

Approaches to learning and competitive attitude in students in higher education

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The degree to which individuals are able to nominate or change their approach to learning in order to meet the needs of the learning situation opens a lengthy and complex debate. Some evidence exists for a shift in approach depending on the experience of the learner and demands of the task, while other evidence is available which indicates stability of approach to learning over time and across task. The present study examines the relationship between approaches to learning and competitive attitude in undergraduate students. Previous research has reported a link between constructs such as achievement orientation and personality traits and cognitive strategies and it was suggested here that competitive attitude may be one mediating factor in students' approaches to learning. Findings did not reveal a convincing relationship between competitiveness and approaches to learning and it is suggested that further exploration of trait constructs such as competitiveness may not yield meaningful evidence regarding the stability of students' approaches to learning. There was also no evidence that the student experience of higher education cultivates competitiveness in students as cross-sectional comparisons of student year groups revealed only negligible and statistically non-significant differences in competitive attitude.

THERE ARE A NUMBER of key focal areas of debate surrounding the concept of learning style. Reviewing the subject Cassidy (2004) highlights terminology, theoretical frameworks and models, measurement and application as areas where a lack of understanding, a lack of evidence and a lack of agreement continue to exist and to hinder the development of cohesive research and practice in field. In a further review of the area, Coffield et al. (2004) extend the currently prevailing critical approach to the field of learning style to question the overall relevance of style to learning, suggesting instead other priorities over further investment in research and development of the concept.

Although there continues to be much debate regarding the precise architecture of the concept of learning style, evidence that individuals do exhibit preferences in their approach to learning together with the significance of achieving a full and sound understanding of such a ubiquitous human endeavour as learning, provides a strong argument for continued activity and further enquiry in both research and practice.

Approaches to learning and learning styles – conceptual issues

At this stage it is important to note that although dealing with the broad topic of 'learning style', the present study specifically examines *approaches* to learning which, according to a number of influential authors in the field, are distinct from learning *styles*. Coffield et al. (2004) present a family-type classification of learning styles, including 'approaches' as a broader view of learning than 'styles' which are influenced by contextual factors and previous experiences and are, therefore, less fixed than styles. Rayner and Riding (1997) differentiate the concepts in terms of focus, with approaches as *learning centred* and styles as *cognitive centred*. Despite the efforts of these authors, there is an inherent problem within the learning style literature with a failure to consistently or fully acknowledge and address these conceptual differences or multiple-paradigms. In part this is due to the lack of a clear or universally accepted theoretical orthodoxy first noted by Masterman in 1970 and which still exists. This in turn creates a dilemma when reporting and interpreting 'learning

style' research with regards to the extent to which conceptual differences should be adhered to and reporting of findings strictly confined within a single conceptual framework (i.e. *style* or *approach*). Given that there has – certainly historically – been a tendency within the literature to treat learning style and approaches to learning as variations on a single theme, and on the basis that these concepts are clearly relevant to each other and to the context of the current study, the paper considers evidence from *both* style and approaches research.

Stability of approaches to learning/learning style

One primary issue for debate concerns the stability of learning style. That is, are the ways in which individuals characteristically approach different learning tasks (i.e. *learning style*, Hartley, 1998) fixed or: (i) do they develop as a function of experiences, skill development and other factors; and (ii) is an individual able to nominate or select (consciously or unconsciously) appropriate learning styles to fit a variety of learning situations? This is in effect the *state-trait* debate which, as Cassidy (2004) points out, is a thorny question which applies to many psychological concepts including learning style. Whether learning style can be considered structural and a trait characteristic which is relatively enduring, remaining stable over time and across situation, or whether it is a process or state characteristic which is transient, changing as a function of experience and sensitive to the demands of the learning situation is unclear. There exists theoretical and empirical work which prefers evidence for both state and trait bases. For example, models of learning style which are based on learning modalities argue that learners have a preference for one of the sensory modalities *visual*, *auditory* or *kines-thetic* (VAK models) and once identified label the learner accordingly. Similarly, cognitive style models based on verbal-imagery and wholist-analytic dimensions (Riding & Cheema, 1991) are traditionally associated with a view of style as a stable

characteristic as these dimensions of style are related to or grounded in hemispheric specialisation. Empirical studies have provided some support for trait-based theories of style, with both Pinto and Geiger (1991) and Loo (1997) reporting little evidence of change in learning style over time. However, later work by Pinto, Geiger and Boyle (1994) involving a three-year longitudinal study of college students did find evidence for a change in learning style over time, while studies by Messick (1984) and Streufert and Nigami (1989) report findings which indicate that individuals adapt their style dependent upon their perceptions of task requirements. That students adapt their style according to the learning situation is supported by Entwistle and Entwistle (1991) and by Newstead and Findlay (1997) who found that students became increasingly inclined towards a surface approach and increasingly disinclined towards a deep approach as exams loomed and performance goals dominated over learning goals, suggesting that students' approaches to learning may well be context dependent. Vermetten, Lodewijks and Vermunt (1999) were able to provide evidence of both variation and consistency in students' use of learning strategies for different courses, suggesting that both context-specific and person-bound components operate to determine students' learning strategy (Vermunt, 2007).

Competitiveness and approaches to learning/learning style

The available evidence concerning consistency or stability of learning styles and approaches to learning is inconclusive and illuminates the need to further explore the issue. One suggested direction for investigation is to examine the nature of any relationship between approaches to learning and other psychological constructs commonly accepted as stable. In the current study the association between students' approaches to learning and the psychological construct *competitiveness* is explored.

As a personality construct, competitiveness can be considered a trait characteristic and one which both intuitively and evidentially is likely to be associated with approach to learning. For example, if approach to learning was stable rather than context-specific, then competitive individuals might be expected to have a strategic approach to learning as their dominant approach given that: *alertness to assessment demands* and *intention to excel* are stated characteristics of a strategic approach to learning (Entwistle & Tait, 1996); and, given the suggestion by Mumford and Gustafson (1988) that personality traits may mediate learning style through inhibition or facilitation and motivation towards a *particular* style. Competitiveness has also been linked to the personality trait continuum Type A-Type B, with Type A individuals being strongly motivated, driven to achieve and attracted to and seeking competition and exhibiting a strong desire to control people and situations (Burger, 2004). Type A individuals have high *competitive achievement striving* and work hard at *achieving tasks* regardless of outside pressures such as deadlines (Burger, 2004). There is evidence that Type A individuals outperform Type B on achievement tasks (Burger, 2004), set higher goals (Ward & Eisler, 1987) and show increased confidence to perform well in a game when competing against others (Gotay, 1981). Perhaps most importantly in the context of the current study and in order to illustrate the relevance of competitiveness to learning, Type A students have been shown to participate more in academic and extracurricular activities, expect to perform well and receive more academic honours than Type B students – who do not show the same desire for competition – (Glass, 1977; Ovcharchyn, Johnson & Petzel, 1981). There is already some published work examining the association between related and relatively stable trait constructs such as achievement orientation and the major personality traits and learning style. Busato et al (1999) reports positive correlations between the personality traits *conscientiousness* (focused,

goal orientated, striving, career orientated (Heinstrom, 2000)), *openness* (broader interests, liberal, like novelty, open to new ideas, intellectual (Heinstrom, 2000)) and Vermunt's (1994) meaning, reproduction and application directed learning style [Inventory of Learning Styles (Vermunt, 1994)] and negative correlations with undirected learning, while *neuroticism* (worried, temperamental, emotional instability, negative affect (Heinstrom, 2000)) was positively correlated with undirected learning style and negatively correlated with meaning and reproduction learning style. Positive correlations between achievement motivation and meaning, reproduction and application directed learning style and negative correlation with undirected learning style were also reported. Similarly, Diseth and Marinsen (2003) found positive correlations between motive for success and Entwistle's (1997) deep and strategic approaches and a negative correlation with a surface approach. *Conscientiousness* has been linked with both educational achievement and will to achieve and *openness* with intellectual aptitude and creativity (Howard & Howard, 2004). Entwistle and Ramsden (1983) found an association between achievement orientation and a strategic approach to learning while Bickley (1996) has compared the five factor model of personality traits (i.e. extraversion, agreeableness, conscientiousness, neuroticism and openness) with learning style and reports a number of significant findings. These include an association between conscientiousness – which shares some similar characteristics with competitiveness such as control, organisation and self-efficacy – and an amalgam of learning style attributes including effort, meta-cognition, time management, attention and rehearsal which Bickley labelled 'learning discipline'. There is, however, little evidence of research directly exploring the association between or influence of competitiveness on approaches to learning.

Aims

In line with previous efforts to extend our understanding of all facets of learning style (e.g. Cassidy, 2006), and the suggestion that personality traits may mediate learning style (Mumford & Gustafson, 1988), the present study aims to establish the relevance of competitiveness to students' approaches to learning and to the issue of stability of approaches. A secondary aim of the study is to gather evidence on the effects of the student experience of higher education, where evaluation and competition are considered prevalent, in terms of whether the experience cultivates increased competitiveness in students as might be expected.

Method

Design

A questionnaire-based survey approach was employed to gather data on competitive attitude and approaches to learning in students. The design was repeated measures with each participant completing both the Competitive Index (Smither & Houston, 1992) and the Approaches and Study Skills Inventory for Students (Entwistle & Tait, 1996). Sequence of instrument completion was rotated to control for order effects.

Participants

A sample of 144 undergraduate single and joint honours psychology students studying in the Faculty of Health in a university in the UK took part in the study: mean age 22.8 years ($SD=6$); 20 male and 119 females; 42 year-one students, 52 year-two students and 50 year-three students. Although female students were over-represented in the sample, an increasing trend for female students to outnumber male students is reported in a number of disciplines in both UK (Gray, 2004) and Australian (Ballantyne, 2000) based undergraduate populations. As such, it is considered legitimate to generalise findings to other undergraduate student populations.

Materials

Competitiveness Index (CI)

(Smither & Houston, 1992)

This is a 20-item self-report personality instrument measuring interpersonal competitiveness in everyday contexts. Respondents give a true or false response to statements regarding competitiveness. Smither and Houston (1992) cite *emotion*, *argument* and *games* as the constituent factors of the CI. Alpha of 0.9 is reported by Houston, Farese and La Du (1992) to indicate high internal consistency along with correlations with other measures of competitiveness (e.g. the Personal Development Competitiveness Scale (Houston et al., 2002)) as indicative of the validity of the CI (Smither & Houston, 1992). Example statements include: *I am a competitive individual*; *I try to avoid arguments*; *when I play a game I like to keep scores*. A total CI score is achieved by summing true and false responses so that a high score in the range 0 to 20 indicates increased competitiveness. Normative data are provided giving a mean score for female undergraduates of 9.52 ($SD=4.62$) and for male undergraduate of 12.06 ($SD=4.88$). Cut-off scores are also provided so that a score 14 for females and 15 for males is indicative of high competitiveness and a score of six for female and seven for males is indicative of low competitiveness.

The Approaches and Study Skills Inventory for Students (ASSIST) (Entwistle & Tait, 1996)

A 38-item inventory measuring learning style using four sub-scales corresponding to the following approaches to learning: *deep* – intention to understand, relating ideas, use of evidence and active learning; *surface* – intention to reproduce, unrelated memorising, passive learning and fear of failure; *strategic* – study organisation, time management, alertness to assessment demands, intention to excel; and *apathetic* – lack of direction and lack of interest. Respondents indicate their level of agreement to each item using a five-point Likert scale. Summing responses to items within each sub-scale gives a score for each of the four

approaches to learning. The Approaches to Study Inventory has been used extensively in educational research (Cassidy, 2004) and in a study examining the psychometric properties of the Revised ASI, Duff (2000) has recommended its continued use in educational settings. The ASSIST also proved to be one of the more resilient tools reviewed by Coffield et al. (2004).

Procedure

Students were asked to participate in the study at the end of a normal lecture period and were advised that participation was entirely voluntary and anonymous. Students agreeing to participate were asked to complete both the Competitive Index and the Approaches and Study Skills Inventory for Students without conferring and using their initial or dominant response to items. Completed questionnaires were returned by the student and a short debrief was given. This procedure was repeated for each student group in years 1, 2 and 3.

Analysis

For the purposes of comparative analysis the cut-off scores provided by Houston and Smither (1992) for the CI were used to create high and low competitive attitude student groups using the range 0 to 7 for low competitiveness and 14 to 20 for high competitiveness.

Results

Competitive attitude and gender

Table 1: Mean competitiveness scores for male and female students.

	Male (N=20)	Female (N=119)
Mean	12.45	9.99
SD	4.8	5.4

In line with previous research male students scored significantly higher on the Competitive Index than female students ($t=1.927$, $df=137$, *one-tailed*, $p<0.05$). CI scores for both male and female samples are similar to normative data quoted for undergraduate students by Smither and Houston (1992), i.e. males 12.06 (SD=4.88); females 9.52 (SD=4.62).

Competitive attitude and age

Table 2: Mean age for low and high competitive attitude groups.

	Low competitive attitude (N=46)	High competitive attitude (N=46)
Mean	23.33	23.13
SD	6.5	6.5

Correlational analysis did not reveal a significant association between competitive attitude and age of students ($r=-0.023$, $N=143$, *two-tailed*, $p>0.05$). There was also little difference in the mean age of low and high competitive attitude groups ($t= 0.148$, $df=89$, *two-tailed*, $p>0.05$).

Competitive attitude and student experience

Table 3: Mean competitiveness scores across student year groups.

	Year 1 (N=42)	Year 2 (N=52)	Year 3 (N=50)
Mean	11.1	10.0	10.2
SD	5.5	5.5	5.1

Mean differences across student year groups revealed little difference in competitive attitude scores. One-way ANOVA confirmed that differences across year groups were not significant ($F=0.0545$, $df=2, 141$, $p>0.05$).

Competitive attitude and approaches to learning*(i) Correlational analysis***Table 4. Competitive attitude and approaches to learning correlation coefficients.**

	Deep (N=144)	Strategic (N=144)	Surface (N=144)	Apathetic (N=144)
Competitiveness (scale alpha 0.87)	0.14	-0.111	-0.038	0.042
Apathetic (scale alpha 0.57)	-0.259**	-0.335**	0.249**	-
Surface (scale alpha 0.79)	-0.061	-0.001	-	-
Strategic (scale alpha 0.84)	0.6**	-	-	-
Deep (scale alpha 0.82)	-	-	-	-

** significant at $p < 0.01$ (two-tailed)

No significant correlations between competitive attitude and approaches to learning were found, although the small correlation with a deep approach did approach significance. Significant negative correlations between apathetic, deep and strategic and approaches and positive correlations between apathetic and surface approaches and between deep and strategic approaches were found as would be expected

*(ii) Comparative analysis***Table 5: Mean approaches to learning scores for high and low competitive attitude groups.**

	Low competitive attitude (N=46)	High competitive attitude (N=46)
Deep*	35.2 SD=6.1	38 SD=6.7
Strategic	35.2 SD=6.6	35 SD=6.7
Surface	33.0 SD=6.3	31.3 SD=6.9
Apathetic	8.5 SD=4.2	9.0 SD=4.5

* significant at $p = 0.04$ (two-tailed)

Table 5 compares mean approaches to learning scores for low and high competitive student groups. Only the mean difference in deep approach between groups reached significance. All other mean differences across groups were small and failed to reach significance ($p > 0.05$).

Table 6: Mean approaches to learning scores for year 1, 2 and 3 student groups.

	Year 1 (N=42)	Year 2 (N=52)	Year 3 (N=50)
Deep	36.6 SD=5.8	36.6 SD=6.6	36.1 SD=6.9
Strategic	34.5 SD=6.6	35.3 SD=7.1	35.7 SD=7.2
Surface	31.9 SD=7.2	33.6 SD=6.2	33.6 SD=7.3
Apathetic	8.1 SD=4.1	8.8 SD=4.6	7.8 SD=3.8

Mean differences across student year groups revealed little difference in approach to learning scores. One-way ANOVA confirmed that differences across year groups were not significant ($F=0.85$ (deep); $F=0.357$ (strategic); $F=0.984$ (surface); $F=0.47$ (apathetic), $df=2, 141$, $p > 0.05$).

Table 7: Mean approaches to learning scores for total student sample.

	Deep	Strategic	Surface
Mean	36.4	35.3	32.6
SD	6.4	6.9	6.9

One-way ANOVA and post hoc analysis comparing mean approaches to learning scores within the total student sample showed deep and strategic approaches to be dominant, with students scoring significantly higher for these approaches than for surface approach ($F=12.473$, $df=2,429$, $p<0.001$; effect size¹ $d=0.57$ for deep and $d=0.39$ for strategic).

Discussion

Stability and approaches to learning/learning style

The principal aim of the study was to establish the nature of any relationship between competitiveness and students' approaches to learning and to consider the question of stability of approach in the context of any such relationship. Findings provided little evidence for a convincing relationship between competitiveness and any of the approaches to learning proposed by Entwistle & Tait (1996). All correlations were small and non-significant, although when students were grouped into high and low competitiveness this did produce a small but significant difference in deep approach between groups, with high competitiveness students scoring higher on deep approach. The premise presented here was that if we accept competitiveness as a personality trait – as proposed by Smither and Houston (1992) – and we also accept evidence suggesting that personality traits are associated with mediate learning style (Blickle, 1996; Busato et al., 1996; Mumford & Gustafson, 1988), then competitiveness in students should be associated with a strategic approach to learning which focuses on study

organisation, time management, alertness to assessment demands and intention to excel. Such an association would have been viewed as evidence in support of approaches to learning as stable because of the theoretically meaningful association with an embedded personality trait. On reflection however, it can be argued that this premise suffers a substantive flaw. The competitive student seeks to perform better than their peers, in effect to *win*. Despite some possible common characteristics present in both a competitive attitude and a strategic approach to learning, competitiveness may in fact facilitate, inhibit or motivate the adoption of *any* of the possible approaches depending on which is *perceived by students* to be the most likely to lead to a win – which may not necessarily be a strategic approach as studies by Entwistle and Entwistle (1991) and Newstead and Findlay (1997), showing students' approaches to learning to be context dependent, have demonstrated. In which case, an association between competitiveness and any of the approaches to learning should not necessarily be taken as evidence of stability of approaches to learning in the sense of that approach prevailing despite or in spite of situational factors. Although such an association would, at least in part, support Mumford and Gustafsons' (1988) assertion that personality traits are one mediating factor of learning style. As in fact Busato et al. (1999) reports, for example, that the personality trait *conscientiousness* (focused, goal orientated, striving, career orientated (Heinstrom, 2000)) was associated – positively and negatively – with all four of the learning strategies or learning patterns proposed by Vermunt (1994).

A further potential limitation of the work is that – although with some justification given the enduring complexities of the subject – the study presents an overly simplistic account of aspects of the field of 'learning style' in that there is only limited

¹ $d=(M_1-M_2)/\sigma$. Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

distinction drawn between approaches to learning, learning styles, learning strategies, learning patterns or learning preferences. Both Cassidy (2004) and Coffield et al. (2004) provide extended accounts of such possible distinctions, in light of which the selection of an instrument which is explicitly a measure of *approaches* to learning – *Approaches and Study Skills Inventory for Students* (Entwistle & Tait, 1996) – brings in to question the degree to which findings can be extended to include inferences regarding the stability of learning *style, strategies, patterns or preferences*. For instance, styles (both cognitive and learning) are commonly described as habitual and automatic while approaches are described as optional and adopted, which has clear implications for the expected stability and context-specificity or dependency of each of these constructs. Whilst dealing with the issue of test selection, one could equally question the suitability of the Competitiveness Index – which measures interpersonal competitiveness in everyday contexts – for use in an educational context. The development and use of a domain-specific instrument measuring competitiveness would undoubtedly increase the validity of the findings.

The absence of any significant differences in cross-sectional comparisons of approaches to learning across student year groups does provide some evidence to support stability of students' approaches to learning. Given that the students' perceived demands of the learning situation are likely to alter across years and levels (even if actual demands do not), an associated change in dominant approach would be expected if approaches were situational rather than stable. It should be noted that no evidence was gathered regarding students' perceptions of the demands of the learning situation or regarding *actual* demands in terms of specific modes of assessment and shifts in assessment profiles across years. These cross-sectional comparisons are of course no substitute for empirical evidence provided by longitudinal studies which assess students'

progressive approaches to learning profile throughout their academic career.

Competitiveness in higher education

A secondary aim of the study was to assess the impact of higher education on student competitiveness. Whilst results showed a significant effect for gender, as expected (Smither & Houston, 1992), with male students scoring significantly higher on the Competitiveness Index than female students, there was no effect for year of study. Findings suggest that, contrary to expectation, the student experience of higher education appears not to develop further the students' pre-existing level of competitiveness. In fact, the finding that more competitive students exhibit a propensity towards a deep approach to learning could be considered – at least tentatively – a positive finding for pedagogy in higher education given that earlier work by Cassidy and Eachus (2000) and by Diseth and Martinsen (2003) suggested that higher education failed to reward a deep approach to learning, with strategic and surface approaches instead correlating with academic achievement. Students eager to 'win' in education may now consider meaningful learning as the most likely way to successfully achieve their goal. There is once again the issue of a lack of a longitudinal design and the use of a tool measuring interpersonal competitiveness in everyday contexts rather than a context specific instrument, which together add a cautionary note to interpretation of these findings.

Conclusion

Firstly, although student competitiveness – as measured using the Competitiveness Index (Smither & Houston, 1992) – showed a statistically significant association with the adoption of a deep approach to learning, the association was weak and whether the finding is theoretically meaningful finding has not been fully determined here. Secondly, the student experience in higher education does not appear to further

develop student competitiveness and both deep and strategic approaches continue to dominate over surface learning in this group of students. Finally, it is suggested that exploring the association between competitiveness, and perhaps other personality traits, and students' approaches to learning is unlikely to provide meaningful evidence in relation to the debate surrounding the stability of approaches to learning or learning style given the array of possible interpretations of any findings.

References

- Ballantyne, C. (2000). Are they glad they came? First-year students' views of their university experience. In A. Herrmann & M.M. Kulski (Eds), *Flexible futures in tertiary teaching. Proceedings of the 9th Annual Teaching Learning Forum*, Perth, Curtin University of Technology, 2–4 February.
- Blickle, G. (1996). Personality traits, learning strategies and performance. *European Journal of Personality*, 10, 337–350.
- Burger, J.M. (2004). *Personality* (7th ed). USA: Thomson Wadsworth.
- Busato, V.V., Prins, F.J., Elshout, J.J. & Hamaker, C. (1999). The relation between learning styles, the big five personality traits and achievement motivation in higher education. *Personality and Individual Differences*, 26(1), 129–140.
- Cassidy, S. (2006). Learning style and self-assessment skill. *Education & Training*, 48(2/3), 170–177.
- Cassidy, S. (2004). Learning styles: An overview of theories, models and measures. *Educational Psychology*, 24(4), 419–444.
- Cassidy, S. & Eachus, P. (2000). Learning style, academic belief systems, self-report student proficiency and academic achievement in higher education. *Educational Psychology*, 20(3), 307–322.
- Coffield, F., Moseley, D., Hall, E. & Ecclestone, K. (2004). *Learning styles and pedagogy in post-16 learning. A systematic and critical review*. London: Learning and Skills Research Centre.
- Diseth, A. & Martinsen, O. (2003). Approaches to learning, cognitive style and motives as predictors of academic achievement. *Educational Psychology*, 23(2), 195–207.
- Duff, A. (2000). Learning Styles Measurement – the Revised Approaches to Study Inventory (RASI). *Bristol Business School Teaching and Research Review*, Issue 3, Summer, ISSN 1468-4578.
- Entwistle, N.J. (1997). *The Approaches and Study Inventory for Students (ASSIST)*. Edinburgh: Centre for Research on Learning and Instruction, University of Edinburgh.
- Entwistle, N.J. & Entwistle, A. (1991). Contrasting forms of understanding for degree examinations: The student experience and its implications. *Higher Education*, 22, 205–227.
- Entwistle N. & Ramsden P. (1983). *Understanding student learning*. London: Croom Helm.
- Entwistle, N. & Tait, H. (1996). *Approaches and Study Skills Inventory for Students*. Edinburgh: Centre for Research on Learning and Instruction, University of Edinburgh.
- Glass, D.C. (1977). *Behaviour patterns, stress and coronary heart disease*. Hillsdale, NJ: Earlbaum.
- Gotay, C.C. (1981). Co-operation and competition as a function of Type A behaviour. *Personality and Social Psychology Bulletin*, 7, 286–392.
- Gray, S. (2004). Our work is not yet done. *Hospital Doctor*, 14 October.
- Hartley, J. (1998). *Learning and studying: A research perspective*. London: Routledge.
- Heinstrom, J. (2000). The impact of personality and approaches to learning on information behaviour. *Information Research*, 5(3). Accessed June, 2007, at: <http://informationr.net/ir/5-3/paper78.html>
- Houston, J.M, Farese, D. & La Du, T.J. (1992). Assessing competitiveness: A validation study of the Competitiveness Index. *Personality and Individual Differences*, 13(10), 1153–1156.
- Houston, J.M, McIntire S., Kinnie, J. & Terry, C. (2002). A factor analysis of scales measuring competitiveness. *Educational and Psychological Measurement*, 62, 284–298.
- Howard, P.J. & Howard, J.M. (2004). *The Big Five Quickstart: An introduction to the Five Factor Model for Personality*. North Carolina: Centre for Applied Cognitive Studies. Accessed June, 2007, at: www.centacs.com/quikstart.htm.
- Masterman, M. (1970). The nature of paradigm growth In I. Lakatos & A. Musgrave, *Criticism of growth and knowledge*. Cambridge: Cambridge University Press.

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- Messick, S. (1984). The nature of cognitive styles: Problems and promise in educational practice. *Educational Psychologist*, 19, 59–74.
- Mumford, M.D. & Gustafson, S.B. (1988). Creativity syndrome: Integration, motivation and innovation. *Psychological Bulletin*, 105, 27–43.
- Newstead, S.E. & Findlay, K. (1997). Some problems with using examination performance as a measure of teaching ability. *Psychology Teaching Review*, 5, 14–21.
- Ovcharchyn, C.A., Johnson, H.H. & Petzel, T.P. (1981). Type A behaviour, academic aspirations and academic success. *Journal of Personality*, 49, 248–256.
- Pinto, J.K. & Geiger, M.A. (1991). Changes in learning style preferences: A preparatory report of longitudinal findings. *Psychological Reports*, 68(1), 195–201.
- Pinto, J.K., Geiger, M.A. & Boyle, E.J. (1994). A three-year longitudinal study of changes in student learning styles. *Journal of College Student Development*, 35(2), 113–119.
- Riding, R.J. & Cheema, I. (1991). Cognitive styles – An overview and integration. *Educational Psychology*, 11(3/4), 193–215.
- Riding, R.J. (1997). On the nature of cognitive style. *Educational Psychology*, 17(1/2), 29–49.
- Smither, R.D. & Houston, J.M. (1992). The nature of competitiveness: The development and validation of the Competitiveness Index. *Educational and Psychological Measurement*, 52, 407–418.
- Streufert, S. & Nogami, G.Y. (1989). Cognitive styles and complexity: Implications for industrial and organisational psychology. In C.L. Cooper & I. Robertson (Eds.), *International review of industrial and organisational psychology*. Chichester: Wiley.
- Vermetten, Y.J., Lodewijks, H.G. & Vermunt, J.D. (1999). Consistency and variability of learning strategies in different university courses. *Higher Education*, 37, 1–21.
- Vermunt, J.D.H.M. (2007). The power of teaching-learning environments to influence student learning. In N. Entwistle & P. Tomlinson, *Student learning and university teaching*. Leicester: The British Psychological Society.
- Vermunt, J.D.H.M. (1992). *Inventory of Learning Styles in Higher Education; scoring key for Inventory of Learning Styles in Higher Education*. Tilburg: Tilburg University, Department of Education.
- Ward, C.H. & Eisler, R.M. (1987). Type A behaviour, achievement striving and a dysfunctional self-evaluation system. *Journal of Personality and Social Psychology*, 53, 318–326.