Chapter 8

The Impact of Moving Away from Home on Undergraduate Metacognitive Development

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1. Introduction

For many freshmen undergraduates around the world, the start of their undergraduate careers are marked by a number of significant challenges, not least amongst these is often the requirement to move away from the family home, usually for the first time, and engage in the processes required to manage your time without parental guidance and intervention. Most students seem to survive this 'rite of passage' and go on to make a success of their studies and the important new social relationships they form at this time. A few do not rise to the challenges, and consequently fail in their adaptation to the new circumstances which confront them. This chapter considers some remarkable quantitative evidence for what the author had previously observed during his career as an academic and residence master in a Hong Kong university. Namely, that moving away from home appears to have a significant positive impact upon the development of metacognition in undergraduates.

2. Definitions of metacognition

Perhaps the most practical definition of metacognition is that it is 'thinking about thinking' (Flavell, 1999; Metcalfe, 2000; Bogdan, 2000; Downing, 2009a; Ning & Downing 2010) however this definition requires further elaboration, because metacognition also involves knowing how to reflect and analyse thought, how to draw conclusions from that analysis, and how to put what has been learned into practice. In order to solve problems, students are often challenged to understand how their mind functions. In other words, they need to perceive how they perform important cognitive tasks such as remembering, learning and problem solving.

Kluwe (1987) refined the concept of metacognition by noting two characteristics: the thinker knows something about their own and others' thought processes, and the thinker can pay attention to and change their own thinking. This latter type of metacognition Kluwe calls

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'executive processes'. Hacker (1998) points out the difference between 'cognitive tasks' (remembering things learned earlier that might help with the current task or problem) and 'metacognitive tasks' (monitoring and directing the process of problem solving), stressing the importance of learning more about thinking. Cornoldi (1998) emphasises the role of learners' beliefs about thinking and makes the point that if students feel confident that they can solve problems, they tend to do better work. In defining metacognition as 'thinking about thinking' or 'second-order cognition', Weinert (1987) acknowledges that purpose, conscious understanding, ability to talk or write about tasks, and generalisability to other tasks are also important factors in determining whether a given task is metacognitive and this viewpoint is supported by Brown (1987) who agrees that metacognition requires the thinker to use and describe the process of mental activity. Many other researchers also make the point that metacognition is best defined by acknowledging that it is both knowledge about, and control over thinking processes (Allen & Armour-Thomas, 1991). Vadhan and Stander (1993) clearly distinguish between ordinary thinking and awareness and understanding of thinking, and this is a theme elaborated on by Hacker (1998) who divides metacognition into three types of thinking:

- Metacognitive knowledge: What one knows about knowledge.
- Metacognitive skill: What one is currently doing.
- Metacognitive experience: One' current cognitive or affective state.

Therefore, whilst cognition focuses on solving the problem, metacognition focuses on the process of problem solving (Marchant, 2001).

In addition to the knowledge people have about how they use their thoughts and strategies (Brown, 1987; Lynch et al., 2006), knowledge about how much they will be able to learn, and what kinds of strategies they use (Gleitman, 1985; Weinert & Kluwe 1987), people also have a set of general heuristics. For example, how they plan, set goals, and process feedback (Frese et al. 1987; Ning & Downing 2010d). The assumption is that these general heuristics can be either conscious or automatic (Brown, 1987; Flavell, 1987) and they may be highly generalised or specific.

3. A brief history of metacognition

The term metacognition first became part of the lexicon of higher education in the1970's when Flavell (1971) introduced the term 'metamemory'. However, the concept is much older than that (King, 2004) and draws on the work of more ancient philosophers like Plato, Aristotle, Confucius, Solomon, Buddha, and Lao Tzu.

Clearly, the potential importance of developing metacognitive skills was recognised long before the actual term was commonly used, with John Locke commenting in 1690, that most children gradually develop the ability to 'reflect' on their own thinking processes. For example, when young children are asked if they understand something, they often simply nod in agreement or fail to ask questions (Brown, 1973) but by adulthood most of us have a better understanding of the complex processes involved in knowing what we do, and do not, know (Piaget, 1972; Downing, 2009b). Brown (1987) and Hatton & Smith, (1995) report that as early

as 1917, Thorndike was testing metacognition by asking his students to problem-solve by answering questions on texts they had read. Consequently, when Flavell (1963) published a text on the developmental psychology of Jean Piaget the as yet unnamed, 'metacogniton' caught the attention of researchers and by 1975 had come into common use. More recently, a number of researchers have begun to explore the validity and reliability of the Learning and Study Strategies Inventory (LASSI) as a longitudinal measure of metacognition in university students (Ning & Downing, 2010a) and even posit metacognition as indicative of another stage of intellectual development beyond Piaget's stage of formal operations.

4. Metacognition and the learning and study strategies inventory (LASSI)

Metacognition is assessed in a range of ways but one of the most popular methods currently in widespread use in schools, colleges and universities worldwide is through the use of questionnaires which require students' to report their perceptions about their thinking and problem-solving skills and strategies. It is generally accepted that most students who struggle at university could improve their performance considerably if they understood the learning process better. Weinstein (1988) points out that poor grades begin to rebound when students learn the tricks of pinpointing the key points in lectures, and asserts that learning is more effective when we engage in thinking about the process of learning, thinking, and problem-solving. Recent research studies have confirmed Weinstein's view (e.g. Ning & Downing, 2010b), and have investigated other factors impacting upon metacognition such as gender differences (Downing et al., 2008) and the impact of problem-based learning approaches on metacognitive development (Downing et al., 2009). As a result of her work in the field of strategic learning at the University of Texas at Austin, Weinstein developed the Learning and Study Strategies Inventory (LASSI) which is now the most widely used learning inventory in the world (Weinstein, 1987). The LASSI measures student's perceptions of their study and learning strategies and methods. In other words, it is a measure of the students thinking about their thinking or metacognition. The tool consists of ten scales, and eighty items which provide an assessment of students' awareness about and use of learning and study strategies related to the skill, will and self-regulation components of strategic learning. Research has repeatedly demonstrated that these factors contribute significantly to successful study, and that they can be learned or enhanced through educational interventions such as learning and study skills courses (Weinstein, 1994a, 1994b; King, 1991; Letteri, 1992; Hanley, 1995).

The LASSI provides standardised scores for the ten different scales and provides students with a diagnosis of their strengths and weaknesses, compared to other students, in the areas covered. It measures three main areas of 'strategic learning':

4.1. Skill component of strategic learning

These scales examine students' perceptions (metacognition) of their learning strategies, skills and the thought processes related to identifying, acquiring and constructing meaning for important new information, ideas and procedures. The LASSI scales related to the skill component of strategic learning are:

- Information Processing-the ability to process ideas by mentally elaborating on them and organizing them in meaningful ways.
- Selecting Main Ideas- the student's ability to identify the important information in a learning situation.
- Test Strategies-the student's ability to prepare effectively for an examination and to reason through a question when answering it.

4.2. The will component of strategic learning

These scales measure students' perceptions of their receptivity to learning new information, their attitudes and interest in college, their diligence, self-discipline, and willingness to exert the effort necessary to successfully complete academic requirements, and the degree to which they worry about their academic performance. The LASSI Scales related to the will component of strategic learning are:

- Attitude-the student's perceived motivation and interest to succeed in their study, and willingness to perform the tasks necessary for academic success.
- Motivation-the extent to which the student accepts responsibility for performing those tasks by using self-discipline and hard work.
- Anxiety-the degree of anxiety perceived by the student when approaching academic tasks.

4.3. The self-regulation component of strategic learning

These scales measure how students' perceptions of how they manage, self-regulate, and control the whole learning process through using their time effectively, focusing their attention, and maintaining their concentration over time, checking to see if they have met the learning demands for a class, an assignment or a test, and using study supports such as review sessions, tutors or special features of a textbook. The LASSI Scales related to the self-regulation component of strategic learning are:

- Concentration-the student's perceived ability to focus his or her attention, and avoid distractions, while working on school-related tasks like studying.
- Time Management-the student's perception of the extent to which they create and use schedules to manage their responsibilities effectively.
- Self-Testing-the student's awareness of the importance of self-testing and reviewing when learning material, and use of those practices.
- Study Aids-the student's perceived ability to use or develop study aids that assist with the learning process.

There is a wealth of research, making use of the LASSI as a measure of metacognition, which identifies the value of learning to learn interventions in schools, colleges and universities (Loomis, 2000; Downing, 2009; Ning and Downing, 2010c), however few studies have tried to identify factors outside the learning institution which might impact upon the development of metacognitive skills in students. For example, to what extent are metacognitive skills enhanced or inhibited by particular life events or circumstances? Most

of us would accept that there are times in our lives when we are forced to review and take stock of our thinking, and moving away from home to study at university for the first time is probably one of these. Does this have an impact upon the development of our metacognitive skills? This study casts light on the potential importance of one particular life event (moving away from home), and identifies some interesting preliminary correlations using demographic data gathered from first year students at a university in Hong Kong.

5. Method

5.1. Sample

The LASSI is offered to all first-year undergraduate students at a university in Hong Kong in order to help them monitor and develop appropriate learning attitudes and strategies, and maximize their opportunities to enjoy a successful learning experience during university and beyond. The LASSI is offered on a voluntary, rather than compulsory, completion basis to all new undergraduate students within weeks 3 to 5 of their first semester at university. An interim test follows this pre-test around the middle of the student's undergraduate programme, and a post-test is also administered towards completion of the undergraduate programme. In other words, each undergraduate student will take LASSI three times during their undergraduate study at university. Therefore longitudinal data can be produced for diagnostic purposes and as evidence of growth in metacognitive ability over the time spent in undergraduate study. The entry and interim tests provide timely data and allow the university to correct any problems with this development early. The LASSI takes approximately 25 minutes to complete online and is offered to all freshmen shortly after registration (3 to 5 weeks).

5.2. Materials

The Learning and Study Strategies Inventory (2nd Edition) Weinstein & Palmer, (2002).

Demographic 'entry' data collected, by the university in Hong Kong during the student admission process.

5.3. Participants

LASSI data was collected from a total of 1,821 (N = 1,821) new first-year undergraduate students at the university in Hong Kong, and correlated with variables taken from the same students' demographic data collected as a normal part of the admission process. The students were distributed into four groups for analysis. Therefore, the data related to LASSI score and background information for the following groups of students was obtained:

a. Full-time UGC (funded place) students (n=984)
b. Part-time non-UGC (self-financed) students (n=343)
c. Foundation year students (all from the Chinese mainland/self-financed) (n=134)
d. Students not belonging to any of the above 3 groups (n=360) (exception-see Table 1)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Exception**	360	19.8	19.8	19.8
	Foundation	134	7.4	7.4	27.1
	UGC funded	984	54.0	54.0	81.2
	Non-UGC funded	343	18.8	18.8	100.0
	Total	1821	100.0	100.0	

Table 1. Category of students

5.4. Procedure

In order to investigate some of the correlations between LASSI scores and other demographic and academic factors during the pilot period, a number of correlations were attempted with the four groups identified above, and the data presented in this study has been selected as of particular interest for further consideration. Although the original N=1821, six cases were omitted from the analysis because of incomplete or confounding data, therefore N=1815.

6. Results

Not surprisingly for a large-scale study of this type, a range of data for correlation was collected and analysed. However, the results presented relate primarily to group c above and have been selected because they are of particular interest, and they were somewhat unexpected. The relationship between scores on LASSI and the type of housing occupied by the students produced some particularly interesting findings (see Table 2). ANOVA analysis yielded highly significant results (p<.000).

This study demonstrates a significant relationship between LASSI score and type of housing, or more accurately, whether a student is living in the 'home' environment (Family Home or FH). The students from the Chinese mainland coming to Hong Kong to study (moving away from 'home') with unidentified housing type obtained by far the highest overall LASSI scores (n=127, mean score=619.73) with those students living in the University's accommodation on campus producing the second highest LASSI scores (n=45, mean score=580.58). Perhaps less surprisingly, those living in private housing produced (n=621, mean score=435.83) the third highest LASSI scores (see Table 2).

		N	Mean LASSI Score
LASSI	Staff quarters (FH)	5	369.8000
	HOS/PSPS (FH)	269	419.3494
	Private housing (FH)	621	435.8293
	Public housing (FH)	748	418.4238
	Student halls (NFH)	45	580.5778
	From Chinese Mainland (NFH)	127	619.7323
	Total	1815	442.4887

FH – Living in family home. HOS - Home Ownership Scheme. NFH – Living away from family home. PSPS - Private Sector Participation Scheme.

Table 2. Mean Total LASSI score according to Type of Housing (FH vs. NFH).

When the total LASSI score is broken down into the three major components of the inventory, 'will', 'skill', and 'self-regulation' the following results are obtained (see Tables 3 to 5).

		N	Mean 'Will' Score
Will Component	Staff quarters (FH)	5	83.2000
	HOS/PSPS (FH)	269	98.9182
	Private housing (FH)	621	104.7536
	Public housing (FH)	748	98.9184
	Student halls (NFH)	45	157.4667
	From Chinese Mainland (NFH)	127	159.0945
	Total	1815	106.5339

Table 3. Mean 'Will Component' score according to Type of Housing (FH vs. NFH).

		N	Mean 'Skill' Score
Skill Component	Staff quarters (FH)	5	150.0000
	HOS/PSPS (FH)	269	136.7993
	Private housing (FH)	621	142.0177
	Public housing (FH)	748	133.6484
	Student halls (NFH)	45	181.6889
	From Chinese Mainland (NFH)	127	199.3307
	Total	1815	142.8110

Table 4. Mean 'Skill Component' score according to Type of Housing (FH vs. NFH).

		N	Mean 'Self- regulation' Score
Self-regulation Component	Staff quarters (FH)	5	136.6000
	HOS/PSPS (FH)	269	183.6320
	Private housing (FH)	621	189.0580
	Public housing (FH)	748	185.8570
	Student halls (NFH)	45	241.4222
	From Chinese Mainland (NFH)	127	261.3071
	Total	1815	193.1438

Table 5. Mean 'Self-regulation Component' score according to Type of Housing (FH vs. NFH).

		Sum of Squares	df	Mean Square	F	Sig.
will component	Between Groups	531261.269	5	106252.254	40.561	.000
	Within Groups	4738756.397	1809	2619.545		
	Total	5270017.666	1814			
skills components	Between Groups	546883.932	5	109376.786	31.883	.000

		Sum of Squares	df	Mean Square	F	Sig.
	Within Groups	6205872.248	1809	3430.554		
	Total	6752756.180	1814			
self-regulation component	Between Groups	785366.094	5	157073.219	31.249	.000
	Within Groups	9093021.373	1809	5026.546		
	Total	9878387.468	1814			
LASSI	Between Groups	5478997.128	5	1095799.426	45.101	.000
	Within Groups	43952864.391	1809	24296.774		
	Total	49431861.518	1814			

Table 6. ANOVA

7. Discussion

These results raise the question of the extent to which the metacognitive skills, assessed by the Learning and Study Strategies Inventory, are influenced or associated with moving away from the home environment in order to engage in undergraduate study. In other words, does a significant change in the social context, like moving away from home to study, impact positively upon metacognitive development and, if so, why is this likely to happen?

8. Cognitive development, culture, and social context

Piaget (1929, 1954, 1977) describes the process of intellectual development in terms of a movement from 'egocentrism' to 'decentring'. This is a cognitive developmental process that culminates in attaining the formal operational stage characterised by advanced deductive logic and the ability to reason from abstract to logical conclusions. One criticism of Piaget's approach is that it asserts that much of cognitive development is a result of maturational processes within the child, and the environment has very little impact on how cognitive abilities change over time. However, since Vygotsky (1975) highlighted the role of social interaction in cognitive development, more contemporary researchers (Rogoff & Chavajay, 1995; Lourenco & Machado, 1996; Serpell & Boykin, 1994; Downing & Chim, 2004) have tended to focus on the role of culture and social interactions in cognitive development. This view posits that children and young adults develop through a process of internalisation, absorbing knowledge from their social context which has a major impact on how their cognition develops over time.

9. Metacognitive development, culture, and social context

Piaget himself recognised that an environment rich with challenges appropriate to the stage of a child's development was more important than trying to force the pace of change in order to help increase the pace of cognitive development. Therefore, it should not be surprising to find that metacognitive development also progresses as a result of challenges from the environment and, if these challenges are the result of a significant life event like

leaving home (perhaps for the first time), it seems likely that this will involve the internalisation of new experiences and subsequent increases in metacognitive activity.

The data presented in this study suggests that these findings are equally relevant to metacognitive development. The overall LASSI scores presented in table 2 demonstrate that students who have moved from the Chinese mainland (n=127) to study in Hong Kong score significantly above the mean LASSI score (N=1815) for the sample. Additionally, students from Hong Kong who had moved into student halls of residence on campus, and so had moved away from home (although not quite so far in geographical terms) also scored well above the mean LASSI score, although somewhat lower than their mainland Chinese counterparts. The first of these findings suggests some element of cultural difference in metacognitive development (Serpell, 2000), and this suggestion might rely on the particular type of education experience encountered by the mainland Chinese group. However, the fact that the group of students living in halls, from the very different cultural context of Hong Kong also score much more highly than their Hong Kong counterparts living in the family home (the general norm for Hong Kong undergraduates) suggests that there is something about the changed social context (moving away from home) that impacts upon metacognitive development. Analysis of the component scores for 'will', 'skill', and 'self-regulation' casts some light on this process.

10. Skill, self-regulation and social context

The differences from the mean scores (N=1815) for the 'will' component are 52.56 (n=127) for the Chinese mainland students studying in Hong Kong and 50.93 (n=45) for students living in halls of residence on campus, not much to write home about! However, differences between these two groups start to look more interesting when we consider the 'skill' and 'self-regulation' components. The differences from the mean scores (N=1815) for the 'skill' component are 56.52 (n=127) for the Chinese mainland students studying in Hong Kong and 38.88 (n=45) for students living in halls of residence on campus. For the 'self-regulation' components these figures are 68.16 (n=127) and 48.28 (n=45) respectively suggesting that these two components are differentially influenced in the two groups and raising the question why? Once again the social context might provide us with a partial answer. The students from mainland China are geographically distant from their home base and their parent culture and so the requirement to self-regulate, and to think about this process (metacognition) is likely to be more pressing than those students living in their own culture but away from the family home. For both groups, the changed social context is likely to influence their perceived ability to concentrate and focus attention positively because they are not subject to the often considerable demands of living in the family home, and this will no doubt impact on the sense of control they perceive in relation to their time-management abilities. In terms of the perceived use of self-testing and study aid strategies, the changed social context gives students everyday opportunities to try out different problem-solving strategies ('skill' component) and weed out those that do not work as well, gradually evolving new strategies depending on changes in the situation in the same way as Siegler, (1996) describes for cognitive development.

In line with Piaget's view that an environment rich with challenges appropriate to the stage of a child's development was more important than trying to force the pace of change in order to help increase the pace of cognitive development, it seems that everyday challenges emerging from the new social context in this study, provide fertile environments for the development of metacognition. The highest 'meta-level' of cognition is usually not implicated when we receive an outside task and when the task solution is known. This is one reason why we do not think about our life goals in our everyday activities. The meta-level only tends to be consulted when things go wrong or when the situation is new. Therefore, the meta-level tends to come into play when we move house or location, or we are encouraged to consider our life and or educational goals in a more general sense, something we are surely disposed to do when moving away from home environment and culture. In other words, the challenging new social context of living away from home, and for the mainland Chinese students, in a different culture increases the use of metacognition because the student cannot call upon routinised or 'automatic' cognition. There is almost a requirement in these circumstances to have knowledge about and control over thinking processes (Allen & Armour-Thomas, 1991).

11. Conclusion

According to Driscoll (1994), there are three basic instructional principles on which Piagetian (cognitive) theorists generally agree:

- **Principle 1:** The learning environment should support the activity of the learner (i.e., an active, discovery-oriented environment).
- **Principle 2:** The learner's interactions with peers are an important source of cognitive development (i.e., peer teaching and social negotiation).
- **Principle 3:** Instructional strategies that make learners aware of conflicts and inconsistencies in their thinking promote cognitive development (i.e., conflict teaching and Socratic dialogue).

Why then should metacognitive strategies such as planning, monitoring and evaluating one's own learning evolve more effectively when undergraduates are away from their home environment and culture? Vygotsky's (1986) view was that in order to subject a function to intellectual and voluntary control, we must first possess that function. In other words, metacognition and self-reflection will develop first as a skill before it can be used as a series of consciously controlled strategies (Lynch et al., 2006). The emphasis on social interaction as a pre-condition for the training of reflective skills is today shared by many approaches to instruction (Von Wright 1991). For example, the use of reciprocal or 'peer' teaching forces the teacher to use a whole series of metacognitive processes such as identifying what the learner already knows, deciding what is to be learned and how; monitoring understanding and evaluating the outcome in terms of increased understanding. This, in turn, encourages the teacher to reflect upon their own thinking processes. In terms of social constructivist theory, metacognitive processes begin as social processes and gradually become "internalised" (Downing, 1991; Lewis & Downing, 2000). The social context of living in an

environment outside what might be termed your 'comfort zone' (Driscoll's, 1994, Principle 1) will undoubtedly provide an action and discovery oriented learning environment, whilst the scope for peer interaction and social negotiation is also considerably widened (Principle 2). Finally, Socratic Dialogue is a method widely used in Europe which allows for in-depth understanding of various issues concerning everyday life. Through rigorous inquiry and consensus students start to unravel some of their basic assumptions and develop metacognitive skills and knowledge. This approach has long valued everyday life as a formidable teacher of self-reflection (Principle 3).

Scruggs et al (1985) and Ning & Downing (2010b) suggest that direct instruction in metacognitive strategies leads to increases in learning (e.g. Learning to learn courses), and that independent use of these strategies develops only gradually. Whilst there is a wealth of research in support of these viewpoints (Hanley, 1995; Bogdan, 2000; Driscoll, 2004;), it is also essential that educators do not neglect the crucial role of the student's experience outside of the classroom in the development of metacognitive skills. Independent use of metacognitive strategies is a by-product of coping with everyday new social contexts and cultures. It seems very likely from the data presented in this paper that the experience of moving away from home (and culture) creates a metacognitive environment which fosters the development of 'thinking about thinking' and provides students with more opportunities to become successful problem-solvers and lifelong learners. In our rapidly changing world, the challenge for teachers is to help undergraduate students develop skills which will not become obsolete. As such, metacognitive strategies are essential for the twenty-first century because they will enable students to successfully cope with new situations, and the challenges of lifelong learning. To return to Socrates, it is clear that moving away from home and culture into a new social context ensures that everyday life is examined, and this study suggests that this examination promotes the development of metacognitive skills which go some way to equipping student's for the demands of a worthwhile career in a rapidly changing world.

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