities of these struggling writers (third research question), the patterns of the six best-, average-, and lowest-achieving writers ( $n = 18$ ) are visualized in Figure 2. In this figure, the transition from the prewriting stage to the stage of text production for each student is indicated by a bold vertical line.

The transcription episodes (T blocks) for each writer show when and how often text transcription was interrupted by self-regulatory activities (P, F, M, R, and E blocks) or silence (S blocks). If we assume that all struggling writers are engaged in knowledge-telling processes in the same degree, few interruptions for all sequential patterns would be expected. However, Figure 2 shows that such interruptions of transcription are frequent for most students. In fact, only the patterns of Hassan and Yussuf (both average achieving; pseudonyms) show a pattern of uninterrupted transcription without indications of cognitive self-regulation. The one T block in their pattern indicates that transcription of the whole text occurred without any interruption by other activities, such as reflecting about formulation, monitoring, or revising. If we compare the six writers who received the highest scores for text quality to the others, it appears that they not only show more self-regulation in the prewriting stage (mainly planning activities) but also transcribe their texts in

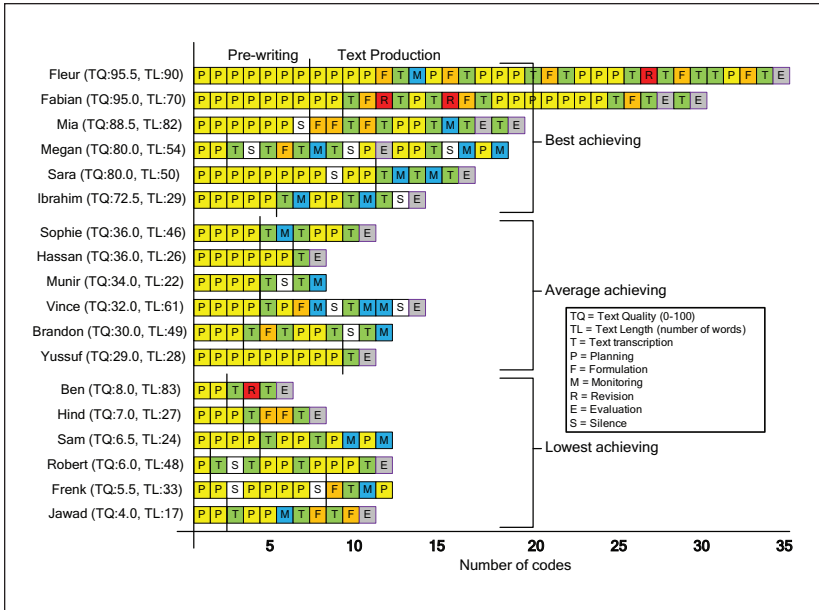


Figure 2. Patterns of self-regulation of 18 writers who obtained the highest, average, and lowest quality scores

separate blocks, which are interrupted by several self-regulatory activities directed to formulating, monitoring, revision, evaluating, or (again) planning. Most of these more successful writers transcribed their text in five or more transcription blocks. In contrast, the writing of the students with the average and lowest scores for text quality shows much less interruption of transcription. These writers have no more than two transcription episodes on average, suggesting that their writing mainly consists of knowledge-telling processes (idea generation and writing ideas down) without much consideration of linguistic, conceptual, or rhetorical issues.

In general, Figure 2 confirms our finding reported previously that the frequency of self-regulatory activities is positively related to text quality within this group of struggling writers: The best-achieving writers on average demonstrate much more self-regulatory activities than do the writers who produced texts of lower quality. More important, however, the patterns also suggest a difference between the average- and lowest-achieving students. While the average achievers show more indications of planning prior to text

production, the lowest achievers display more indications of planning *during* text production. This suggests that the lowest achievers might have started too early transcribing, with too little attention to what they actually wanted to communicate, forcing them to reconsider things after they already had produced a substantial part of their texts. For example, Sam and Robert were forced to generate new ideas after they already had written down ideas and were forced to plan anew in the midst of text production. In contrast, the average- and best-achieving students devoted more effort in planning before writing, presumably resulting in a more orderly writing process. This finding is comparable to results reported by van den Bergh and Rijlaarsdam (1999) with more proficient adolescent writers.

The patterns depicted in Figure 2 show no obvious differences among the three groups in self-regulation directed to monitoring. From our previous analyses, we already saw that all writers in this study showed few indications of monitoring. Likewise, all our writers showed little revision activity. Figure 2 shows that the few revision activities that occurred directly succeeded a transcription (or formulation) episode. This suggests that they were directed to local issues (e.g., lexicon or spelling) only and did not concern more global text characteristics (a suggestion confirmed by our direct observation of these episodes in the students' writing). Finally, Figure 2 shows that in almost all cases, evaluation was the last activity the students undertook. Inspection of these episodes showed that these evaluations were limited to the conclusion that students were satisfied with their text. Therefore, the evaluation activities of struggling writers examined here can be characterized as quite superficial and without consequence. The lack of more frequent and more global cognitive self-regulation directed to monitoring, revision, and evaluation of their writing is an indication that these writers' processes are still driven by knowledge-telling processes. Differences between the better and poorer achievers may be primarily related to the extra effort that the first group invested during writing, breaking down their transcription episodes into smaller units, which allowed them to pay more attention to the quality of their formulation and local planning.

## Discussion and Conclusions

An important objective of this study was to determine to what degree the writing processes of adolescent struggling writers can be described by the knowledge-telling process (Bereiter & Scardamalia, 1987). This process consists of producing each new sentence by consulting long-term memory for new content elements, without paying attention to global text coherence,



connections between sentences, and rhetorical goals. We found that the writing processes of the writers in our study show many traces of knowledge telling, supporting findings of previous studies into writing processes of struggling writers (Alexander et al., 1998; Bereiter & Scardamalia, 1987; Englert et al., 1988; Graham, 2006; Graham et al., 1993; Hayes & Flower, 1980; McCutchen, 1995).

However, our study also shows that some of these adolescent struggling writers put quite some effort in regulating their writing processes. A main finding of our study is that struggling writers who spend much energy in (especially) planning and formulating succeeded in writing better texts than those of their low-achieving peers. Although we cannot conclude that this relation is causal, it certainly suggests that the amount of self-regulatory activity spent by these students is not in vain. This indicates that these students have some sense of cognitive self-regulation and confidence in their abilities for improving their text by using that regulation.

A closer look at the self-regulatory activities of the best-, average-, and lowest-achieving writers revealed details of the sequential patterns of cognitive self-regulation of our struggling writers. It became clear that the group lowest on text quality spent little attention on planning before starting to write, in comparison to the average and highest groups. Even more interesting was our finding that the higher-achieving writers interrupted transcription episodes for self-regulatory activities during writing more often than the two other groups. This indicates that these students have a more reflective attitude toward transcription and formulation processes than what would be expected from the viewpoint of the knowledge-telling model. Apparently, it seems to make a difference whether these struggling writers pay attention to what they have written and to what they intend to write next on a local level. Although we are cautious not to imply causation, it seems plausible that differences in the quality of texts produced might be explained by patterns of cognitive self-regulation.

In a second-language writing context, Hayes and Chenoweth (2007) defined the concept of *language bursts*. Such bursts are defined by uninterrupted writing of stretches of language and are seen as indicative of writing fluency in the L2. Although the concept of language burst might seem to be similar with our notion of uninterrupted transcription, the way that Hayes and Chenoweth operationalized these bursts differs substantially from the operationalization of blocks of uninterrupted transcription in our study. Given our think-aloud instructions, our struggling writers were encouraged to tell what they were thinking while writing. A block of uninterrupted transcription in our study indicates that there was no cognitive self-regulation for the writer

to relate to (or, at least, that he or she wanted to relate). In many cases, these blocks concerned the complete text (see Figure 2), in contrast to language bursts, which are defined by production (typing) pauses of a certain duration and are therefore normally much shorter. The association of longer transcription episodes with poorer writing in our study can thus not be compared with the finding of Hayes and Chenoweth that longer bursts are associated with higher L2 writing proficiency (fluency).

Not surprising, the repertoire of self-regulative activities for most adolescent struggling writers in our study appeared quite limited. Although struggling writers put some effort in self-regulating activities directed to planning (mainly for content generation), more advanced planning activities and self-regulation directed to formulating, monitoring, evaluating, and especially revising were rare. Although the writing task in this study did not contain concrete rewards for the students to produce a well-written piece, we do not believe that this influenced our results in a significant way. First, the students in general appeared motivated in performing the writing task in front of an encouraging and motivating researcher. The students also knew the researcher well because they were involved in a broader (longitudinal) study in which she had collected data from them for more than a year. Therefore, students felt at ease and were not shy in expressing their thoughts during writing. In addition, few self-regulatory activities directed to monitoring, revising, and evaluating are reported in studies of the writing processes of more proficient writers of the same age (Bereiter & Scardamalia, 1987; Breetvelt, 1991; McCutchen, 1995; van Gelderen, 1997). Therefore, we may assume that the low frequency of indications of monitoring, revising, and evaluating is a valid characteristic of these students' writing. The fact that no relationship was found between these self-regulatory activities and text quality suggests that these struggling writers lack the expertise and/or confidence to adopt efficient strategies for monitoring, revising, and evaluating.

Van den Bergh and Rijlaarsdam (1999) questioned whether frequency of self-regulatory activities relates to text quality. According to these authors, the distribution of self-regulatory activities over the writing process is far more important in explaining differences in text quality. In contrast, we found significant correlations between frequencies of self-regulation activities and text quality. As a preliminary explanation, we propose that the discrepancy has to do with the distribution of writing proficiency in the samples studied. Whereas van den Bergh and Rijlaarsdam studied more proficient writers in Dutch secondary schools, our sample consisted of adolescent struggling writers at the lowest end of the proficiency scale. Because we found large

differences in the amount of self-regulatory activities among struggling writers, it is plausible that the ones that regulate more also produce texts of better quality. The difference among students of higher writing proficiency might be more related to the timing of the self-regulatory activities than to their sheer quantity.

Instruction directed at self-regulation of writing can enhance writing skills (De La Paz, 1999; Englert, 1992; Graham & Perin, 2007; Zimmerman & Risemberg, 1997). Therefore, in relation to the findings of this study, emphasis on cognitive self-regulatory skills in writing instruction for adolescent struggling writers seems warranted. A focus on self-regulation directed at formulating seems especially promising given the results discussed above. But, also, instruction in self-regulation directed at global planning, monitoring, revising, and evaluating seems valuable for this group of writers. Research evidence is accumulating that there are instructional practices that meet these kinds of needs for support of adolescent struggling writers—for example, by teachers modeling cognitive self-regulation during writing and the type of training advocated by Graham (2006).

Finally, we have to point to an important limitation of this study. The writing processes were analyzed using only one specific writing task assignment. One characteristic of this assignment seems of particular importance. The writing assignment elicited brief compositions (about 50 words) and production times (about 5 minutes). Although this task is considered appropriate for our students, future research should establish whether the results are different for other types of assignments that elicit longer texts and longer production times. Nevertheless, we believe that the in-depth exploration of the frequencies and patterns of self-regulatory activities used by adolescent struggling writers has added valuable information to the body of research into writing processes and important recommendations for writing instruction aimed at this group of writers.

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