

A PERSONAL JOURNEY OF DIFFERENTIAL ENGAGEMENT: COMING TO  
TERMS WITH THE MEANING OF 'DOCTORATE'

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ABSTRACT

The purpose of this paper is to provide a theoretical account of underlying cognitive processes involved in the production of works of art and in thesis production. It is argued that there is a conceptual relationship between the quality of thinking and the way in which a work of art and a thesis is constructed and processed. Understanding the nature of the cognitive processes underlying different levels of concern assumes fundamentally different ways in which knowledge is addressed. This suggests fundamentally different epistemologies with which the task is conceived and addressed. This will be illustrated by reference to recent research conducted into the processing behaviours of composers and similar inferences will be drawn about my own doctoral studies.

*Introduction*

*Conceptualising the relationship between quality of thinking and artistic production*

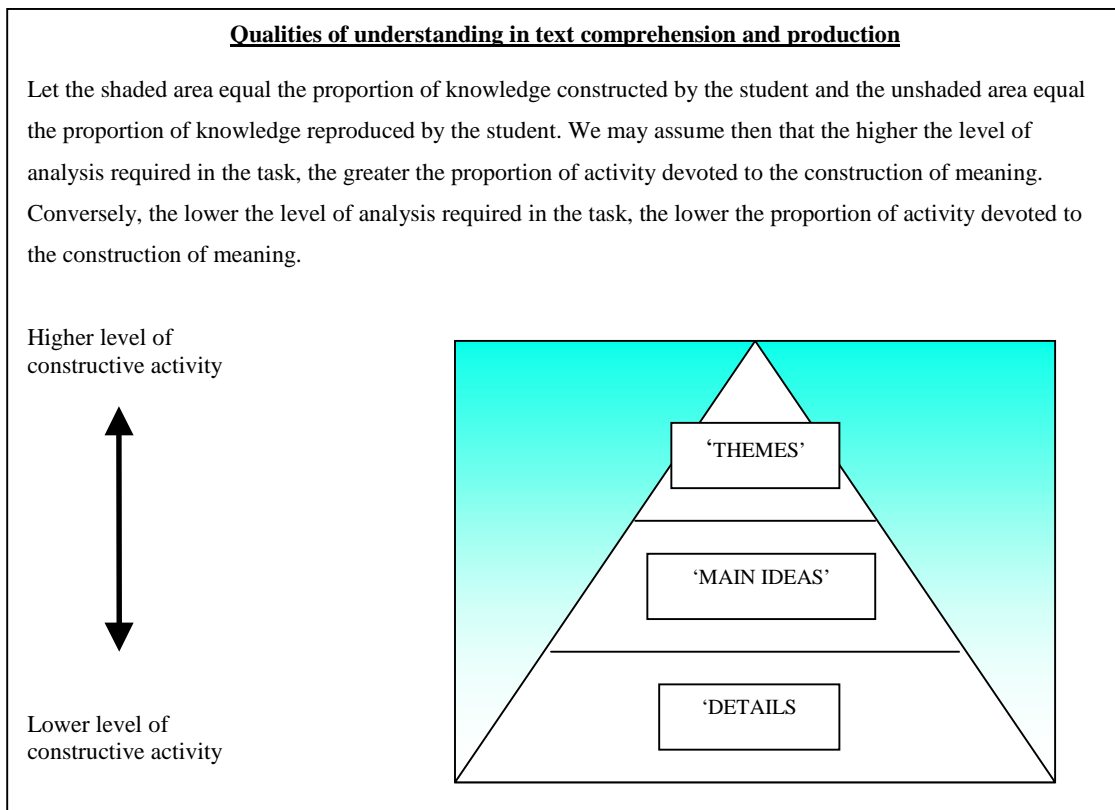
Production of a creative work, be it a musical performance, a painting, a PhD thesis and the like, is seen as an act of cognition, and therefore subject to the same constraints evident in any other act of cognition (Cantwell & Scevak, 2002). As a form of cognition, the assembly and construction of the creative work or the PhD, incorporates conative as well as cognitive processes (Snow, 1989). As Snow (1989) explains, cognition includes

conceptual structures of declarative knowledge, procedural skills involved in learning, thinking and reasoning, and learning strategies, styles and tactics. Conative processes include self-regulatory functions and motivational orientations. In summary, many theorists point to the complexity of the interaction between cognition and affect as learning takes place, and what is learned is applied to the construction and production of non-trivial tasks (eg. Boekaerts, 1997; Cantwell, 2001, Vermunt, 1996).

Cantwell & Millard (1994) have previously alluded to a conceptual relationship between the quality of thinking in music (as reflected in the planning processes of musicians) and the way in which text is constructed and processed. Current theory in text comprehension/production suggests that learning involves the construction of multi-layered meanings (see Figure 1). That is, information may be processed at three broad levels of analysis: at the level of detail, main ideas and themes. Illustrated in Figure 1 are two crucial features of this conception. First, is the hierarchical nature, that is, the transformation of information from detail to main idea and thematic levels, is additive: individuals construct meanings that both build on and subsume meanings generated at lower levels (eg. Kirby, 1991; Cantwell & Jeanneret, in press ). Understanding at the thematic level of analysis, therefore, presumes and requires understanding at the main idea and detailed level of analysis, just as understanding at the main idea level of analysis presumes and requires understanding at the associated detailed levels of analysis. The second feature is the increasingly active role of the individual learner in constructing meaning at the higher levels of analysis (eg. Weinstein & Mayer, 1986). This is represented, in Figure 1, by the increasing density of colour as one moves to the apex of the triangle. What alters here is the proportion of information which may be taken as given in relation to the proportion of information requiring construction by the individual. The higher the level of analysis, the greater the constructive activity of the individual.

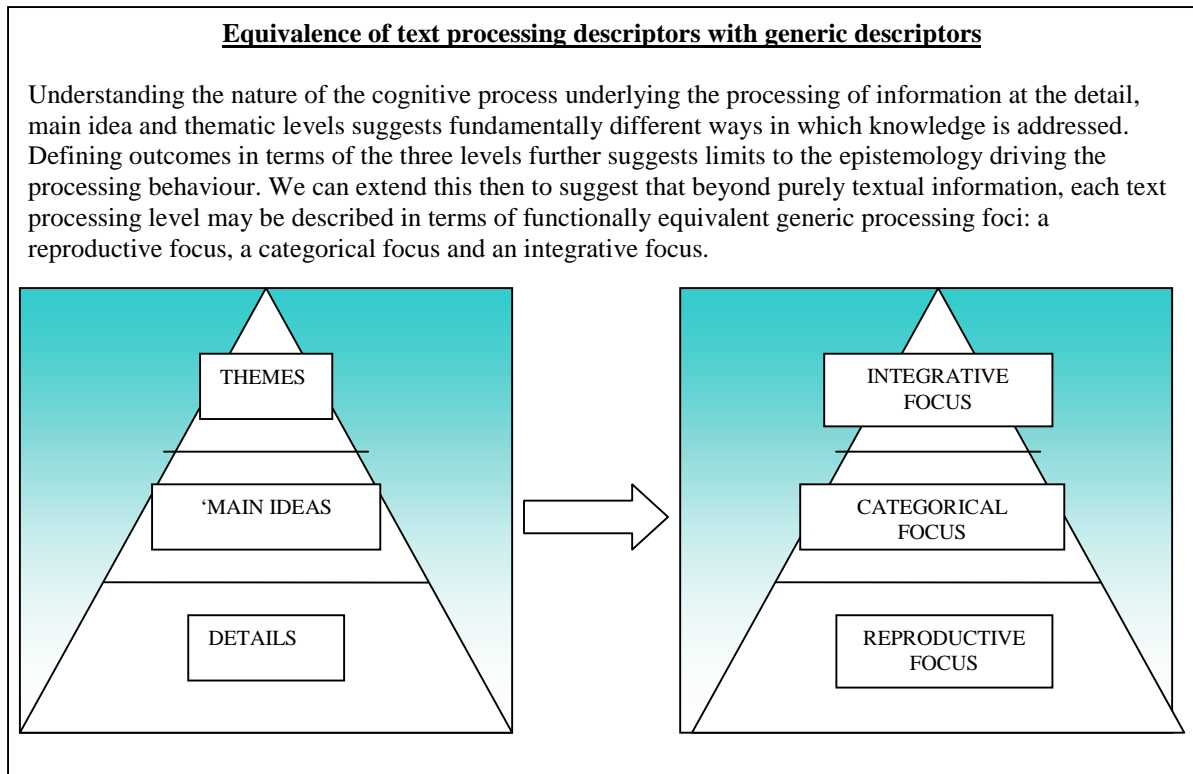
Constructing meaning then at the thematic level, ultimately calls upon a significant amount of prior knowledge and prior understanding as the reference point for making higher order sense of the text under consideration. Moreover, as research by Sullivan and Cantwell (1999) has demonstrated, higher order musical processing involves not only significant prior knowledge and understanding about music, but also more general dispositions towards meaning creation that are not necessarily specific to the domain of music itself.

Based on the notion of differential levels of meaning construction in text analysis, it is proposed that more generic qualities of process and outcome may be inferred. Detail level analysis leaves information largely untransformed, with the consequence that learning outcomes may rarely reflect more than a reproductive focus. Main Idea level analysis represents a first order transformation of information. It is however, a categorical focus in which information is largely summarised under context dependent and conventional headings. The thematic level of analysis involves a more fundamental transformation of information through the construction of meanings beyond the literal meanings exemplified in the main idea and detail levels of analysis. That is analysis involves an integrative focus, potentially extending meanings to potentially quite high levels of abstraction.



**Figure 1:** A conceptual model of text comprehension and production (from Cantwell & Jeanneret, in press)

This theoretical model then, specifies three generic qualities of process and outcome (the reproductive, categorical and integrative foci), each of which implies different qualities of knowledge use and strategic behaviour. At the same time, these focal levels may also be seen as interactive and additive through the construction of coherent relationships within and between knowledge elements constructed at each level of analysis. Outcomes reflective of an integrative focus for example would both imply and subsume outcomes generated at the categorical and reproductive levels. The equivalence of the text processing/construction model and the more generic focal framework is illustrated in Figure 2.



**Figure 2:** The equivalence of text processing/construction descriptors with the generic descriptors of attentional focus in learning (from Cantwell & Jeanneret, in press)

Underlying the taxonomic model of attentional focus is the assumption that intention in learning and performance will typically constrain processing activity to particular levels of meaning. Given the theoretical and empirical link between intention and process described in the student learning literature (eg. Biggs, 1996), shifts in attentional focus by the musician (such as shift from a reproductive to a categorical focus) represents more than a simple additive process – rather such a shift represents a transformational process driven by qualitatively different conceptions of the possibilities and purposes of the musical process itself. The shift to a higher level of attentional focus is necessarily accompanied by an increased proportion of attention devoted to constructed as opposed to given information. To illustrate shifts in understanding from a reproductive, categorical and integrative focus, results from ongoing research into the composing behaviours of composers will be used. *Music composition*

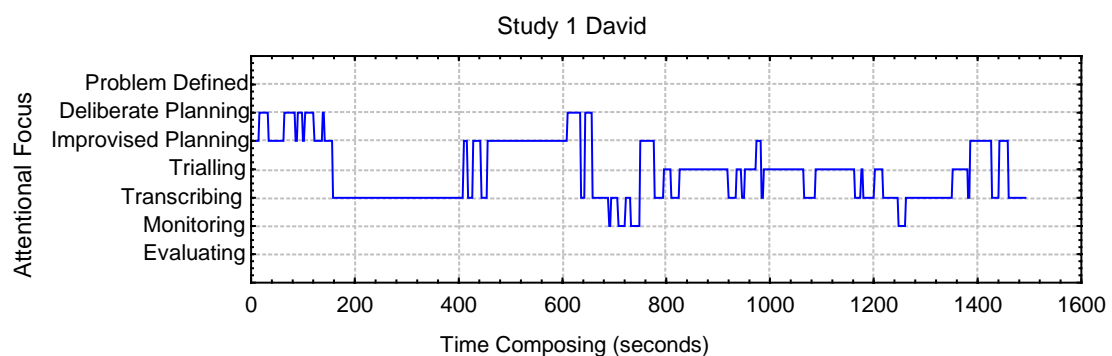
Reitman (1965) viewed composition as an ill-structured problem solving activity. To solve ill structured problems requires reflective or 'mindful' (Salomon & Globerson, 1987) planning and processing, a knowledge base of sufficient abstraction to provide a framework for interpreting complex data (Cholowski & Chan, 1994), and the availability and accessibility of domain specific problem solving strategies (Cantwell & Moore, 1996). Planning involves establishing goals, generating specific strategies for realising these goals, and reflecting on the appropriateness of these strategies to the attainment of the compositional goals. Based on these evaluations, goals are realised or new goals are set. Monitoring the behaviour of composing and evaluating the effectiveness of the music that is created sets in motion a cycle of 'doing' and 'evaluating', and where change is necessary, regulating the cycle.

In prior reports of research into composing, Cantwell et al 2000; and Irvine et al 2001, argued that individual differences in learning to compose new music, are reflective of an interaction between the composers underlying epistemologies, prior knowledge states and situationally induced motivational states. Thus it will be possible to discriminate between composers on the basis of the structural complexity of their planning processes, which in turn are seen to reflect fundamental differences both in the complexity of the strategic repertoire underlying planning, and importantly, in the driving epistemological assumptions underlying intention formation and implementation. To investigate these differences, seven composers (five university composition majors and two professional composers) verbalised their thoughts during the process of composition. Verbal protocols were analysed for evidence of attentional focus over seven categories: problem identification, deliberative planning, improvised planning, trialling, transcribing, monitoring and evaluating (eg. see Lawson 1991). Graphing changes in attentional focus provides a pictorial representation of changes in attentional focus as the task of

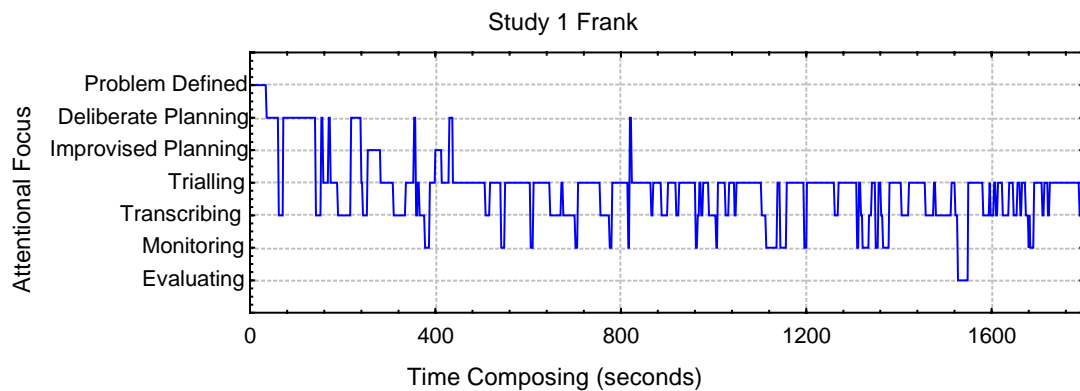
composition takes place in real time. Categorising attentional foci allowed inferences to be drawn about the ‘mindfulness’ (Salomon & Globerson, 1987) with which the composer addresses the task, and the strategic variation implied by that process. Attention at the extreme categories of the taxonomy (Categories 1 & 2, and Categories 6 & 7) may be associated with more explicit metacognitive activity. The central categories are more representative of operational level activity in ‘real time’ composing.

Attentional shifts, then, between the extreme categories and the central categories may be seen as indicative of reference to the more abstract construct understandings driving decision-making at the regulative and process levels. By way of illustration, the attentional focus of three composers over the time of composing is included in Figures 3, 4, and 5. The X-axis on these illustrations indicates the category of attentional focus at any given point in time. The Y-axis indicates real time.

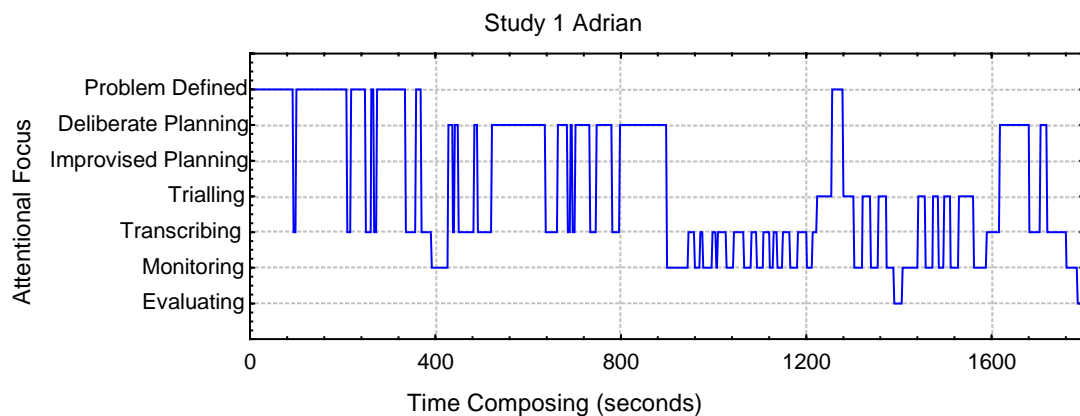
Attentional focus was mapped over real time and graphically represented to provide evidence of strategic behaviour during composition. The graphs were grouped into three categories representative of more novice-like behaviours (see figure 3), more intermediate-type behaviours (see figure 4) and more expert-like behaviours (see figure 5).



**Figure 3:** Graph of attentional focus for David



**Figure 4:** Graph of Attentional Focus for Frank



**Figure 5:** Graph of Attentional Focus for Adrian

The most notable observation from these illustrations is the increasing spread of categories involved in the composition process as one moves from the more novice-like to the more expert-like composer. Consistent with expectations, the novice (David, figure 4) gave no explicit attention to the global aspects of either problem representation or evaluation. That is, the composition activity was closely tied to the act of composing as a regulated activity, but one that, in all likelihood, involved little reference to higher order

elements of meaning and understanding. The limited amount of monitoring is more indicative of reflection on the surface features of the composition (the level of detail in figure 1) than on the overall meaning and direction of composition. Frank (see figure 5), as an example of intermediate level problem solving, reflected many of the focal and strategic attributes of the novice. However, the processes differed in the nature of initial planning and, to a lesser extent, in the use of monitoring and evaluation. The composer explicitly reflected on the nature of the problem as a starting point, and then focussed on a trialling strategy for the majority of the time spent composing. The expert composer, Colin (see figure 6) on the other hand, while also giving initial time to representing the musical problem, spent far greater proportion of time compared to the more novice-like composers in deliberative planning and in monitoring and evaluating.

In an interview immediately following the composing activity, questions were asked to gain insight into the different generic descriptors of figure 2. In response to the question: “If you were teaching first year university students in composition, how would you use this composition as part of that teaching process”?

David replied:

“Learn your chords and learn your scales and then chuck it all out the window and jam, it’s as simple as that in brief.”

What is notable in David’s response is that the focus of composing is to reproduce the details of chords and scales (see the level of details in figure 1).

Frank’s reflection on the composition task was as follows:

I am going to write a psalm tune. Used to singing psalms and its broken up into four quarters. So each quarter, the first quarter has, basically four different chords in it. The second one has six and the third has four and the fourth has six as well. So um, I have to figure out some chord progressions for it and I am going to write for SATB so stave, so I have to choose a key and, major or minor and from past experiences I think that the minor one’s are better, so I’ll do a minor key, so I just have to figure out a minor key. I have to think about the ranges of the voices so if we, Bottom note can be an F for the bases, top note can be a G for the sopranos,

that's not too bad, maybe D maximum for the alto's and E for the tenor's so they won't complain, or an E flat or something

Frank's focus is to reproduce a category of composition known as a 'psalm tune'. The details of the category are delineated as four quarters; four chords per quarter; key etc.

Adrian, a professional composer, had this to say about his composition:

"I'll try and write a waltz, because I'm doing a series of waltzes at the moment. A series of 60, minute waltz's for the pianist 'x' and the idea behind them is that you end up with 60 chunks of time which are equal but in the course of the 60 waltz's the style of the waltzes' varies enormously so some of them will be very slow and some of them will be very fast. Some of them may have twelve bars and some may have 112 bars, some of them will have a lot of notes and some will have hardly any. Some will be great, be big barn storming numbers, some of them will be spare and Satiesque. And, you actually get to play with time in real time everything, but each piece will last a minute. But in terms of perception of time, there is a distinct difference and some of them will seem to go on much longer than others. I'm also going to join some of them up so that they will, actually one will flow into another and there will be other places where obviously one will just stop and something completely different will start. I've written, I've actually completed two of them, two down 58 to go and sketched out ideas for perhaps another five but this is not really a project I'm thinking about at the moment. I'm finishing off a big music theatre piece so I'll be doing this without any prior thought".

Note the reference to the category of composition as a "waltz". However, the problem is not to reproduce any waltz. Here this composer is concerned with issues of proportion and time. Here the conception of the problem is much more abstract and complex than that given by Frank and David. The act of composition is not tied to getting notes on a page but to the active construction of a piece of music that is reflective of this composer's unique conception of this composition.

These composers reflect fundamentally different conceptions and understandings of the nature of the composition task. Such differences are reminiscent of the individual differences as described in the literature on approaches to learning (Biggs, 1993; Cantwell & Moore, 1996; Marton & Saljo, 1976; Volet & Chalmers, 1992; Sullivan & Cantwell, 1999). The deep approach, for example, is marked by an intention to

understand content in a structurally complex way, while the surface approach is marked by a desire to simplify structural complexity to a point of minimally acceptable competence (Biggs, 1993; Cantwell, 1997; Sullivan & Cantwell, 1999). For composers, possession of a deep approach is therefore more likely to be associated with a perception of musical meaning that goes beyond notational reproduction (Cantwell & Millard, 1994).

A second study was implemented to see if individual differences in approach to learning would be reflected in different patterns of attentional focus as composers composed. As all subjects in this study may reasonably be described as technically competent musicians (by AMEB level achieved), we may well expect that a major point of individual difference in intention formation in composing new music lies in the more sophisticated assumptions of the musical epistemology which a deep rather than a surface approach to musical composition may represent. If it is the case that “deep” musicians are epistemologically more likely to see complex possibilities in music, then it becomes reasonable to further speculate that the depth of cognitive engagement will be greater, that the corpus of cognitive strategies called upon will be greater, and that the structural quality of planning focus will indicate greater complexity of musical concerns and result in a wide spread of attention at the extreme categories of attentional focus ie. categories 1 & 2, and 6 & 7.

### *Method*

#### *Subjects*

The study included 14 students who had entered into a four year Bachelor of Music course based on their interest in music composition as a career. Mean age of the participants was 20.86 years, ranging from 18 to 33. Four participants were female (29%)

and ten were male (71%). Seven students were in their first year of university study, two in second year, four in third year and one in their final year of study. Ten students had learnt the piano, two the saxophone, one the Guitar and another the Trumpet. These students reported achieving a high standard of performance on their instrument with three students gaining the A.Mus.A award (level 9) from the Australian Music Examination Board (AMEB) with the minimum achievement being grade 6 AMEB. Similarly, the group reported medium to high levels of attainment in theory with one student achieving the A.Mus.A., two students grade 8, two grade 7, five students grade 6, three grade 5 and one student grade 4.

### *Materials*

Materials for the study consisted of a demographic information sheet, and three questionnaires. Demographic information sought included age, sex, instrument learnt and AMEB grade or equivalent standard achieved, and AMEB grade in theory/musicianship achieved. Three questionnaires relating to aspects of musical composition were provided. An adaptation of Cantwell & Moore's (1996) Strategic Flexibility Questionnaire provided a measure of the manner in which students metacognitively deal with complexities in musical composition. Biggs' (1987) Study Process Questionnaire was included as a measure of the underlying conception of learning driving musical composition engagement, and a Self-efficacy Questionnaire as a measure of personal belief to confidently engage specific aspects of composition tasks. In this paper reports of the results of Study Process Questionnaire are reported.

### *Study Process Questionnaire*

In a previous study, Sullivan & Cantwell (1999) reported using a modified and shortened version of Biggs' (1987) Study Process Questionnaire. Six items from each of the surface, deep and achieving scales (three motive and three strategy items for each) were

modified to be specific to musical composition. This required only slight changes of wording.

*Surface:* This scale had previously been identified with those students who rely on extrinsic motivations and to adopt superficial strategies to learning academic tasks. It is expected that some individuals may also report reliance on extrinsic motivation and to simplify structural complexity to a point of minimally acceptable competence. E.g.

Surface: “I generally restrict my composing to what is specifically set as I think it is unnecessary to do anything extra”.

*Deep:* This scale had previously been identified with those students who were intrinsically interested in the subject matter and were motivated to understand by interrelating ideas with prior knowledge. It is expected that for musical composition this approach would be marked by a desire to understand in a structurally complex way. E.g., “I find that composing in any style of music can be highly interesting once I get into it”.

*Achieving:* This scale has been identified with those students who seek ego enhancement through high academic grades. It is expected that in musical composition that this approach would be marked by a desire to achieve high academic grades. E.g., “I would basically see myself as an ambitious person and want to get to the top of the class in composition, whatever I do”.

## *Procedures*

### *Data collection*

After obtaining informed consent, all participants were individually tested at two times in semester 2 of 2001. Time 1 was in the first week of the semester and time 2 was in the fourteenth and final week of semester. Participants chose the location where the testing would be carried out. Three participants chose to do the testing in their own homes, while eleven participants chose to be tested in the Conservatorium of music. Subjects were

given as much time as they needed to complete the SFQ, SPQ and the Self-efficacy questionnaire. They were then given a practice task to gain fluency in talking aloud while writing and solving a problem. When the participants were able to fluently talk aloud while solving a problem, the researcher moved on to the composing task. The participants were then given the task of composing a piece of music in any style and for any combination of instruments that they wished and to talk aloud while composing. Participants were instructed that they were to compose for thirty minutes and that their talking and composing would be captured on video and audio tape. At the conclusion of the thirty minutes, participants were allowed to finish what they were doing and then were asked a series of questions on the composition. First, participants played through the completed composition. Then they were asked to report on what they were thinking about as they played their composition. Next, they reflected on what they would revise in their composition. Then, they were asked to describe how they might use this composition to teach someone else to compose as they had just done, and finally, to rate from 1 to 5 as to how they thought they went in their composition and why they gave that mark. All composing and question sessions were videoed, audio taped and later transcribed for analysis.

#### *Coding of transcripts*

Videos and cassettes recorded the composers' verbalisations and composition processes, which provided protocols for later analysis. Protocols were coded in relation to the attentional focus of the composer. The foci were based on the application of conventional problem-solving categories (e.g. Lawson, 1991) and are described in Table 2 below.

#### *Scoring of graphs*

Based on the three levels of categories observed in study 1 (above), the graphs were seen as indicative of those patterns found at the intermediate level of composers. The graphs were graded on a three-point scale from one to three. The differences between those scored as a three and those scored as a two were primarily in the number of instances spent in evaluation. The differences between a score of two and a one were primarily in the number of instances in problem representation.

### *Scoring of compositions*

The compositions were scored on a three-point scale that represented the structure of the SOLO taxonomy. A three was indicative of a relational level, a two was indicative of a multi-structural level and a one was indicative of a uni-structural level.

### *Statistical procedures*

All analyses were conducted using the Statistica for Windows (v6.0) program (Statsoft, 1999). As there were fourteen cases it is recognised that psychometrically it is a statistically small sample. However, we are interested in the patterns and trends of this sample. In particular, we are interested in whether the patterns of attentional focus are supportive of theory. Correlations between scores on the Study Process Questionnaire and the attentional focus of the composers were calculated.

## *Results*

### *Descriptive Statistics*

Attentional shifts of the composers at time 1 and time 2 was graphed over the time of composing. The X-axis on these graphs indicates the category of attentional focus at any given point in time. The Y-axis indicates real time. The graphs give instances of attention at each category level as well as the proportion of time spent processing at each level.

The means and standard deviations for number of instances at each level of focal attention and proportion of time spent processing at each level of focal attention at Time 1 and Time 2 are presented in Table 1. For the purposes of this paper, correlations of SPQ at time 2 are reported.

**Table 1:** Means and standard deviations for instances of attention and time spent as a proportion of total time at Time 1 and Time 2

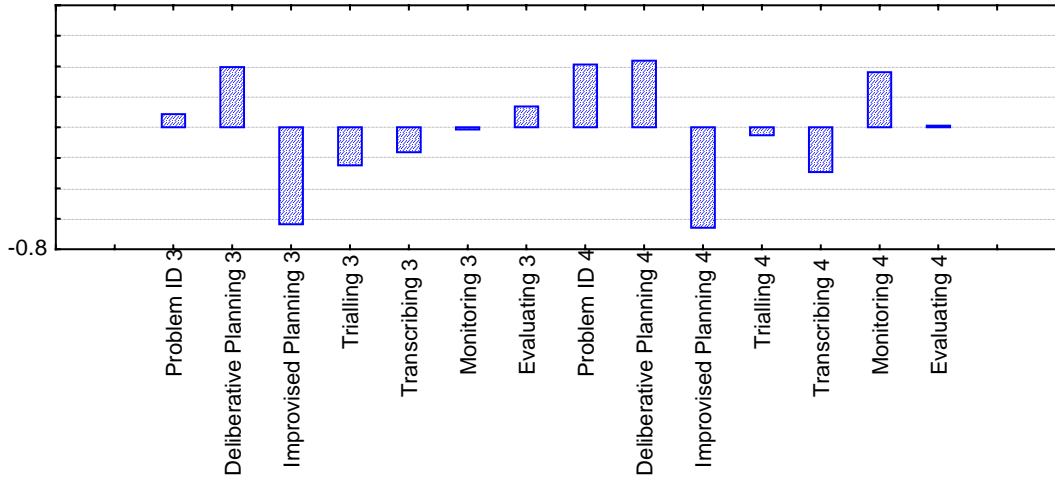
<u>Measures</u>	<b>Time 1</b>				<b>Time 2</b>			
	Instances 1		Proportion 1		Instances 2		Proportion 2	
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
Problem ID	1.00	1.04	2.39	3.4	1.07	0.62	2.67	2.57
Deliberative Plan	31.29	15.03	19.15	11.41	34.07	19.23	16.93	11.59
Improvised Plan	9.21	13.92	7.32	11.09	8.07	11.92	4.69	7.06
Trialling	24.21	21.85	18.8	19.3	31.64	22.79	19.46	19.12
Transcribing	45.36	19.09	27.07	11.39	53.29	24.20	29.75	13.51
Monitoring	49.64	22.76	21.98	9.65	49.57	26.56	21.16	10.15
Evaluation	2.43	2.28	3.3	3.26	3.64	2.65	5.72	5.66

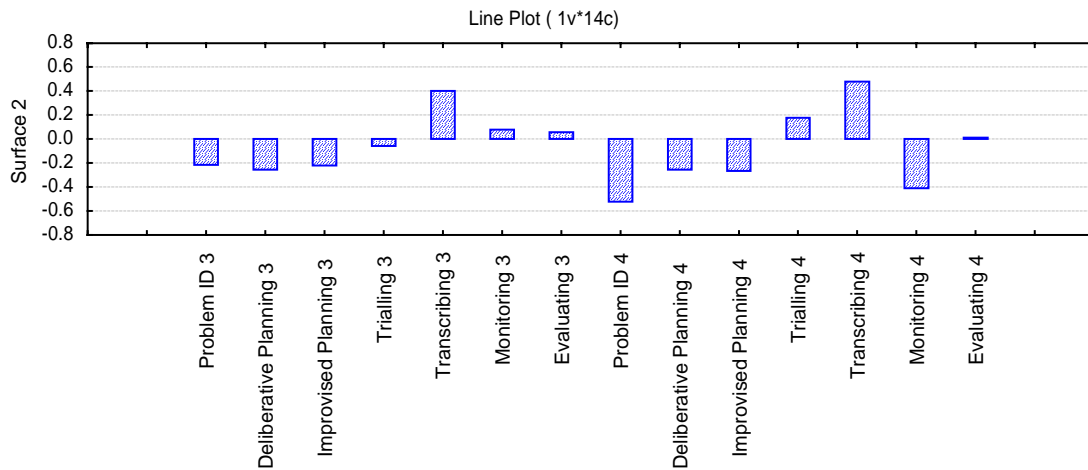
**Table 2:** Categories used in coding attentional focus of composers and example statements from transcriptions of verbal protocols

Category	Definition	Sample Protocol
Problem defined	A global description of the composer's intention to compose in a particular form and genre	I am going to write a psalm tune. Frank I'll try and write a waltz, ...Adrian  I will write for piano and what I will do is um, a specific amount of bars in order to know what my goal is from the beginning and I think I'll make it nineteen bars .... Bob
Deliberative planning	Verbal statements describing sub goals to be attained	I've got to have a D in the alto's otherwise you don't have the chord, the major chord. Ok, now I just have to fill in the middle parts. Frank  I'm just doing a chord progression and just writing in the chords, just an eight bar phrase. Colin
Improvised planning	Explorations of musical ideas on an instrument	(Samples on CD ROM)
Trialling	Repeated playing or singing of the same musical pattern	(Samples on CD ROM)
Transcribing	Writing musical notation	
Monitoring	Verbal statements that are positive or negative assessments of motifs and/or phrases	I think that's nice, I think that will work ...Adrian  I could do ii-V-I, but that's too generic and boring ...David
Evaluation	Verbal statements that are positive or negative assessments of sections or forms	So I think this return section is slightly longer than it was in the beginning. Just make it slightly more indulgent with everything. Colin



Line Plot ( 1v\*14c)

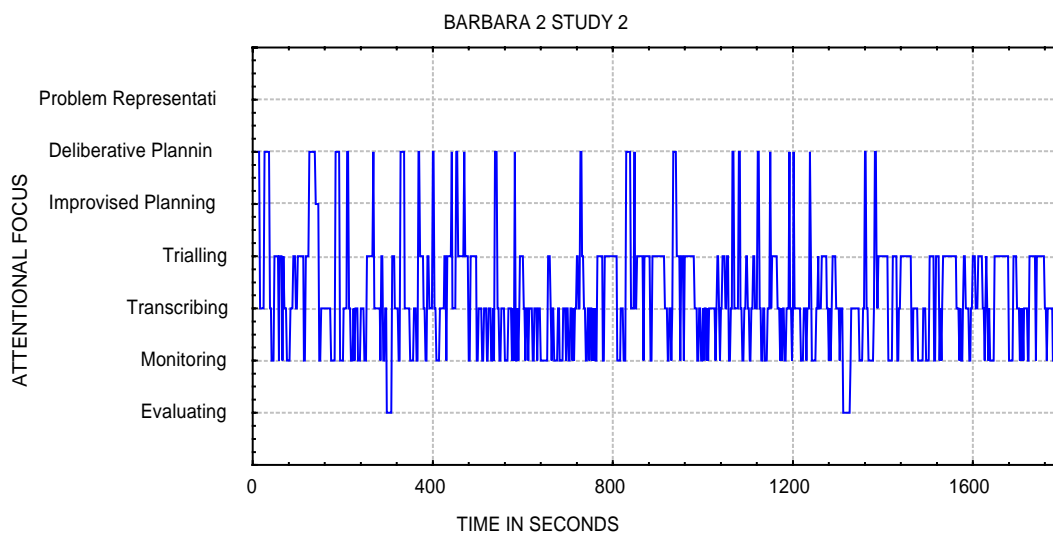




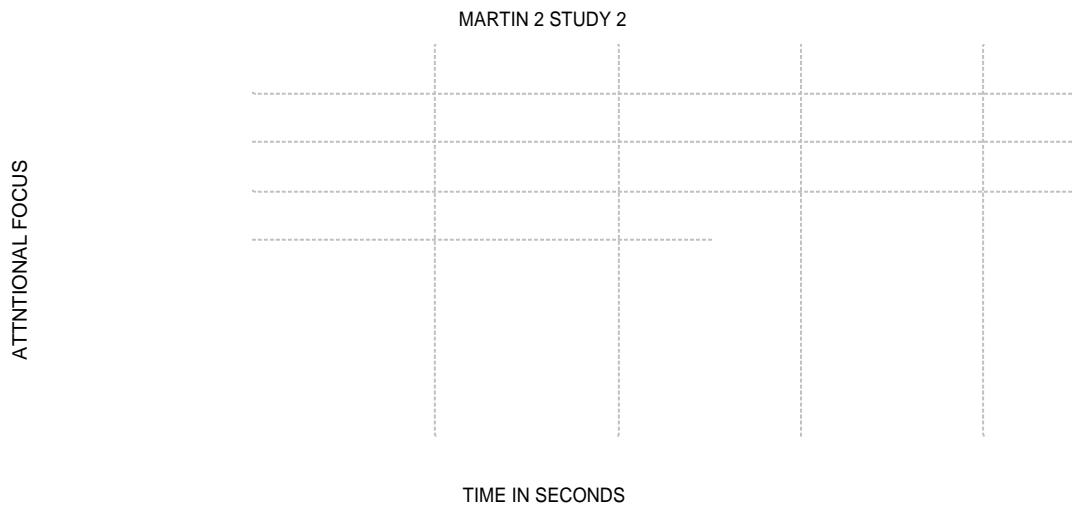
**Figure 7:** Correlations of surface approach with attentional focus

At time 2, respondents reporting high on the surface scale were more likely to devote more instances to transcribing, monitoring and evaluating. As a percentage of time devoted to each level of focus, respondents were more likely to more time on trialling and transcribing, but less likely to spend time on problem identification, deliberative planning, improvised planning and monitoring.

Scatter plots were calculated to indicate the spread of scores on each of the Surface and Deep scales of the SPQ. Barbara scored highly on the surface scales and her graph of attentional focus is given in figure 8. Martin scored highly on the deep scales and his graph of attentional focus is given in figure 9.



**Figure 8:** Graph of attentional focus for a surface approach: Barbara



main ideas and themes. The higher the level of analysis, the greater the constructive activity of the individual. Constructing meaning then at the thematic level, ultimately calls upon a significant amount of prior knowledge and prior understanding as a reference point for making higher order sense of the text or music under consideration. Higher order processing involves not only significant prior knowledge and understanding, but also more general dispositions towards meaning creation that are not necessarily specific to the domain of music itself.

This was operationalised by Biggs (1987) in the SPQ. The surface approach relied on extrinsic motivations and to adopt superficial learning strategies to the composition task. A deep approach relies on intrinsic interest in the subject matter and is motivated to understand by relating ideas with prior knowledge and a desire to understand in structurally complex ways. This was demonstrated by the differences in which attentional patterns were observed in the processing behaviours of two composers as they composed for thirty minutes.

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