



Theories of intelligence, learning behaviours and approaches to learning: A comparison between traditional and mature students

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ABSTRACT

Typically research in education has examined students' intellectual strengths as a key correlate to academic success. It is now widely acknowledged that other individual differences, rather than intellectual intelligence alone, may have a greater influence. This current study will build on existing research and in addition look at student populations, and the increasing diversity pertaining to age between traditional and mature students. To assess how these populations differ, this study investigates how non-cognitive factors such as 'theories of intelligence' can influence learning behaviours and approaches to learning. A sample of 126 students participated in this study, 61 'Traditional' students (22 years-of-age and lower) and 65 'Mature' students (23 years-of-age and higher). Participants' theories of intelligence, learning behaviours and approaches to study were measured using 3 self-reporting questionnaires. Theories of intelligence were measured using Dweck's 'Entity' questionnaire; approaches to learning were measured using the 'Approaches and Study Skills Inventory' (ASSIST). The questionnaire used to measure learning behaviours was developed specifically for this research and was analysed using principle component factor analysis. The analysis identified 4 subscales; Perseverance, Resilience, Effort and Confidence, which were used to measure students learning behaviours. Results for theories of intelligence indicate a significant difference with mature students, overall tending to hold more of a growth mindset. Learning behaviours for both groups reflected a learning goal orientation; however there was still a significant difference between groups, with mature students displaying more of learning goal orientation than traditional students. Approaches to learning indicated that there was a significant difference and that mature students adopted a deeper approach to learning than that of traditional students. It is suggested that further research looking at how non-cognitive factors differ between the two groups is essential for gaining an understanding of the now diverse student undergraduate population.

1. Introduction

Education is said to be one of the most important investments a country can make to its people and future and is thought to be crucial to society's continuing development (Pasnica, 2009). For this reason there is a huge body of research looking at education and specifically what makes individuals educationally successful. Not surprisingly, the majority of research within this field tends to focus on compulsory education; students aged 5 to 16, with only a small percentage of studies looking at students in further and higher education. In 1997, under UK government reforms, new legislation (Education Act 1997) promoting lifelong learning emphasised the government's commitment to helping any person of any age return to further education. Plans were outlined for a 50 percent participation target of 30-year-olds and under to be enrolled in further education by 2010. According to Osborne (2012), the UK may have gone some way in achieving this, as compared to the rest of the EU; the UK has the highest percentage of part-time mature students. It is surprising therefore that so little empirical research has been carried out comparing this population against standard entry students. According to Merrill (1999), the increase in this group will impact considerably on the composition of the student body in terms of mature and traditional student numbers. Research within any area of education is critical to understanding and developing learning strategies and theories, however acknowledgement of a new and increasing population, that of the mature student, needs to be explored further. This current study will discuss the relevance of individual theories of intelligence and the impact they have on students' learning behaviours and the approaches they adopt towards studying. In order to increase understanding, comparisons will be made between traditional entry students', those aged 22 years and lower, and mature students, aged 23 years and higher, to see how these two groups differ within the educational realm.

Traditionally, research in education has tended to look towards students' intellectual strengths as a key correlate to academic success (Harris, 1940). The importance of such factors is not disputed (Sternberg, 1997; Busato, Prins, Elshout & Hamaker, 2000), however increasingly research has begun to acknowledge that other individual differences, rather than intellectual intelligence alone, may have a far greater influence. Neisser et al. (1996), for example, questioned how a person's intelligence quotient (IQ) alone, can be used as a predictor of academic success when individuals differ so greatly in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience and to engage in various forms of reasoning. For this reason, research within the educational field has begun to expand beyond looking solely at IQ and extend the focus to include other individual differences such as self-discipline, personality traits and creativity (Duckworth & Seligman, 2005; Naderi, Abdullah, Aizen, Sharir & Kumar, 2009). The proceeding sections will address this further and look at the findings from several studies that add credence to Neisser's doubts that IQ, as a single determining factor, is sufficient enough predictor of academic success.

1.1 Beyond IQ – Individual Differences

In the specific context of learning and education, the term individual differences refers to the different characteristics, attributes, aptitudes, preferences and propensities present in any group of students which have the potential to influence the learner

experience or learner outcome (Cassidy, 2012). To date, research looking at individual differences and their effect on academic success has tended to look at more conventional examples such as age, gender, culture, and previous experience (Banks et al., 2001). There is some debate regarding such factors and they are often reported as moderators, in that they are not the actual cause of any reported academic individual differences, they merely act to enhance the differences (Baron & Kenny, 1986). However there are no doubts that these differences do yield compelling evidence; for example research by Clark, Lee, Goodman and Yacco (2008), found that females, when compared to males, tend to obtain higher grades during secondary school assessment. This is supported by Hunley et al. (2004) whose research also reported that within a sample of secondary school students, females, on average obtained higher grades than male students. However it was suggested, for both studies, that factors such as student motivation and study behaviours may have been the more influential factors and that the differences in gender, as previously discussed, just emphasised the difference.

As previously discussed, this current study is fundamentally interested in undergraduate student populations, and the increasing diversity pertaining to age and the differences between traditional and mature students' in relation to educational theories. It is therefore acknowledged that age as a moderator in actuality serves the purpose well for this investigation. Multiple studies (Kevern, Ricketts, & Webb, 1999; Naderi et al. 2009a; Sheard, 2009), have tended to show that mature students achieve better academic grades than their younger counterparts. This is supported by Hoskins, Newstead and Dennis (1997), who reported, mature students studying at undergraduate level tended overall to achieve higher degree classifications in comparison to younger students. There is however contradictions in results as shown by Koh and Koh (1999), who found that in certain subjects, such as engineering and science, younger students outperform mature students. This is perplexing as according to Hoskins et al (1997), in theory; the discipline studied should not be a major determinant of degree classification, as a good classification in one subject should equate to similar weight in another. This highlight's, that basic individual difference's such as age alone, is too general an attribution to account for findings relating to academic success. It is not enough for academic discussions of skills and skill formation to exclusively focus on such a variable in conjunction with cognitive ability. With this in mind, this study will investigate the relationship between age, specifically related to traditional and mature students and the relative influence of non-cognitive skills.

1.2 Non-Cognitive skills Versus Cognitive skills.

The term 'non-cognitive skills' refers to a set of attitudes, behaviours, and strategies that are thought to underpin individuals' academic success (Gutman & Schoon, 2013). As previously discussed, academic success is traditionally measured by the 'hard skills' of cognitive ability such as IQ. The problem with looking at 'hard skills' is that they can't explain the "*numerous instances which can be cited of people with high IQs who fail to achieve success in life because they lacked self-discipline and of people with low IQs who succeeded by virtue of persistence, reliability and self-discipline*" (Heckman and Rubinstein, 2001, p.145). This highlights the necessity to take non-cognitive skills into account especially in relation to looking at moderating factors such as age. For example, with regards to 'self-discipline', research by Trueman and Hartley (1996) found that older students display superior study and time management skills in

comparison to their younger counterparts. The greater success of mature students has also been attributed to factors such as higher levels of motivation (Eppler & Harju, 1997).

The importance of looking beyond cognitive skills is far reaching. Research by Heckman and Rubinstein (2001) has shown that lack of non-cognitive skills displayed throughout the education process can carry forward to later outcomes, such as career development. Heckman's study of the General Educational Development (GED) programme, found that individuals who ceased high school due to lack of motivation and self-discipline, but later returned as a mature student to complete the GED exam, were still more likely to earn lower wages than those student who chose the conventional route of completing high school. Heckman argued that if the sole predictor of academic and career success was IQ, this should not be the case as the GED examination was equivalent to a high school diploma and so should indicate similar cognitive ability. Heckman's study therefore indicates that other non-cognitive factors which connect academic achievement and successful employment prospects must be more relevant than IQ alone. The GED study may hold some relevance to this current study as it is acknowledged that mature students returning to education may have entered higher education through a less conventional route such as an access to higher education qualification. It therefore needs to be questioned if Heckman's study may contradict the findings of Eppler and Harju (1997) and Trueman and Hartley (1996) and strengthens the importance of continuing research comparing traditional and mature students. It is because of examples such as Heckman's (2001) study, that research in non-cognitive skills is increasing and is now generally considered as important, if not more so, than cognitive skills and IQ. It is suggested that if research is to make any headway in securing the importance of such skills, the focus should be on education as in the majority of cultures it is identified as a key factor in the formation of individuals (Abedin, Jaafar, Husain & Abdullah, 2013).

It seems appropriate to summarise that non-cognitive skills do appear to wield their influence on academic success, however what is less clear is where such attributes as motivation; perseverance and self-discipline stem from. One plausible explanation can be seen in the works of Dweck (1999), who suggests that it is not the ability (IQ) or belief in ability (self-efficacy) that predicts the resilience or perseverance of learners, but is more associated with the individual's belief about the nature of ability.

1.3 Theories of Intelligence

Dweck, Chiu and Hong (1995), states '*that people's implicit theories about human attributes, structure the way they understand and react to human actions and outcome*' (p. 267). Implicit theories of intelligence have shown to have significant predictive power in gaining an understanding of a person's cognitive, affective and behavioural actions in a variety of situations. Research by Sternberg (1985), reported that a person's belief system regarding their intelligence is positively correlated with attributes such as creativity and wisdom. In terms of academic performance, research by Blackwell, Trzesniewski and Dweck (2007) has shown that a person's belief system about the nature of intelligence may hold the answer as to why some students are more motivated to work harder than others.

According to Dweck et al. (1995), there are two distinct sets of beliefs that individuals have with regards to the nature of intelligence, these are known as 'mindsets'. Mindset

theory dictates that individuals can be placed on a continuum according to their implicit views of where ability comes from. Individuals' who believe that success is based on innate intellectual abilities, which cannot be changed; are said to have a "fixed" mindset. Others, who believe their success is based on hard work and that intellectual ability can be changed are said to have a "growth" mindset. Research by Erdley and Dweck (1993) has shown that students who hold a fixed mindset are less likely to attempt challenging tasks for fear of failing and looking unintelligent. This may result in students avoiding tasks that require effort as it may be perceived as being a sign of low ability which will ultimately interfere with students reaching their full academic potential. In contrast, Dweck identifies that students who hold a 'growth' mindset are mainly focused on improving their competence and acquiring new knowledge: they are oriented towards learning goals. In order to meet with these learning goals, they are willing to expend the necessary effort and to seek out challenging or difficult situations that promote learning.

To summarise, the main assumption of mindset theory is that a person's individual belief about the nature of academic ability can determine the way students approach learning and achievement situations. This current research has reviewed studies that have shown that a person's mindset has the predictive ability to impact on the kinds of goals a person can adopt. This may lead to differing learning behaviours and ultimately through a person's mediation of effort expenditure and persistence can help predict their achievement. According to Dweck and Leggett (1988) the differing mindsets, growth and fixed, should be most apparent when students are subjected to challenging difficult tasks. When applying this rationale to this current study, it would be plausible that comparisons between the population of mature students and traditional students, may display interesting results. According to Eppler and Harju (1997) students who return to education, after previously dropping out, are making the deliberate choice to expose themselves to challenge because they often have additional stresses such as career demands and family commitments. The proceeding section will address how mindset theories can influence students 'goal orientation' and will suggest how these are best identifiable through learning behaviours.

1.4 Goal Orientation/Learning Behaviours

Goal orientation theories are concerned with why students want to succeed academically, how they approach tasks, and the standards they use to evaluate their performance (Pintrich & Schunk 1996). According to Ames (1992), goal orientation is represented by a combined array of beliefs that can guide 'different ways of approaching, engaging in, and responding to achievement situations' (p.261). In addition, goal orientation concept is thought to be a somewhat stable individual difference that students bring with them to a multitude of learning tasks, environments and activities (Pintrich & Schunk, 1996). Research within this area has tended to agree that there are two general goal orientations. Nicholls, Cheung, Laurer and Patashnick (1984) for example, refer to both as 'ego' and 'task' orientations. Dweck and Goetz (1978), referred to both as 'mastery' and 'helplessness' which was later changed to 'learning and 'performance' (1986). This current study will use the latter terms of 'learning' and 'performance'.

According to Middleton and Spanias (1999), students' who exhibit a learning goal orientation, value improvement and knowledge. These students believe that success is dependent on increasing one's conceptual understanding and developing skills

through positive behaviours such as collaborating with peers, working hard, and advice seeking (Stipek et al., 1998). In contrast, Dweck (2006) states, students who display a performance goal orientation, do so in an attempt to only demonstrate competence and to validate self-worth by seeking favourable judgments and avoiding negative judgments about their competence.

This study questions if the differentiation of the two goal orientations is possibly best identified through a person's learning behaviour. To support this view, Stipek et al. (1998) found that learning orientation is associated with students being more attentive, more willing to take risks, and more likely to choose challenging tasks. It was found that these students tend to persist longer on tasks, and use more effective and creative problem solving strategies. Bouffard, Boisvert, Vezeau and Larouche (1995) also identify this particular goal orientation with positive self-regulatory processes. In comparison, students who hold a performance goal orientation, tend to avoid difficult tasks for fear of failure. Rather than developing competence within a specific task they tend to use memorising techniques, avoid help seeking behaviours and give up more easily on difficult tasks. It has already been acknowledged that mature students may face additional stresses by exposing themselves to the challenge of returning to education. As learning goal orientation is centred on embracing challenge and the willingness to take risks, it is plausible that mature student sway towards this particular goal in comparison to traditional students.

The literature reviewed has established that non-cognitive functions and a person's theories of intelligence are associated with goal orientation. However, this current research suggests that having the additional ability to recognise specific behaviours may also prove beneficial within this area. The importance of this is perhaps summed up nicely in the words of W James, (1907) *'First, what are the types of human abilities and, second, by what diverse means do individuals unleash these abilities?'*(p. 332). To date however there appears to be little research looking at learning behaviours associated with goal orientation. This study therefore proposes to design a questionnaire that will assess students' goal orientation in terms of specific associated behaviours. The questionnaire will enable this research to identify behaviours as measurable factors which can then be assessed in order to implement intervention and increase and promote a learning goal orientation.

1.5 Approaches to learning

In addition to looking at goal orientation, this study will also address the 'Students Approaches to Learning' model. Research by Marton and Saljo (1976) has shown that the particular approach that a student takes can have an impact on academic success. The model focuses on students' levels of engagement or depth of processing applied during learning. Entwistle and Waterson (1988) identified three major approaches to learning characteristics in students. A 'deep' approach indicates that an individual is intrinsically motivated, with learning being the goal in itself. A 'surface' approach is associated with students being extrinsically motivated and focusing on outcome goals (e.g. grades, qualifications) rather than learning goals. The final approach, 'strategic', applies to individuals who seek to achieve maximum output (i.e. meeting assessment requirements) through minimum input (i.e. academic endeavour/study). Both deep and strategic approaches are associated with academic success, while surface approaches are associated with academic underachievement.

This current study recognises the similarities between the 'Students Approaches to Learning' model and the 'Goal Orientation' model. It can be seen that students who adopt a learning goal orientation may display the same behaviours as those who adopt a deep approach to study. Students who display behaviours associated with performance goal orientation may adopt a more surface approach. Interestingly, the students approaches to learning model allows for a third option; that of the strategic approach. It is suggested that it is easy to identify students who have a definite learning or performance goal orientation, but not so easy to recognise students who are in between. It has been acknowledged that mature students may have additional influences that could affect their goal orientation. It is therefore suggested that the third approach; strategic, may prove interesting in establishing where students, especially mature students sit within the goal orientation continuum.

1.6 What is missing?

It is clear that non-cognitive skills are strongly correlated with academic success; however the evidence seems less clear regarding the relationship between such skills and learning behaviours. It is suggested that the ability to identify behaviours as measurable factors will enable assessments in order to implement intervention and increase and promote a learning goal orientation. In addition it has been identified that research concerning mature students appears contradictory, so this study will attempt to clarify this issue by highlighting the differences between mature students and traditional students. This current study aims to investigate this by looking at non-cognitive factors such as how a person's theory of intelligence can influence learning behaviours and approaches to learning. Furthermore, it suggested that by looking at students' approaches to learning in conjunction with goal orientation, may enable research to establish why mature and traditional students differ.

Three hypotheses will be tested for this current study. Hypothesis one predicts that mature students will display more of a growth mindset compared to traditional students. The second hypothesis states that students who display a growth mindset will score highly on the learning behaviours questionnaire indicating a learning goal orientation. Hypothesis three predicts that a high score associated with learning behaviours will determine that students' will employ a deep approach towards learning.

2. Method

2.1 Participants

This study used a total of 124 students which were recruited through quota sampling, 61 were recruited from the University of Portsmouth 'participant pool' and 65 were recruited from a selection of South Downs College Access courses. The 61 students, 44 female and 17 male were representative of the 'Traditional' student group (aged 22 and lower) and displayed an age range of 18 to 22 ($M=20.52$ years, $SD=1.16$). The students that completed the study using the participant pool were mostly made up of first year social sciences (psychology, sociology, criminology) undergraduates who were given study credits for their participation. The remaining 65 participants, 42 female, 23 male, were recruited from a cohort of access course students affiliated with South Downs College, studying Health and Social care. The second group

representative of 'non-traditional' students (aged 23 and higher) displayed an age range of 26 to 48 (M=31.47, SD=7.231) (Table 1).

Table 1

Sample Descriptive

	Student Population	N	Mean	Std. Deviation	Std. Error Mean	Male	Female
Age	TS	56	20.61	1.107	.148	17	44
	MS	60	31.46	7.231	.934	23	42

2.2 Design

For the purpose of this research an independent design sample was used to investigate the comparisons in behaviours to learning as an effect of students' 'mindset' theories, 'goal orientation' and 'approaches' to study, between traditional and non-traditional students. Each groups displayed variation of gender with females being the most prevalent in both groups. The independent variable for this design was related to the participants age and whether they were categorised as a traditional student (aged 22 or lower) or a non-traditional mature student (aged 23 and above). This study addressed three dependent variables, students' mindset theories, students' goal orientation, measured through learning behaviours and students' approaches to study.

2.3 Materials

Each participant was initially given a consent form (Appendix A) and asked 5 demographic questions (Appendix B) prior to completion of questionnaire. The demographic questions related to participants age, gender, course of study, marital status and if they had dependent children. In addition to these questions, students who were identified from their age as being non-traditional were also asked how long it has been since they has partaken in any form of learning within an educational environment.

Participants' were asked to complete three questionnaires, which will be discussed below.

2.3.1 Theories of intelligence. A three-item questionnaire developed by Dweck and Henderson (1989) was used to measure participants' implicit theory of intelligence. This measure is similar in format to the one used in Chiu, Hong, and Dweck (1997). The items are "You have a certain amount of intelligence and you really can't do much to change it"; "Your intelligence is something about you that you can't change very much"; and "You can learn new things, but you can't really change your basic intelligence." Participants were asked to show their degree of agreement with each item on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). Hence, the lower the participants' scores, the less they believe that intelligence is a fixed entity. This study opted not to included items relating to a 'fixed' mindset theory because studies (e.g. Leggett, 1985) have shown that, even for respondents who endorse items depicting growth mindset theories, there is a strong tendency to favour items depicting the opposite. Furthermore, a pilot study (Dweck et al.1995a, 1995b) found that when students were asked to give an explanation of their responses to the

fixed mindset of intelligence measure; they were able to give clear fixed mindset theory explanations for their responses. Therefore it can be assumed that those who score highly on growth mindset statements would represent agreement with the fixed mindset statements. To further gauge the instrument's validity, reliability analysis was conducted and was found to display high internal reliability with a Cronbach's alpha of .95 for this sample size of 126. In addition, this measurement was also chosen as it has been subjected to robust analysis by several other studies (as cited in Chiu, Hong, & Dweck, 1997). For example, the Snyder (1979) Self-Monitoring Scale was used to show that the measurement is not confounded with the self-presentation concerns of participants'.

2.3.2 Learning Behaviours. The 'Learning Behaviour' questionnaire, developed for this study, was comprised of 30 statements, each one measuring participants' behaviours towards learning. The measurement was developed using several study tools from various educational establishments but most notably the 'Your Learning Questionnaire' used in the 'Growing Learners' initiative established through the University of Portsmouth. As the original questionnaire was aimed at pupils within key educational stages 1 to 4, the items were adapted to suit the current study's population of undergraduate students. So that both positive and negative learning behaviours were measured equally, the statements varied in in both positive and negative directions. Statements 1 to 15 reflected negative learning behaviours, for example, '*If I have to work really hard it makes me feel like I am not very clever*'. The following 15 statements, exemplified positive learning behaviour such as '*I feel ok about making mistakes because I learn from them*' (see Appendix C for full questionnaire). Participants were asked to rate their level of agreement with each item on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The responses for item 1 to 15 were then reverse scored so that the negatively worded statements reflected the optimal learning behaviours being measured; this ensured that all of the items – negative behaviours and positive behaviours towards learning – were consistent in terms of what a 'strongly agree' or 'strongly disagree' implied. After reverse scoring the internal consistency of the 30 statement questionnaire was measured, which displayed a Cronbach's alpha of .95.

The Learning Behaviours Questionnaire was further analysed to initially assess the suitability of using principle component analysis (PCA). Inspection of the correlation matrix indicated that all of the 30 statements had a least one correlation with another item ($r < 0.3$) suggesting reasonable factorability on all statements. PCA extraction revealed 4 factors identified by this study as; Perseverance, Resilience, Effort and Confidence (Table 2). These factors allowed the questionnaire to be broken down into subgroups. A high score on each subscale would indicate prevalence for that particular behaviour and a low score would indicate not so prevalent.

2.3.3 Approaches and study skills inventory for students (ASSIST) (Tait & Enwhistle, 1996). This is a 52-item measurement (Appendix D) which aims to identify students study strategies. ASSIST employs scales which measure three approaches to studying. The first scale, 'deep' has 16 statements and measures the participants' intention to understand how they relate ideas, their use of evidence gathering and their active learning techniques. The second scale, 'surface', has 20 statements and aims to measure participants' study strategies such as their intention to reproduce knowledge, their use of unrelated memorising, passive learning and their fear of failure. The final scale, 'strategic', investigates participants study organisation skills,

their time management, alertness to assessment demands and their intention to succeed; this scale has 16 statements. All statements are combined into 13 subscales of four statements each, which are then grouped into the three main scales, as previously discussed. Participants were again asked to show their degree of agreement with each item on a 5-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). A score for each of the approaches and academic aptitude is obtained by summing the scores for items falling within each particular subscale. The scale that has the highest score would give an indication of individuals approach to learning. The ASSIST inventory was chosen as it is considered to be one of the most reliable and valid instruments available for measuring students learning styles. Research by Cassidy (2008) provides evidence supporting the inventory's internal consistency and construct validity with sub-scale coefficients of .84 for strategic, .82 for deep and .79 for surface. It has been considered that there is little evidence to support the inventory's test-retest reliability and predictive validity; however Duff (2000) recommends the instruments continued use for educational management and research.

2.4 Procedure

Participants in the 'traditional' student group were recruited using 'Qualtrics Survey Software' which was available through the University of Portsmouth participant pool. The 'mature' student cohort was approached during their tutorial sessions for 'Access to Further Education' courses at South Downs college (prior authorisation from the tutor was granted). In exchange for mature students participation it was agreed that the researcher of this current study would give a brief presentation about their experience as a 'mature' student studying at an undergraduate level. Prior to completion of the questionnaires, participants were asked to read and acknowledge their agreement to participate in the study via the consent form. The participants were then requested to complete all questionnaires, indicating their responses using the appropriate Likert scales. As the questionnaires aimed to measure the individual's theories, behaviours and approaches to study, participants completed the questionnaires independently. On completion of the questionnaires the participants were given a full debriefing form (Appendix E). Time spent completing the questionnaires was not expected to exceed 20 minutes for each individual.

The data from each participant was then collated and scores for each questionnaire and their subsequent subscales calculated using SPSS 22.0 for Windows.

3. Results

This results section will initially look at the analysis for learning behaviours, followed by theories of intelligence and finally addressing students' approaches to learning. The differences between traditional students (TS) and mature students (MS) will be analysed using a series of T Tests.

3.1 Learning Behaviours

3.1.1 Principle Component Analysis (PCA). The Learning behaviours questionnaire was employed to measure different underlying components related to learning behaviour. The measure was analysed using PCA. The overall Kaiser-Meyer-Olkin

(KMO) measure of sampling adequacy was .85, with individual statement measurements of KMO all greater than 0.7. Bartlett's test of sphericity was statistically significant ($p < .05$), indicating the data is factorable.

PCA revealed 5 components that had eigenvalues greater than one and which explained 48.18%, 10.47%, 5.66%, 4.4% and 3.66% of the total variance, respectively. Inspection of the scree plot and interpretation of the component matrix indicated that four components should be retained. The four component solution explained 68.7% of the total variance. A Varimax orthogonal rotation was used to aid interpretability. The interpretation of the data and the 4 identified components was consistent with the learning behaviours the questionnaire aimed to measure. Component 1; perseverance, component 2; resilience, component 3; effort and component 4; confidence. Component loading communalities of the rotated solutions are presented in Table 2.

Table 2

Rotated Structured Matrix for PCA with Varimax Rotation for 4 components

Items	Rotated Component Coefficients				Communalities
	Component 1 Perseverance	Component 2 Resilience	Component 3 Effort	Component 4 Confidence	
Qu5	.844	.265			.798
Qu14	.811	.272	.158	.109	.768
Qu 6	.798	.283	.195		.761
Qu 9	.744		.361	.221	.780
Qu 26	.744	.219	.184	.213	.681
Qu 24	.723	.209	.352	.155	.715
Qu 25	.694	.377	.320		.727
Qu 23	.637	.268	.490	.129	.734
Qu 16	.618	.312	.210		.524
Qu 8	.600	.444	.107		.574
Qu 30	.562	.112	.130		.352
Qu 17	.551	.233	.512	.253	.684
Qu 12	.525	.418	.147	.417	.645
Qu 29	.346	.823	.171		.829
Qu 11	.208	.804	.191	.138	.745
Qu 28	.317	.797	.193		.774
Qu 10	.247	.787	.176		.829
Qu 27	.287	.703		.234	.632
Qu 3	.218	.701	.144		.567
Qu 13	.291	.683		.395	.747
Qu 2		.667	.230	.514	.764
Qu 1		.618	.213	.580	.807
Qu 18	.522	.590	.161		.647
Qu 15	.382	.516	.235	.231	.521
Qu 20		.201	.750		.635
Qu 21	.454		.607	.414	.759
Qu 19	.462	.285	.603		.658
Qu 22	.419	.52	.601	.192	.698
Qu 4	.342	.383		.670	.714
Qu 7	.538			.561	.655

Note. Major loadings for each item shaded

The first component 'Perseverance' consisted of 13 statements which was shown to have a high level of internal consistency as determined by a Cronbach's alpha of .914. The second component 'Resilience' consisting of 11 items, again had a high level of consistency with Cronbach's alpha of .936. A similar high Cronbach's alpha of .668 was displayed for component 3, 'Effort', which consisted of 4 statements. The final component 'confidence', consisting of 2 statements, displayed a lower Cronbach's alpha of 0.422 however is can assumed this is due to the number of statements and it being the final extraction.

Independent samples t-tests were conducted to evaluate if the mean scores for the 4 factors; Perseverance, Resilience, Effort and Confidence, was significantly different between TS and MS. Inspection of boxplots indicated that there were no outliers for each of the subgroups.

3.1.2 Perseverance. A significant difference was found in the mean scores for perseverance for TS ($M=52.30$, $SD=12.46$, 95% CI [49.10, 55.49]) compared to MS ($M=57.49$, $SD=9.33$, 95% CI [55.18, 59.80]) with MS scoring higher in on perseverance; $t(124)=2.66$, $p=.005$ (1-tailed), $d=0.47$. This suggests MS have a higher perseverance level than that of TS.

3.1.3 Resilience. Similar to perseverance, a significant difference was found in the mean scores for resilience. TS ($M=35.51$, $SD=10.19$, 95% CI [32.90, 38.12]) compared to MS ($M=39.66$, $SD=11.19$, 95% CI [34.89, 42.43]) with MS scoring higher in on resilience; $t(124)=2.17$, $p=.016$ (1-tailed), $d=0.39$. This suggests MS have a higher resilience levels than that of TS.

3.1.4 Effort. A significant difference was found in the mean scores for Effort for TS ($M=17.23$, $SD=3.93$, 95% CI [16.36, 18.20]) compared to MS ($M=18.92$, $SD=2.37$, 95% CI [18.33, 19.51]) with MS scoring higher in on effort; $t(124)=3.27$, $p<0.001$ (1-tailed), $d=0.52$. This suggests MS have a higher effort level than that of TS.

3.1.5 Confidence. A significant difference was found in the mean scores for confident behaviours, TS ($M=7.25$, $SD=2.65$, 95% CI [6.85, 8.10]) compared to MS ($M=8.42$, $SD=1.63$, 95% CI [7.42, 8.45]) with MS scoring higher; $t(124)=3.43$, $p=.000$ (1-tailed), $d=0.53$. This suggests MS have a higher level of confidence than that of TS.

In summary, it can be seen that MS appear to display more conducive learning behaviours for each of the 4 factors.

Table 3
T-Tests – Learning Behaviours

	Student Status		<i>t</i>	<i>df</i>	<i>p</i>	<i>Range</i>
	TS	MS				
Perseverance	52.3 (12.46)	57.49 (9.33)	2.66	124	.005	13-78
Resilience	35.51 (10.19)	39.66 (11.19)	2.17	124	.016	11-66
Effort	17.23 (3.93)	18.92 (2.37)	3.27	124	.001	4-24
Confidence	7.25 (2.65)	8.42 (1.63)	3.43	124	.000	2-12
Overall	112.79 (25.63)	123.55 (21.65)	2.55	124	.006	30-180

p = ≤0.001, Standard Deviation in parenthesis below

3.2 Theories of Intelligence

An independent sample T-test was run to determine the differences in scores between the 61 TS and 65 MS. There were no outliers in the data, as assessed by inspection of a boxplot. There was homogeneity of variance, as assessed by Levene's test of variances ($p=.625$). Theories of intelligence scores could range from 3, (growth mindset) to 18 (fixed mindset). Results indicate that MS scored lower on the questionnaire ($M=7.97$, $SD=3.55$, 95% CI [7.09, 8.85]) compared to TS, ($M=9.79$, $SD=3.41$, 95% CI [8.91, 10.66]). This indicates that MS do not view intelligence as a fixed entity. A significant statistical difference can be seen between the TS and MS mean intelligence theory scores; $t(124)=2.926$, $p=.002$ (1-tailed), $d=0.52$.

3.3 Approaches to Learning - ASSIST

To compare the mean scores for each of the 3 approaches; Deep, Strategic and Surface, independent sample T-tests were conducted between TS and MS. Data was initially inspected using boxplots which indicated that there were no outliers for each of the 3 scales.

3.3.1 Deep. The T test revealed a significant difference for students' deep approach to study; TS ($M=55.05$, $SD=6.96$, 95% CI [53.27, 56.83]) compared to MS ($M=58.09$, $SD=7.51$, 95% CI [56.23, 59.93]) with MS scoring higher; $t(124)=-2.35$, $p=.010$ (1-tailed), $d=.41$). This suggests MS approach their learning at a deeper level than that of TS.

3.3.2 Strategic. A significant difference was found in the mean scores for strategic approaches to study, TS ($M=71.89$, $SD=8.84$, 95% CI [69.62, 74.15]) compared to MS ($M=68.42$, $SD=7.04$, 95% CI [66.67, 70.16]) with TS scoring higher; $t(124)=2.45$, $p=.008$ (1-tailed), $d=.43$). This suggests TS approach their learning at a more strategic level than that of TS.

3.3.3 Surface. A significant difference was found in the mean scores for surface approaches to study, TS ($M=47.70$, $SD=7.60$, 95% CI [45.76, 49.65]) compared to MS ($M=51.43$, $SD=8.55$, 95% CI [49.31, 53.55]) with MS scoring higher; $t(124)=-2.58$, $p=.005$ (1-tailed), $d=.46$). This suggests MS approach their learning at more surface level than that of TS.

Table 4
T-Tests - Approaches to Learning

	Student Status		<i>t</i>	<i>df</i>	<i>p</i>
	TS	MS			
Deep	55.05 (6.96)	58.09 (7.51)	2.35	124	.01
Strategic	71.89 (8.84)	68.42 (7.04)	2.45	124	.008
Surface	47.7 (7.60)	51.43 (8.55)	2.58	124	.005

$p \leq 0.001$, Standard Deviation in parenthesis below

Analysis has shown that MS tend to adopt a deeper approach to learning than that of TS, who in comparison score higher on strategic approach. Interestingly MS have been shown to score higher on surface approach which would initially contradict the deep approach results. These finding will be reviewed in the discussion.

4. Discussion

The focus of investigation presented in this paper was to highlight the importance of looking at non-cognitive attitudes and behaviours towards learning. It was found that mature students, overall tend to hold a growth mindset compared to traditional students. This supports research hypothesis one. Both groups, traditional and mature students, reflected a learning goal orientation, indicating that hypothesis two was also met. However, hypothesis three, which predicted students who display a learning goal orientation would adopt a deep approach was only partially supported. Mature students did score higher on deep approach compared to traditional students however for both groups of students', the strategic approach was the most prevalent. These findings will be discussed further in the proceeding sections.

4.1 Theories of Intelligence

The results of this study indicate that mature students do display a relatively strong growth mindset in comparison to traditional students. This supports hypothesis one, however, it is recognised that both groups scored relatively low on the scale. Therefore it cannot be determined that traditional students display a fixed mindset and mature students display a growth mindset. As mindset is measured on a continuum; both groups can be identified as adjacent to each other with mature students closer to the extreme end of growth mindset. As previously discussed, Dweck (1995) determines that students who hold a 'growth' mindset theory with regards to intelligence, tend to focus on improving competence, acquiring new knowledge and are oriented towards learning goal. In order to meet with these learning goals, they are willing to expend the necessary effort and seek out challenging or difficult situations that promote learning. In the UK, higher education is not compulsory, so it could be argued that any student, regardless of age, who chooses to voluntarily pursue education at this level, may be deemed as having a growth mindset. Another plausible explanation for the similarities may be due to the nature of further or higher education itself. Although a person's theory of intelligence is said to be individualistic, research by Zepke, (2006) has identified that theories regarding learning can be affected by social influences, population, and even the educational establishment. This is interesting, as although this current study has made comparisons between the two different sub-groups, it should be considered together they constitute as a categorised population which may explain why such similar theories of intelligence were found. It may therefore be beneficial for future research to explore how two distinct groups such as students and their non-student peers differ in theories of intelligence.

It cannot be disputed that there was a significant difference between mature students mindsets' compared to traditional students. However, the similarities do highlight the importance of looking beyond a student's mindset and strengthens this current study's expectations that learning behaviours may yield more conclusive evidence of a variance between groups. This is because, as initially identified, a person's theory of intelligence can influence goal orientation which in turn, it is suggested, would best be observable by students learning behaviours.

4.2 Learning Behaviours

It has already been discussed by reviewing Dweck's (2010; 2006; 1995 and 1986) studies that a person displaying a growth mindset would tend to adopt a learning goal orientation. So for this current study, as both samples have displayed growth mindset's, it should be expected that both display behaviours more conducive with this particular orientation. The four components identified were chosen, as each on a stand-alone basis, have been shown to affect educational achievement and as a collective group, it is suggested, may represent goal orientation.

4.2.1 Perseverance. Perseverance, specifically relating to academia, is described by Farrington et al. (2012) as a student's tendency to complete educational assignments in a timely and thorough manner, to the best of one's ability, despite distractions, obstacles, or level of challenge. This would therefore indicate that perseverance would fit accurately within the goal orientation framework and would also allow certain behaviours to be identified. Furthermore, many studies have identified perseverance as a key element to learning goal orientation (Caraway, Tucker, Reinke & Hall, 2003; Bouffard et al. 1995; Dweck, 1995). The results of this study for perseverance behaviours collaborates with that of the growth mindset and the learning goal orientation, with mature students again scoring higher for this behaviour. As with the theories of intelligence score, the results for traditional students were shown to be not much lower. Interestingly, research by Bloom (1968) states that perseverance levels may vary between learning tasks and that those students' who give up quickly in one particular discipline may persevere for an unusually long time in another. As perseverance has been identified as a key component in learning goal orientation it may shed doubt on Pintrich and Schunk's (1996) study which states that goal orientation is a somewhat stable trait that students bring with them to a multitude of learning tasks, environments and activities. This current study aimed to identify perseverance in terms of behaviour so that it could be recognised then used as a measurable factor which could be increased with intervention to promote learning goal orientation. Bloom (1968) however argues that while efforts may be made to increase the amount of perseverance in students, it is likely that better instruction and learning materials may be more effective in helping students master a learning orientation. To do this, Bloom suggests that students need evidence of their success through frequent feedback accompanied by specific help in instruction. This may indicate that the next component measured in this current study, for learning behaviours, 'resilience' may prove more beneficial in identifying a more malleable behaviour which encourages learning orientation.

4.2.2 Resilience. Howard and Johnson (2000) define resilience as the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances. In this current study we have looked at resilience in terms of behaviours, such as question asking and answering, help seeking and tackling fear of failure in the face of adversity. In comparison to traditional students, mature students scored higher on this particular behaviour which supports similar finding in the research by Cantwell, Archer and Bourke (2001). This result indicates again the link between a growth mindset and learning orientation in terms of behaviour. VandeWalle, Cron and Slocum (1999) identified a link between goal orientation and the provision of constant feedback. It found that when a person has real-time knowledge of how they are performing, for example in the case of question asking and question answering, they can adjust their goal directed behaviours and better assess their capabilities. It can be summarised that resilience behaviour is an important contribution in learning orientation however in addition to this is has the ability and value of being able to be

modified. Research by Brunwasser , Gillham and Kim (2008) found that interventions such as the 'Penn Resilience Programme' can help increase student resilience by significantly reducing learned helplessness and increasing optimism. It is suggested therefore that future research within this realm look towards such a programme in bid to promote learning orientation.

4.2.3 Effort. According to Dweck (2006) a student who displays learning goal orientation is more willing to expend the necessary effort in order to succeed academically. This study has questioned what behaviours are involved in exerting such effort. The behaviours to learning questionnaire identifies that students who are willing to expend additional effort, tend to display more competitive behaviours, such as rising to challenges and working harder to contend with peers. Mature students again scored higher than traditional students for this aspect; however this may be, according to Bowl (2001), because mature students have more to prove as often they have returned to education after discontinuing previously. McFadden (1995) addresses this as the 'second-chance' model whereby adult re-entry to education is viewed in terms of 'settling of old scores' with the education system. It could therefore be questioned if this kind of competitiveness could ever be malleable because it is born out of experience. It may be appropriate to except this difference in behaviour between the two groups and summarise that mature students have the valuable resource of prior experience.

4.2.4 Confidence. The final factor used to measure learning behaviours, related to students' confidence levels. This was the smallest factor measured however results indicate a significant difference between the two groups with mature students scoring higher, indicating that they display more confident behaviours toward learning. It should however be considered that the mature sample group was primarily recruited from access to higher education courses, which may confound results. Thomas (2002) has shown that the leap from access to higher education to undergraduate status is immense and often results in lack of academic-preparedness on the part of the mature students. Research by Powell (1985) indicates that undergraduate mature students do lack self confidence in their studies and harbour considerable fear of failure. It may therefore be questioned if the results from this current study would display similar findings if the sample group of mature students were undergraduates enrolled within higher education. Although this may prove a limitation to this current study it does identify an area for future research, questioning if access to higher education courses do fully prepare mature students for undergraduate level.

For each of the individual elements, and overall, results indicate that mature students scored higher thus displaying more conducive behaviours toward learning compared to traditional students. However it is recognised that the scores for traditional students were well within a range that could be accepted as supporting beneficial learning behaviours. This result is not surprising considering that both groups fell within a growth mindset parameter and thus supporting this study's second hypothesis, that those displaying a growth mindset will display behaviours associated with a learning goal orientation. This study has the added benefit that by recognising goal orientation in terms of behaviours, these can then be used as measurable factors which can be increased with intervention to promote learning goal orientation.

4.3 Approaches to Learning

It is difficult to compare the findings relating to the different students' approaches to learning, as in the main, the majority of previous research only looks at the two groups independently. However, it is interesting, that the results from this current study contradict previous findings (Cassidy & Eachus 2000; Duff 2004), that mature students tend to adopt a deep approach to learning. It should be considered that previous research has tended to look at students approach to learning and its association with academic achievement, rather than learning behaviours. It is identified that mature students tended to adopt a deeper approach to learning compared to traditional students however for both groups the strategic approach was most prevalent. It can therefore be stated that results for approaches to learning only partially support hypothesis three. In most studies it is implied that a deep approach is more conducive to learning. For example, research by Rosario et al. (2010) developed a specific educational programme, aimed at primary years to specifically promote this approach. It would have therefore seemed credible, that this study would have assumed that mature students shown to display a growth mindset, as well as positive learning behaviours, would indeed adopt a deep approach to study. However, according to Newble (1986), the way in which students approach their learning is dependent on a variety of factors including the characteristics of the departments and teaching to which they are exposed. These factors appear to influence whether the students adopt a surface, deep or strategic approach. This may prove a limitation to this current study's findings as it has been identified that the majority of participants used, were enrolled within the social sciences disciplines. It is suggested that it may be beneficial for future research to address how approaches to learning may vary depending on the subject being studied.

Although subject field may prove to be a determining factor, this study suggests that for approaches to learning, the student's status may be more significant. Results from this study indicate that mature students displayed a higher surface approach to learning than that of traditional students. This initially appears surprising as they scored higher on growth mindset than traditional students so one would think they would score lower on surface approach. However, according to King (1980, cited in Wilson, 1997), many mature students tend to have difficulties gauging the level and depth of work required at undergraduate level. King's research found that although mature students display great enthusiasm, they tended to overwork which resulted in them trying to cover every aspect which caused them to be unable to grasp the basics. Higgins and Lloyd (1992) also found that many mature students, who have been out of practice in the academic practices, may find higher education more time-consuming than traditional students with more recent study experience. To further compound this, Smithers and Griffin (1986) found that this is influenced by non-academic responsibilities, for women in particular, which may lead to mature students being more sensitive to the pressures of time and workload. Although the hypothesis for approaches to learning was only partially met, this study has identified a particular area of concern for mature students. It is suggested that the benefits of studying goal orientation by looking at behaviours may prove valuable in addressing students' approaches to learning as well.

This research originally suggested that strategic approaches to learning may be an indication of where students lay within a goal orientation continuum. It has been shown that by looking at goal orientation and approaches to learning together; it is not conclusive that a learning orientation is associated with a deep approach. Nor can it

be determined that a performance orientation is associated with a surface approach. It is therefore suggested that further research within this area is needed.

It is recognised that the sample may have been limited by its size. This, combined with the number of statistical tests being run, may have inflated the chances of making a false positive error. However, as the current study was largely exploratory, it was considered that using a Bonferroni Correction method would have increased the risk of making Type II errors, and in turn, missing potentially enlightening findings.

In summary, this research has shown how students' theories of intelligence are intrinsically linked to goal orientation which is best identifiable through learning behaviours. By taking this approach it allows for these behaviours' to be recognised as measurable factors which can be increased with intervention to promote learning goal orientation. This research has also found that learning behaviours may prove beneficial in helping adapt students' approaches to study. Finally, it is recognised that mature students and traditional student do hold similar views regarding theories of intelligence however their behaviours and approaches do differ and it should be recognised that one of the challenges for higher education is to bridge the divide between the two groups.

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