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The role of a basic expectation effect in learning and performance and its implications

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The role of a basic expectation effect in learning and performance and its implications.

Abstract: Motivational models of student achievement have outlined a role for expectations in students' long term achievement trajectory but as of yet the role of expectation effects in the immediate learning and performing environment remains untested. It is suggested that expectation effects, if apparent in the immediate learning environment, may offer an underpinning explanation for some of the major theories that have produced large effects from small manipulations; with a focus on implicit theories (Dweck, 1999) and stereotype threat (Steele and Aronson, 1995). This experiment tested expectation effects by giving students in year one or year four of an undergraduate degree a learning task and indicating the degree of difficulty to them, giving high or low expectations. Their learning was tested a week later in a 'warm-up' test, before being told they were to complete a 'real' test, before which the degree of difficulty was indicated. The two tests allowed learning and performance to be tested separately. It was found that year one students were susceptible to the expectation effect as those in the low expectation condition had lower test scores than those in the high expectation condition, the pattern was level obvious for the year four students. The results are discussed with relation to current theories and a basic expectation mechanism and further research options are suggested.

Contents

1. Introduction

This paper seeks discover the ease with which student expectations and thus their achievement, can be influenced. What it is that can make two similar students achieve at different levels has been a topic of great interest in psychology for many years and a number of prominent achievement models have emerged from the literature. Student motivation in particular has generated a large number of theories, including expectancy-value model (Wigfield and Eccles, 2000); academic self-efficacy (Bandura (1977; 1997) and academic self-concept (Bong and Slaavik, 2003), all of which attempt to describe the myriad factors that can impact on intrinsic student motivation, including student expectancies.

Similarly, Carol Dweck's long-running 'Mindsets' theory (1988; 1998; 1999) has attempted to account for differences in students' effort expenditure and their ability to recover from failure or negative feedback, by outlining students' implicit theories of intelligence and how this affects subsequent achievement. Phenomena such as the racial achievement gap in the USA and women's under-performance in mathematics domains gave rise to another major theory in the field of differential achievement, that of stereotype threat (Steele and Aronson, 1995) whereby awareness of a stereotype that exists about a student's in-group causes a drop or rise in performance. Large effects have often been experimentally induced by surprisingly subtle suggestion.

Do these theories exhibit certain common themes? This paper seeks to discover whether many of the theories regarding variability found in student achievement, can be explained by the differential effect of student expectations on learning and performance and whether these can be manipulated simply by suggestion. Many models outline the role of student expectations in motivation, but not learning, as having an indirect effect on achievement. It is possible the expectations are having a direct effect by interfering with encoding of information at the learning stage and the display of that learning at performance stage. Few studies thus far have singled out how learning specifically is affected, which the current study will aim to do by using a task that involves learning new material. This study will attempt to pin down this effect by indicating to students that others have found a task easy or difficult and assessing the impact of this suggestion on subsequent tests of learning and performance. A number of related measurements, such as self-efficacy, will be taken with a view to testing how expectation effects differ between students.

1.1 Expectancy-value theory

One major theory in academic motivation has already considered how student expectations impact upon the dynamic and complex environment in which academic activities take place; this theory gives an indication that expectancies have an important role to play. The expectancy-value model (Wigfield and Eccles, 2000) explicitly outlines the effect of student expectations on achievement motivation. The now well-established model, posits

that the expectancies held about a task will affect the achievement, performance and choice of achievement related behaviours in education settings. These it links in a dynamic interactive model that includes several social, cultural and psychological factors, which are also considered to have major influence on academic behaviour. Although, traditionally much of the literature is concentrated in school settings, it is important to consider student motivation in any learning situation in order to optimise the process at all levels, including higher education.

Expectancies are defined as the beliefs of learners regarding their performance on an upcoming task, as opposed to their beliefs regarding their competence and abilities in general, which is also included in the model under the self-schemata construct (Wigfield and Eccles, 2000). In this model, expectancies are measured simply by students implying whether they expect to do well or not and are proposed to directly predict achievement behaviours, under the influence of several psychological and sociocultural influences, including cultural stereotypes and people's interpretations of experience. Hence, any manipulation aimed at altering these expectations must imply either of those two outcomes.

The model developed by Eccles and colleagues has been tested extensively in real achievement situations and has repeatedly been found to be valuable as an important predictor of various outcomes, such as achievement (Dennissen Zarret and Eccles, 2007; Wigfield, Eccles, Schiefele, Roeser and Kean, 2006), course choice (Durik, Vida and Eccles, 2006) and persistence (Pintrich and Schunk, 2002). Hence the model has been useful in beginning to quantify the differentiation in achievement and motivation between students, but as of yet has not tested how expectations interfere with immediate learning and performance.

Studies investigating achievement under this model will typically use a longitudinal design, taking measures of their variables of interest and then monitoring achievement in the natural setting, or working from longitudinal data previously collected. Although this allows the construction of the correlations within relatively large data sets, it does not give any indication of how students' beliefs and motivation interact and interfere with the educative process. This study will try to initiate understanding of this by testing how manipulating expectations influences the learning and performance stages of education.

1.2. Academic Self-efficacy and Self-concept

A role for expectancies was similarly carved out by Albert Bandura (1977; 1997), in his theory of academic self-efficacy, where the distinction is also made between outcome expectancies and efficacy expectancies. Bandura predicted that efficacy expectancies are more predictive of academic success than outcome expectancies, in line with the expectancy-value model (Wigfiled and Eccles, 2000) and so efficacy expectancies were measured in

the current study in order to test how manipulating expectations may affect this. In academic terms, self-efficacy is defined as referring to our perceptions of our ability to learn and to perform actions (Bandura 1997; Schunk and Pajares, 2009). This is thought to stem from our feedback from previous performances, information gathered vicariously through others' performances - specifically those similar to us – as well as physiological feedback from our affect and anxiety states. The manipulation used in this study will attempt to alter efficacy expectations by indicating to students that the immediate task is easy or difficult, qualified by results from 'other students'. If the manipulation brings about a change in self-efficacy, as measured by confidence levels, this may offer a potential mediating factor through which achievement is affected.

The academic self-efficacy construct is closely related to that of academic self-concept; the former has been suggested as an active forerunner to development of the latter (Bong and Slaavik, 2003), however making a clear definition between the two can be difficult. Self-concept, as opposed to self-efficacy, refers to someone's knowledge and perceptions of themselves in academic situations in general, rather than their beliefs about ability to learn and perform (Bong and Clark, 1999). Typically both are measured using self-report questionnaires; however the difference between these questionnaires reflects one of the major differences between the two constructs: academic self-efficacy questions will typically be aimed at understanding future expectancies, whereas academic self-concept will focus on past achievements and behaviours (Wigfield and Eccles, 2000). Both however, are heavily influenced by past experiences.

What is unclear is the nature of the interaction between the two. If self-efficacy were affected when student expectations are manipulated would this be mediated by their academic self-concept score? The influence of internal records of past experiences may override any effect of external manipulation setting, hence a measure of both constructs will be included in the current study in an attempt to distil this relationship.

In achievement literature the predictive power of these constructs in student learning has been a major focus, including the study of factors such as motivation, course choice, goal-setting behaviour, persistence and many others (Wigfield, Tonks and Clauda, 2009). As a result, a strong relationship has emerged between academic self-efficacy and academic self-concept measures and a variety of indicators, although again these studies typically utilise the correlational longitudinal design. In one particular study, self-efficacy beliefs were found to be predictive of the variance in writing achievement among a sample of undergraduate students and pointed toward the importance of considering the influence of ability beliefs (Shell, Murphy and Bruning, 1989). As was found with the expectancy value model, academic self-concept scores were found to be highly predictive of achievement: the two were found to have a reciprocal relationship, in that initial achievement leads to a high self-concept, which in turn aids further achievement (Marsh, Trautwein, Lüdtke, Köller and Baumert, 2005).

Kornilova, Kornilova and Chumakova (2009) recently attempted to determine the relationship between academic self-concept, achievement and intelligence as measured by standardised intelligence tests. They found that self and peer-estimated intelligence and academic self-concept had more power than standard intelligence scores for predicting achievement; the questionnaire used to measure self-concept was adopted in this study. This was developed to capture a measure of the beliefs that constitute a student's self-concept: their image of themselves in academic settings. The current study includes a comparison between those in their first or final year of undergraduate study, allowing the comparison of self-concept scores between these groups and also the correlation between self-concept scores and average student score on the test. Considering that academic self-concept is strengthened by previous learning experiences, it stands to reason that those in honours years would have a better self-concept and hence would be less susceptible to manipulations of expectations and that typically, their self-concept scores would reflect their test scores.

1.3. Mindsets and Self-theories

Another major influence on student motivation and achievement research stems from work by Carol Dweck (1988; 1998; 1999) on self-theories, known also as mindsets. This theory is a candidate for being underpinned by the suspected basic expectation mechanism and may possibly be re-framed as such. Self-theories relate to individuals' beliefs about their abilities and personality traits as either fixed (entity theory) or malleable (incremental theory). Dweck and her collaborators posit that these beliefs are sources of individual differences in goal orientations, which in turn affect achievement. It is thought that "entity" theorists perceive their abilities as fixed traits and tend to adopt performance goals, seeking to gain favourable and avoid unfavourable judgements about their competence. Their "incremental" opposites, on the contrary, adopt mastery (or learning) goals, in which they seek to understand and master something new, and, thus, increase their competence.

The work of Dweck and others regarding self-theories stemmed from earlier research (Diener & Dweck, 1978; 1980) that had attempted to understand why children react differently to failure. This was later tested by Elliot and Dweck (1988) in a paradigm whereby, after completing an initial complex task, children were given feedback that led them to believe that they had high or low ability on this type of task, thus manipulating their expectation of performance. The children were then presented with a choice between a performance (displaying of competence) task with different difficulty levels, or a learning (mastery) task; both tasks were identical. This choice was influenced by a further manipulation that pushed them towards either type of task. Regardless of choice all were given an identical problem-solving task adopted from Diener and Dweck (1978) in order to test how the manipulations affected their learning behaviours. It was found that in the condition whereby the performance goal was highlighted, manipulations of expectations of ability had an effect, in that those given low expectations performed more poorly and displayed less persistence to solutions.

The effect of expectation disappeared in the condition where the learning goal was highlighted, possibly because the emphasis placed on learning and mastery-orientated type behaviours fostered a positive attitude towards the task, removing any anxiety effects about performance on the task. Essentially, emphasizing the importance of learning from a task rather than performing on it fostered positive behaviour and performance, regardless of expectations of ability. For Dweck, the result was evidence that having the implicit theory that intelligence is a malleable quality and orienting towards goals that increase learning and thus intelligence, would instantiate the most productive behaviours and best achievement outcomes. Early work from Bloom (1968) emphasised this similarly in mastery learning theory, in which regular non-graded formative assessments were recommended in order to emphasise the importance of mastery rather than learning to display aptitude. It is important to note in Dweck's study that from such a small intervention, of indicating projected ability for the upcoming task, behavioural and performance differences were elicited.

Another later study (Mueller and Dweck, 1998), arguing for the dangers of praising children for their intelligence rather than their effort, produced a similar result to that of Elliot and Dweck (1988), as again a subtle manipulation brought about a large effect. This particular study, as with many of Dweck's, was conducted on primary age children who were given a set of Raven's matrices problems and then regardless of actual performance were told they had done well and given praise in one of two forms: “you must have worked hard” or “you must be smart”. The children then completed a second set, upon which they were told they had performed poorly. A further set of problems were given to measure the effect of the manipulation and it was found that praising for intelligence pulled the scores down and praise for effort pulled them up.

This study also considered the childrens' goal directed behaviour; offering them performance or learning opportunities to see which they endorsed more often and naturally, children praised for their intelligence more often chose to pursue performance goals to show off this intelligence. However, the negative expectation that had been imbued by informing them that their performance had been poor on the second set, disrupted their performance, whereas the children for whom effort was highlighted as important felt no need to prove their ability and performance was less disrupted.

This work was then developed to produce the mindsets theory, which has been repeatedly tested as a predictor of achievement and many but not all, have delineated a major role for implicit theories in achievement. The studies described above have all referred to an instant change in behaviour but understanding changes over a longer time course is also important. In a particular longitudinal study, theories of intelligence as measured by ratings on a scale of 6 items predicted grades for the next two years (Blackwell, Trzesniewski and Dweck, 2007). In the second part of that paper an intervention aimed at creating an 'incremental mindset' over a course of eight sessions, halted a downward trajectory in grades over the course of the semester. This was not followed

up later to test whether the effects lasted, which may have shed light on the longevity or viability of the manipulation.

It is hard to pin down exactly what differentiates a mindset (incremental or entity) from the a set of expectations a student holds regarding the outcome of the effort put in to studies or their expectation about their ability to learn and succeed at learning. It is possible that what is being manipulated in Dweck's studies, rather than an 'implicit theory of intelligence', is the expectation in these students that either displaying intelligence or displaying effort is what is important. If expectations are underlying these results, it is possible that expectations can be influenced in students by means of subtle suggestions; this study seeks to explore whether this is possible in higher education students.

1.4. Stereotype threat

Another major pool of influence on academic achievement stems from the body of work regarding stereotype threat; another candidate effect which may possibly be underpinned by a basic expectation mechanism. Stereotype threat, is a phenomenon whereby an awareness of a stereotype and its negative features can have a detrimental effect on performance (Inzlicht and Schmader, 2011). This effect can occur among members of any group about which negative stereotypes exist (Steele and Aronson, 1995). The roots of the theory lie in the original studies of Steel and Aronson (1995; Steele, 1997) stemming from the acknowledgement of the achievement gap between black and white students in American schools. Since then, a vast body of evidence has built to show repeatedly that individuals performing a task at which their in-group is considered to perform comparatively worse than others, will under-perform themselves. This includes effects for women and maths performance (Spencer, Steele and Quinn, 1999). The effect can be dramatic; Steele and Aronson (1995, Experiment 4) found that by merely asking African American college students to indicate their race before completing a standardized test was enough to decrease their score by almost half. If this study can show that manipulating student expectations can interfere with learning and performance, it may be that stereotype threat is brought about by awareness of a stereotype causing a negative expectation.

It is thought that the awareness of a stereotype for members of that group initiates negative thought, increases arousal and depletes executive resources by means of emotion regulation, thus impacting on their performance and achievement. That is, it raises the possibility, in the mind of a stereotyped individual, that the academic difficulties they experience may be due to an internal fault or shortcoming, namely, that they lack the ability to succeed on the task. This is supported by evidence that stereotype threat leads to increased arousal (Ben-Zeev, Fein and Inzlicht, 2005; O'Brien and Crandall, 2003), reduced working memory capacity (Schmader et al., 2008) and increased emotional suppression (Johns, Inzlicht, and Schmader, 2008), that lead from increased error vigilance and attempting to suppress the negative emotions elicited by the negative stereotype.

This effect has also been tested in the opposite direction, with the effect of stereotype viewed as a performance enhancer (Shih, Ambady, Richeson, Fujita and Gray, 2002); by priming the positive stereotype of Asian-American superiority at maths, performance was enhanced. This has been studied under the guise of 'stereotype lift' (Walton and Cohen, 2003). Levy (1996) showed that priming of negative terms associated with the elderly (e.g., senile, dementia) produced deficits in the memory abilities of elderly participants. Meanwhile, the priming of positive terms (e.g., wise, experienced) produced an enhancement of the elderly participants' memory abilities. Could it be that the effect produced by priming awareness of a stereotype result simply from fostering positive or negative expectations in that group?

The impact of this effect can be wide-reaching and disruptive and so considerable effort has been put into defending against or blocking the results. Perhaps the best known of these involved employing the techniques outlined by Carol Dweck and colleagues in their research regarding implicit theories (for example Blackwell, Trzesniewski and Dweck, 2007), whereby the intervention involved attempting to impart an incremental view of intelligence in students at risk from stereotype threat. It was thought that by applying the Dweck style intervention, which has been evidenced as improving achievement and academic enjoyment, the detrimental effects of stereotype threat could be cancelled, or at least lessened (Aronson, Fried and Good, 2002; Good, Aronson and Inzlicht, 2003). It was found that by altering the maladaptive beliefs of intelligence as a fixed trait, in other words imbuing them with more positive expectations for their high-school career, that the achievement inequalities created by stereotype threat did diminish. Again, the follow up to these interventions was at the end of the semester. It would interesting to see whether the change lasted over their academic career or whether, with the novelty of the extra attention gone, the original pattern returned.

Recently, attention has been turned towards understanding how stereotype threat interferes with the learning process specifically. Traditionally the effects of stereotype threat have been measured in terms of performance, without necessarily separating out the factors that contribute to that performance. Rydell, Rydell and Boucher (2010) note that a number of the previous studies conducted on stereotype threat could possibly be explained by taking the effect on learning into account, such as Adams, Garcia, Purdie-Vaughns and Steele (2006), whose experiment involved teaching women how to solve logic puzzles under a threat or non-threat condition. Similarly, Grimm, Markman, Maddox, and Baldwin (2009) also used a task that involved teaching a new line categorisation; hence in both studies the differences could have been caused at the learning stage. To test this, they designed a study that involved invoking stereotypic awareness at various stages of the process of teaching new abstract mathematical rules to women and testing their ability to transfer them; their manipulation involved just one sentence indicating that the study was investigating gender differences in maths.

In a later study, Taylor and Walton (2011) used an arguably better design of a more parsimonious nature to show similar results. This paper provides the basis for the design of the current study and looked at stereotype threat with regards to the race achievement gap. It involved applying a manipulation, then testing learning and performance separately. Black and White students had to learn lists of rare words and their definitions, under either threat or non-threat conditions and perform recall tasks either in a 'warm-up' task designed to test learning and a 'real' task under threat or no threat condition to test the effect of the manipulation on performance. Taylor and Walton found that Black students who had studied under threat conditions performed worse than White students on both the non-threatening 'warm-up' and the actual test and that overall scores were lowest when Black students both learned and performed under threat conditions.

Also measured, were a number of possible mediating factors such as, socio-economic status, SAT score, gender and year in school, although only socio-economic status proved to have any effect. Oddly these included no measures of students' ability beliefs such as academic self-concept, despite the evidence relating them to achievement, to which learning and performance are intrinsic. These will be measured in the current study. If by adapting this design and removing the emphasis on stereotype to test a more general expectation effect, achievement differences can still be elicited, this may provide evidence for the role of basic student expectation mechanism.

1.5. Expectations in Stereotype Threat

To what extent are the expectations created by stereotype threat contingent on relating to the stereotype? The role of performance expectations has already been studied with regards to their mediating effect on stereotype threat (Cadinu, Maass, Frigerio, Impagliazzo and Latinotti, 2003). Building upon earlier work that had found stereotype threat manipulations could undermine performance expectations (Stangor, Carr and Kiang, 1998), this study regarding women's maths performance found that participants that received negative information regarding their gender showed lower levels of expectations and a decrease in performance compared to women in the positive and control conditions. Performance expectations were measured by asking participants to plot a bar on a graph that represented how well they expected to do in comparison with the average scores of men and women; these differed depending on the condition to which they were assigned. These were plotted immediately after the stereotype threat manipulation to test whether positive or negative expectations had been instilled.

Cadinu et al., (2003) found that the expectations, as indicated by participants, followed the pattern of the manipulation; negative information bred negative expectations and vice versa; but only significantly for those who had on a previous occasion indicated that they found maths important. The positive or negative information was transmitted simply by means of a short paragraph indicating that differences do or do not emerge between men and women in maths ability, as part of the instructions. This paragraph brought about a change in

performance expectancy that mediated the relationship between the stereotype manipulation and performance. The result essentially supports the theory that stereotype threat works by acting upon students' expectations. This would seem to indicate that a direct manipulation of expectations could have essentially the same effect as stereotype threat by affecting learning and performance directly. If stereotype threat is acting as a manipulation of expectation of performance and learning, would a direct attempt at influencing students' expectations regarding a task bring about the same effect? Alternatively, it may be that the effect on expectations is contingent on there being some outside factor to which the expectation can be attributed.

1.6. Overview of Current Study

The purpose of this experiment was to explore whether the main effects of phenomena such as Dweck's mindsets and stereotype threat can be explained as simply the setting of student expectations affecting their subsequent achievement. Student expectations have been considered in light of how they effect student motivation and thus achievement indirectly, but have not yet been tested with regards to having an effect on student learning and performance. In order to test this, an experiment has been devised based on the design used in Taylor and Walton (2011), that will allow for the effect of expectations on learning and performance to be tested separately. In this study, students were given a learning task that was qualified as either easy or difficult for some students and then a week later they answered the questions on what they had learned, first in a 'warm-up' condition then the 'real' test, which again they were instructed would be easy or difficult in order to manipulate expectations for performance. Students in their first and final year of study were used and compared in the analysis to determine whether these effects acted differently on students who have either had little or much practice at learning in this higher education setting.

For the purposes of this study, learning is defined as the initial acquiring of the information and performance as displaying that learning in a test situation. Learning and performance were measured by true-false questions designed to test equally both surface (knowledge reproducing) and deep (knowledge transforming) learning (Marton and Saljo, 1976). Previously, it has been found in stereotype threat literature that easier problems and tasks can be immune to the effects of threat (Rydell, Rydell and Boucher, 2010; O'Brien and Crandall, 2003). In the implicit theory literature the links between mindsets and deep and surface learning have been less clear. Originally incremental mindsets and mastery goals had been linked with deep processing strategies and entity theory with surface processing (Greene and Miller, 1996), although in a later study this was less obvious (Dupeyrat and Mariné, 2005). In the current study both the learning test and performance test questions were split equally between surface and deep learning in an attempt to understand the impact of expectations on learning strategies.

The manipulations of the experiment were included in the text of the instructions given to participants, in order to ensure that delivery was the same for each participant and had to be at the correct balance between subtlety so as not to alert participants to the nature of the task. Previous research has found that blatant priming of high stereotype expectations for performance did not bring about an effect in the results, whereas subtle priming did (Shih et al, 2002). Piloting for the current study put the manipulations at a suitable level, such that they were noticeable but did not reveal the nature of the experiment.

As it was possible that the expectation manipulation would have less of an effect when students' already had a grasp of the material to be, as their confidence in their answers would increase, participants' familiarity with the material covered was also measured. Self-efficacy, a student's immediate expectations for success (Schunk and Pajares, 2009), was tested by means of confidence measures included throughout the study (see Appendix A for an example), in order to understand whether manipulations of expectation would have an effect on this. The links between self-efficacy and achievement highlight it as a possible mediating variable between expectations and learning and performance. A measure of academic self-concept was also taken, as it was suspected that, similarly to familiarity with the material, having a high academic self-concept score would mean students were less susceptible to manipulation of expectation. This measure represents a student's beliefs about the overall effectiveness of his or her learning activity and subjective value of efforts put into the learning activity and so a high score on this measure would mean the participant considers themselves a relatively successful student (Kornilova et al., 2009).

2. Hypotheses:

2.1 Hypothesis one: Manipulating students' expectations regarding the difficulty of a learning task will influence their score on subsequent tests of that learning; this will have a different effect on Year 1 and Year 4.

2.2. Hypothesis two: Manipulating students' expectation regarding difficulty of a performance task will influence their performance on that task, as shown by their change in score from the learning ('warm-up') test, to the performance test; this will have a different effect on Year 1 and Year 4.

2.3. Hypothesis three: Manipulation of expectation will be evident in the confidence ratings of the students, thus affecting their self-efficacy.

2.4. Hypothesis four: Manipulating students' expectations will also influence their engagement in deep processing; specifically, students with low expectations will show decreased deep processing, evident in poorer scores on the deep learning questions than the surface learning questions.

3. Method

3.1. Design and Participants:

The experiment used a 2x2x2 design, adapted from Taylor and Walton (2011). The factors were as follows: year of study (1, 4); learning expectation (high/low) and performance expectation (high/low). The first two factors were between-subjects, the third was within. A total of 38 participants were recruited from Psychology undergraduate courses; 16 from first year (Year 1) and 22 from fourth year (Year 4), to complete the task. Participants with dyslexia were excluded to control for differences in ability to read from a text between groups, other than that, participants needed only to fit the criterion of being in either the first or final year of their first undergraduate degree. Year 1 participants were rewarded for their participation through use of the department's course credit system.

3.2. Materials:

Participants were given two booklets, one at learning and one at test. Each began with an instruction page which also contained the expectation manipulation, telling them to read the instructions carefully. The learning phase booklet contained a passage approximately 1500 words in length and concerned the topic of hypnosis, as it is not currently included in the psychology undergraduate curriculum, in an attempt to control for prior knowledge effects between groups. In a further attempt to control for prior knowledge, the learning phase booklet also included an opportunity for participants to rate first their predicted familiarity from the topic name and then their actual familiarity after reading the passage, on a 0-100 scale. The passage was collated from various sources and piloted to check readability and suitability of content for both Year 1 and Year 4 psychology undergraduates.

The test phase booklet contained 24 true or false questions (2 sets of 12 questions), designed to test both surface (50%) and deep learning of the passage (Marton and Saljo, 1976). In both the learning and test phase booklets, confidence measures were included, which requested a rating on a 0-100 scale, for an example see Appendix A. Participants also completed an academic self-concept scale (see Appendix B) adapted from a study by Kornilova et al. (2009); internal validity was tested and the α coefficient was given as .76. This is an inventory of seven statements are rated in accordance with how much they apply to that person, those with a low score have a low academic self-concept and vice-versa. This was taken at the beginning of the study to avoid the task and manipulation having impact on the students' self-ratings and was not deemed to be likely to alert the participants to the nature of the study.

3.3. Manipulation:

3.3.1.Task one: The manipulation of learning expectations was included in the instruction page on the front of the learning booklet and read as follows:

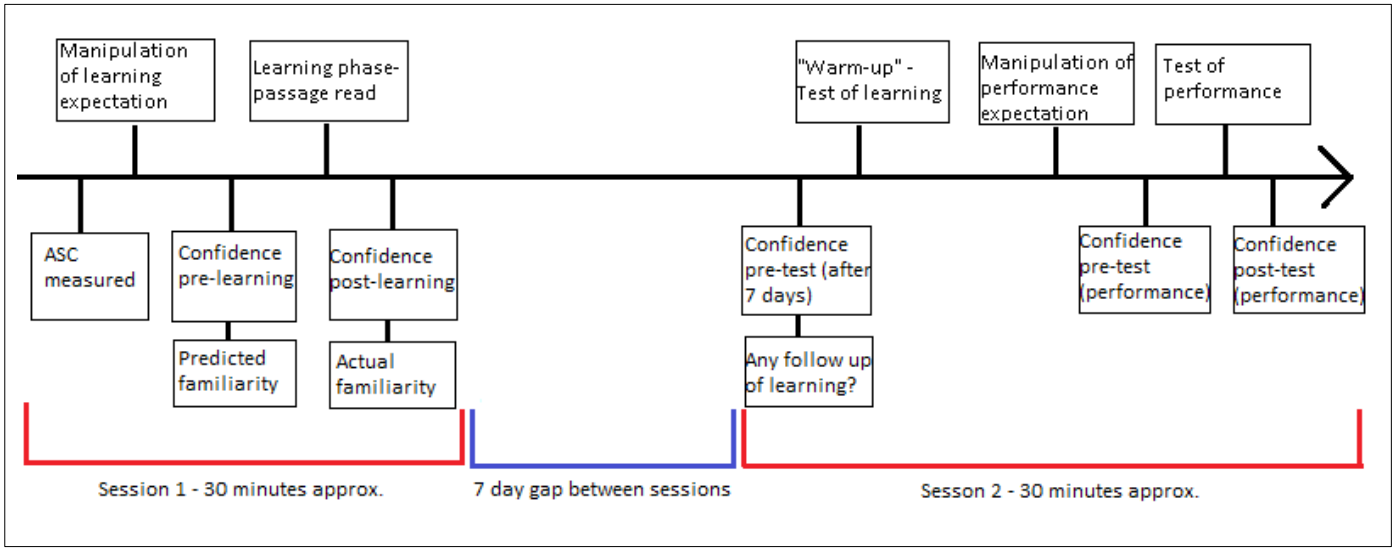
> *The task requires you to spend 15 minutes reading and learning a passage about hypnosis, which has not previously been part of the curriculum. Some students find this* ***(difficult/easy)*** *but please give the task your full attention, as you will be answering questions on this material.*

3.3.2. Task two: The manipulation of performance expectations was given after the 'warm-up' (learning) test on a following instruction page for the 'test' questions and read as follows:

> *Please now answer the test questions over the page, these are designed to test how well you learned the information in the first part of the task. Some students find this* ***(difficult/easy)*** *but please give the task your full attention.*

3.4. Procedure:

The time-line gives an overview of the order and time-course of procedures, moving from the left to the right.



3.4.1. Task one: Ethical approval was sought and given before running the experiment, in accordance with ethics code of the School of Psychology and Neuroscience. Participants attended two 30 minute sessions a week apart. At the first of these the learning materials were presented and at the second the test materials. At the learning session before reading the passage, participants completed the Academic Self-Concept inventory, adapted from Kornilova et al., (2009) and also gave a confidence rating and indicated whether they were familiar with the topic of the passage. Participants then had 15 minutes to read the approximately 1500 word passage and were allowed to take notes during the learning phase, but were instructed to leave any notes taken behind them when they left the first session; these were not included in any analysis. After reading, another confidence rating was given alongside indication of familiarity with the materials covered in the passage.

3.4.2. Task two: At the second session seven days later, participants were presented with the second booklet and first gave a confidence rating before answering any questions and also gave indication of whether they had attempted any additional reading since the learning phase. The 12 'warm-up' questions, included to test learning before manipulating performance, were then answered in five minutes. At that point, the participants then read the instruction to complete the 'test' questions, in which the performance manipulation was included and after that another confidence rating was given. The 12 'test' questions were completed in another five minutes and then a further confidence rating. Participants were then de-briefed and thanked for their participation.

4. Results

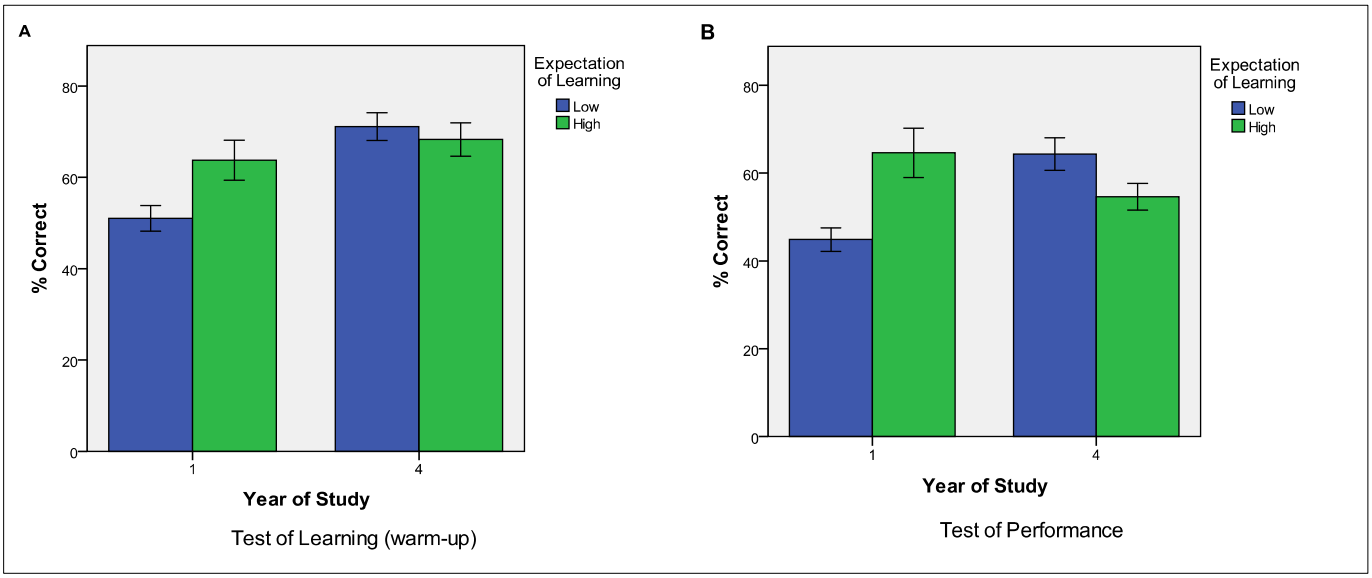


Figure 1 showing a similar pattern of results in both learning and in the performance test after having the performance manipulation. Mean score (%) for learning test (A) and performance test (B), as a function of level of study, learning expectations. Error bars represent ±1 standard error.

4.1 Preliminary Analysis: The results were initially analysed a multivariate analysis of covariance (ANCOVA), with level of study and learning expectations as between-subject factors (2x2). This tested whether any of the predicted covariates; students' predicted familiarity with material, actual familiarity with the material or self-rated academic self-concept; would differ the effect of the learning expectation manipulation although none proved to be significant and were thus dropped from further analyses. Follow up analysis on the predicted covariates showed that neither predicted familiarity ratings, $t(36)=.818$, $p=.419$, $d=.27$ nor actual familiarity ratings $t(36)=1.882$, $p=0.68$, $d=.62$, differed significantly between Year 1 and Year 4 and so prior knowledge of this topic was similar between both years.

Ratings for academic self-concept were significantly higher for Year 4 (M= 28.77, SD= 4.25) than for Year 1 (M= 26.00, SD= 2.70), $t(36)=2.288$, $p=.028$, $d=.74$, as was expected. Pearson's correlation analysis revealed that academic self-concept scores were significantly correlated with overall score averaged across both tests, $r(38)= .292$, $p= .038$. None of the participants indicated that they had attempted any follow-up learning during the seven day gap so this did not need to be analysed.

Table 1 - Means scores (%) and standard deviations for Year 1 and Year 4 students in the low and high learning expectation conditions, on the learning test and the performance test.

Learning Expectation	Year of Study	Learning Test ('warm-up')		Performance test	
		M	SD	M	SD
Low	1	51.00	7.93	44.88	7.55
	4	71.09	10.09	64.36	12.36
High	1	63.75	12.45	64.63	15.96
	4	68.27	12.13	54.64	10.07

4.2. ***Hypothesis One*** *- Manipulating students' expectations regarding the difficulty of a learning task will influence their score on subsequent tests of that learning; this will have a different effect on Year 1 and Year 4.*

A further 2x2 ANOVA was calculated with the predicted covariates removed. This was to test the interaction that was apparent from Figure 1, as Year 1 and Year 4 showed different patterns of scores on the 'warm-up' and performance test (see Table 1 for means and standard deviations). This analysis revealed a significant main effect of year of study in the learning test; Year 4 performed significantly better on the learning test, $F(1, 30)=8.691$, $p=.006$, $\eta p2=.225$, 95% CI [3.339,18.397]. This effect failed to reach significance on the performance test, $F(1,30)=1.926$, $p=.175$, $\eta p2=.060$, possibly because Year 4 students in the high learning expectation condition showed a drop in performance from the 'warm-up' (M=68.27, SD=12.13) to the performance test (M=54.64, SD=10.07).

The main test of the effect of expectations on learning was through the learning test scores but the main effect of learning expectations on the learning test failed to reach significance, $F(1,30)=1.075$, $p=.308$, $\eta p2=.035$. However a significant interaction was revealed between level of study and learning expectation, both in the learning test, $F(1,30)=4.922$, $p=.034$, $\eta p2=.141$ and in the performance test, $F(1,30)=15.361$, $p=<.001$, $\eta p2=.339$, this means that the learning expectations acted differently upon Year 1 and Year 4.

As the between-subject factors had fewer than three groups, t-tests were used to follow up the interaction results. As can be seen from the graph in Figure 1A, for the learning test, Year 1 students' mean performance in the low expectation condition (M=51.00) was lower than in the high expectation condition (M=63.75), $t(14)=2.443$, $p=.028$, $d=1.22$. The mean score of Year 4 students showed the opposite pattern and was higher in the low expectation condition (M=71.09) than in the high expectation condition (M=68.75), this change was non-significant, $t=<1$.

As Figure 1B shows, Year 1 students' mean performance score showed a greater difference than on the learning test, showing a mean of 44.88% in the low learning expectation condition and a mean of 64.63% in the high learning expectation condition, again this was a significant increase, $t(14)=3.136$, $p=.007$, $d=1.58$. Year 4 student's mean percentage score showed the opposite pattern again, a mean of 64.36% in the low learning expectation condition and a mean of 54.64% in the high learning expectation condition, the difference marginally failed to reach significance, $t(20)=2.023$, $p=.057$, $d=.904$.

4.3 ***Hypothesis Two*** *- Manipulating students' expectation regarding difficulty of a performance task will influence their performance on that task, as shown by their change in score from the learning ('warm-up') test, to the performance test; this will have a different effect on Year 1 and Year 4.*

A 2x2x2 mixed model ANOVA was conducted involving Year of study (between-subjects), learning expectations (between-subjects) and performance expectations (within-subjects) to test the effect of performance expectation on the change in score from learning test to performance test, within each learning threat condition. Figure 1 showed that the pattern of results was similar on both learning and performance test but overall drop in performance occurred, suggesting that the low performance expectation manipulation had more of an effect than the high performance expectation.

Violations of sphericity did not need to be checked as the within-subjects factor had only 2 levels. The analysis found a significant change from learning test to performance test, $F(1,30)=5.604$, $p=.025$, $\eta p2=.157$, meaning average percentage test score dropped significantly from the learning test ($M=64.50$, $SD=12.85$) to the performance test ($M=57.50$, $SD=13.77$, 95% CI [-1.69, -11.77). The 3-way mixed model did not repeat the significant main effect level of study on the change in score from learning test to performance test, $F(1,30)=1.055$, $p=.313$, $\eta p2=.034$, so level of study did not vary the change in percentage score from learning test to performance test, therefore, analyses collapse across this variable.

Collapsing across level of study, a further 2x2 mixed model was calculated. A change in score x performance expectation interaction was found to be significant $F(1,34)=4.354$, $p=0.44$, $\eta p2=.114$, so performance expectation influenced the change in score differently within each learning expectation condition, as suspected from the graph. Within the low learning expectation condition, students given the low performance expectation manipulation showed a significant drop in mean score from 66.60% in the learning test to 55.10% in the performance test, $t(9)=2.293$, $p=.48$, $d=.738$, 95% CI [-1.54,-22.64], but those given the high performance expectation manipulation failed to show a significant change in score, $t=<1$.

Within the high learning expectation condition, those given low performance expectation showed a drop in mean percentage score from learning test (70.10%) to performance test (57.70%) that was marginally significant, $t(9)1.950$, $p=.083$, $d=.631$. Those given high performance expectation within the high learning expectation condition failed to show any significant change in mean percentage score, $t=<1$. From this analysis it would seem only the low performance expectation manipulation had an effect.

4.4. ***Hypothesis Three*** *- Manipulation of expectation will be evident in the confidence ratings of the students, thus affecting their self-efficacy:* A series of repeated measures analysis were used first to assess changes in all participant's confidence ratings throughout the experiment, this involved testing differences between all points of measurement of confidence (see time-line), that will forthwith be referred to by the following numbers:

- pre-learning test to post-learning test (change 1)
- from post-learning test to post-seven day gap (change 2)
- from post-seven days to after 'warm-up'/pre performance test (change 3)
- from pre-performance test to post-performance test (change 4)

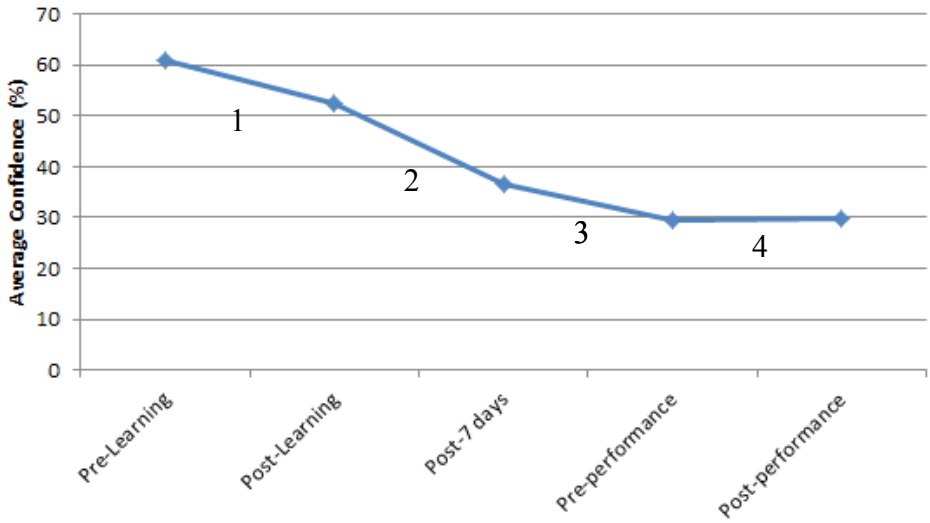


Figure 2 – Mean confidence ratings (%) from all students, averaged across year of study and expectation conditions, from all points of measurement.

Figure 2 shows average confidence ratings and would seem to indicate that confidence continually dropped throughout the experiment, apart from at change (4). Analysis revealed that the confidence ratings from before the learning phase (change 1) (M=61.05, SD= 11.099) to after the learning phase, (M=52.37, SD=16.995) showed a significant decrease, $F(1,36)=7.994$, $p=.008$, $\eta p2=.182$. Similarly, change 2 (M=52.37, SD=16.995 to M=36.58, SD=15.986) was significant, $F(1,36)=349.72$, $p=<.001$, $\eta p2=.907$. Again, change 3 (M=36.58, 15.986 to M=29.47, SD=15.587) was significant , $F(1,36)=192.860$, $p=<.001$, $\eta p2=.843$. There was a minute change in mean confidence ratings at change 4 (M=29.47, SD=15.578 to M=29.74, SD=16.021), which was not significant $F=<1$.

4.4.1. Confidence ratings of Year 1 and Year 4: Figure 3 would seem to show that mean confidence ratings were consistently higher for Year 4 students than for Year 1 throughout the experiment, both showing similar patterns of decrements until the final measurement post-performance test. Analysis with 1-way ANOVA here showed, confidence levels were only significantly higher for Year 4 students (M=41.48) than Year 1 students (M=29.37) at change 2, $F(1,36)=6.437$, $p=.016$, $\eta p2=.152$, 95% CI [2.29, 22.58] and at change 4 (Year 4 M=34.54, Year 1 M=23.12), $F(1,36)=5.247$, $p=.028$, $\eta p2=.127$, 95% CI [1.77, 21.06].

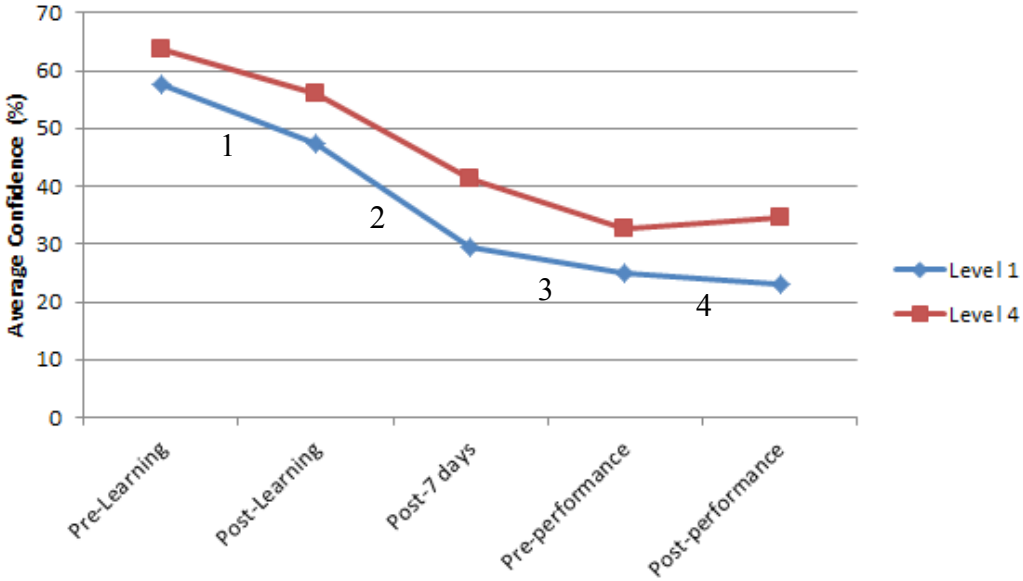


Figure 3 - Mean confidence ratings (%) for level 1 and level 4 averaged across expectation conditions, from before learning phase to after test phase.

4.4.2. Effect of learning expectation manipulations on confidence: Figure 4 would seem to show that Year 1 students in the high learning expectation gave consistently higher confidence ratings than those in the low learning expectation condition, by splitting the data according to year of study and conducting a between-subjects one-way ANOVA analysis on Year 1 students, with learning expectation as the between-subjects variable, revealed none of these differences were significant. Figure 4 shows a less consistent pattern for Year 4 students, but again none of these differences were found to be significant in a further one-way ANOVA on Year 4 students. The difference in confidence ratings between Year 4 students in the high and low condition post-performance marginally failed to reach significance, $F(1,20)=3.267$, $p=.086$, $\eta p2=.140$.

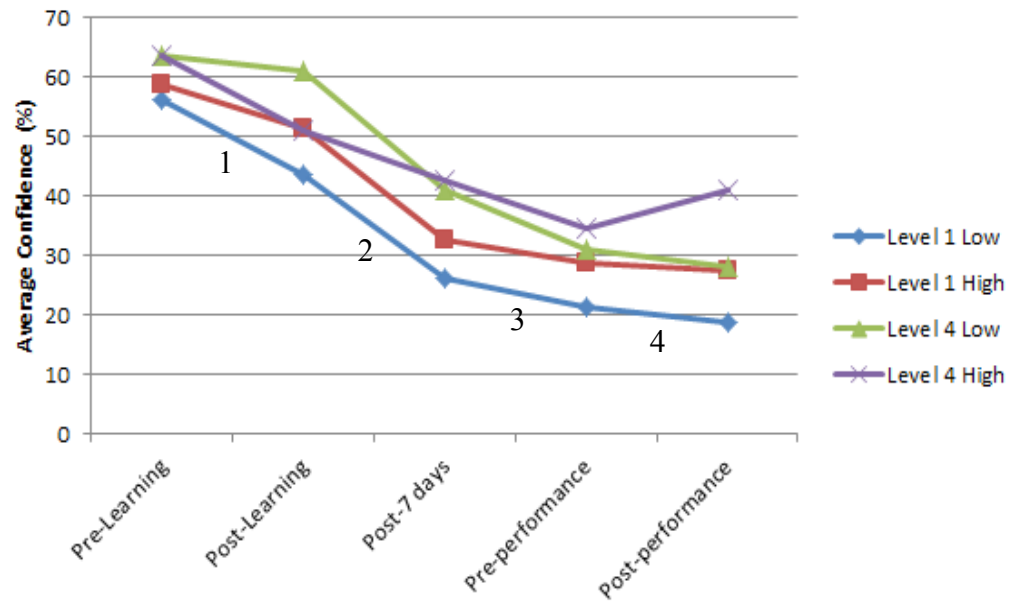


Figure 4 – Mean confidence ratings (%) for level 1 and level 4 students in low and high learning expectation conditions.

A series of 2x2 repeated measures ANOVA analysis, testing the effect of high or low learning expectations and year of study on each change in confidence (1,2,3,4) for Year 1 and Year 4 students found that change (1) was not significantly affected by learning expectation and neither was change (2), nor change (3). For Year 1 students, change (4) was not significantly affected by the high or low expectation condition but for Year 4 students, change (4) differed significantly between the high and low expectation condition. This difference was such that Year 4 students in the low expectation condition showed a drop in mean confidence ratings from pre-performance test (M=30.91) to post-performance test (M=28.18), this was not significant, t(10)=1.00, p=.341, whereas, Year 4 students in the high-expectation condition showed a rise in mean confidence rating from pre-performance test (M=34.55) to post-performance test (M=40.91), which was significant, t(10)=4.183, p=.002, d=0.33.

4.4.3. *Effect of performance expectations on confidence ratings:* Figure 5 would seem to show that the differences in mean confidence ratings for Year 1 and Year 4 were slight; a further 2x2 repeated measures ANOVA analysis was conducted to test the effect of the performance expectation manipulation and Year of study on confidence ratings from before the performance test to after. This analysis confirmed that the performance expectation conditions had a non-significant effect on confidence ratings for Year 1 or Year 4 students, F=<1.

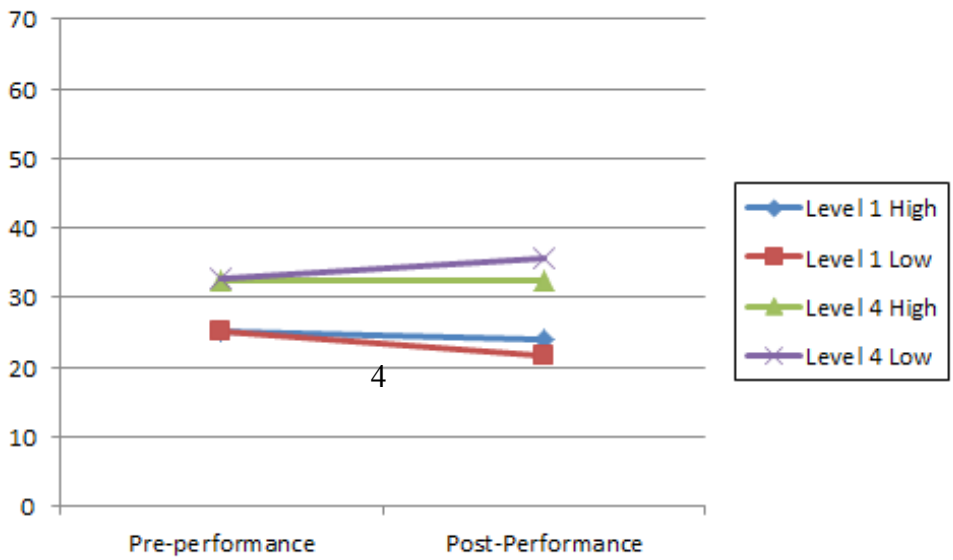


Figure 5 – Mean confidence rating (%) from pre-performance test to post-performance test for level 1 and level 4 in the low and high performance expectation conditions.

4.5. ***Hypothesis four*** *– Manipulating students' expectations will also influence their engagement in deep processing; specifically, students with low expectations will show decreased deep processing, evident in poorer scores on the deep learning questions than the surface learning questions:*

A 2x2 between-subject ANOVA (year of study and expectation of learning), was used to test the effect of learning expectations on surface and deep processing, as shown by percentage scores in the surface and deep learning questions across the tests.

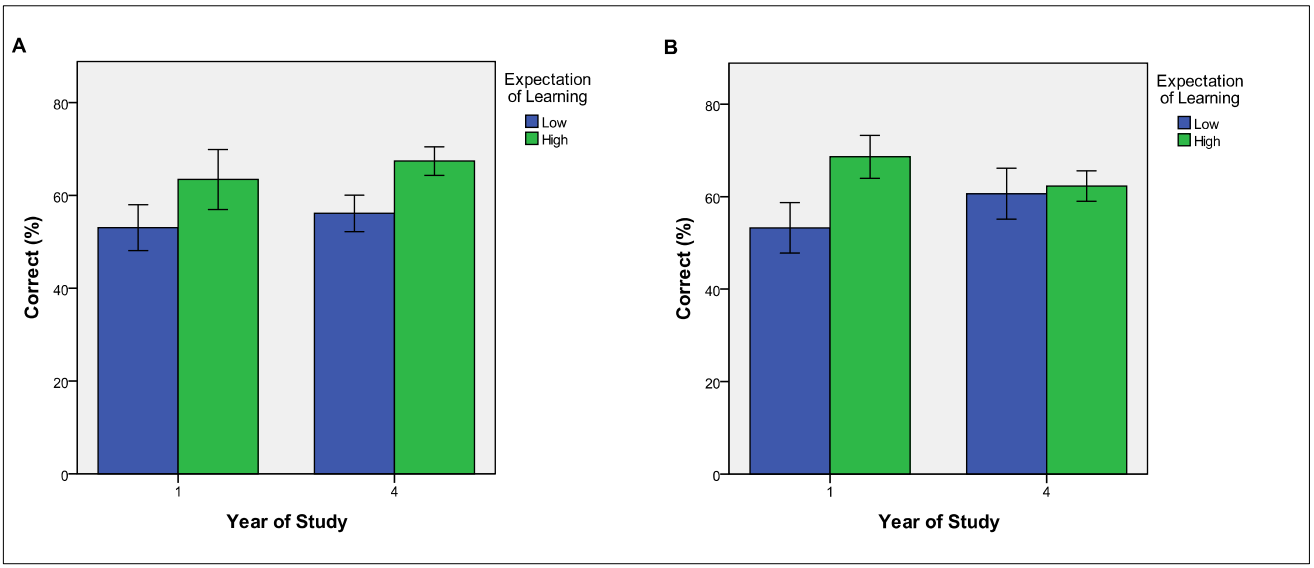


Figure 6 - Mean score (%) for surface (A) and deep (B) learning questions for level 1 and level 4 students as a function of learning expectation condition. Error bars represent ±1 standard error.

It was predicted that learning expectations would affect the deep learning scores across the tests, in that low learning expectations would lead to a lower deep learning score. Contrarily, Figure 6A and B would seem to show that surface learning score was affected by learning expectation, more so than deep learning score. The ANOVA analysis revealed a main effect of learning expectation on surface learning, as those in the low learning expectation condition showed lower surface learning scores, $F(1, 34)=5.175$, $p=.022$, $\eta p2=.144$, 95% CI [-1.623, 20.025].

This main effect failed to reach significance for the deep learning scores, $F(1,34)=3.088$, $p=.088$, $\eta p2=.083$, as Figure 6B also seemed to show an interaction between level of study and learning expectation, for the deep learning scores. This interaction marginally failed to reach significance, $F(1,34)=2.009$, $p=.165$, $\eta p2=.056$, as although the mean deep learning score for Year 4 students in low ($M=60.63$) and high ($M=62.27$) learning expectation was not significantly different $t(20)=.275$, $p=.800$, $d=.117$, it followed the same direction as mean deep learning scores for Year 1 students in low ($M=53.25$) and high ($M=68.62$), which did show a significant difference, $t(14)=2.148$, $p=.050$, $d=1.07$.

5. Discussion

This experiment has provided evidence that, as expected, student expectations of their ability and subsequent learning or performance can be affected by subtle manipulations aimed a raising or lowering them. Students were given a learning task and informed that "some students" find this difficult or easy, in an attempt to manipulate expectations regarding that task. One week later, the effect of that manipulation was tested in a 'warm-up' test that allowed testing of that knowledge free from any performance effects, at which point a second manipulation aimed at expectations of ability to perform was administered before giving the students the 'real' test. It is interesting to find that the intended manipulation of learning expectations only had the predicted effect on year one students, but not the year four students, supporting to an extent hypothesis one.

Hypothesis two was partially supported, as it was only the low performance expectation manipulation that had an effect, by pulling the scores down. However, for those who were in the high learning expectation condition this only marginally reached significance. Generally, an overall decrease in score from the 'warm-up' test to the performance test became apparent from the results, again this was regardless of year of study. Hypothesis three predicted an effect of expectations on student self-efficacy; this was also partially supported by the results. Students' confidence ratings throughout the task did vary according to either the learning or performance expectations but these differences were not substantial enough to prove significant. The ratings did however, show substantial decrements in confidence throughout the course of the study. Hypothesis four was not supported by the results as it was found the expectations interfered with surface learning to a greater extent than with deep learning, as overall surface learning score was lower in the low expectation condition for both year one and year four.

Although the indications of the difficulty were not contingent on some external reason or cause regarding fixed or fluid intelligence, or racial stereotypes, for the year one students it was enough to significantly interfere with the learning process. A difference in score with a fairly robust effect size of 1.2 was found between the high and low learning expectation group. These results support the expectancy-value model (Wigfield and Eccles, 2000), that has already outlined several ways that expectations can interfere with motivation, but could possibly be extended to outline interference from expectations at the level of learning and performance as well as motivation. The results would seem to give evidence that many large effects in education that stem from small manipulations may result from expectation manipulations on suggestible students. In Dweck's implicit theories of intelligence (1999), it could be that students' expectations regarding the benefit of effort and striving to master learning are being influenced. Stereotype threat would also seem to fall under the bracket of arising from an expectation mechanism, as was partially suggested by Cadinu et al. (2003) and may not necessarily be contingent on being attached to stereotypic ideas. The awareness of a stereotype may create an expectation in the student that their ability to learn and perform will either be worse or better than those around them.

This expectation effect may also help to explain other phenomena like that of teacher expectations: a repeated finding that teacher expectation can influence student achievement (Jussim and Harber, 2005), originating with the infamous Pygmalion studies (Rosenthal and Jacobson, 1968). In the current study, students were specifically told, although in writing, by an authority figure that the task could be easy or difficult for them. It stands to reason that a similar effect could come from vocalisations of the teacher, although further research would need to investigate expectations effects through vocal instruction. If these effects are underpinned by a basic expectation mechanism, this would not advocate re-branding them as one defining effect, but highlight the merit of understanding the various ways that student expectations can be affected and the various routes that intervention can take.

Additionally, insight into the relationship between the intensity of the manipulation of expectation and the time-course of the effect would be vital to understanding the type of intervention needed. Immediate effects have been shown from small manipulations (Dweck, 1988, Taylor and Walton, 2011) and longer effects, over a semester, from more extensive interventions (Blackwell et al, 2007, Good et al, 2003) but the relationship is yet to be fully established. On going research to discover the manner and extent to which various influences can manipulate expectations will aid the optimisation of the learning environment.

The expectation effect was found to act differently for years one and year four, but the factors that were predicted to vary the effect, namely familiarity with the subject and academic self-concept, were not found to be significant. Ratings of both predicted familiarity with the material and actual familiarity with the material were found to be similarly low in both levels and so were unlikely to be influencing the differential effect of manipulations but do show that students possessed approximately equal knowledge of the content of the learning. Given that academic self-concept has been outlined as highly related; as initial achievement leads to a high self-concept, which in turn aids further achievement (Marsh et al., 2005; Bong and Clark, 1999); it was predicted that those with a high academic self-concept score would also have a high score on the tests. This was confirmed as academic self-concept score was correlated with overall test score, so it would seem that students' ratings of themselves in academic situations in general were accurate.

Furthermore, self-rated scores were significantly higher for year four students than for year one and so would seem to be showing at least one aspect of the difference between students at the start and end of a qualification, but it may be practise in this particular learning environment that led to the difference in scores. Year four students will have much more experience, not only in extracting relevant information from a block of text but also applying that to summative assessment situations. Year four student had attended a greater number of tutorials in the style of the current task, hence practise may have led to greater confidence and less susceptibility to expectation manipulations. Finding out the various protective factors that can block the effect of expectation manipulations is as important as understanding the various forms that expectation manipulations can take.

Possible inspiration for explaining the difference between these two groups of students comes from literature on regulatory focus theory, which posits that self-regulation (control of current behaviour based on a subsequent goal) exists dichotomously in either prevention or promotion form (Higgins, 1998). Self-regulation in the academic literature has been of interest for those trying to understand the self-directive process through which student acquire and utilise academic skills. It is thought to be linked with underlying beliefs such as self-efficacy and outcome expectations (Zimmerman and Schunk, 2001). The two forms of regulation proposed by Higgins (1998) relate to a specific set of input and output psychological variables that impact substantially upon an individuals behaviour; input wise, those with a promotion focus will be sensitive to gain situations but those with a prevention focus will be sensitive to loss situations.

The relationship between prevention and promotion self-regulation and expectations was recently tested in Keller and Bless' (2008) paper regarding the Moderation of Expectancy Effects by Regulatory Focus theory (MERF), which posited an interactive relationship between expectations and type of regulatory focus. The authors hypothesised that negative expectancies would be most detrimental to prevention-focused students and that positive expectancies would be most detrimental to promotion focused students. Prevention-focus students would be sensitive to loss and hence negative expectations would increase anxiety, whereas for promotion-focus students, anxiety would be increased by positive expectations and wanting to meet these standards. They found confirmation of the MERF hypothesis across three studies. This offers a potential explanation for why first and fourth year students were affected differently in the current study. First years may have been prevention focused but the fourth year, with higher confidence levels and more practise in learning situation were promotion focused, which would seem to be supported by the higher scores for year four. Although the differences failed to reach significance in the learning test, in both tests the year four students showed the opposite pattern to the first years, as students in the high expectation condition showed lower results.

It was also predicted that, as self-efficacy has been defined as referring to our perceptions of our ability to learn and perform actions (Bandura, 1997; Schunk and Pajares, 2009), there would be evidence of the manipulations of expectation on students' self-rated confidence measures as representative of their self-efficacy. Bandura's (1997) academic self-efficacy has on previous occasions been evidenced as predictive of students' overall achievement and so was highlighted in this study as a possible mediating factor between expectations and outcome on the tests. What was found, was that confidence ratings dropped significantly and consistently throughout the study apart from pre-test to post-test, showing possibly that the content of the learning and tests, and students' meta-memory had a stronger effect on confidence than expectation setting. Students' confidence dropped after reading the material, then further after the seven day gap, then further after completing the 'warm-up' but did not drop significantly after completing the performance test, suggesting the they did not experience a change in difficulty, despite showing a drop in performance. This gives evidence that the overall drop in score from learning test to performance test shown by all students should not be attributed to an increase in difficulty in the questions.

Also, year four students gave consistently higher confidence ratings than year one throughout the tasks, although only after the seven day gap and after the performance test did the ratings prove significantly higher, possibly showing that year four students' confidence was less affected by performance anxiety, as would be consistent with their having more practise in that type of situation. A similar result was found among the year one students as those in the high learning expectation gave consistently higher confidence ratings. Although the differences were not found to be significant, they may still offer a possible mode by which expectations interfere with performance as lower self-efficacy has been previously linked with vulnerability to performance anxiety (Bandura, 1997). Self-efficacy has also recently been linked to student abilities to self-regulate (Komarrajo and Nadler, *in press*) as students with high self-efficacy tend to show more directive studying behaviour, higher discipline levels and higher motivation. The same effect was not found among the year four students, as the confidence ratings did not reliably differ between the low and high learning expectation conditions, which reflects the lack of significant difference in the year four 'warm-up' scores.

Further understanding of the difference between first year and fourth year students comes from the results from hypothesis five regarding surface and deep learning. It was predicted that manipulation of expectations would affect the deep learning scores of students as previous research has found that surface learning to be less susceptible to the effects of expectations (Rydell, Rydell and Boucher, 2010; O'Brien and Crandall, 2003; Taylor and Walton, 2011), as the anxiety increase or decrease induced by expectations would seem to affect deep processing. However, the results of the current study show that it was surface learning scores that seemed to be most affected. The surface learning scores of first year and fourth year students, were lower in the low learning expectation condition than in the high learning condition, but the deep learning scores were only significantly lower in the low learning expectation condition than the high expectation condition, for the year one students. Suggesting the the year four marks were higher as they involved more deep processing of the information than the year one students.

It could be argued then, that year four students were exhibiting qualities of what Dweck would call an incremental theorist and adopting a mastery approach, by engaging in deep processing of the materials. It is reasonable to assume that year four students, given their practise in challenging academic situations, would have the expectation that increasing effort bring better results, although without administering a Dweck style questionnaire (see Hong, Chiu and Dweck, 1995) it cannot be concluded as to their beliefs about reward for effort and mastery learning.

This may also be explained by self-regulation theory (Zimmerman and Schunk, 2011), as year four students may be better self-regulators and more practised at employing deep, transformation learning processes, which in this case may have led to a detrimental effect on surface learning as surface processing was of lower priority. If year

four students were also motivated by a promotion focus, as opposed to the year one students with a prevention focus, this may have led to a more active engagement in learning processes. Keller and Bless (2008) note that regulatory focus can be induced both *situationally* and *chronically*, the latter of which may have occurred from the year four students having spent a much longer time and having had much more practise in this HE setting, where striving for top achievement, as opposed to avoiding failing has been encouraged. Investigating the differences in regulatory focus; further research that includes taking measure of students' self-regulatory processes would shed light on this possible issue.

Another effect that became apparent from the current study, was that overall scores for all students, year one and year four, dropped from the 'warm-up' test of learning to the test of performance. This result mirrored that found in Taylor and Walton (2011), as white students also suffered a significant decrease in score from learning test to performance test although this seems to have not been addressed in their discussion. Although it cannot be ruled out that in the current study the performance test questions were more difficult, piloting of the questions brought no reports of differences in difficulty and there was no significant drop in confidence after the second test that would have indicated an increase in difficulty. The fact that only the low performance expectation condition seemed to have an effect on the performance test score could have cause this drop in performance, as score would have been pulled down but not up. This would seem to suggest that students in a test situation would seem to have a bias towards interpreting information that suggests they will find it difficult. Their performance anxiety may have exacerbated by the explicit statement that the second test was 'designed to test how well you learned the information'.

It has been suggested in the stereotype threat literature, that stereotype threat is effective by increasing arousal and depleting executive resources, thus impacting on performance and achievement. This is supported by evidence that stereotype threat leads to increased arousal (Ben-Zeev, Fein and Inzlicht, 2005; O'Brien and Crandall, 2003) and reduced working memory capacity (Schmader et al., 2008). Expectation effects may operate by a similar mechanism, somehow increasing arousal that leads to decrement in learning capacity or vice versa. This may also explain the finding in the current study that only the low performance expectation manipulation showed a significant drop in score on the performance test, regardless of year of study, as being in the performance situation led to a bias towards negative information regarding performance. Although the drop in learning score was less when students had learned under high expectation conditions, suggesting that the positive arousal of high learning expectations may combat low performance expectations.

5.1 Limitations

Understanding of how the expectation effect worked could have been improved by establishing, either through a control group or baseline calculation, how far the expectation effect had moved the score of the year one students from the average score for the population. That would have revealed whether both the high and the low learning expectation manipulation had had an effect, or simply one or the other. Given that it was only the low performance manipulation that significantly pulled the score down, it is possible that only the low learning expectation had the effect of lowering the score from the population mean; this could be revealed with further research including a baseline or control. Knowledge of the effect may also be furthered by understanding exactly how expectations interfere with the learning and performance processes. Although confidence ratings in this study were offered as a possible mediating factor, thorough mediational analysis, such as path analysis (Land, 1969) and regression including several possible mediators would give a more comprehensive picture.

Also, repeating this study using a more thorough test of learning and performance, as the current study used a bank of only 24 true or false questions, which may have amplified the differences between subjects. Each question was worth approximately 8% of students' total score on that test. Devising a more sensitive test would lead to a clearer picture of the magnitude of difference that may be found.

5.2 Conclusions and Further Research

This paper offers evidence of a basic expectation mechanism that may underpin many of the well-known theories and effects in education literature, by highlighting the possibility that student expectations are prone to manipulations that bring out differences in learning and performance. Rather than condemning the major theories as defunct re-branding of the same effect, this finding highlights the importance of understanding the varied forms that expectation effects can take so that their detrimental or facilitative effects on student achievement may be avoided or encouraged in future. In further research, emphasis should be placed upon understanding the intrinsic factors that vary the students' susceptibility to various expectation effects; in this study it seems that level of practise or experience and self-regulatory processes had a part to play. Also crucial to a comprehensive picture of expectation effects is understanding the longevity of each type of manipulation. So far immediate effects have generally been studied but the temporal extent of various interventions needs to be mapped out. That way, discovery of the optimal interventions to combat low and bolster high expectations would mean they could be rolled out on a wide scale to encourage an effective learning environment.

Appendix A – Example of a self-rated confidence measure.

How confident are you that you can learn this information?

Please circle a value.

O.....10.....20.....30.....40.....50.....60.....70.....80.....90.....100

Appendix B – The Academic Self-Concept Scale (questions 5,6,7 = reversed scoring)

Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements by writing the number that corresponds to your opinion in the space underneath each statement.

1	2	3	4	5	6
Strongly Agree	Agree	Mostly Agree	Mostly Disagree	Disagree	Strongly Disagree

1. You often have to force yourself to start doing another academic task.

2. You use your abilities in learning only to a limited extent.

3. You cannot be said to be a well-achieving student.

4. You rarely experience joy from learning, especially if it requires a lot of effort.

5. You put forth maximum efforts to master knowledge and skills and that's why you're sure you'll become a high-level professional.

6. You enjoy completing all academic tasks in time and at a high level.

7. Generally, you receive "excellent" grades.

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