Performance Approach, Performance Avoidance and Depth of Information Processing: A fresh look at relations between students’ academic motivation and cognition

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ABSTRACT This study examines the effects of motivational approach on the recall of verbal information processed at shallow and deep levels. Two hundred students attending the same primary school were randomly assigned to either a mastery focused condition, performance approach condition, performance avoidance condition, or a control group. The participants were motivationally manipulated prior to receiving 12 stimulus words designed to be encoded at either shallow or deep levels of processing. A free recall test followed, then a cued recall test. Results indicate that students remembered more stimulus words during cued recall than free recall. Recall of verbal information was superior when processed according to the deeper (category and sentence) levels of processing. Performance approach and avoidance goals resulted in superior recall during free and cued recall, compared with a mastery goal or with the control group. The usefulness of these findings for promoting greater clarity among motivational frameworks and ideas for further research are discussed.

Introduction: Achievement motivation and depth of processing

Many empirical studies examining achievement motivation have revealed that motivational factors, including intrinsic versus extrinsic orientations (Lepper & Greene, 1978), task involvement versus ego involvement (Nicholls, 1984), informational versus controlling feedback (Deci & Ryan, 1985), failure attributed to lack of effort versus low ability (Weiner, 1966), and learning goals versus performance goals (Dweck & Leggett, 1988) differentially affect achievement strivings. The way in which these motivational variables achieve their effects, and the cognitive processes involved, have received very
little attention in research studies. Questions concerning what a motivated individual does to enhance cognitive performance remain largely unexplored.

Traditionally, mastery and performance motivational orientations have received the most attention in studies concerning achievement motivation (see for example Butler & Neuman, 1995; Fox, Goudas, Biddle, Duda, & Armstrong, 1994; Graham & Golan, 1991; Nolen & Nicholls 1993). Personal development and acquisition of new skills and knowledge are dominant concerns of mastery-focused individuals, whereas maintaining a favourable judgement of one’s own ability by demonstrating superior performance relative to others is the dominant concern of performance-focused individuals (Bouffard, Vezeau, & Bordeleau, 1998). Abundant research of these two tendencies reveals mastery involvement leads to a more adaptive motivational state than performance involvement (Anderman & Maehr, 1994; Martin & Debus, 1998; Ryan, Hicks, & Midgley, 1997; Wolters, Yu, & Pintrich, 1996).

Very recent research on achievement motivation offers an alternative framework by partitioning performance involvement into performance approach and performance avoidance goals (see for example Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot & Sheldon, 1998). This recent dichotomy provides the opportunity to assess distinct differences between the goal to demonstrate ability (directed towards the attainment of favourable judgements of competence) and the goal to avoid demonstrating lack of ability (focused on avoiding unfavourable judgements of competence) and their effect relative to mastery orientation (pursuing the development of competence) on information encoding and retrieval.

The present study follows procedures outlined in Graham and Golan’s (1991) study of the relationship between students’ motivational orientations and the depth of their information processing. However, unlike Graham and Golan’s research, which combined an information processing variable (depth of processing) with a dichotomous motivational variable (mastery versus performance orientation), the present study combines depth of processing with a trichotomous motivational variable (mastery versus performance approach versus performance avoidance) to examine how an individual’s motivational state influences their depth of processing. The importance of this research, then, is founded in its attempt to distinguish more precisely students’ distinct performance orientations and the effect these have on students’ depth of processing. A control group was included to provide a baseline for comparisons.

It is thought that individuals’ motivational state may directly influence the cognitive processes of information encoding or attention deployment. Despite early research, such as that by Weiner (1966) and Wine (1971), there has been a limited number of follow-up studies attempting to relate motivational incentives to specific aspects of cognitive psychology such as information processing. This research study attempts to explore this relatively neglected topic by combining an information processing variable with a trichotomous motivational variable to examine the effects of motivation on the encoding and retrieval of verbal information.

*Trichotomous Motivation Variable*

In contemporary research into achievement motivation, goal theory has emerged as the predominant explanation of students’ academic motivation and behaviour (Seifert, 1995). The past decade has seen many theorists associate individuals’ competence strivings with a social-cognitive, “achievement goal” approach. This approach is commonly defined as the purpose of task engagement (Cury, Biddle, Sarrazin,
Famose, 1997). The particular type of goal adopted by individuals creates a framework for how they will interpret, experience, and act in their achievement pursuits (Bouffard et al., 1998). Early theorists associated with the achievement goal approach identified two distinct orientations towards competence: a mastery goal focus and a performance goal focus. A mastery orientated individual focuses on the development of competence and task mastery (Bouffard et al., 1998), whilst a performance orientated individual focuses on demonstrating competence relative to others (Martin & Debus, 1998; Seifert, 1997).

Due to the predominance of goal theory, most studies have approached achievement motivation with this conceptualisation of the mastery versus performance goal dichotomy. However, interestingly, the alternative approach of partitioning the performance goal into performance approach and performance avoidance was incorporated into the earliest achievement motivation conceptualisations (see, for example, Atkinson, 1957; Lewin, Dembo, Festinger, & Sears, 1944; McClelland, 1951; McClelland, Atkinson, Clark, & Lowell, 1953; Murray, 1938). These early theorists proposed that individuals' achievement pursuits may be orientated toward the attainment of success or the avoidance of failure (Rawsthorne & Elliot, 1999).

Then in the late 1970s and early 1980s the achievement goal approach was introduced to achievement motivation (see, for example, Dweck & Bempechat, 1983; Maehr & Nicholls, 1980; Nicholls, 1979, 1984). This approach was defined as "the reason for or purpose of competence-relevant activity" (Elliot & Harackiewicz, 1996, p. 461). Initially, achievement goal theorists pursued the lead of Lewin, McClelland and Atkinson in conceptualising an approach and avoidance motivation (Pintrich, 2000). However, it later received little theoretical and empirical attention and was eventually overlooked (Elliot & Harackiewicz, 1996). For example, as reported by Middleton and Midgley (1997), performance approach and avoidance goals were overlooked by Nicholls and his colleagues (such as in Nicholls, Patashnick, Cheung, Thorkildsen & Lauer, 1989). Their early work assessed both avoidance and approach scales. The two scales were combined and labelled "ego-orientation". Studies following this research disregarded the items assessing avoidance goals from the ego-orientation measure.

Results from a number of studies attest that performance goals facilitate adaptive achievement behaviour, but in contrast a substantial number of studies reveal performance goals have negative consequences, while other studies posit that performance goals have no discernible effect (Elliot, 1999).

The recent reconsideration of a trichotomous construct lead by Elliot and colleagues (Elliot, 1994, 1997; Elliot & Church, 1997; Elliot & Harackiewicz, 1996) strives to differentiate performance goals in terms of approach and avoidance (Pintrich, 2000). One recent study which adopted a goal theory framework to examine an avoidance component within the performance goal was Elliot and Church (1997). Results attest that performance avoidance goals proved deleterious to both intrinsic motivation and graded performance whereas performance approach goals led to better performance but had no effect on intrinsic motivation. The researchers' findings suggest that the trichotomous framework requires further differentiation within the two performance goals.

Middleton and Midgley (1997) claim performance avoidance goals may be an influential motivational tendency, yet this remains largely unexplored in studies using a goal theory framework. Roney, Higgins and Shah (1995) conducted a set of experiments in which they manipulated approach and avoidance by focusing participants'
attention on task-specific performance guidelines for a precise number of anagrams to try to solve (approach) or to avoid not solving (avoidance). Results of the study attested that participants from the performance avoidance condition performed worse and displayed less persistence on unsolvable anagrams than did the participants from the approach condition.

The above studies provide evidence of the negative effects of performance avoidance in the short term. One study conducted by Elliot and Sheldon (1998) examined the long term effects of performance avoidance. Results disclosed that students in the pursuit of a performance avoidance goal were associated with low perceptions of competence, contributing to negative implications for achievement-relevant and general wellbeing outcomes.

Information Processing

In general, it seems the quantity and quality of information retained by an individual depends largely on the perceptual and cognitive operations employed at the time of encoding (Kawamoto, Kello, Higareda, & Vu, 1999; Richardson-Klavehn & Gardiner, 1998). A classic article by Craik and Lockhart (1972) explains this process of affecting memory, especially encoding operations, in terms of depth of processing. From this perspective, memory traces are seen as by-products of perceptual analysis with the levels of analysis as important determinants of memory information (Benton, Glover, & Bruning, 1983). This framework is interpreted according to a hierarchy of processing: the greater the depth of processing, the greater the degree of semantic or cognitive analysis. Information may be processed at various levels, deep or shallow.

Trace persistence is a function of depth of processing, with deep levels of analysis associated with more elaborate, longer-lasting and stronger traces. Deep levels of processing are evoked by the subject attending to the meaning of information. Shallow levels of processing are evoked by the subject focusing on surface features, or an emphasis on pronunciation of the information. In summary, a deep level of processing leads to a more persistent memory trace, resulting in better memory performance (Thompson-Schill & Gabrieli, 1999).

The levels of processing paradigm assumes that what an individual remembers depends to a large degree on the way in which the information was processed or encoded during learning. Information may be processed at various levels and the deeper the level, the more superior the retention of target information. A representative study by Craik and Tulving (1975) examined the depth of processing paradigm. The researchers asked a group of subjects a number of questions, each requiring a positive or negative response. Four types of questions were presented, each designed to elicit a different level of processing. Assume, for example, that the target word is "bear". A subject might be asked, "Does the word bear rhyme with fair?" or, "Is the word bear in capital letters?". The first question type requires phonemic processing, since the emphasis is placed on the pronunciation, whilst the second question type requires attention to the surface features of the target word. Both these question types evoke shallow levels of processing. A third question type asks, "Is the word a type of animal?" and a fourth type might be, "Would the word make sense in the sentence, 'The bear roared loudly'?". The third question calls for the classification of the target word. This requires taxonomic analysis. The final question calls for the target word to be placed into a sentence so as to make meaning. This requires semantic analysis. Both the taxonomic and semantic question types evoke deep levels of processing. After a number
of questions from the above four question types, Craik and Tulving gave their subjects an unexpected recall test. As hypothesised under the depth of processing paradigm, subjects recalled more target words that had been accompanied by questions requiring deep levels of processing (category and sentence) than target words accompanied by questions requiring shallow processing (phonemic and structural).

There are a number of methods which facilitate depth of processing, resulting in greater memory performance. One of these methods is to provide meaningful stimuli, since these are retained more efficiently than less familiar information (Richardson-Klavehn & Gardiner, 1998; Thompson-Schill & Gabrieli, 1999). Recall performance is also affected by the quality of the trace and by the presence of retrieval cues (Craik & Lockhart, 1972). The retrieval environment facilitates memory performance as recall can be impaired if the environmental context between study and test alters (Russo, Ward, Geurts, & Scheres, 1999). Another technique to increase memory performance is to allow for ample processing time (Moscovitch & Craik, 1976). Despite this there are some theorists, for example Nelson (1977), who argue against time as an accurate predictor of memory performance.

**Distinctions Between the Present and Modelled Research**

The levels of processing paradigm was adapted by Graham and Golan (1991), who examined the effects of students’ motivation on information processing and word recall. This experimental framework was adopted by the present study although several significant modifications were made to enhance the conceptual clarity of the research.

First, the motivational prompts of the present study differed from Graham and Golan’s (1991) research. The present study incorporated a trichotomous variable (mastery, performance approach and performance avoidance) rather than the dichotomous variable (mastery and performance) used in Graham and Golan’s study.

Second, findings from the present study will be more relevant to a greater population as a substantially larger sample was used: 200 students (53% female and 47% male) from kindergarten through to year six at the same primary school, compared to Graham and Golan’s (1991) sample of 55 students (56% female and 44% male) from fifth and sixth grade.

Third, participants in Graham and Golan’s (1991) study were informed that their performance on an initial task (a set of puzzles) predicted their performance on the final task (a computer word game). According to the researchers, the inclusion of the initial puzzle established a believable context for the experimental manipulation (computer word game). Instead of a puzzle task to create a believable context, the present study used an initial experimental protocol which was identical to the final experimental protocol except that the stimulus words used in the initial protocol were different from those used in the final experimental protocol. We reasoned that the initial experimental protocol would provide an even more believable context for the final experimental protocol than Graham and Golan’s puzzle task provided for their final experimental protocol. We also reasoned that if the participants were exposed to a particular motivational prompt on two separate occasions (during both the initial and final experimental protocol), the salience of the motivational prompt in the final experimental protocol would be enhanced.

Fourth, Graham and Golan (1991) presented their stimulus words on a computer screen. In contrast, the present study attempted to replicate a more realistic classroom situation since memory performance can be impaired if the environmental context is
unfamiliar (Russo et al., 1999). The experimental protocols provided a realistic classroom situation because the experimenter was a class teacher at the school and, importantly, the experimental protocols took place in students' own classrooms.

Fifth, low mean scores recorded by Graham and Golan's (1991) students underscored a potential weakness founded in the use of 60 stimulus words. In order to work with higher means, a more realistic number of stimulus words was necessary for the present study, especially since the participants were younger. Tulving and Pearlstone's (1966) study revealed that the probability of an item's retrieval declined as the number of items presented per category increased. Therefore the present study limited the total number of stimulus words to be recalled in each experimental protocol to 12.

Finally, Moscovitch and Craik's (1976) findings reveal stimuli words receiving a "yes" response are more likely to be recalled than words requiring a "no" response. To maximise memory performance resulting in higher mean scores all of the responses to the questions in the initial and final experimental protocols required a positive response whilst in Graham and Golan's (1991) study 25% of the total number of responses required a negative response.

Method

Participants

Participants included 200 infant and primary students: 35 (20 boys and 15 girls, average age = 5.2) were in kindergarten, 71 (34 boys and 37 girls, average age = 6.6) were in grades one and two, 53 (31 boys and 22 girls, average age = 8.6) were in grades three and four, 41 (21 boys and 20 girls, average age = 10.6) were in grades five and six. The sample comprised students from various ethnic and socioeconomic backgrounds, displaying a range of cognitive abilities. Permission for participation was granted by the school principal and primary care givers of the students.

Procedure

Students were randomly allocated to one of four treatment groups: mastery goal \((n = 52)\), performance approach \((n = 51)\), performance avoidance \((n = 47)\) and a control group \((n = 50)\). All students individually responded to two experimental protocols, conducted one day apart. Each session was conducted by the same experimenter who was a class teacher at the school. The experimenter conducted the two experimental protocols at the back of the students' classrooms because it was a familiar environment.

The experimenter explained to the students that she was interested in finding out how the brain remembers certain information and then recalls the information. She further explained that the students in the class could assist her in investigating this process by participating in an experiment. The students' involvement in the study was described briefly. They were told of the two different word games (experimental protocols) which would require them to answer 12 easy questions (experimental phase) and then complete two simple memory activities (free recall and cued recall).

Experimental Task

Adopted from Moscovitch and Craik (1976), the levels of processing tasks entailed two experimental protocols each consisting of three practice questions to familiarise
students with the material and procedure, followed by 12 encoding questions, then a free recall task and a cued recall task.

Students were induced to process each stimulus word at either a shallow or deep level of processing. One third of the questions required phonemic (rhyme) processing, one third required taxonomic (category) processing and the remaining third required semantic (sentence) processing. Questions for each of the experimental protocols were ordered so as the words would rotate among these three question types. This method of rotation was formed to control for any effect of order in the questions. The practice task before each experimental protocol comprised three encoding questions, one from each of the three question types (rhyme, category, and sentence). Table I displays the type of practice encoding questions the students received before commencing the actual experimental protocols.

Due to the range of abilities of the students, the present study combined some consecutive year groups to complete the same initial and final experimental protocols: years one and two were combined, as were years three and four, and years five and six. The kindergarten students completed their experimental protocols independently. The 12 stimuli words for each of the experimental protocols were selected so as not to exceed the lowest grade's reading level.

In the actual task, the students listened to the experimenter read a stimulus word followed by a question (for example, “Pat. Does the word rat sound like pat?”). The students responded to the question with a positive or negative answer. Their responses

<table>
<thead>
<tr>
<th>KINDERGARTEN</th>
<th>Question</th>
<th>Level of processing</th>
<th>Category (deep)</th>
<th>Sentence (deep)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonemic (shallow)</td>
<td>PAT Does the word rat sound like pat?</td>
<td>Level of processing</td>
<td>Question</td>
<td>Level of processing</td>
</tr>
<tr>
<td>Category (deep)</td>
<td>PIG Is the word pig a type of animal?</td>
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<tr>
<td>Sentence (deep)</td>
<td>MAP Does the word map make sense in the sentence: “Australia is on a map”</td>
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</tbody>
</table>

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<thead>
<tr>
<th>YEARS ONE &amp; TWO</th>
<th>Question</th>
<th>Level of processing</th>
<th>Category (deep)</th>
<th>Sentence (deep)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonemic (shallow)</td>
<td>VAN Does the word man sound like van?</td>
<td>Level of processing</td>
<td>Question</td>
<td>Level of processing</td>
</tr>
<tr>
<td>Category (deep)</td>
<td>JAM Is the word jam a type of food?</td>
<td></td>
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<tr>
<td>Sentence (deep)</td>
<td>JET Does the word jet make sense in the sentence: “This jet can fly”</td>
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<tr>
<th>YEARS THREE &amp; FOUR</th>
<th>Question</th>
<th>Level of processing</th>
<th>Category (deep)</th>
<th>Sentence (deep)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonemic (shallow)</td>
<td>CORN Does the word born sound like corn?</td>
<td>Level of processing</td>
<td>Question</td>
<td>Level of processing</td>
</tr>
<tr>
<td>Category (deep)</td>
<td>SALT Is the word salt a type of food?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Sentence (deep)</td>
<td>FAIRY Does the word fairy make sense in the sentence: “A fairy has wings”</td>
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<thead>
<tr>
<th>YEAR FIVE &amp; SIX</th>
<th>Question</th>
<th>Level of processing</th>
<th>Category (deep)</th>
<th>Sentence (deep)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonemic (shallow)</td>
<td>FASHION Does the word passion sound like fashion?</td>
<td>Level of processing</td>
<td>Question</td>
<td>Level of processing</td>
</tr>
<tr>
<td>Category (deep)</td>
<td>TONGUE Is the word tongue a part of the human body?</td>
<td></td>
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<tr>
<td>Sentence (deep)</td>
<td>SAUCE Does the word sauce make sense in the sentence: “I love sauce on my pie”</td>
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</tbody>
</table>
were recorded systematically. The free recall and cued recall tasks immediately followed the encoding questions. The students were informed during the practice task and reminded before beginning the actual task, to remember the first word (stimulus) from each of the 12 encoding questions in order to complete the recall tasks. The first recall task, referred to as free recall, entailed the students listing in three minutes all the stimulus words they could remember from the 12 encoding questions. The second recall measure, cued recall, entailed the experimenter reading an encoding question without the stimulus, and the students were asked to recall the stimulus associated with the encoding question. This procedure was repeated for each of the 12 encoding questions.

The same process was carried out for the final experimental protocol, which was conducted one day after the initial protocol. Appendices (available on request from the authors) display the interview question sheets used for each of the different combined year groups in the study.

**Experimental Manipulation**

All four treatment groups received instructions on how to complete the task. In addition to instructions, students allocated to the mastery, performance approach, or performance avoidance orientation groups were motivationally prompted according to their condition. Motivational prompts were introduced before each of the experimental protocols and were repeated before each of the recall tasks.

Mastery manipulations typically entail focusing the students' attention on their effort in an attempt to improve their mastery of the task, as opposed to comparing themselves to others. In the mastery focused condition the children were told, "If you concentrate on this task, try to see it as a challenge and enjoy mastering it, you will probably get better as you go along."

Performance approach manipulations typically entail focusing the students' attention on their self-perceived ability, or their ability in comparison to other students. In the performance approach condition the student were prompted with, "People are either good at this activity compared to other kids their age or they are not. Your performance on this activity will tell me something about how good you are at this kind of task."

Performance avoidance manipulations typically entail focusing the students' attention on avoiding the appearance of lack of ability. In the performance avoidance condition the children were told, "Answer the following questions to this test with the correct answers so your class don't think you are silly or stupid."

The control group received no motivational prompt, only instructions on how to complete the task.

**Dependent Measure**

Following the 12 encoding questions the students completed the free recall and cued recall tasks. The maximum score to be achieved for each recall task was 12 stimulus words. The order in which the students recalled the stimuli during free recall was insignificant to the scoring, however during cued recall the students were asked to recall the stimulus associated with the specific encoding question.

After the initial experimental protocol the students were congratulated on their performance and assured they had done well on the task. Once the final experimental protocol was complete, the students were thoroughly debriefed as the experimenter
commended each student on their achievement and informed them of the confidentiality of the results.

Results

Initial Experimental Protocol

Preliminary analyses were conducted using analysis of variance (ANOVA) to determine whether there were interaction effects of age, gender, and question type between goal orientation and depth of processing. These analyses showed no interaction effects of age, gender, and question type therefore the data were combined across age and gender. Both Bartlett’s and Hotelling’s tests of normality showed that variance comparisons between groups were nonsignificant ($P > 0.05$). Thus, the assumption of variance homogeneity between groups is tenable.

The number of stimulus words remembered under conditions of free and cued recall were analysed in separate 4 (experimental condition) x 3 (question type) analyses of variance (ANOVAs). Significant ANOVAs were followed by a post hoc comparison between the means, using Fisher’s least significant difference (LSD) test (Pedhazur and Pedhazur Schmelkin, 1991). The free recall data are shown in the top half of Table II, and the cued recall data are displayed in the bottom half. Effect sizes are also reported in Table II. Effect size of the differences between groups was calculated with the mean of the experimental groups minus the mean of the control group divided by the standard deviation of the control group.

Free recall main effects. The combined results of shallow (rhyme) and deep (category or sentence) levels of processing were relatively poor under conditions of free recall, with students recalling, on average, 33% of the stimulus words. However, ANOVA revealed a significant main effect of question type ($F (2, 196) = 5.7, MS = 3.2, P < 0.001$). Specifically, free recall under the deeper levels of processing (category and sentence) was significantly greater than free recall under the shallow level of processing (rhyme). There was no significant difference between category and sentence words for free recall. There was no significant main effect for experimental condition and no significant interaction effect for experimental condition and question type.

Cued recall main effects. The combined results of shallow (rhyme) and deep (category or sentence) levels of processing for cued recall revealed an average of 65% recall. The pattern of main effects of question type ($F (2, 196) = 6.0, MS = 3.2, P < 0.001$) for cued recall replicated those for free recall. That is, cued recall under deeper levels of processing (category and sentence) was significantly greater than cued recall under the shallow level of processing (rhyme). There was no significant difference between category and sentence words for cued recall. There was also a main effect of experimental condition for cued recall, ($F (3, 98) = 4.2, MS = 3.5, P < 0.01$.) Significantly fewer words were recalled by students in the control group (7.16) than the mastery condition (7.92), performance approach condition (8.26) and the performance avoidance condition (7.65), $P < 0.01$.

Cued recall interaction effects. The effect of the experimental manipulation was not uniform across all levels of processing, as revealed by the significant experimental condition x question type interaction ($F (6, 196) = 2.3, P < 0.05$.) This interaction is
<table>
<thead>
<tr>
<th></th>
<th>Mastery (n = 52)</th>
<th>Approach (n = 51)</th>
<th>Avoidance (n = 47)</th>
<th>Control (n = 50)</th>
<th>Average of row means</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Free recall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhyme</td>
<td>0.98</td>
<td>0.75</td>
<td>1.25</td>
<td>1.00</td>
<td>1.11</td>
<td>0.81</td>
</tr>
<tr>
<td>Category</td>
<td>1.54</td>
<td>1.00</td>
<td>1.47</td>
<td>1.22</td>
<td>1.34</td>
<td>0.94</td>
</tr>
<tr>
<td>Sentence</td>
<td>1.37</td>
<td>1.07</td>
<td>1.58</td>
<td>1.20</td>
<td>1.36</td>
<td>0.99</td>
</tr>
<tr>
<td>Total</td>
<td>3.89</td>
<td>4.30</td>
<td>3.81</td>
<td>3.84</td>
<td>3.84</td>
<td></td>
</tr>
<tr>
<td>Average of column means</td>
<td>1.30</td>
<td>1.43</td>
<td>1.27</td>
<td>1.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cued recall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhyme</td>
<td>1.96</td>
<td>1.22</td>
<td>2.14</td>
<td>1.22</td>
<td>1.89</td>
<td>1.11</td>
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<tr>
<td>Category</td>
<td>2.69</td>
<td>1.19</td>
<td>3.08</td>
<td>1.09</td>
<td>2.87</td>
<td>1.10</td>
</tr>
<tr>
<td>Sentence</td>
<td>3.27</td>
<td>0.81</td>
<td>3.04</td>
<td>1.08</td>
<td>2.89</td>
<td>1.09</td>
</tr>
<tr>
<td>Total</td>
<td>7.92</td>
<td>8.26</td>
<td>7.65</td>
<td>7.16</td>
<td>7.65</td>
<td></td>
</tr>
<tr>
<td>Average of column means</td>
<td>2.64₄</td>
<td>2.75₄</td>
<td>2.55₄</td>
<td>2.39</td>
<td></td>
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</tr>
</tbody>
</table>

Notes to Table II:
- Maximum score = 4 within each question type
- Mean scores with different subscripts are significantly different from each other at $P < 0.05$
- Effect size calculated using the formula: $\frac{M_{\text{experimental}} - M_{\text{control}}}{SD_{\text{control}}}$
depicted in Figure 1. Analysis within question type revealed no significant differences in the cued recall of rhyme or sentence words as a function of experimental condition ($P < 1.0$). However, students in the performance approach condition recalled significantly more category words (3.08) than students in the control group (2.50).

Fig. 1 shows that performance approach students recalled the highest number of shallow (rhyme) stimulus words with the control group recalling the least; however, this difference was non-significant. Students in the performance approach condition also recalled the highest number of stimulus words for category questions and performed significantly ($P < 0.05$) better than students in the control group who again recalled the least words. Students in the mastery condition recalled the highest number of words for the sentence questions, while students in the performance avoidance condition recalled the least words; however, this difference was non-significant.

**Final Experimental Protocol**

Preliminary analyses were conducted using analysis of variance (ANOVA) to determine whether there were interaction effects of age, gender and question type between goal orientation and depth of processing. These analyses showed no interaction effects of age, gender and question type therefore the data were combined across age and gender. Both Bartlett's and Hotelling's tests of normality showed that variance comparisons between groups were non-significant ($P > 0.05$). Thus, the assumption of variance homogeneity between groups is tenable.

The number of stimulus words recalled under conditions of free and cued recall were analysed in separate 4 (experimental condition) x 3 (question type) analyses of variance (ANOVAs). Significant ANOVAs were followed by a post hoc comparison between the means using Fisher's least significant difference (LSD) test (Pedhazur et al., 1991).
The free recall data are shown in the top half of Table III and the cued recall data are displayed in the bottom half. Effect sizes are also reported in Table III. Effect size of the differences between groups was calculated with the mean of the experimental groups minus the mean of the control group divided by the standard deviation of the control group.

**Free recall main effects.** The combined results of shallow (rhyme) and deep (category and sentence) levels of processing were relatively poor under conditions of free recall, with students recalling on average 35% of the stimulus words. However, ANOVA revealed a significant main effect of question type \( F(2, 196) = 5.6, MS = 3.2, P < 0.001 \). The averages of row means in Table III show that students recalled significantly fewer rhyme words than category and sentence words (both \( P_i < 0.001 \)) under free recall. No significant difference between category and sentence words was evident (\( P > 0.05 \)). The main effect of experimental condition, and its interaction with question type, was not significant.

**Cued recall main effects.** The combined results of shallow (rhyme) and deep (category and sentence) levels of processing for cued recall revealed an average of 72% recall. The pattern of main effect for question type \( F(2, 196) = 5.2, MS = 3.4, P < 0.001 \) during cued recall was similar to free recall. That is, cued recall under deeper levels of processing (category and sentence) was significantly greater than cued recall under the shallow level of processing (rhyme). However, there was also a significant difference between category and sentence question type for cued recall.

There was a main effect of experimental condition for cued recall; \( F(3, 98) = 4.12, MS = 2.9, P < 0.01 \). Significantly fewer stimulus words were recalled during cued recall by the control group than the performance avoidance students. Also, fewer words were remembered by the mastery orientated students than students in either the performance approach or performance avoidance conditions, but these differences did not reach significance (\( P > 0.05 \)).

**Cued recall interaction effects.** The effect of motivational manipulation was not uniform across all levels of processing, as revealed by the significant experimental condition \( \times \) question type interaction \( F(6, 196) = 2.6, P < 0.05 \). This interaction is depicted in Fig. 2.

There was no significant interaction effect for the rhyme question type. However, analysis within question type revealed significant differences in the cued recall of category and sentence words as a function of experimental condition. Students in the performance avoidance condition recalled significantly more category words than the mastery and control group students. Also, students in the performance avoidance condition recalled significantly more sentence words than the control group students.

Fig. 2 shows the performance approach students recalled the highest number of shallow (rhyme) stimulus words with the control group recalling the least; however, this difference was non-significant. Students in the performance avoidance condition for cued recall recalled significantly more category stimulus words than both the mastery and control group students. Moreover, significantly fewer sentence words were recalled by students in the control group than students in the performance avoidance group.

The same pattern from Fig. 1 repeats in Fig. 2 for the mastery orientated students. The mastery orientated students display poor recall for the rhyme question type;
### Table III. Results of final experimental protocol

<table>
<thead>
<tr>
<th></th>
<th>Mastery (n = 52)</th>
<th>Approach (n = 51)</th>
<th>Avoidance (n = 47)</th>
<th>Control (n = 50)</th>
<th>Average of row means</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Free recall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhyme</td>
<td>0.96</td>
<td>0.77</td>
<td>1.00</td>
<td>0.82</td>
<td>1.11</td>
<td>0.67</td>
</tr>
<tr>
<td>Category</td>
<td>1.63</td>
<td>1.09</td>
<td>1.75</td>
<td>0.93</td>
<td>1.60</td>
<td>0.97</td>
</tr>
<tr>
<td>Sentence</td>
<td>1.62</td>
<td>0.87</td>
<td>1.78</td>
<td>0.90</td>
<td>1.57</td>
<td>1.08</td>
</tr>
<tr>
<td>Total</td>
<td>4.21</td>
<td>4.53</td>
<td>4.28</td>
<td>3.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average of column means</td>
<td>1.40</td>
<td>1.51</td>
<td>1.43</td>
<td>1.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cued recall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhyme</td>
<td>2.10</td>
<td>1.22</td>
<td>2.35</td>
<td>1.28</td>
<td>2.30</td>
<td>1.10</td>
</tr>
<tr>
<td>Category</td>
<td>2.94a</td>
<td>1.00</td>
<td>3.12</td>
<td>0.93</td>
<td>3.38f</td>
<td>0.68</td>
</tr>
<tr>
<td>Sentence</td>
<td>3.37</td>
<td>0.84</td>
<td>3.24</td>
<td>0.93</td>
<td>3.51b</td>
<td>0.80</td>
</tr>
<tr>
<td>Total</td>
<td>8.41</td>
<td>8.71</td>
<td>9.19</td>
<td>8.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average of column means</td>
<td>2.80</td>
<td>2.90</td>
<td>3.06a</td>
<td>2.71a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes to Table III:
- Maximum score = 4 within each question type
- Mean scores with different subscripts are significantly different from each other at \( P < 0.05 \)

**Effect size calculated using the formula:**
\[
\text{Effect size} = \frac{M_{\text{experimental}} - M_{\text{control}}}{SD_{\text{control}}}
\]
FIG. 2. The interaction effect of motivational orientation and depth of processing under cued recall, final experimental protocol.

however, better recall is demonstrated in the deeper levels of processing, particularly in the sentence question type.

Discussion

Comparing Results Between the Present and Modelled Research

Main effects of motivation and cognition. The results of this study showed that students' recall of verbal information was superior when it was analysed for meaning (deep processing), rather than when the focus was on superficial characteristics (shallow processing). These results are consistent with the findings of Graham and Golan (1991), even though the present study included an additional performance motivated condition.

Behaviours associated with the adoption of a mastery goal include an active form of cognitive engagement through the use of greater learning strategies, likely to result in conceptual understanding (Meece, Blumenfeld, & Hoyle, 1988; Nolen, 1988; Seifert, 1995). Consistent with the literature and the findings of Graham and Golan (1991), the mastery orientated students in both the initial and final experimental protocols replicated the hypothesised depth of processing levels effect.

Elliot and Harackiewicz (1996) state that performance avoidance individuals self-regulate to avoid potentially negative outcomes, and that this form of regulation interferes with optimal task engagement resulting in poor achievement. In contrast, our performance avoidance students demonstrated an increase in the recall of deep processing for the sentence stimulus words compared with rhyme and category words in both the experimental protocols, with the exception of free recall for the second experimental protocol, where the students remembered slightly more category words than sentence words.
Interaction effects of motivation and cognition. Like Graham and Golan’s (1991) study, all of the significant interaction effects of the present study occurred during cued recall. Similar to the modeled research, all of the significant interaction effects occurred in the deeper levels of processing (category and sentence) than the shallow (rhyme). This suggests that the motivational conditions appear to have their greatest impact when individuals process information at deeper levels.

Mastery goals, performance goals and cognition. The deleterious effects of a performance goal compared with a mastery goal on the recall of deeply processed information were documented by Graham and Golan (1991). By contrast, our results reveal that students with a performance goal demonstrated superior recall of deeply processed information when compared to students in either the mastery goal or control groups. For example, the performance avoidance students recalled significantly more category stimulus words than the mastery students during cued recall for the initial experimental protocol. A main effect of experimental condition for the initial experimental protocol during cued recall revealed both the performance approach and performance avoidance students performed significantly better than the control group. Although there were no significant differences between the two performance goals, the distinction between performance approach and performance avoidance remains a worthwhile one to pursue.

Distinctions Between the Present and Modeled Research

Modifications to the modeled research. The present study made several modifications to Graham and Golan’s (1991) study which appear to have enhanced the conceptual clarity of the research. First, it is speculated that repeating the motivational manipulation would provide an even more believable context for the final experimental protocol than Graham and Golan’s puzzle task provided for their final experimental protocol. In addition, it was reasoned that if participants were exposed to the prompt on two separate occasions, the salience of the prompt in the final experimental protocol would be enhanced. Second, better recall performance by the students in the present study may be attributed to the limited number and selection of stimulus words since familiar stimuli assist with more effective encoding (Craik & Lockhart, 1972). Third, the comparability of the experimental protocols with a more realistic classroom situation may have contributed to better recall since the retrieval environment is a determinant of effective recall (Nelson, 1977; Russo et al., 1999). Fourth, a larger sample were examined in the present study, therefore the findings may be relevant to a greater population of individuals and, as such, may contribute to the understanding of motivation in young students as well as older students.

Limitations. Consistent with Graham and Golan’s (1991) research, the present research did not assess the effectiveness of the manipulations used to induce differential motivational states. This can be seen as a limitation of both the previous and present study and should therefore be taken into account when interpreting the results. Future research could improve on the previous and present research by providing evidence that the motivational manipulations were effective in inducing differential motivational states.
Links to the theoretical frameworks. Importantly, the results from the present study show that for cued recall, students motivated according to a goal (either mastery, performance approach or performance avoidance) performed better than students in the control group for the initial and final experimental protocols. These findings indicate that verbal motivation, associated with any of the trichotomous experimental conditions, enhanced student performance as demonstrated in better recall. Therefore in a classroom situation, it may be more beneficial, for strict academic performance (without any consideration of the psychological effects on students), for the teacher to motivate students verbally using any of the three experimental manipulations, than simply giving instructions on how to complete a task.

The results of the present study revealed the performance goals as superior determinants of recall performance than either a mastery goal or control group. This finding is consistent with Elliot and Church's (1997) results, which revealed a mastery goal adoption had no effect on graded performance, whereas a performance approach goal led to superior performance. However, Elliot and Church's (1997) results revealed the adoption of a performance avoidance goal led to poor graded performance. This finding contrasts with the results of the present study since the performance avoidance orientated students demonstrated significantly better recall than the mastery and control conditions. The present study speculates that, in particular, the fear of failure encourages students with a performance avoidance goal to focus on the task at hand even more intensely than mastery students. As a result, the performance avoidance orientated students were able to recall significantly more information than mastery orientated individuals.

Whilst a performance avoidance motivational state may induce better results in the short term, it may also have negative implications for long-term recall. The present study examined recall over a 24-hour period. It may be that, over longer periods, mastery motivated students may display better recall, although this aspect of information processing over time remains largely unexplored. A recent research study conducted by Elliot and Sheldon (1998) investigated performance avoidance motivation over time. Over the course of a semester they found students who approached a task in the pursuit of a performance avoidance orientation, suffered iminical consequences for outcomes, including performance, persistence, task involvement, and intrinsic motivation. These findings are yet to be confirmed and deserve further investigation.

The results of the present intervention indicate that motivational goal orientation drives the effectiveness of levels of processing, as this relates to a student's recall ability. Alternatively, it is possible that the deeper levels of processing may power motivational orientations. Bergin (1998), for example, hypothesises that cognitive strategies may in fact power student motivation. As another alternative, it is possible that academic motivation and cognition may share a reciprocal relationship, in which they power one another. Whatever the case, the causal relationship between motivation and cognition deserves further investigation (see Dowson & McInerney, 1998 for one example of an attempt to specify causal relations between students' academic motivation and cognition).

Implications for Educators

Achievement motivation. Essentially, teachers are concerned with how to motivate students effectively in order to improve academic performance. Difficulties arise when
the literature is divided between mastery goals versus performance goals (Elliot and Church, 1997). According to the result of the present study, any form of motivation, whether it be mastery focus, performance approach or performance avoidance, induces better academic performance than receiving task instructions only.

Depth of processing. The results of the present study reveal deep levels of processing determine better recall performance than shallow levels of processing. The more detailed the prompt (sentence rather than category), the more meaningful the cue. These findings are important for educators, since they suggest that the level at which a stimulus is presented determines the effectiveness of recall ability. They also indicate that the more meaningful the cue, the easier the access to the target information, resulting in superior recall. Perhaps if instructors present information using meaningful cues, deep levels of processing will be facilitated and their students may display superior recall performance.

Suggestions For Future Research

As a final note, it would be interesting for future research studies to combine the teaching of cognitive strategies alongside the provision of differing motivational prompts in order to assess which motivational conditions induce better academic performance within the context of strategic instruction.

The present study replicated the design and pattern of results achieved by Graham and Golan’s (1991) study, although an additional performance orientation group was incorporated in the experimental design of the present study. It would be interesting to investigate whether the results from the present study could be replicated using a similar experimental design.

Perhaps a study examining the effectiveness of the motivational prompts used in the present study (mastery, performance approach, performance avoidance) may reveal methods to optimise achievement using the various motivational orientations.

Conclusion

This study was able to replicate the design and a similar pattern of results achieved by Graham and Golan (1991), with the addition of a performance approach and performance avoidance orientation.

The results indicate that, even in the presence of a performance avoidance or approach orientation, recall of verbal information was superior when it was analysed for meaning (deep processing) rather than when the focus was on superficial characteristics (shallow processing). More significant differences were evident at the deeper levels of processing and these differences occurred mainly in the final experimental protocol.

The results of the present study show no significant differences between the two performance goal conditions; however, significant differences between the performance goals and the mastery orientated and control groups were evident. Therefore, the distinction between performance approach and performance avoidance remains a worthwhile area of investigation.

Any of the trichotomous motivational prompts proved to be more beneficial than simply receiving instructions since the control group achieved the lowest recall scores for all three depth of processing questions (rhyme, category, and sentence) in both of the experimental protocols.
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REFERENCES


Motivation and Depth of Information Processing


