'This paper is submitted for consideration by the Research Commission for a Session at the XVIII ISME Conference in Canberra, 1988.'

ABSTRACT

MUSIC AS A COGNITIVE DEVELOPING ACTIVITY:A THEORETICAL FRAMEWORK FOR INVESTIGATING LEARNING

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The cognitive learning theorists from the Eastern world - Vygotsky, Luria and Leont'ev, provide a new perspective to learning, different from that of Western world theorists. Vygotsky's developmental hierarchy of conceptual thought processes, Luria's brain functional system which allows for interchangeability in cognitive processes, and Leont'ev's theory of activity, are each examined for their potential application

in considering music as an activity for developing cognitive processes. A theoretical framework has been constructed for these theories which illustrates how music as an activity can develop memory and cognitive processing. The implications for music learning are that such a framework could provide a new means for investigating music and its associated activity. This could give music credence as a cognitive developing discipline in education.

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MUSIC AS A COGNITIVE DEVELOPING ACTIVITY:A THEORETICAL FRAMEWORK FOR INVESTIGATING LEARNING

Cognitive learning theories emanating from the Eastern world of research are becoming increasingly available through a series of English translations. In particular the research of three Soviet theorists concerned with cognitive processes, Vygotsky, Luria and Leont'ev - the 'troika'[1] - offers new possibilities for investigations into learning capacities and learning potential. Music educators and researchers in the English speaking world already have begun to examine Western world

[1] 'Troika' means a group of three

cognitive learning theories in relation to music and education (Comte, 1981; Zimmerman, 1984). With the conference theme in mind, "A World View of Music Education", this paper will look further than the Western world views on learning and attempt to formulate a theoretical framework which could justify music as a cognitive developing activity. It is not intended to initiate a comparison of Western and Eastern research or to discuss Western and Eastern ideologies. However, regardless of one's ideological view it is necessary to identify different ideas and approaches to see how these might influence the development of any theory. In this respect the approach to learning adopted by the 'troika' provides a different perspective, new to Western thinking, about consciousness, memory, learning and cognition.

They regard:

- consciousness as not being absolute but socially and culturally shaped; it varies with the individual;
- long-term memory as being emphasised in relation to simultaneous processing;
- there being two conditions of learning: consideration of how children learn in a social context and a child's perception of the task;
- a cognitive process as having social origins; it also has functional links which are interchangeable.

These points need to be considered at the same time as their theories are discussed.

It was Vygotsky's theory of conceptual thought processes, and the relationship of language to these, which initially suggested a possibility for music activity to be contemplated in a similar way. Other pertinent aspects of his theory were the recognition that knowledge continuously evolves in a social context, and that the internalisation of knowledge and meaning could be

examined through a 'tool' or 'sign'. Vygotsky's theory, together with Luria's brain functional system, and the structure of activity designed by Leont'ev, has led me to develop a theoretical framework (see Figure 1) focussing on music as an activity (Bygrave, 1985).

Some relevant features of the 'troika' theories will now be outlined and considered from the viewpoint of music as an activity. The research of the 'troika' did not concern music. Their research was concerned primarily with language although Luria did identify some musical associations in patients with brain damage.

Vygotsky (1972), in his theory of conceptual thought, investigated conscious thought processes and considered the relationship between thought and language which he saw as separate functions. From his studies Vygotsky concluded that a 'word' or 'speech' proceeded through a developmental hierarchy of four stages governed by the same principles as those relating to other mental operations that employ a 'tool' or a 'sign'. Vygotsky outlined three stages in conceptual thought development. In short, his theory illustrated the development of thinking through the use of language as a 'tool' or 'sign'. He envisaged a 'sign', mediating internal activity of consciousness, as an extension of a 'tool' which mediated information processing in external activity. Vygotsky applied his developmental hierarchy model to learning processes outside language, specifically the development of operations or behaviours in memory and in mathematics. I now suggest that the development of memory, through Vygotsky's developmental hierarchy based on intellectual response processes, can be illustrated by employing music as the 'tool' or 'sign' in the following way:

(1) Primitive stage: the response to a complex structure with

primitive means. Vygotsky (1981) states that in this stage a child's behaviour is determined by the immediate appearance of the resources. For example, a child who for the first time is given a notated music sheet and musical instruments, such as chime bars, would ignore the music sheet and play at random on the chime bars. This is because he/she has no knowledge of a relationship between the notes on the music sheet and the notes of the chime bars.

(2) Naive psychological stage: children accumulate and master certain experiences by using a 'tool' in an external way. The previous example can be extended to include naming various notes on the music sheet and naming various chime bars. A relationship is thus introduced whereby a note on the music sheet has the same name as that of a chime bar. This relationship is an external association between two objects. The child does not understand the true nature of the relationship but through practical associations like that described, gains experience in a naive psychological way.

(3) Stage of using external signs: a child knows that the presence of a 'tool' assists in carrying out an operation. The note on the music sheet for instance, is connected with that of the chime bar. By establishing this connection the child can then begin to make new associations. This is the important point in Vygotsky's model wherein children can organise stimuli in order to achieve a response. In other words, new connections are created by appropriate reasoning. Thus, in music the child begins to form an association of the written note with a given sound. A number of these written notes can then be organised as a number of sounds to construct a tune. Gradually these written notes and associated sounds can be

extended into a variety of sound combinations and tunes.

(4) **External reactions are internalised:** a child no longer needs external stimuli because any external operation has its internal representation. In a musical learning process a child reaches this stage when he/she knows how a written musical note sounds internally, that is, he/she knows the concept ('sign') of the acoustics of a sound. The child can then create, improvise, play or sing a tune knowing how it will sound.

Luria (1973) developed his brain functional system from a concept that functional criteria can be considered either as an entity, or in a relationship. By viewing memory as a functional system, Luria (1976) was able to identify the many links in a cognitive process. His concept allowed for a damaged neurological link, or a non-functional link, in the cognitive process to be replaced in some instances by another functionally equivalent link. In his research on the cerebral cortex, Luria distinguished two basic forms of integrative activity, simultaneous and successive processes. Simultaneous processes integrate individual stimuli arriving into the brain as a single entity related in space. Successive processes integrate individual stimuli which arrive sequentially, one after the other, into the brain.

The following possibilities for learning through a relationship of musical associations, cognitive processing, and memory become apparent to me:

- Simultaneous processes allow for a system of relationships, or the knowing of how three, four or more elements integrate to make a whole. These processes can provide a semantic form of organisation useful in the acquisition of long-term memory. In the music context timbre, pitch, tempo and dynamics, can all be integrated with a series of sounds which can be clumped together

to form a meaningful, surveyable musical 'whole' such as a tune. - Successive processes, a series of links following each other in sequential order, have implications for educational experiences with children whose short-term memory functioning is low. It allows for a compact idea like a musical theme, to be expressed in detail. For instance, musical notes organised in a sequence can be readily imitated and identified.

Luria's system also provides an extension of learning processes by the replacing of a damaged or of a non-functional link by another functional link. This has considerable implications. For instance in music learning by deaf children a damaged link concerned with sound perception can be replaced by visual cues for prompting auditory skills. Similarly a non-functional link in learning such as a deficiency in the sequencing process, can be interchanged with a simultaneous process to provide more effective memory skills. Luria has demonstrated empirically that while both damaged links or non-functioning links can cause blocks in memory and learning, functional systems work together with a degree of interchangeability (Wertsch, 1981).

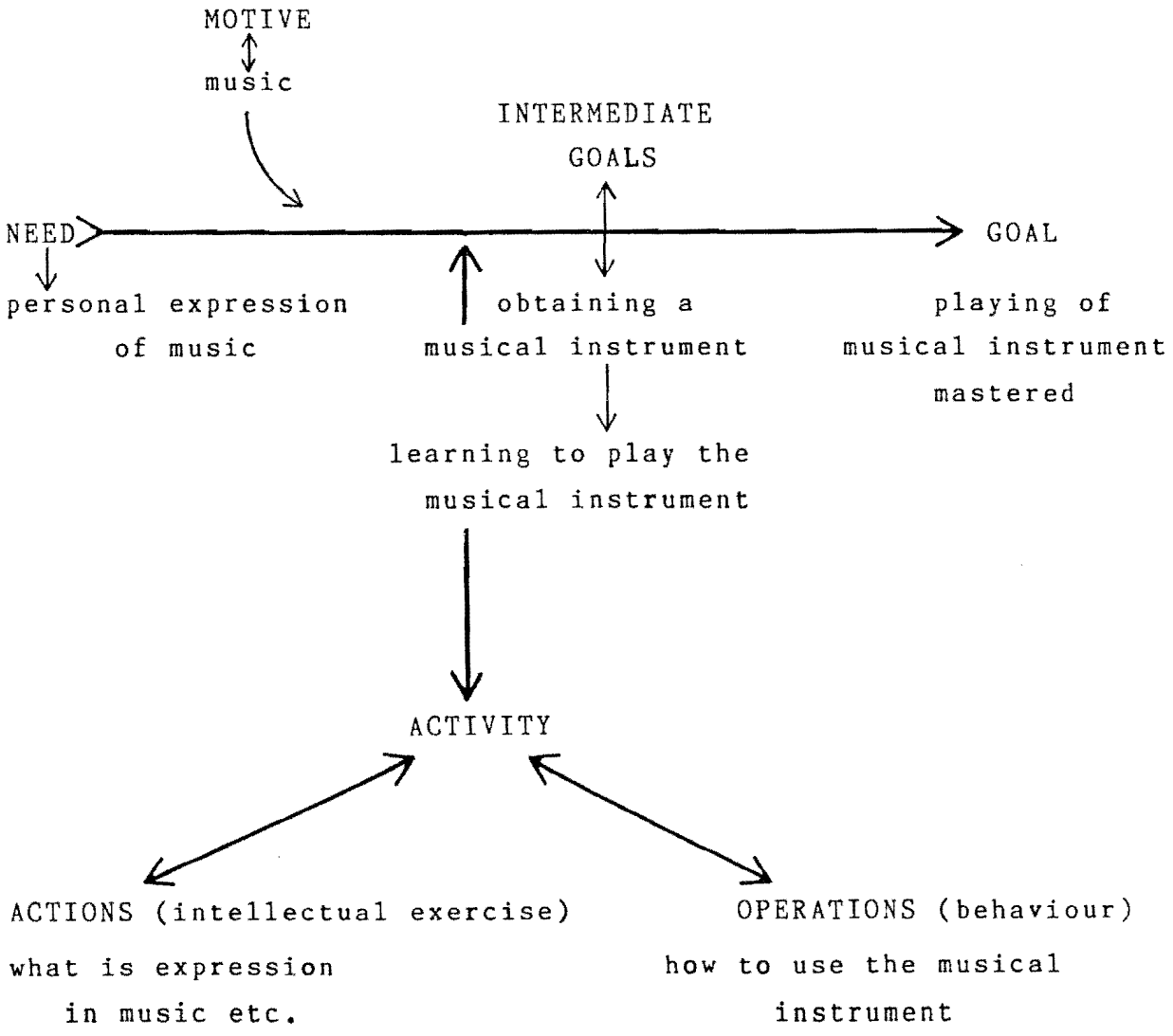
Leont'ev (1981) constructed a theory of activity which is widely used in present day Soviet psychology. Activity is seen as a fundamental concept related to external behaviour and linked to the consciousness. Leont'ev's theory provides a structure of six concepts which allows for each to be examined as a separate functional unit within the whole structure. One concept only, the analysis of activity , will be considered at this time.

Three separate levels of analysis - actions on the basis of their goals and operations, are covered in this concept. However, before any activity takes place there has to be a perceived need recognised by an individual. It is through this

need that a goal is defined - the object of an activity. Leont'ev also identifies a **motive**. He says that an activity's object (goal) is its real motive and that although there is always some need, there can be no activity without a motive. **Intermediate goals** are identified along the way before the final goal is realised.

Within activity there are **actions** - the intellectual working out for oneself of new ideas, thoughts and their associated goals, and **operations** - the conditions of behaviour necessary for attaining the goal.

A musical activity, as for instance mastering the playing of a musical instrument, could be illustrated thus:



Such an analysis of music as an activity offers possibilities for music to be investigated in many ways. This model allows for the following considerations: How does a motive arise? How can a goal be defined? How is the intellectual process of action viewed? How are the conditions of the operation carried out? These could be answered through investigations of the environment and the behaviour associated with each individual segment or in a system of relationships within a music activity.

Sociohistorical and cultural interactions clearly lie behind the development of the 'troika' theories and are directly related to a child's cognitive processes. The view of the 'troika' is that society and culture produce activity for an individual and that it is through social interaction that a child develops knowledge, thoughts and cognitive processes. Vygotsky (1981) discusses two levels of social foundation in connection with cognition - the interpsychological level, when a child needs help in an activity, and the intrapsychological level, when a child is able to carry out an activity from his/her own thinking. With reference to the music activity model, the intrapsychological level would be the playing of a musical instrument to express music as one wanted to. Both levels have in their turn, implications for music and learning. Firstly, the environment in which a child interacts with music will have considerable influence on how a child perceives music. Secondly, the way in which a child actually learns to think, to comprehend, to analyse through music activity, will have undeniable implications for the association of music with knowledge.

The confluence of the 'troika' theories into a theoretical framework allows for a plan of associative relationships linking music activity with cognitive development. I feel that such a

framework could have implications for learning by providing a new means for investigation into knowledge acquisition and learning, with music and its associated activity as the focus.

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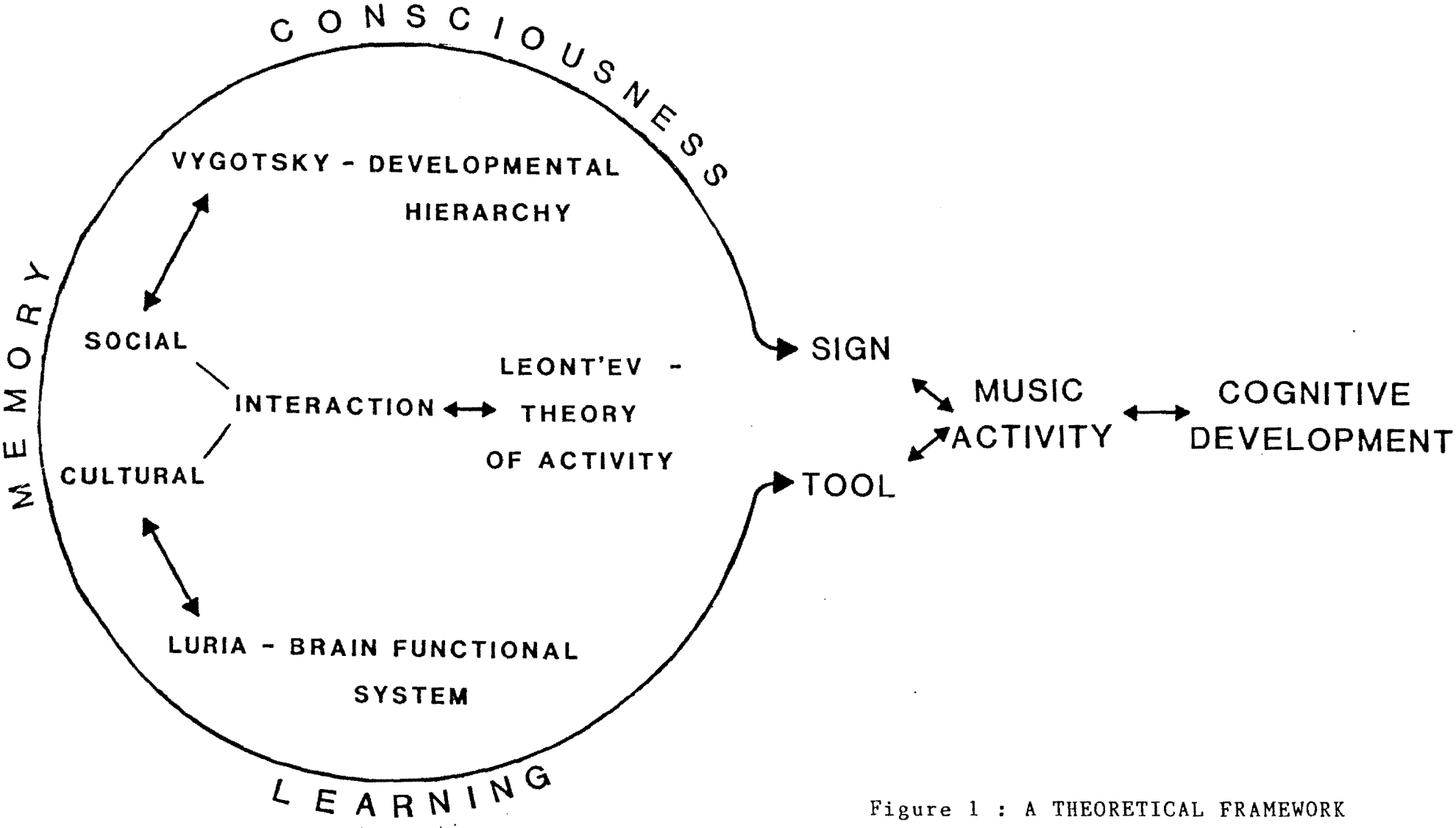

Figure 1 : A THEORETICAL FRAMEWORK