Secondary Students' Self-Regulated Engagement in "Learning through Reading": Findings from an Integrative Research Project

Deborah L. Butler

(University of British Columbia)

Sylvie C. Cartier

(University of Montréal)

Leyton Schnellert & France Gagnon

(University of British Columbia).

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Abstract

In the research described herein, we draw on a model of *Self-Regulated Learning in Complex Activities* (Butler & Cartier, 2005; Cartier & Butler, 2004) to investigate student engagement in learning through reading (LTR) as situated in multiple layers of context. We employed a unique, mixed-methods design to find patterns within and across 31 classrooms at multiple levels of aggregation. Participants were 646 secondary students engaged in curriculum-based LTR activities and working within contexts that varied in multiple ways (e.g., by school, program, grade, classroom, domain). Findings related to student LTR were derived from a situated administration of two coupled assessment tools: A Learning through Reading Questionnaire that assesses students' perceptions about their engagement; and a performance-based assessment of reading performance. We used frequency, factor analytic, and cluster analyses to construct two kinds of engagement profiles: construct-level profiles (for constructs related to emotion, motivation, reading strategies, and self-regulating strategies, separately); and cross-componential profiles reflecting coherent patterns across model components. Main findings were: (1) construct-level profiles that were robust across contexts (e.g., little self-reported planning), but also showed important variation related to individual-context interactions; (2) links between dimensions of self-reported LTR engagement and reading performance that were also mediated by individual differences and context; (3) four coherent cross-componential profiles of LTR engagement (actively engaged; disengaged; high stress/actively inefficient; passive/inactively efficient) that were related to performance in distinctive ways; and (4) patterns in cluster membership that depended on individual-within-context interactions. We close by distilling conclusions and implications for theory, research, and practice.

Secondary Students' Self-Regulated Engagement in "Learning through Reading": Findings from an Integrative Research Project

Research suggests that students who intentionally and reflectively self-regulate learning are more likely to be successful. Thus, our research is centrally concerned with expanding understanding about the nature of self-regulated learning (SRL) and contexts and practices that support it. In the research reported here, we take seriously the challenge to find ways to study SRL as a *situated* event (Butler & Cartier, 2005; Winne & Perry, 2000). To that end, we provide descriptive portraits of self-regulated engagement for 646 secondary students (grades 7 to 12) working on curriculum-based "learning through reading" (LTR) activities within diverse contexts. We advance understanding by employing a unique design framework to uncover patterns in LTR engagement that are meaningful at different levels of aggregation, while at the same time considering how self-regulated LTR is situated within multiple layers of context and is mediated by individual-context interactions.

Advancing understanding about SRL requires investigating how students marshal their energies and resources to complete particular kinds of academic work (Butler & Cartier, 2004). Indeed, students are successful at self-regulating to the extent that their efforts are effectively adapted to the demands of different kinds of activities (Butler & Cartier, 2004; Viau, Cartier, & Debeurme, 1997; Weinstein, 1994). In the research reported here, we focused attention on LTR because, at the secondary level, content area instructors routinely expect that their students know how to construct new knowledge through reading. Unfortunately, however, research suggests that LTR activities are often challenging for students, requiring selection and coordination of multiple strategies not only for building meaning from multiple informational texts but also for active learning (Cartier, 2000; Stetson & Williams, 1992). Further, once students reach the secondary

level, they are expected to adapt approaches to LTR so as to construct knowledge across domains (e.g., Science, Humanities, Social Studies, Mathematics), even if each domain varies in terms of rhetorical text structures and expectations for learning (Cartier & Robert, 2003). Thus, in this research, we construct multidimensional profiles reflecting how students perceive the demands of LTR activities in different domains as well as their engagement within them. We also identify gaps in those perceptions associated with less successful engagement.

In sum, in the research reported here, we draw on a model of *Self-Regulated Learning in Complex Activities* to investigate students' engagement in LTR activities as situated in varying domains. Our goals were to: (1) advance theoretical understanding about how SRL is "situated" in multiple layers of context; (2) identify patterns in LTR engagement for secondary students within and across contexts with implications for assessment and instruction, and (3) continue developing innovative methodological strategies for investigating SRL (Butler & Cartier, 2005).

Secondary Students' Engagement in Learning through Reading

Cartier (2000) has defined LTR as "a process and a learning situation during which the reader/learner's goal is to learn a topic through reading texts while managing their work environment and task progress" (p. 93). As such, LTR is a ubiquitous expectation of students in secondary settings. It is assumed by teachers across subject areas (e.g., Science, Mathematics, Social Studies, Humanities) that students are able to manage their learning so as to gain knowledge through reading, most frequently textbooks (Armbruster & Anderson, 1988; Johnson & Giorgis, 2001; Laparra, 1986). In our research, we focus on how the quality of students' engagement in LTR in varying content domains is related to the knowledge they actually gain. Our goal is to identify important gaps in students' understandings about and engagement in LTR so as to provide direction for assessment and instruction (Schnellert, Higginson, & Butler, 2006).

In projects underway in both British Columbia (BC) and Quebec (e.g., Butler & Cartier, 2005; Butler, Cartier, Schnellert, Gagnon, Higginson, et al., 2005; Cartier, Butler, & Janosz, 2006; Cartier, Chouinard, & Butler, 2006), we are building from a model of *Self-Regulation within Complex Activities* to identify key components comprising students' LTR engagement (see Figure 1). Our model builds on prior research focused on defining SRL components and processes (e.g., Corno, 1993, 1994; Pintrich, 2000; Winne & Perry, 2000; Wang, Haertel, & Walberg, 1993; Zimmerman, 2000) to describe the complex interplay between motivation, emotion, cognition, and metacognition in strategic learning (Butler & Cartier, 2005; Cartier & Butler, 2004). Given research linking each component of our model to the quality of student performance, as described below, it is these components that we investigate as potential targets for assessment and instruction.

A central premise within our theoretical model (see Figure 1) is that how individuals engage in LTR reflects an interaction between what an individual brings to an activity and multiple layers of context (Butler & Cartier, 2005; Cartier & Butler, 2004). Thus, across projects, in our research we examine various ways in which individuals' prior history and experiences, language proficiency, strengths, challenges, and interests interact with multiple layers of context (i.e., sociocultural/historical; national/provincial; neighborhoods and schools; local learning environments; domains; activities and tasks) to shape engagement in learning.

Next, within a particular context, and when presented with an LTR activity (and component tasks, such as reading, learning, studying, and representing knowledge), students bring to bear knowledge, perceptions, beliefs, and conceptions that mediate their engagement in learning. These include students' knowledge about the domain under study and processes for completing tasks (Alexander & Judy, 1988; Pressley & Afflerbach, 1995; van Dijk & Kintsch, 1983), conceptions about academic work (Butler & Cartier, 2004; Brown, Campione, Ferrara, Reeve, &

Palincsar, 1991; Cartier, 2000; Flavell, 1979), and motivationally-linked perceptions and beliefs, such as self-perceptions of competence and control over outcomes, perceptions of task value, or attributions for success (Bandura, 1993; Borkowski, 1992; Pintrich & Schrauben, 1992; Schiefele, 1991; Schunk, 1991, 1994; Viau, 1994, 1999). Students also experience stress and frustration when LTR that, in the absence of strategies for managing motivation and emotions, can undermine persistence and performance (Corno, 1993; 1994; Meichenbaum & Biemiller, 1992; Zimmerman, 2000). Thus, to understand students' engagement in LTR, we need to assess how prior knowledge, beliefs, perceptions, conceptions, and emotions mediate engagement.

Another key component of *SRL in Complex Activities* is students' activity interpretation (Butler, 1995, 1998; Butler & Winne, 1995; Cartier & Butler, 2004). Ideally students consciously and reflectively interpret available information (e.g., oral or written explanations) so as to define task requirements and criteria for judging performance (i.e., during self-monitoring or self-evaluation), and then efficiently target effort and strategies to meet expectations. Unfortunately, however, research suggests that students may stumble at this pivotal step (e.g., Butler, 1999; Stetson & Williams, 1992). For example, students may hold less than optimal conceptions about different kinds of academic tasks (e.g., Butler & Cartier, 2004; Brown et al., 1991), or at least perceptions that differ from teacher expectations (Winne & Marx, 1982). They also may not recognize the importance of taking time to interpret task demands (Butler, 1995, 1998). Thus, in our research we focus particular attention on how students make sense of the demands and processing requirements associated with LTR activities (see Butler & Cartier, 2004). Indeed, the Learning through Reading Questionnaire (LTRQ) used in this project provides a nuanced portrait of students' perceptions about outcome and process expectations when LTR.

Even when students have productive understandings of task requirements, they may not choose to engage in learning. In light of their perception of task requirements, and mediated by

both motivational beliefs (e.g., perceptions of competence and control; task value) and emotions (e.g., stress or worry), students define personal objectives that might fuel engagement, or non-engagement, in learning (Borkowski & Muthukrishna, 1992; Butler & Cartier, 2004; Corno, 1993, 1994; Linnenbrink & Pintrich, 2001; Meichenbaum & Biemiller, 1992; Pintrich 2000). In our work, we investigate links to engagement of four types of objectives, those that: (1) reflect a productive learning focus consistent with LTR (e.g., on reading, understanding, learning); (2) might undermine engagement (e.g., finishing as quickly or reading as little as possible); (3) reflect an external orientation (e.g., pleasing or impressing others); and (4) are socially-oriented (e.g., to work with friends).

At the heart of our model of SRL in complex activities is a set of recursive, dynamic, and cyclical activities which constitute *self-regulation in action* (see Figure 1). These activities include task-orchestrating, self-regulating strategies such as planning (e.g., time, resources, methods), self-monitoring progress in light of task requirements (i.e., performance criteria), adjusting approaches to learning as needed, managing motivation and emotions, and self-evaluating outcomes (Butler, 1998; Butler & Winne, 1995; Cartier, 2000; McKeachie, 1988; Pressley & Afflerbach, 1995; Zimmerman, 2000). Given relationships between adaptive use of self-regulating strategies and successful performance (e.g., Butler, 1995, 1998; Case, Mamlin, Harris, & Graham, 1995; Zimmerman, 2000), in this research we assess how students define their self-regulated engagement in learning, with a focus on planning, self-monitoring, self-evaluating, adjusting approaches to learning, and managing motivation and emotions.

Finally, our model recognizes the centrality of cognitive strategies to students' engagement in LTR (Cartier, 2000; Dole, Duffy, Roehler, & Pearson, 1991). Cognitive strategies are the thoughts and actions that learners engage when completing an activity (Cartier, 2000; Smith, 1982; Weinstein & Mayer, 1986; Vauras, 1991). As an activity, LTR requires coordinated use of

strategies for both constructing meaning from text and learning new information. Ideally, students build from productive perceptions of activity demands to select effective and efficient strategies. Unfortunately, however, research suggests that students are not always successful at identifying potentially productive strategies or even enacting ones that they know (Bos & Anders, 1992; Butler, 1995, 1998; Cartier & Butler, 2004; Flavell, 1979; Laparra, 1991). Thus, in our research we examine relationships between strategic profiles of students and performance in situated, curriculum-based activities.

In sum, our model of *SRL in Complex Activities* defines a range of interacting components to be considered when describing how individuals working within multiple layers of context might engage in an LTR activity. In our research program, we have built from this model to develop a variety of methodological tools that capture: (1) how students think about the requirements of LTR activities and their engagement in LTR; (2) how students actually engage in LTR; and (3) what students gain from that engagement. In the project reported here, we employed two new measures designed to assess the first and the third of these objectives[1]. More specifically, we coupled use of a situated, performance-based LTR assessment (the PBA) with use of a self-report tool (the LTRQ) designed, not to measure learning behaviour, but rather to capture how students think about and interpret their engagement in LTR. We analyzed data from these two tools to create two types of descriptive profiles of LTR engagement as situated in multiple layers of context: construct-level profiles (for each of our model components, separately); and cross-construct profiles reflecting coherent patterns across model components.

Method

The research reported here provides a descriptive account of how students think about the requirements of and their engagement in LTR activities in relation to their reading performance.

[1] In upcoming projects we will build in measures that allow coordinated examination in all three areas.

Figure 2 provides an overview of the overall study design, which includes pre-posttest student assessments (LTRQ plus PBAs) along with measures designed to document teacher professional development in relation to instructional change. Findings reported here derive from the pretest assessments for 646 students in one year of the project. Our interest was in constructing descriptive LTR profiles based on our relatively new LTRQ, investigating links between LTR profiles and reading performance as measured by PBAs, and situating study of LTR to recognize individual-context interactions.

When constructing our design framework, we sought a methodological stance that was true to our view of SRL as situated, but at the same time enabled us to check for meaningful patterns: (1) at multiple, nested levels (e.g., for an individual, a classroom, a department, a program, a school, a district); (2) for groupings of individuals with varying backgrounds, challenges, and experiences (e.g., gender, receiving learning assistance, limited English language proficiency); and (3) in light of individual-context interactions (e.g., LTR for females studying in Science or Humanities). To achieve these objectives, we borrowed from a methodological framework prevalent in qualitative inquiry, a multiple-case study design (Merriam, 1998; Yin, 2003).

Thus, we would describe our design in this research as encompassing multiple, context-dependent case studies at the classroom level, each of which preserved meaning in context. As is depicted in Figure 2, data collected for each "case study" included student-level assessments coupled with rich information about the contexts in which students were working. These latter data derived from teacher interviews, field notes from planning meetings, observations, and document/artefact collection that focused on classroom practices, school-based programs, school cultures, neighbourhoods, communities, district priorities, and provincial standards and expectations. It helped in situating our findings that one of our core team members (Leyton Schnellert) was a district-level consultant with much experience working within the district and

with teachers in each of the participating schools. His "insider" perspective complemented was and balanced by those of other team members who viewed the findings from multiple angles.

As part of this project, detailed LTR profiles at the construct level were developed for each of 31 classrooms. Reports were generated and discussed with teachers working within school-based collaborative inquiry groups, who then considered implications for classroom practice (see Schnellert et al., 2006 for examples). It would be impossible in this short paper to convey detailed information about findings from each of the separate "case studies." Instead, we report findings from cross-case analyses conducted as a means of finding larger patterns in the data. To define these patterns, we moved "upwards" and "downwards" across levels of aggregation to consider how overall patterns found in various kinds of groupings (across classes; across students) related to patterns observed in individual cases (i.e., whether a general pattern was common across classes or masked differences). Thus, in our analyses of LTR profiles, we employed complementary quantitative and qualitative methodological tools that allowed us to retain a situated view of SRL while still investigating cross-case patterns.

Participants

Table 1 presents an overview of participants and some of the key differences between the 31 classroom contexts in which students were working at the school, grade level, curricular domain, and school program levels. To elaborate, participating students came from four schools located within multi-cultural urban neighborhoods, three that enrolled students in grades 8 to 12 (schools 1, 2, and 4), and one that enrolled students in grades 7 to 9 (school 3). Classrooms were selected by school teams based on a combination of teacher interest and school/department goals. In the end, classrooms addressed a variety of curricular areas from grades 7 to 12. Finally, in three schools students worked within one of two different programs. In schools 1 and 2, students could pursue their education in either the regular English language stream or in French

Immersion. In school 3, families and students could choose between a Fine Arts and Science Academy. In these schools we could compare LTR profiles of students working in the same curricular domain but within different programs.

Table 1 also lists three of the individual difference variables we used in the aggregated groupings, including: (1) gender; (2) whether students were receiving learning assistance, which in the participating district is provided to students who have an identified disability and/or are struggling significantly; and (3) whether students had limited English language proficiency and had been designated as English-as-a-second-language learners. The students participating in this project reported 30 unique languages as either their first languages or the language spoken in their home. Fifty-one percent of students reported speaking English as their first primary language; 37% reported first speaking either Chinese, Mandarin, or Cantonese; less than 2% reported originally speaking any of the other 26 languages.

Assessment Tools

The LTRQ and the PBA were linked so that we could associate data from the two assessments. Before starting the LTRQ, teachers showed students the texts they would be reading during the PBA, and told them that they would be asked shortly to read those texts to learn more about the subject addressed therein. Students were then asked to think about that example activity when answering all questions on the LTRQ (e.g., *when asked to complete an activity like the one in the example, I* …). Shortly after filling in the LTRQ, usually in the next class block, students completed the PBA.

The Learning through Reading Questionnaire. The LTRQ is a measure of students' perceptions about LTR activities and their engagement within them. In this study, the first section of the LTRQ requested the following background information from students: name, student number, age, grade level, gender, teacher's name, class/subject, block, first languages spoken,

languages spoken in the home, and length of time in Canada. Additional information about students' ESL designation and participation in learning assistance was available from class lists.

The main body of the LTRQ includes 22 questions designed to assess students' perceptions about our model components, with a focus on: prior knowledge (about the domain, topic, task referenced in the PBA texts), motivational perceptions and beliefs (self-perceptions of competence and control, attributions, task value), emotions, task understanding (activity interpretation, performance criteria), personal goals, cognitive strategies, and self-regulating strategies (planning, self-monitoring, self-evaluation, adjusting, motivation and emotion control). For each question, students responded to a series of items. For example, when asked what they are "being asked to do" when presented with an LTR activity like the one they were shown (i.e., activity interpretation), student responded separately to choices such as "read the texts," "find important details or facts," "see how information about the subject goes together," or "memorize information." Construct-level profiles were created by graphing responses for items associated with each model component separately.

For most items, students rated on a scale from one to four the *frequency* with which an item reflected their experience when LTR. For example, in the question on task interpretation, students rated whether they were asked in an LTR activity like the one they were shown to "find important details or facts," "almost never," "sometimes," "often," or "almost always." For a few other questions, response options varied. For example, when judging how much they knew already about the topic in the PBA activity, students rated their knowledge on a four-point scale ranging from "very little" to "a lot."

A good deal of evidence has been gathered to validate the LTRQ (Butler & Cartier, 2004; Cartier & Butler, 2004), in both English and French language versions. The validation process initially included interviews with students as they answered each question. The theoretical

framework and questionnaire were then subjected to an expert review. To check on the sensitivity of the tool, within these case studies, we inspected how differences in responses across classrooms were meaningful given differences in students, domains, and classroom practices. For example, we judged whether pre-posttest changes were specific to the nature of instructional changes effected. Finally, we used combinations of cross-tabulation, frequency, chi-square, factor, correlational, and cluster analyses to check that relationships between components within the model and with performance were as expected based on our theoretical framework. A subset of validation data are reported in coming sections. More detailed information about our validation processes are available elsewhere (Butler & Cartier, 2004, 2005; Cartier & Butler, 2004).

The Performance-Based Assessment. The PBA is a multi-dimensional, curriculum-based measure of the quality of students' performance on an LTR task. In this project the PBA was collaboratively developed, administered, and scored by teachers and researchers (see Schnellert et al., 2006). To begin, teacher-researcher teams selected curriculum-based topics and texts deemed typical and appropriate given the domain of study and the students' grade level. Then open-ended questions were developed that would reveal the quality of student work in terms of dimensions identified in reading for information performance standards for each grade level as articulated by the Ministry of Education in BC (2002). Examples of questions from one PBA assessment at the grade 8 level are included in Appendix A. Within each school, the same PBA was used for classrooms at the same grade level in the same program and addressing the same curricular area. All questions were a variation of those found in Appendix A, but were tailored to the discipline, topic, and grade-level provincial performance standards for reading informational text.

To complete the PBA, students were required to read one or more texts in order to learn about a particular topic. Then, they answered several questions independently and in writing. Students were asked additional questions in a brief interview/observation to get a sense of

strategies used, knowledge gained and LTR processes enacted, and to allow students with written language challenges to express their understanding in a different way (for an example, see Appendix A). Teachers recorded students' responses and made notes of their own observations.

One researcher worked with school teams to collaboratively score PBAs to ensure consistency in application of criteria within and across schools (see BC Ministry of Education (2002) for scoring criteria). When scoring, teachers looked across responses to each of the questions to judge the quality of student work. Each dimension was rated on a scale from 1 (does not meet expectations) to 7 (exceeds expectations). At each grade, teams also assigned an overall score on the same 1 to 7 point scale that captured the level of students' performance across dimensions (a "snapshot").

Note that the dimensions assessed in the PBA reflect both process and outcomes. For example, a "comprehension strategies" dimension reflects the extent to which a student demonstrates use of discourse-level comprehension strategies. These strategy judgments were inferred by teachers from written responses and oral self-reports. On the other hand, the main ideas, details, and note-taking dimensions assess students' recognition of important details and facts, understanding of main ideas or themes, and ability to organize information, which could be considered multiple indicators of how well students pulled out and related information. While the core constructs assessed in the PBA were the same across grade levels, how the levels of performance related to dimensions within the constructs varied slightly from grade to grade. Consider the "notetaking" dimension as an example. Notes that demonstrated a hierarchy of ideas and that differentiated main ideas from details would receive a score of 3 for a grade 9 student and a score of 5 for a student in grade 8 (i.e., expectations increased across grade levels).

In future research, we hope to refine scoring procedures on PBA dimensions to the point where we can discriminate with great confidence between the process and outcome dimensions,

and then relate those dimensions to those from the LTRQ or other measures. However, in this project, we used the overall snapshot score as a holistic, but multi-dimensionally grounded assessment of the quality of students' performance. Note that, compared to most class grades used as a measure of outcomes in research, the advantages of our teacher-assigned snapshot scores were that: (1) they were situated in the same task as was referenced in the accompanying self-report tool; (2) they were directly focused on LTR in the applicable content areas; (3) the criteria for scoring were standardized across classrooms at the same grade level, and where relevant, across grade levels; and (4) facilitated team-scoring ensured greater consistency in interpretation. Note that, while PBAs were developed and scored for all classrooms in this project, for logistical reasons, data available to the project team came from only 199 students.

Data Collection and Context

The LTRQ and the PBA were typically administered in consecutive blocks within students' classrooms. For the LTRQ, teachers were provided with guidelines on how to introduce and guide students through the questionnaire. In general, teachers read through the LTRQ with students as they answered each of the questions. As described above, students referenced the PBA task while answering the LTRQ. Students generally completed the PBA during the class meeting directly after the LTRQ administration. For the PBA, teachers presented students with copies of the texts to be read, along with typewritten questions with space to answer each of the questions (see Appendix A). Students read the texts and then answered the questions, looking back at the texts as needed. Students worked on the task independently, while one or more teachers circulated to ask targeted questions orally of students. During those interviews, teachers recorded students' answers and made notes on a common notetaking template.

Information about each classroom context was collected using the strategies outlined earlier. In addition to general information gathered about schools and school programs (e.g., entrance

criteria, program focus and structure), we gathered more specific information about each participating classroom. We kept records of PBAs so that we could judge comparability but also the range of topics/domains addressed. We kept field-notes from meetings in which we interpreted assessment findings with teachers and made plans for classroom practices. One of our research team members visited teachers classrooms (when invited) to engage in co-planning and observations. End of the year interviews were held with a subset of teachers who brought examples of classroom work. For all classrooms, we had complete class lists that provided information about students.

Data Analyses

Interpreting data from the LTRQ and the PBA. We used several types of analyses to construct LTR profiles based on the LTRQ data. For construct-level profiles, we conducted frequency analyses to identify the percentage of students at a given level of aggregation who gave one of the top two responses (e.g., "often" or "almost always"). We used chi-square analyses in cases where we wished to explore group differences.

Next, as a preparatory step in the construction of cross-construct profiles, we conducted exploratory factor analyses in order to identify stable and reliable dimensions that characterized students' responses to the LTRQ (see Table 2). We used Principal Axis Factoring with oblique rotation (oblimin, delta = 0) to group correlated items (Tabachnick & Fidell, 2001). To ensure that derived dimensions were robust for any combination of analyses we might want to conduct, and establish the construct comparability of the derived dimensions across groups, we conducted four independent sets of factor analyses, sampling from the data in four different ways to include: (1) all students who responded to the pretest only (the complete *N* of 655); (2) all students who responded to the posttest questionnaire (*N* = 322); (3) all students who responded to both pre- and posttest questionnaires (*N* = 310), considering pretest data; and (4) all students who responded to

both pre- and posttest questionnaires (*N* = 310), considering posttest data. Criteria for judging the adequacy of extraction and the number of factors for each sample included eigenvalues greater than 1, communalities greater than .295, and reliability estimates (Cronbach's Alpha) greater than .60 for each dimension.

To choose the final set of dimensions, we created a display that cross-referenced the dimensions, associated items, and reliabilities across the four samples. We set specific criteria for item inclusion (factor loadings greater than .295, no overlapping items across dimensions). We also aimed for reliabilities of at least .60 for each dimension considering all four samples. However, given the exploratory nature of these analyses, in just a few cases we let these drop to just below .60 (e.g., .58), but if and only if the dimension was theoretically important and if at least two of the four reliability estimates were acceptable. Nonetheless, note that, for the pretest data reported here, all reliability estimates for the LTQR dimensions were above, often significantly above, our cut-off of .60 (see column 5 of Table 2). In the end, we uncovered 23 dimensions that captured key constructs assessed by the LTRQ. We used these dimension scores in various other analyses. For example, we used correlational analyses to check for relationships between dimensions and the PBA snapshot score.

We also entered dimension scores into cluster analyses to identify cross-componential patterns in self-reported engagement for just the sample of students who completed the pretest LTRQ. To that end, we entered the LTRQ dimensions as input into a "two-step" hierarchical cluster analysis procedure using Ward's algorithm to minimize the within cluster-differences and avoid problems with chaining observations found in the single linkage method (Hair, Anderson, Tatham, & Black, 1998). The squared Euclidian distance was used to calculate the measures of similarity between clusters, as is recommended when using Ward's method. In a first step, we ran the SPSS hierarchical procedure to identify a manageable number of clusters by cases. The

agglomeration coefficient was used to select the number of clusters, because the size of change in the coefficient is a robust indicator of the distinctiveness of the clusters being merged. Examination of the percentage change in the clustering coefficient suggested that the best solution included either 3 or 4 clusters. In the second step, we reran the hierarchical cluster analysis, constraining the cases for a 3- and 4-cluster solution, to obtain cluster memberships and test for mean differences between clusters on each dimension using ANOVA and post-hoc tests. Inspection of the mean scores and the meaning of patterns within the clusters led us to select the four-cluster solution (see below). Finally, we used a combination of correlational and chi-square analyses to explore how cluster membership was distributed in different groupings and was related to performance.

Linking student data to contexts. For an initial inspection of patterns in data, construct-level profiles based on LTRQ data were developed separately for each of the contexts in which data were gathered. We then met with school teams to present and interpret class-, domain-, grade-, and school-level profiles. We kept detailed field notes documenting teachers' and our perceptions about how patterns observed in the data related to features of contexts. We kept similar records when team scoring and interpretation of PBA data occurred. We used a series of quantitative tools (e.g., Chi-square analyses; ANOVAs) to look for cross-case patterns that might be mediated by layers of context interacting with individual differences. But we consistently referred back to qualitative descriptions of contexts to interpret the meaning of patterns within and across cases.

Results

Construct-level profiles. Inspection of construct-level profiles across levels of aggregation suggested a number of general patterns robust across 646 students, along with some important variability. Among these main findings were, first, that students reported relatively high self-perceptions of competence and control while LTR (e.g., roughly 90% suggesting they could be

successful in different aspects of LTR activities). But notable variation was observed when we examined cross-class patterns for students receiving learning assistance, and when we looked at classroom-level profiles for students working in classes targeted for less successful students (e.g., School 4, grade 12 students studying Communications, where only 42% of students felt they could often or almost always succeed). In contrast, in one context (School 3, grade 8 students reading in Humanities in the French Immersion program), 100% of students felt that they could often or almost always do a good job of following instructions when LTR. In data interpretation meetings for contexts wherein students' self-perceptions were high initially, teachers were at first encouraged, but then reconsidered the accuracy of students' self-perceptions. Indeed, a significant pre-posttest shift for one set of students (School 3, grade 7 students studying in Science in French Immersion) was that their initially high self-perceptions of competence and control declined over the year as they gained more experience with LTR activities, which was interpreted by their teacher as a "reality check" (i.e., they became better calibrated in their judgments).

Another robust finding across classes was that students reported paying little attention to planning prior to engaging in LTR. Figure 3 (panels a to c) provides good examples of the kind of construct-level profiles that we created at varying levels of aggregation. Panel a presents cross-school findings for each of the items related to planning, and illustrates how few students reported often or almost always engaging in pre-planning activities (e.g., only 25% overall reported planning their time). Panels b and c together demonstrate the variability in this general pattern across four different contexts. Panel b shows variations in planning profiles for School 3, grade 7 students reading in Science in either the Fine Arts or Science Academy; Panel c shows planning profiles for School 2, grade 8 students reading in Humanities in French Immersion or regular English programs. Even considering this variability, however, our findings overall revealed lower levels of planning than teachers might like to see for students in most contexts.

A third robust pattern in our findings pertained to students' self-reports of cognitive (i.e., reading and learning) strategies they used when LTR. Our findings suggested that students were very likely to recognize the value of and report using strategies for working with text (e.g., paying attention to bold or underlined words) along with some effective reading strategies (e.g., think about what I already know; search for meaning). But they were much less likely to report using more active, meaning-making strategies for working with information (e.g., finding links between information; thinking of examples; applying ideas; summarizing in their own words). Partial strategy profiles from two contexts are presented in Table 3, which contrasts construct-level profiles for School 2, grade 8 students reading in Humanities in French Immersion or English programs (including only items on which differences were statistically reliable). In addition to showing cross-context variation in responses, these findings suggest some of the overall patterns observable across cases (e.g., more emphasis on text features than on such strategies such as finding links between information).

Another robust finding that emerged, and that is also evident in Table 3, was that, if one looks across construct-level profiles for any given group of students (e.g., the grade 8 students reading in Humanities in the English program), it is possible to observe a theoretically-predictable and coherent pattern in responses. For example, the data in Table 3 suggest a positive, cross-construct LTR profile for students in the French Immersion program, whose ratings were higher than those of their English program peers on all of the positive/productive model components. In contrast, students in the English program appeared to feel less in control over learning (e.g., lower self-perceptions of control; external attributions; use of rote memory strategies), to experience less positive emotions, to report less frequent use of most types of cognitive and self-regulating strategies, to be externally focused, and to rely more on others in accomplishing and judging the quality of their work (e.g., help-seeking during planning).

One additional case study example illustrates how, while we were able to report response patterns that cut across classrooms, we nonetheless were constantly reminded of the need to interpret data in context. In a team meeting where we examined the construct-level profiles for one classroom from School 2 in which grade 8 students were studying in Humanities in the English program, we noticed what appeared to be an inconsistency in student responses. While most students self-reported that they could often or almost always achieve a good mark when LTR, they also self-reported low self-perceptions of competence and control across other items (e.g., I can succeed). The classroom teacher demystified this apparent contradiction by explaining that, with this group of very demoralized and disengaged students, she had adopted the practice of assigning high marks for just turning in work. Thus, in this context, students seemed to recognize the disassociation between the quality of their performance while LTR and the marks they could achieve. For us, this case study example underlined the importance of interpreting patterns in context. At the same time, the example illustrates the benefit of creating construct-level profiles based on item-by-item responses rather than just collapsing across items to create dimensions

Dimensions. Nonetheless, to complement our construct-level analyses, we did conduct exploratory factor analyses to identify dimensions reflected in items on the LTRQ (see Table 2). We found 23 reliable dimensions clustered into 6 main categories: (1) Motivation (perceptions of competence and control; controllable attributions; external attributions; task value; positive personal goals); (2) emotions (positive emotions; stress and worry); (3) task understanding (positive task interpretation; positive performance criteria); (4) self-regulating strategies (planning; monitoring: learning; monitoring: work progress/methods; adjusting: working with text & rereading; adjusting: linking information; adjusting: work management; emotion/motivation control; self-evaluating); (5) reading and learning strategies (working with information; working with text); and (6) ways of working (focus on memory; help-seeking;

disengaged; external focus). While some of these dimensions included a set of items derived from just one of our main questions (e.g., planning), others combined items from across the questionnaire (e.g., the ways of working dimensions). As an example of the latter, items reflecting a focus on memory were drawn from main questions on task interpretation, strategy use, adjusting, and performance criteria. What was encouraging, in terms of validating both our SRL model and our questionnaire, was that these 23 dimensions that emerged based on empirical criteria mapped so cleanly onto our theoretical framework.

Table 4 presents correlations between each of the questionnaire dimensions and the snapshot score from the PBA. These analyses suggested that, when examined at a high-level of aggregation, all but two dimensions (help-seeking and external focus) were significantly, if modestly, related to performance. Relationships were as would be expected given our theoretical framework. For example, self-reported use of working with information strategies was positively related to performance ($r = .28$, $p < .001$), while self-reports of disengagement and PBA scores were negatively related ($r = -.32$, $p < .001$). We note that these correlations are not as strong as might be expected. However, consistent with our construct-level profile analyses, we found that these aggregated correlations masked significant context-individual variations. For example, later in this paper we show how correlations between dimensions and PBA scores ranged from 0 to .46 (absolute values) for students in different cross-componential clusters. For ESL learners, 14 of the 23 correlations between the PBA and dimensions were greater than .30, with two greater than .50 (see Tang, Butler, Cartier, Giammarino, & Gagnon, 2006). These were in comparison to those of non-ESL peers for whom only 7 correlations were statistically reliable, and those tended to be lower (from .23 to .34). Finally, observed relationships between the LTRQ and the PBA might be stronger if we could partial out the effect of prior achievement (Corno, personal communication).

Cross-construct profiles. To create cross-construct profiles, we conducted cluster analyses, as described earlier. We then used ANOVAs and post-hoc tests to examine between-cluster differences in scores on each of our 23 dimensions. Results validated the clear distinctions between clusters as suggested by the cluster analyses and are presented in Table 5.

To help in interpreting the cross-construct LTR profiles reflected in each cluster, we provide two complementary representations: (1) in Table 5 we have colour-coded mean scores to create a side-by-side comparison of clusters; and (2) in Figures 4 to 7, we provide easy-to-interpret graphical representations of z-scores for each cluster separately based on a comparison to the entire sample. What these representations reveal are four distinct profiles of engagement.

In an "actively engaged" cluster were 262 students (42% of the sample) whose profiles reflected a positive pattern across motivation, emotions, cognitive strategy use, and self-regulation. As can be seen clearly in Figure 4, the only below-the-overall-mean z-scores for these students were for external attributions, disengagement, and experiences of stress and worry. In contrast, the profiles of the 83 students in our "disengaged" cluster (13% of the sample) reflected exactly the opposite pattern (see Figure 5).

We labeled the profile represented in figure 6, into which fell 135 students (21% of the sample), "high stress / actively inefficient" (Swanson, 1990). We chose these descriptors to represent two trends in the patterns of students' responses. On one hand these students appeared to have little sense of control over outcomes (low self-perceptions of competence and control; low controllable attributions; high external attributions), an external focus, and high levels of stress and worry. At the same time, while their self-reported use of strategies was actually mid-

range (with means falling between "sometimes" and "often;" see Table 5)[2], they were also more likely to report seeking help (when planning and experiencing challenges). Thus, we interpreted this pattern as including students who perceived themselves to be trying, but ineffectively, and so were anxious and not at all confident about their ability to succeed.

Our final cluster (see Figure 7) included 166 students (26% of the sample). At first we labeled this group as "passive," because these students were second highest in terms of productive motivational perceptions and beliefs and lowest in external attributions (see Table 5). They reported little stress or disengagement in learning. They also seemed to set reading and learning focused personal goals. But, their reported use of self-regulating strategies was at best mid-range, and they reported the second lowest use of some strategies for self-regulation (adjusting: work management; emotion/motivation control; self-evaluating) as well as for cognitive (reading and learning) strategies. Thus, we came away with the impression of students who were happy about their participation in LTR activities but invested less effort in learning. But inspection of further analyses led us to question how we might label this final cluster profile.

For example, one follow-up analysis examined differences in performance on PBAs as a function of cluster membership (see Table 6). An ANOVA revealed statistically reliable differences in snapshot scores considering all four clusters simultaneously (F (3, 195) = 3.504, $p < .02$). Post-hoc analyses showed reliable differences in PBA scores between actively engaged and disengaged students ($p < .05$). At the same time, we noticed trends suggesting that the second highest performance could be observed in what we had called the "passive" group, with "high stress/actively inefficient students" coming in third. This finding led us to wonder whether

[2] The central, vertical line in Figures 4 to 7 represents a relatively high mean score, given the large number of students who fell into cluster 1. Means slightly below the overall group mean still represent reasonable self-reports of strategy use (between 2 and 3, reflecting self-reported use of approaches between "sometimes" and "often."

"passive" students might be better described as "inactively efficient," if they could achieve moderate success without being so deliberately strategic.

Another analysis elaborated our understanding of relationships between cluster membership and performance further. Table 7 summarizes findings from a broken-down correlational analysis (compared to Table 4) linking dimensions to PBA scores for each cluster separately. Some caution needs to be exercised in interpreting these correlations, both because of low n's in some cases (which reduces power to find significant differences) and because of possible ceiling or floor effects in dimension scores for actively engaged and disengaged clusters, respectively (which may have attenuated correlations). Nonetheless, some suggestive patterns emerged.

One was that, with the most highly-engaged cluster (based on self-reports), those students who endorsed more task related criteria, used three types of SRL strategies (adjusting work management; emotion/motivation control; self-evaluating), and who used reading and learning strategies focused on working with information (but, notably, not working with text), scored higher on PBA assessments. In contrast, for the small number of students in the disengaged cluster for whom we also had PBAs (n = 29), no self-reported strategic activities were related to performance, besides reports of disengagement, which were negatively related (r = -.38, p < .04).

For students in the high stress/actively inefficient cluster, the dimensions most closely associated with performance included two SRL strategies: working with text and rereading (r = .28, p < .08), and emotion/motivation control (r = .41, p < .01). To us it seemed to make sense that these students, who overall were less confident and more highly stressed, would do better to the extent that they had strategies for managing emotions and motivation. At the same time, within this group, the students who were most externally focused (r = -.39, p < .01) and most disengaged (r = -.28, p < .08) were also the least successful.

Finally, among the "passive/inactively efficient" group, correlational data suggested that it was those students who reported more positive SRL profiles across model components who performed most successfully. This finding is consistent with an interpretation that these students might achieve moderate success through minimally self-directed behaviour, but might be even more successful if they channeled their efforts more strategically (bridging towards the actively engaged profile). For example, as was the case for actively engaged students, students who reported higher use of reading and learning strategies that involved "working with information" did better on the PBA ($r = .35$, $p < .01$). Positive performance was also associated with higher perceptions of task value, more task-focused personal goals, more positive emotions, positive task interpretation, and three types of SRL strategies (monitoring: work progress/methods; adjusting: working with text and rereading; self-evaluating). As with other groups, performance appeared to be negatively related to disengagement ($r = -.23$, $p < .10$)[3].

What can we conclude from these cluster analyses? It seems clear that our LTRQ allows construction of rich, cross-construct profiles that were related to performance. It also appears that a solid number of our participants (42%) reported a positive engagement in LTR. Less encouragingly, a non-insignificant number (13%) of students reported being disengaged from learning, while the remainder (45%) reported profiles that were definitely problematic. Finally, our findings reinforce our consistent concern with looking "upwards" and "downwards" across levels of aggregation. Here correlations between dimensions and PBAs appeared to be mediated by individual differences reflected in distinctive profiles of engagement.

Individual-context interactions in cluster membership. In the last set of analyses to be reported in this main project paper, we investigated how profiles of engagement varied depending

[3] For correlational analyses with lower N's, we relaxed the criterion for judging statistically reliability to .10 (two-tailed). But given that we had clear theoretical predictions concerning relationships, we might also have selected a one-tailed cut-off of .05, to the same effect.

on what individuals brought to the contexts in which they were working. To explore this question, we created a series of tables displaying the number and percentage of students within different groupings who fell into each of the four clusters (Miles & Huberman, 1994). We used chi-square analyses to help in determining which of our observed patterns were statistically reliable.

Table 8 presents our display comparing the percentage of students within clusters between students who were receiving learning assistance support and their peers who were not similarly struggling in school, aggregated across classes. As might be predicted from past research (see Butler, 1998, 1999), we found fewer students receiving learning assistance in the actively engaged cluster (34% vs. 42%). Similarly, fewer students receiving learning assistance fell into the happy but inactively efficient cluster (16% vs. 27%) Finally, a greater proportion of students receiving learning assistance reported being disengaged (27% as compared to 10%). These findings reveal relationships between one broad individual difference variable and students' perceptions about their engagement in learning. They also underline how students struggling in school are at-risk for disengaging (Cartier, Butler, et al., 2006).

As another example, Table 9 presents cluster membership by gender, again aggregating across classes. Findings here were that females reported more positive, actively-engaged, strategic profiles than did their male peers (47% vs. 34%). Minor differences were also apparent in percentages of students in high-stress/actively inefficient and passive/inactively efficient profiles, each in favour of males. But Table 10 illustrates how gender differences might also be affected by context. This table compares data for grade 8 students working in Humanities or Science and Technology. These data suggest that equal proportions of males and females reported being actively engaged when studying Science and Technology (46% and 47%, respectively), but that a significantly larger proportion of females, in comparison to males, perceived themselves to

be actively engaged in humanities (54% vs. 36% for males). Males were more likely to evidence passive/inactively efficient profiles in both contexts.

Discussion and Implications

Our first conclusion based on the results of this study is that our model of *SRL in Complex Activities* provides a productive framework for describing important, interacting components in students' engagement in LTR. Our results suggest the importance of each of our model components to understanding LTR engagement, and at the same time shows how coherent profiles can be constructed to capture multi-componential relationships.

Our findings also suggest the productivity of the unique design framework we established to investigate patterns across multiple levels of aggregation. To better understand SRL as it is situated in different tasks, domains, and classrooms, we need approaches such as that used here that preserve meaning in context but while also affording meaningful analysis at higher levels of aggregation. Our results also help in validating our LTRQ. For example, construct representation (e.g., construct comparability and nomothetic span) was enhanced by findings of a robust set of coherently related dimensions in exploratory factor and cluster analyses, as well as by findings that item-level responses were so sensitive to contextual differences (e.g., for the teacher whose students thought they could achieve good marks even if they lacked confidence in their ability to succeed while LTR).

What do our findings suggest about profiles of engagement in LTR for participating students at the secondary level? Construct-level analyses suggested several robust patterns at high levels of aggregation that were quite problematic. Examples were observations of low self-reported use of key strategies for self-regulation (e.g., planning) and for active learning. Further, cluster analyses revealed that less than half of students held perceptions of their engagement in learning that could be described as "actively engaged," while 58% of students fell into profiles

associated with less successful outcomes. We conclude that we are observing an important mismatch between students' perceptions about LTR activities and teachers' expectations.

These latter findings are consistent with what we are learning from a similar project in Quebec (Cartier, Butler, et al., 2006). In that project, we found even more problematic strategic profiles among roughly 38,000 students learning through reading in Social Studies within disadvantaged neighborhoods. In that study, we also found less productive LTR profiles for students in more advanced grades. At a theoretical level, what these two studies contribute, collectively, is a more nuanced understanding of how secondary students' perceptions about the demands of LTR activities and their engagement within them might be problematic, considering emotion, motivation, cognition, and metacognition as they play out in recursive cycles. At a more practical level, we are finding that teachers in our projects can build from these multidimensional profiles to target specific areas for intervention (see Schnellert et al., 2006), and that meaningful aggregated data supports situated and meaningful assessment of progress towards literacy goals at the department, school, program, district, and Ministry levels (Cartier, Janosz, & Butler, 2005). Thus, our research has important implications for content area teachers who wish to assess and support effective LTR by students studying in different domains.

But further research is also needed to investigate relationships between students' perceptions about their engagement in LTR (as measured by our LTRQ), self-regulated engagement as enacted (as measured through traces, think alouds, observations, other tools), and reading outcomes (Winne & Perry, 2000). In future projects, we will add to our set of assessment tools ones to trace students' real-time engagement in LTR, at least for subsets of students, thereby enabling us to more thoroughly investigate SRL as a situated *event*. We also need to focus attention on how the relatively low aggregated correlations between our LTRQ and PBA scores might be explained, given contributions of other variables (e.g., facility with strategy enactment;

prior achievement). In future research, increased reliability in scoring for individual PBA dimensions will allow more fine-tuned analysis of relationships between the LTRQ and PBA.

Finally, a key goal in this research was to investigate how profiles of LTR engagement were mediated by individual-context interactions. In this paper, we were able to illustrate that both contexts and individual background variables were indeed related to profile differences. Further research is needed, however, to understand at the level of activity enactment how these impacts are effected. Further, while we could find context-related differences in this study (e.g., between students in French Immersion and English programs), extensions of this research are necessary to explaining those differences (e.g., effects of self-selection or of program qualities). Nonetheless, what is clear from our findings here is that students' engagement in LTR is impacted by both what students bring to contexts and the contextual layers in which they are working.

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Table 1
An Overview of Participants and the Contexts in Which Data Were Collected

	Grade	Domain	Program[1]	# classes	*N*[2]	LA[3]	ESL[4]	M	F
School 1	8	Science & Technology	English	2	23	6	10	9	14
			French	3	65	20	0	29	36
	Total			5	88	26	10	38	50
School 2	8	Humanities	English	2	47	2	6	25	22
			French	3	65	1	0	21	44
	10	Drafting		1	24	1	3	18	6
	11	Social Sciences		2	26	1	3	12	14
	11	Textiles		1	11	0	0	11	0
	Total			9	173	5	12	87	86
School 3	7	Science	FA	1	22	6	1	4	18
			SA	1	16	0	4	8	8
	8	Humanities	FA	2	42	11	2	16	26
			SA	1	26	2	12	16	10
	9	Humanities	FA	1	24	6	3	4	20
			SA	1	23	4	3	16	7
	Total			7	153	29	25	64	89
School 4	8	Humanities		4	86	12	14	52	34
	10	English		3	79	12	20	44	35
	10	ESL English 4		1	22	0	22	14	8
	12	Communications		1	27	12	1	16	11
	12	Foods & Nutrition		1	18	2	4	4	14
	Total			10	232	38	61	130	102
TOTAL				31	646	98	108	319	327

Note. [1] English = Regular English Program; French = French Immersion Program; FA = Fine Arts Academy; SA = Science Academy; [2] The total pretest N was 655, but isolated demographic data were missing for 9 cases; [3] LA = Students receiving learning assistance; [4] ESL = Students designated ESL and receiving support to achieve English language proficiency.

Table 2
Results from our Exploratory Factor Analysis

Dimensions	# of items	Cronbach's Alpha			
		Pre-Post: Pretest (*n* = 310)	Pre-Post: Posttest (*n* = 310)	Pretest all (*n* = 655)	Posttest all (*n* = 322)
Motivation					
Perceptions of competence and control *e.g., When I am asked to read in order to learn, I think that I can succeed*	12	.71	.74	.70	.74
Controllable attributions *e.g., When I am asked to read in order to learn, I think that I will succeed if I use good methods*	2	.65	.64	.64	.65
External attributions *e.g., When I am asked to read in order to learn, I think that I will succeed if the activity is easy*	2	.60	.54	.62	.53
Task Value *e.g., In my opinion, this kind of reading to learn activity is important*	2	.62	.58	.61	.59
Positive Personal Goals *e.g., Me personally, what I try to do when I read to learn is to understand what I am reading*	4	.79	.80	.75	.79
Emotions					
Positive emotions *e.g., When I find out that I will have to read in order to learn, I am happy*	8	.64	.64	.64	.65
Stress and Worry *e.g., When I find out that I will have to read in order to learn, I am stressed*	7	.80	.83	.77	.83
Task Understanding					
Positive Task Interpretation *e.g., When I have to read in order to learn, I am being asked to find the main ideas or themes in the readings*	7	.74	.72	.75	.75
Positive Criteria *e.g., At the end of a reading to learn activity, I know I have done a good job when I understood what I read*	16	.90	.88	.89	.88
Self-Regulating Strategies					
Planning *e.g., Before I begin the activity of reading to learn, I start by planning my time.*	4	.73	.74	.73	.74

Monitoring: learning *e.g., When reading to learn, I identify what I do and don't understand in the readings*	5	.76	.73	.76	.73
Monitoring: work progress/methods *e.g., When reading to learn, I ask myself if I am concentrating well*	4	.73	.65	.71	.66
Adjusting: working with text & rereading *e.g., When I have difficulties reading to learn, I reread information in the text*	5	.69	.72	.71	.72
Adjusting: linking information *e.g., When I have difficulties reading to learn, I make links between what I am reading and what I know about the subject*	2	.77	.76	.75	.76
Adjusting: work management *e.g., When I have difficulties reading to learn, I try to use better methods for working*	2	.67	.58	.68	.57
Emotion/Motivation control *e.g., When I feel stressed, worried, or fed up while I am reading to learn, I take a deep breath to calm myself down*	4	.62	.67	.62	.68
Self-evaluating *e.g., When I finish reading to learn, I ask myself if I learned everything I needed to learn*	4	.65	.63	.66	.65
Reading and Learning Strategies					
Working with information *e.g., While I am reading to learn, I think about what I already know about the subject*	12	.83	.84	.82	.84
Working with text *e.g., While I am reading to learn, I survey the text*	5	.58	.65	.62	.64
Ways of Working					
Focus on memory *e.g., When I have to read in order to learn, I am being asked to memorize information*	5	.65	.67	.68	.67
Help-seeking *e.g., When I feel stressed, worried, or fed up while I am reading to learn, I ask for help*	4	.70	.69	.69	.70
Disengaged *e.g., Me personally, what I try to do when I read to learn is to read as little as possible*	6	.71	.77	.72	.65
External focus *e.g., Me personally, what I try to do when I read to learn is to please or impress other people*	5	.63	.66	.63	.66

Table 3
Construct-Level Comparisons for School 2, Grade 8 Students Reading in Humanities 8 in French Immersion (n = 65) or the English Program (n = 37), Statistically-Reliable Differences Only

Item	French Immersion	English	Chi-square (*df* = 1)	*p* <
Self-Competence & Control				
I can follow instructions	**100%**	89%	5.430	.05
I can understand what I read	**97%**	81%	7.355	.01
I can find the important information	**92%**	74%	5.354	.05
I can remember information read	**78%**	56%	4.586	.05
I can judge the quality of my work	**89%**	61%	7.300	.01
I cannot be successful	0%	**15%**	13.203	.001
I can succeed	**92%**	68%	7.027	.01
I can get a good mark	**91%**	65%	8.734	.01
Attributions				
I will succeed because I'm good at reading	**71%**	48%	4.936	.05
I will succeed if the activity is easy	15%	**40%**	9.635	.05
I will succeed if I am lucky	12%	**29%**	4.722	.05
Task Value				
The task is important	**80%**	58%	7.645	.01
Emotions				
Happy (beginning)	**52%**	23%	10.935	.001
Relaxed (beginning)	**56%**	26%	8.073	.01
Personal Goals				
Finish as quickly as possible	11%	**29%**	5.833	.05
Read as little as possible	2%	**16%**	6.107	.05
Please or impress other people	8%	**23%**	7.027	.01
Self-Regulating Strategies: Planning				
Plan my time	**31%**	16%	5.22	.05
Choose a method	**55%**	32%	6.246	.05
Ask someone how to do the activity	17%	**36%**	4.346	.05
Reading and Learning Strategies				
Look at the table of contents	**55%**	32%	7.658	.01
Pay attention to bold or underlined words	**89%**	71%	7.300	.01
Reread paragraphs in the text	**69%**	37%	7.681	.01
Underline important information	**63%**	31%	12.257	.001
Take notes on important ideas	**78%**	49%	8.671	.01
Think about what I already know	**82%**	56%	8.753	.01

Item	French Immersion	English	Chi-square (*df* = 1)	*p* <
Find links between information	**60%**	23%	8.645	.01
Memorize key words, details, facts	**77%**	53%	6.774	.01
Learn paragraphs by heart	3%	**15%**	5.632	.05
Search for meaning of what I am reading	**85%**	47%	13.100	.001
Self-Regulating Strategies: Self-Monitoring				
Check to make sure I have completed all readings	**89%**	66%	8.88	.01
Identify what I do and don't understand	**86%**	55%	12.792	.001
Check if can describe main topics	**72%**	45%	6.717	.01
Check that I have found all important information	**88%**	60%	7.515	.01
Ask myself if I am concentrating well	**66%**	44%	9.163	.01
Self-Regulating Strategies: Adjusting				
Read more slowly	**85%**	60%	5.266	.05
Try to memorize information	20%	**39%**	3.855	.05
Look back at introduction or summary	**68%**	48%	4.638	.05
Pay attention to words I don't know	**82%**	48%	13.873	.001
Look at titles, subtitles, etc.	**91%**	68%	7.134	.01
Try to use my time better	**75%**	52%	3.80	.051
Try to use better methods	**75%**	44%	8.948	.01
Self-Regulating Strategies: Self-Evaulating				
Assure myself I've done a good job	**82%**	53%	8.753	.01
Compare with other students	29%	**52%**	3.846	.05
Criteria				
Ask myself if I've learned everything	**66%**	27%	12.556	.001
Think about how I could do better next time	**62%**	40%	6.585	.01
Did my best	**97%**	82%	4.018	.05
Found important ideas or themes	**86%**	58%	9.338	.01
Concentrated well on my work	**85%**	73%	4.051	.05
Read all the texts	**86%**	60%	10.425	.001
Better understood the subject	**92%**	74%	7.107	.01
Got a general idea about the subject	**92%**	72%	7.017	.01
Understood what I read	**92%**	74%	6.845	.01
Memorized information	16%	**46%**	6.608	.01
Pleased or impressed someone	14%	**47%**	14.673	.001

Table 4
Correlations between Dimensions and the Performance-Based Reading Assessment

	N	Correlation	*p* <
Motivation			
Perceptions of Competence & Control	199	0.23	.001
Controllable attributions	199	0.18	.01
External attributions	199	-0.15	.05
Task Value	199	0.23	.001
Positive personal goals	199	0.30	.001
Emotions			
Positive emotions	199	0.26	.001
Stress & worry	199	-0.13	.07
Task Understanding			
Positive task interpretation	199	0.18	.05
Positive criteria	197	0.23	.001
Self-Regulating Strategies			
Planning	199	0.13	.07
Monitoring: learning	199	0.19	.01
Monitoring: task progress/methods	199	0.20	.01
Adjusting: working with text & rereading	199	0.27	.001
Adjusting: linking information	199	0.20	.01
Adjusting: work management	199	0.18	.05
Emotion/Motivation control	198	0.24	.001
Self-evaluating	198	0.26	.001
Reading and Learning Strategies			
Working with information	199	0.28	.001
Working with text	199	0.16	.05
Ways of Working			
Focus on memory	199	0.13	.06
Help-seeking	199	-0.02	n.s.
Disengaged	199	-0.32	.001
External focus	199	0.04	n.s.

Table 5

An Overview of Mean Differences on Dimensions for the Four Cluster Profiles

	Actively Engaged	High Stress/ Actively Inefficent	Disengaged	Passive (Inactively efficient?)	Actively Engaged *n* = 262 (42%)	High Stress/Actively Inefficient *n* = 135 (21%)	Disengaged *n* = 153 (13%)	Passive (Inactively Efficient?) *n* = 166 (26%)
Motivation								
Percep. of Comp & Con	2.91	2.55	2.30	2.76	>2, 3, 4 (.001)	<1, >3, <4 (.001)	<1, 2, 4 (.001)	<1, >2, 3 (.001)
Controllable attributions	3.67	2.97	2.44	3.22	>2, 3, 4 (.001)	<1, >3, <4 (.001)	<1, 2, 4 (.001)	<1, >2, 3 (.001)
External attributions	1.73	2.61	2.58	1.54	<2, 3 (.001), >4 (.05)	>1, >4 (.001), =3	>1, 4 (.001), =2	<1 (.05), <2, 3 (.001)
Task value	3.00	2.30	1.94	2.49	>2, 3, 4 (.001)	<1, >3 (.001), <4 (.06)	<1, 2, 4 (.001)	<1, >3 (.001), >2 (.06)
Positive personal goals	3.65	3.09	2.63	3.30	>2, 3, 4 (.001)	<1, >3, <4 (.001)	<1, 2, 4 (.001)	<1, >2, 3 (.001)
Emotions								
Positive emotions	3.02	2.62	2.29	2.67	>2, 3, 4 (.001)	<1, >3 (.001), =4	<1, 2, 4 (.001)	<1, >3 (.001), =2
Stress and Worry	1.89	2.11	2.10	1.75	<2 (.01), <3 (.05), =4	>1 (.01), =3, >4 (.001)	>1 (.05), =2, >4 (.001)	=1, <2, 3 (.001)
Task Understanding								
Positive task interpret.	3.24	2.94	2.69	2.94	>2, 3, 4 (.001)	<1, >3 (.001), =3	<1, 2, 4 (.001)	<1, >3 (.001), =2)
Positive criteria	3.23	2.78	2.35	2.84	>2, 3, 4 (.001)	<1, >3 (.001), =4	<1, 2, 4 (.001)	<1, >3 (.001), =2
SRL Strats.								
Active planning	2.67	2.13	1.63	2.02	>2, 3, 4 (.001)	<1, >3 (.001), =4	<1, 2, 4 (.001)	<1, >3 (.001), =2
Monitoring: learning	3.21	2.70	2.14	2.69	>2, 3, 4 (.001)	<1, >3 (.001), =4	<1, 2, 4 (.001)	<1, >3 (.001), =2
Monitoring: task progress/methods	2.92	2.38	1.84	2.24	>2, 3, 4 (.001)	<1, >3 (.001), =4	<1, 2, 4 (.001)	<1, >3 (.001), =2
Adjusting: work w/text & reread	3.26	2.87	2.27	2.79	>2, 3, 4 (.001)	<1, >3 (.001), =4	<1, 2, 4 (.001)	<1, >3 (.001), =2
Adjusting: making links	2.54	1.99	1.46	1.89	>2, 3, 4 (.001)	<1, >3 (.001), =4	<1, 2, 4 (.001)	<1, >3 (.001), =2
Adjusting: work management	2.94	2.50	1.86	2.26	>2, 3, 4 (.001)	<1, >3 (.001), >4 (.05)	<1, 2, 4 (.001)	<1, >3 (.001), <2 (.05)
Emotion/mot. control	2.89	2.54	1.86	2.21	>2, 3, 4 (.001)	<1, >3, 4 (.001)	<1, 2, 4 (.001)	<1, 2, >3 (.001)
Self-evaluating	3.00	2.46	1.73	2.33	>2, 3, 4 (.001)	<1, >3 (.001), >4 (.07)	<1, 2, 4 (.001)	<1, >3 (.001), <2 (.07)
Cognitive Strats.								
Working with info.	2.84	2.38	1.87	2.26	>2, 3, 4 (.001)	<1, >3 (.001), >4 (.05)	<1, 2, 4 (.001)	<1,>3 (.001), <2 (.05)
Working with text	2.90	2.71	2.12	2.50	>2 (.01), >3, 4 (.001)	<1, >4 (.01), >3 (.001)	<1, 2, 4 (.001)	<1, >3 (.001), <2 (.01)
Ways of Working								
Focus on Memory	2.36	2.14	1.78	1.91	>2, 3, 4 (.001)	<1, >3 (.001), >4 (.01)	<1, 2, (.001), =4	<1 (.001), <2 (.01), =3
Help seeking	2.56	2.69	2.16	2.15	=2, >3, 4 (.001)	=1, >3, 4 (.001)	<1, 2 (.001), =4	<1, 2 (.001), =3
Disengaged	1.45	1.77	2.16	1.55	<2, 3 (.001), =4	>1, <3, >4 (.001)	>1, 2, 4 (.001)	=1, <2, 3 (.001)
External focus	2.17	2.09	1.79	2.04	=2, >3 (.001), =4	=1, >3 (.001), =4	<1, 2 (.001), <4 (.01)	=1, =2, >3 (.01)

Notes. Yellow = highest (with ties); Purple = lowest (with ties); Green = 2nd place; Blue = 3rd place; No fill = ties for mid-range.

Table 6

ANOVA Results[1] *on Mean Scores for the Subsets of Students in Clusters who Completed a Performance-Based Measure of Reading*

	n	*M*	*SD*	*SE*	Effect sizes			
Cluster					C1	C2	C3	C4
Cluster 1: Actively Engaged	75	**3.48**[2]	1.45	0.17		.42	**.67**	.19
Cluster 2: High Stress/Actively Inefficient	40	2.93	1.14	0.18	.42		.28	.22
Cluster 3: Disengaged	29	**2.62**[2]	1.08	0.20	**.67**	.28		.48
Cluster 4: Passive /Inactively Efficient	52	3.21	1.39	0.19	.19	.22	.48	
Total	*196*	*3.17*	*1.35*	*0.10*				

Notes. [1] $F(3, 195) = 3.504$, $p < .02$;

[2] Bonferroni post-hoc analyses revealed statistically reliable differences between means with the same superscript, $p < .05$.

Table 7

Correlations between Dimensions and the Performance-Based Assessment for Different Clusters

Dimension / Cluster	Actively Engaged			High Stress/Actively Inefficient			Disengaged			Passive/Inactively Efficient		
	n	*r*	*p* <	*n*	*r*	*p* <	*n*	*r*	*p* <	*n*	*r*	*p* <
Motivation												
Perceptions of Competence & Control	75	0.10		40	-0.03		29	-0.02		52	0.22	
Controllable attributions	75	0.16		40	0.03		29	-0.25		52	0.02	
External attributions	75	-0.08		40	-0.12		29	-0.14		52	0.13	
Task Value	75	0.03		40	0.06		29	0.20		52	**0.34**	**0.01**
Positive personal goals	75	0.12		40	0.01		29	0.18		52	**0.46**	**0.00**
Emotions												
Positive emotions	75	0.10		40	0.15		29	0.23		52	**0.33**	**0.02**
Stress & worry	75	-0.06		40	-0.18		29	-0.20		52	-0.01	
Task Understanding												
Positive task interpretation	75	-0.08		40	0.10		29	-0.11		52	0.29	**0.04**
Positive criteria	75	**0.22**	**0.05**	40	0.03		29	0.04		52	0.08	
Self-Regulating Strategies												
Planning	75	0.15		40	-0.22		29	-0.17		52	0.08	
Monitoring: learning	75	0.09		40	0.18		29	-0.03		52	0.08	
Monitoring: task progress/methods	75	0.12		40	0.08		29	0.00		52	**0.29**	**0.04**
Adjusting: working with text & rereading	75	0.06		40	**0.28**	**0.08**	29	0.20		52	**0.28**	**0.05**
Adjusting: linking information	75	0.16		40	0.07		29	0.00		52	0.17	
Adjusting: work management	75	**0.37**	**0.00**	40	-0.06		29	-0.07		52	-0.05	
Emotion/Motivation control	75	**0.21**	**0.07**	40	**0.41**	**0.01**	29	0.02		52	-0.02	
Self-evaluating	75	**0.21**	**0.07**	40	-0.10		29	-0.14		52	**0.35**	**0.01**
Reading and Learning Strategies												
Working with information	75	**0.32**	**0.00**	40	-0.21		29	0.02		52	**0.35**	**0.01**
Working with text	75	0.02		40	0.07		29	-0.03		52	0.21	
Ways of Working												
Focus on memory	75	-0.02		40	0.00		29	-0.05		52	0.22	
Help-seeking	75	0.12		40	-0.24		29	-0.10		52	-0.02	
Disengaged	75	**-0.19**	**0.10**	40	**-0.28**	**0.08**	29	**-0.38**	**0.04**	52	**-0.23**	**0.10**
External focus	75	-0.08		40	**-0.39**	**0.01**	29	-0.04		52	0.03	

Table 8
Cluster Membership for Students who Were Receiving Learning Assistance Support Compared to Peers

	Cluster	Actively Engaged	High Stress/ Actively Inefficient	Disengaged	Passive/ Inactively efficient	Total
No Learning Assistance	Count	228	112	57	150	547
	%	**42%**	21%	10%	**27%**	100%
Learning Assistance	Count	33	23	26	16	98
	%	34%	24%	**27%**	16%	100%
Total	Count	261	135	83	166	645
	%	41%	21%	13%	26%	100%

Note. $\chi^2_{\text{learning assistance (2) x clusters (4)}}$ (3, N = 645) = 22.41, p = .001, *Cramér's V* = .19

Table 9
Gender Differences in Cluster Membership

	Cluster	Actively Engaged	High Stress/ Actively Inefficient	Disengaged	Passive/ Inactively efficient	Total
Female	Count	157	62	41	76	336
	%	**47%**	18%	12%	23%	100%
Male	Count	105	73	42	90	310
	%	34%	**24%**	14%	29%	100%
Total	Count	262	135	83	166	646
	%	41%	21%	13%	26%	100%

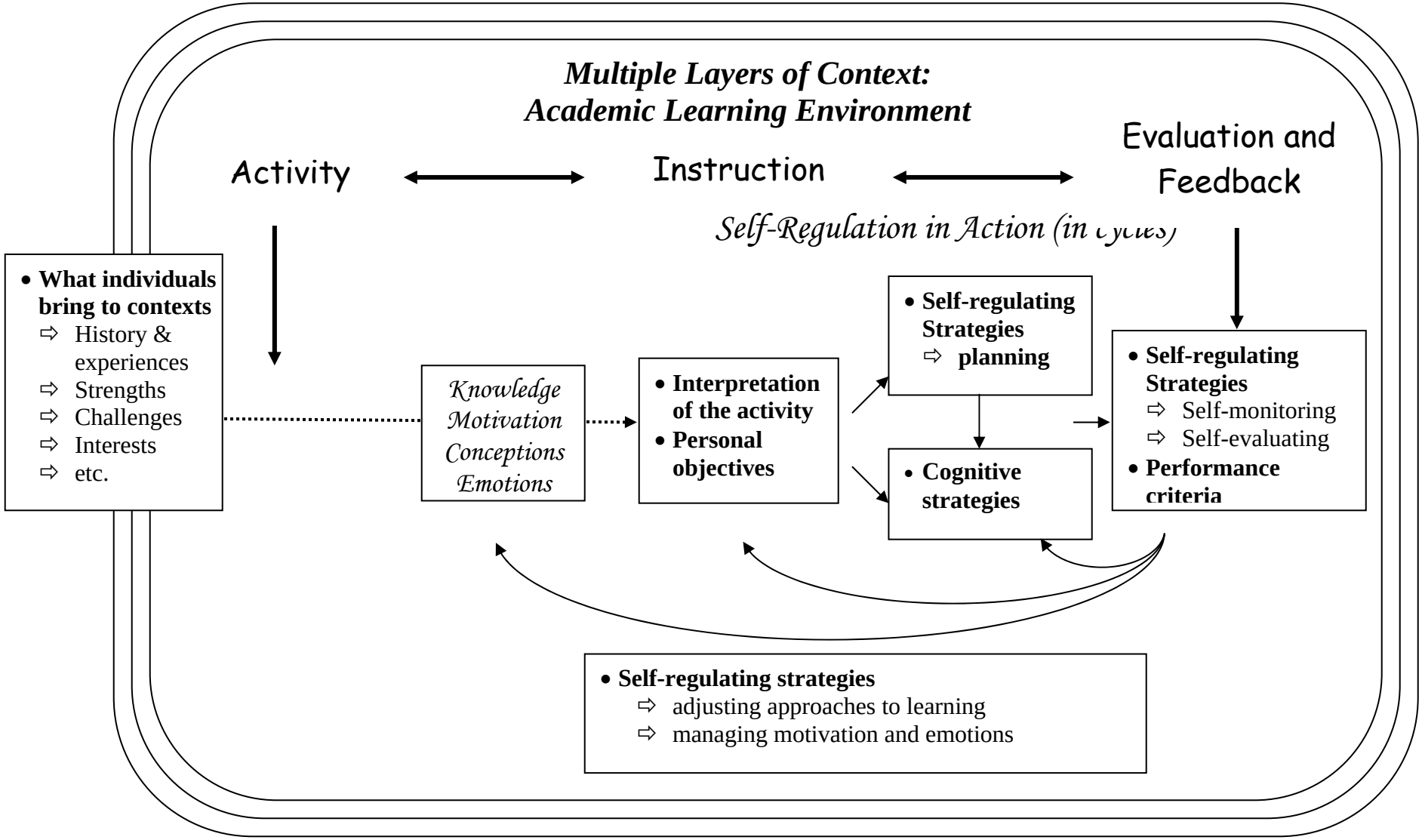
Note. $\chi^2_{gender\ (2)\ x\ clusters\ (4)}$ (3, N = 646) = 11.38, p = .01, *Cramér's V* = .13

Table 10
Gender Differences by Context: Grade 8 Humanities vs. Science and Technology

Cluster	**Humanities**		**Science & Technology**		**Total**
	Male	**Female**	**Male**	**Female**	
Actively Engaged	45	68	13	17	143
	36%	**54%**	46%	47%	45%
High Stress/Actively Inefficient	22	19	2	3	46
	18%	15%	7%	8%	15%
Disengaged	15	10	1	3	29
	12%	8%	4%	8%	9%
Passive/Inactively Efficient	43	30	12	13	98
	34%	24%	43%	36%	31%
Total	125	127	28	36	316

Notes. 1. $\chi^2_{\text{gender (2) x clusters (4) within humanities}}$ (3, N = 252) = 8.20, $p < .05$, *Cramér's V* = .18.
2 $\chi^2_{\text{gender (2) x clusters (4) within Science \& Technology}}$ (3, N = 64) = .79, p = .85.

Figure 1
A Situated Model of Self-regulated Learning in Complex Activities (Butler & Cartier, 2004; Cartier & Butler, 2004)



Adapted with permission from Butler & Cartier (2005a)

Figure 2
Study Design: Data Collected to Trace Student Learning and Teacher Professional Development

Pretest	Instruction	Posttest
Student Assessments • Questionnaire • Performance-based assessment (PBA)	Teacher practices • Interviews (Int) • Artifacts (Art) • Observations (Obs)	Student Assessments • Questionnaire • Performance-based assessment (PBA)

↘ ↓ ↙

- Students' conceptions about academic work (Questionnaire & PBA)
- Students' learning through reading (understanding, inferences, and applications) (PBA)
- Teacher learning and classroom practices (Int, Art, Obs)

Figure 3-a
Construct-Level Profiles Showing an Overall Pattern for Planning Across All Four Schools

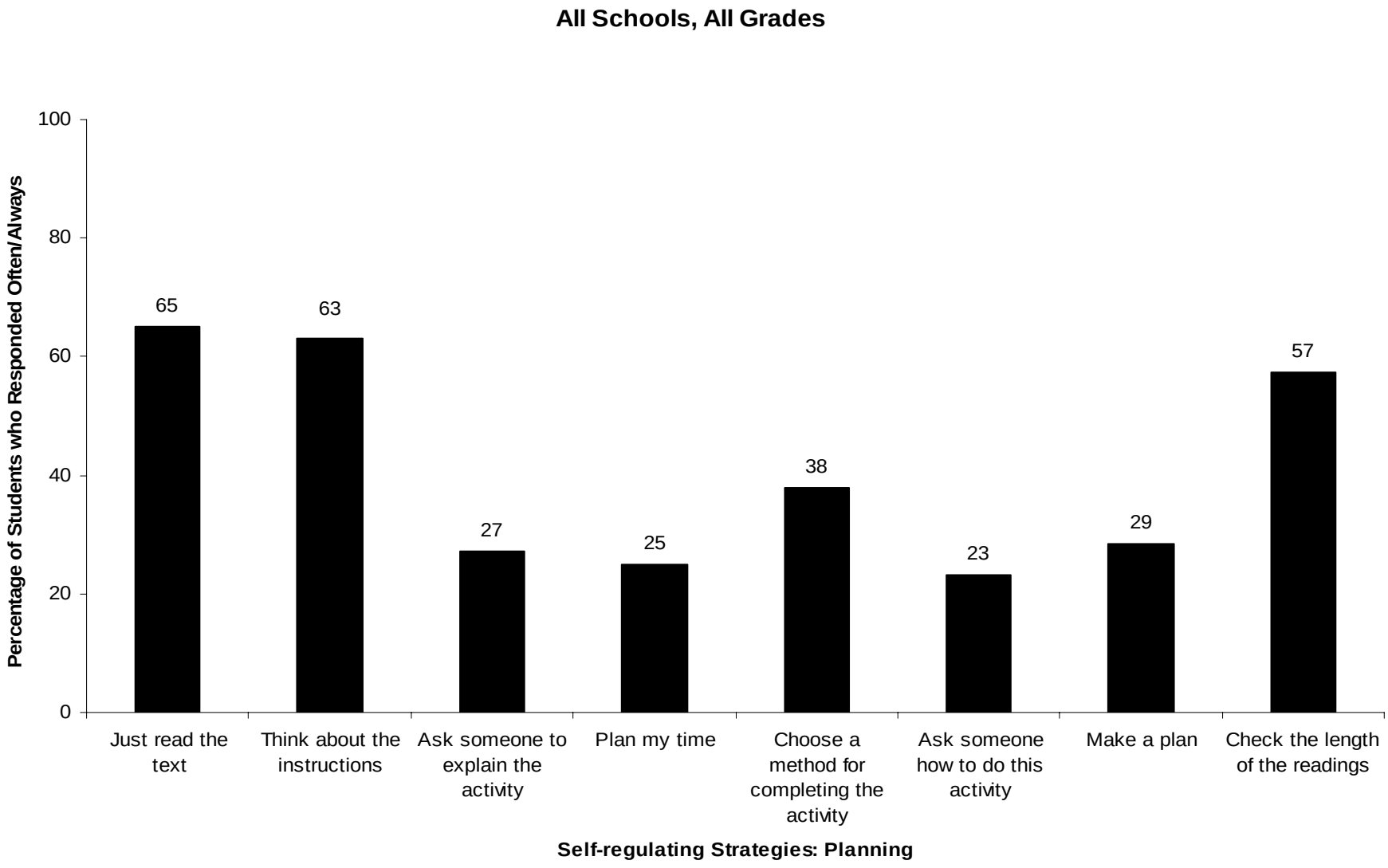
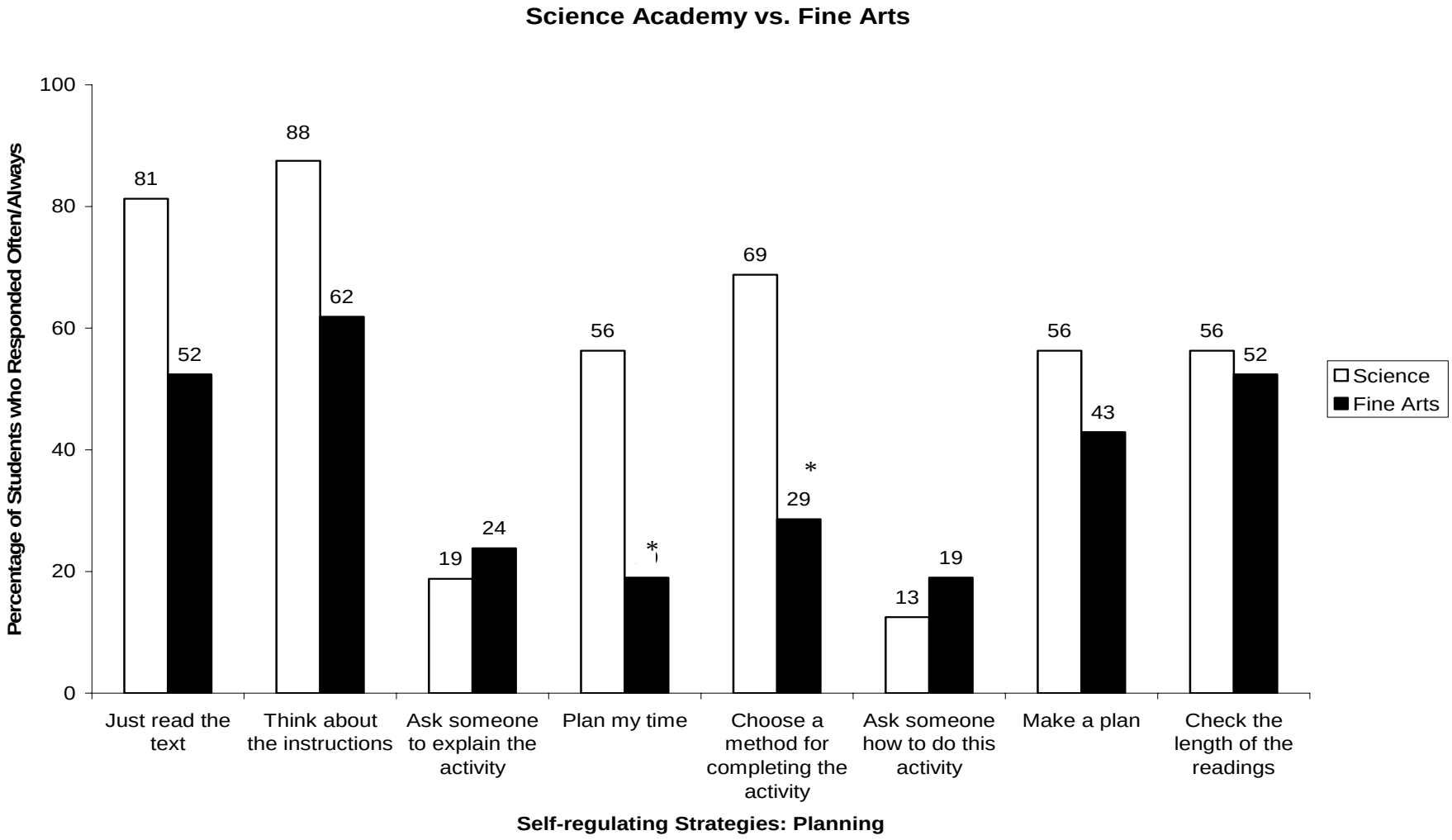
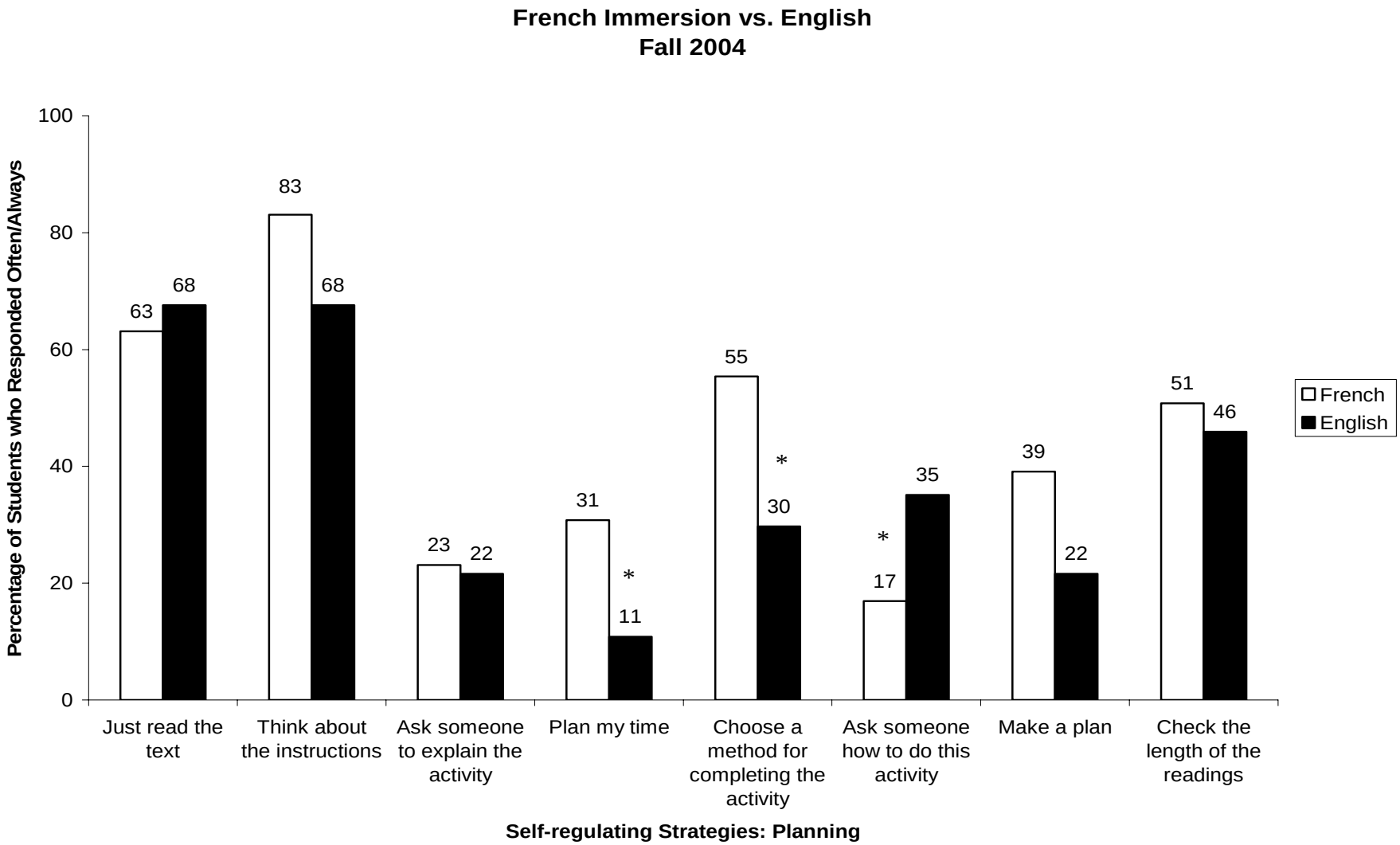


Figure 3-b
Construct-Level Profiles for Planning for School 3, Grade 7 Students Reading in Science in Either a Fine Arts (n = 16) or Science Academy (n = 21)



* $p < .05$

Figure 3-c
Construct Level Profiles for Planning for School 2, Grade 8 Students Reading in Humanities in French Immersion (*n* = 65) or in English (*n* = 37) Programs



* p < .05

Figure 4
An "Actively Engaged" Profile

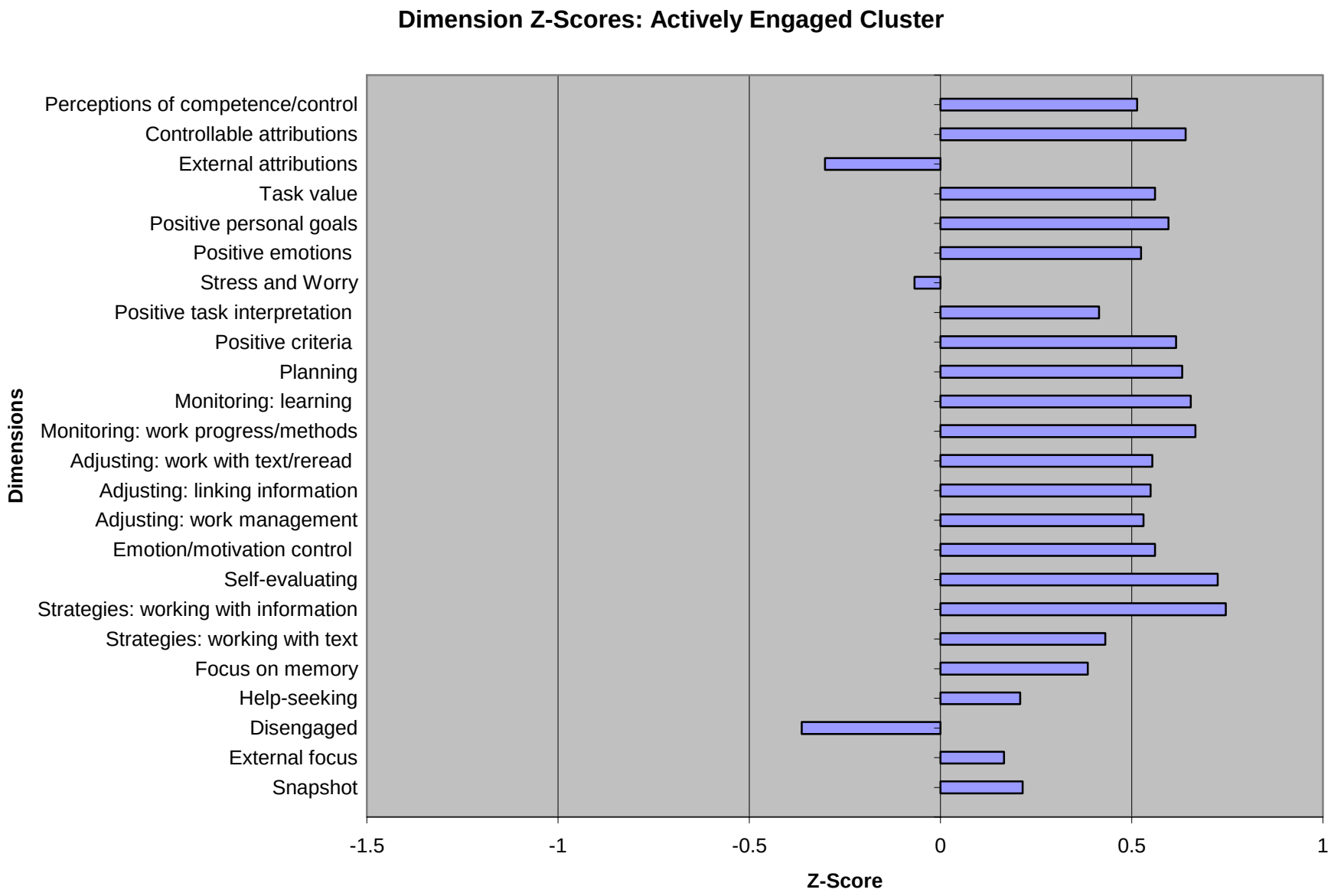


Figure 5
A "Disengaged" Profile

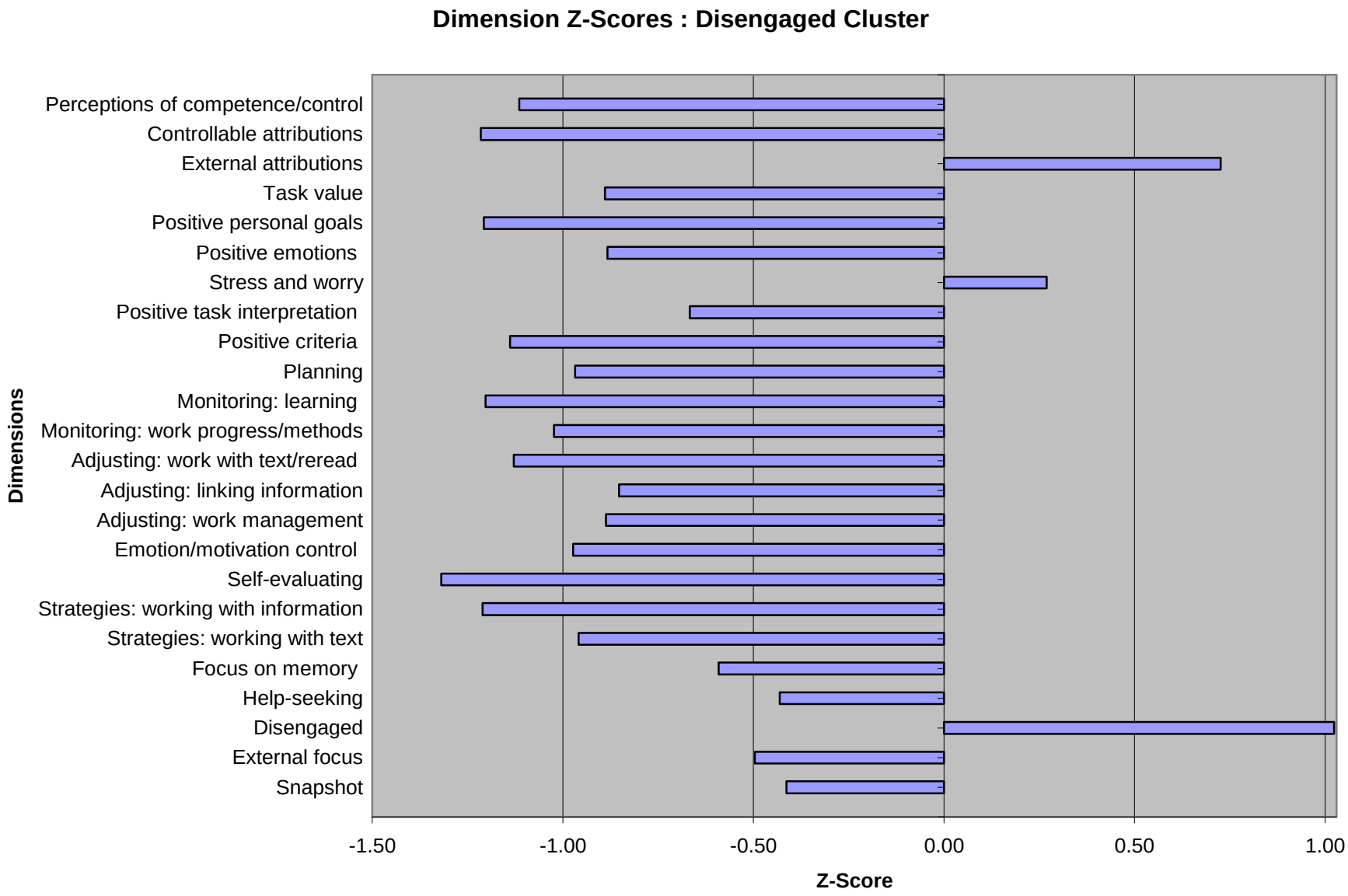


Figure 6
A "High Stress/Actively Inefficient" Profile

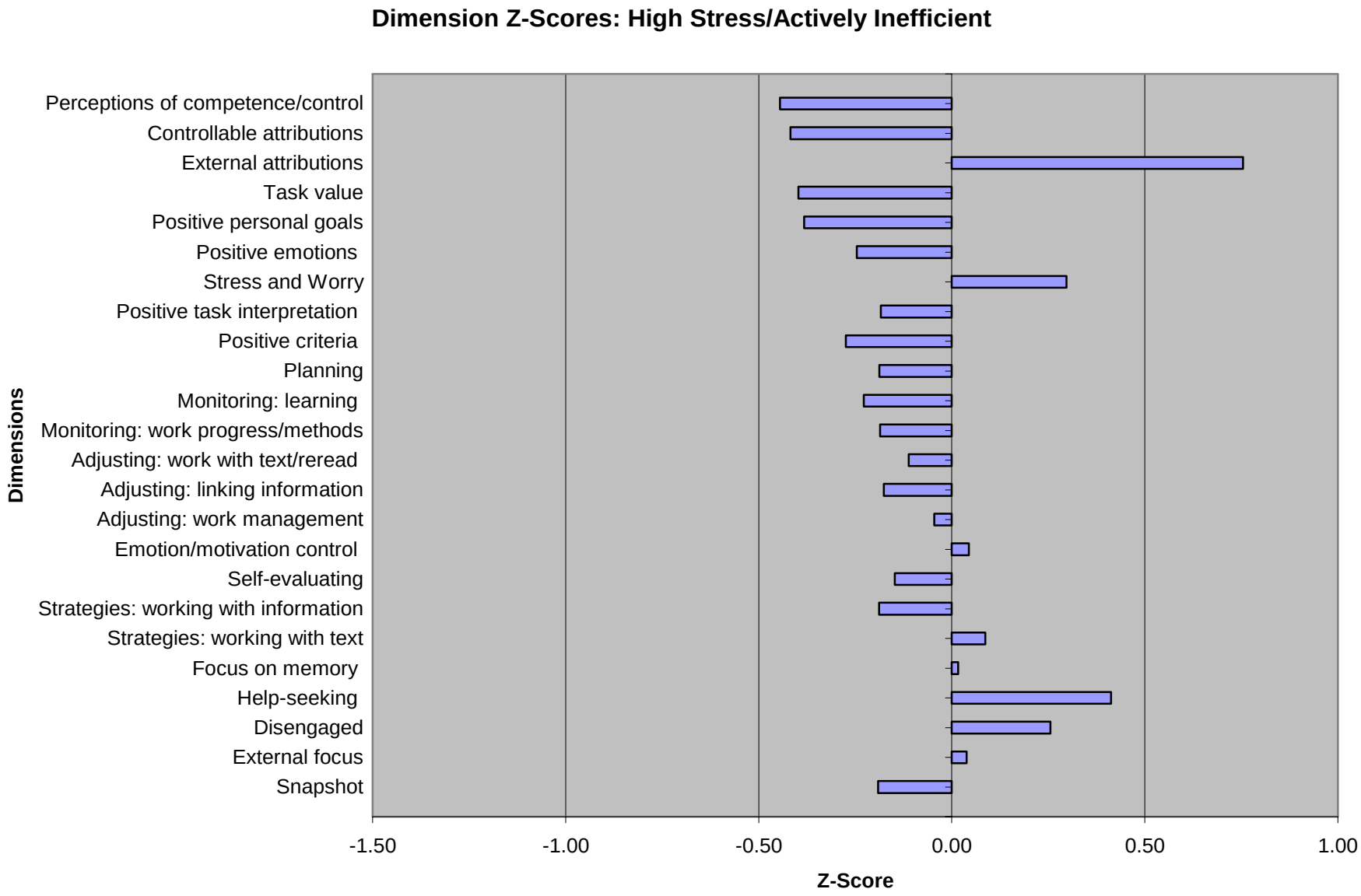
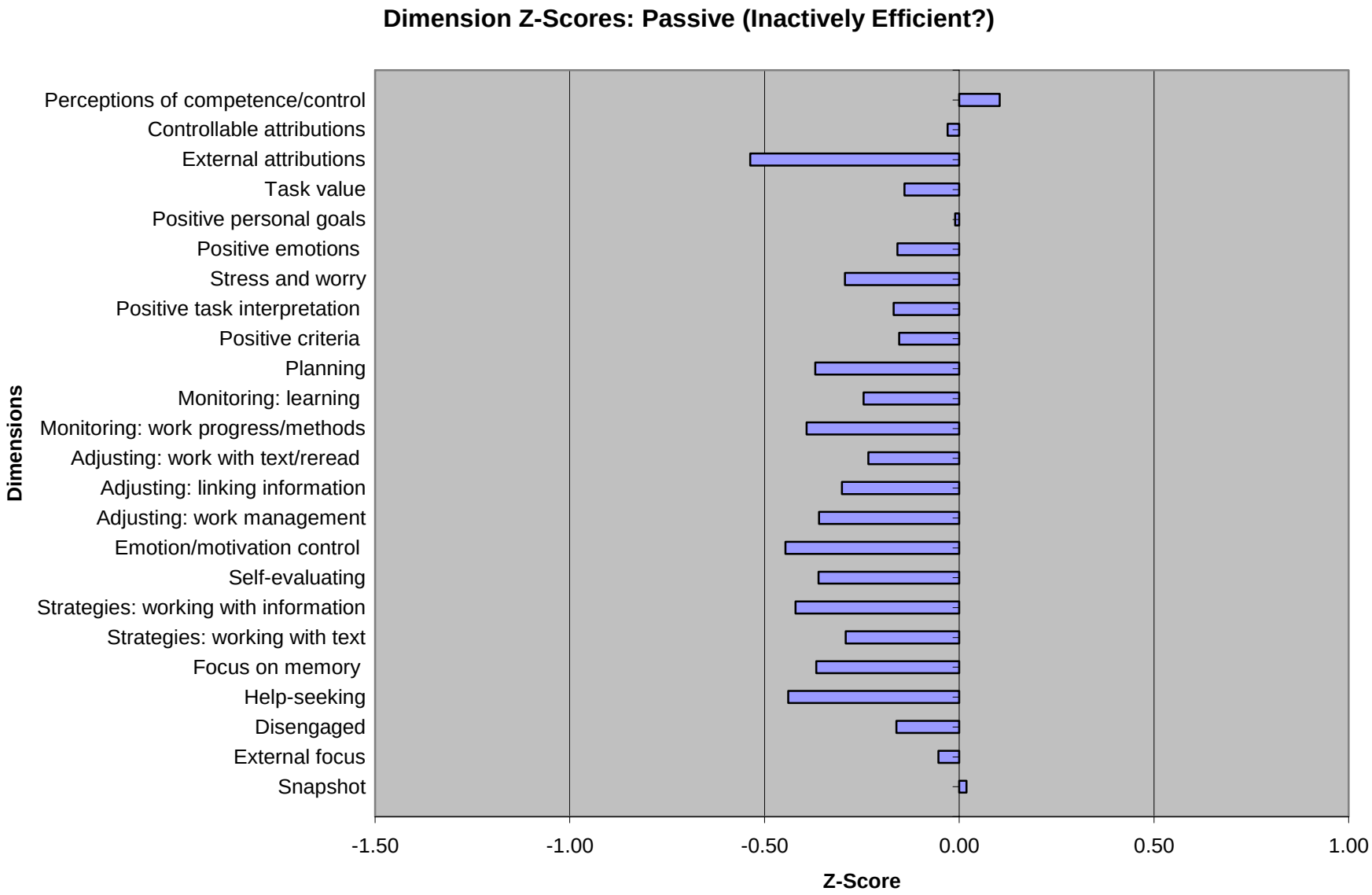


Figure 7
A "Passive/Inactively Efficient" Profile



Appendix A
An Example of Questions Asked as Part of one PBA

Context: School 2, Grade 8, Humanities Class

Questions:

1. **Summarizing :** Using a web, words, diagrams, and/or drawings, show that you can identify the key ideas and details from this passage (use the other side of this page).

2. **Connections :** How does what you read connect with what you already know?

3. **Vocabulary :** Define each of the following words. Explain how you figured out what they meant.

Word	*Definition*	*How I figured out its meaning*
a. Manor		
b. Medieval		
c. Heiress		
d. Commodity		
e. Ancestral		

4. **Inferencing :** Read between the lines to find something that you believe to be true, but that isn't actually said. Explain your reasoning.

5. **Reflecting:** Was this reading easy or hard to understand? How did you help yourself understand? (If this was easy, what do you do to help yourself understand something more difficult?)

Ask, after reading, the following questions[1]

6. **Word strategies:** When you come to a challenging word, how do you figure it out?

7. **Sense strategies:** If your reading does not make sense, what do you do?

8. **Main idea:** What was the main idea of this selection?

[1] These questions were asked of students orally.