

**Title:** MUSIC: A COGNITIVE DEVELOPING ACTIVITY

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In considering music as a cognitive developing activity the theories of Vygotsky, Luria and Leont'ev - the 'troika' - provide a different perspective to learning through music from that of many Western theorists. In the 'troika' approach to learning, the concepts of consciousness, memory, conditions of learning and cognitive processes are regarded more in a social context. Such a context blends with a music educational setting.

A theoretical framework can be constructed from components of the 'troika' theories to illustrate how music as an activity can develop memory and cognitive processing. Vygotsky's developmental hierarchy of conceptual thought processes can be investigated by employing music as the 'tool' or 'sign' to mediate information processing from the primitive stage through to the stage where external reactions are internalised. Luria's brain functional system practically demonstrates interchangeability in simultaneous and successive processing in cognitive activity; this has considerable implications for learning in music education. Leont'ev's theory of activity provides a structure of units each examinable as a separate functional unit within a whole structure. Music as an activity can thus be analysed with reference to actions, goals and operations as entities or in a relationship.

The implications for childrens' learning are that such a framework could provide a new means for investigating music and its associated activity. This could give credence to music as a cognitive developing discipline in the field of education.

Current research being undertaken by the author in Australia with learning disabled (L.D.) children aged from four to nine years in special education settings, has shown that participation in a daily music program can lead to improvement in L.D. children's cognitive processing skills. Through musical activity the L.D. children learned to recognise, discern, differentiate and analyse sound. Auditory discrimination, essential for literacy skills, was developed and the visual, tactile, and kinaesthetic modalities of learning were stimulated and extended. Finally, the social interaction between teacher - child - peer within the music education environment would suggest that such interaction, provided it is positive and supportive, can also contribute to the internalisation of knowledge.

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The research of three Soviet theorists concerned with cognitive processes, Vygotsky, Luria and Leont'ev - the 'troika' - offers further 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 cognitive learning theories in relation to music and education (Comte,1981; Zimmerman,1984). This paper will examine components of the theories of Vygotsky, Luria and Leont'ev and attempts 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 Eastern and Western ideologies. However, 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 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; and
- 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 the 'troika' 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. Although the research of the 'troika' did not concern music and was concerned primarily with language, Luria (1973) did identify some musical associations in patients with brain damage in his research.

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. 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 also applied his developmental hierarchy model to learning processes outside language, specifically the development of operations or behaviours in memory and 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

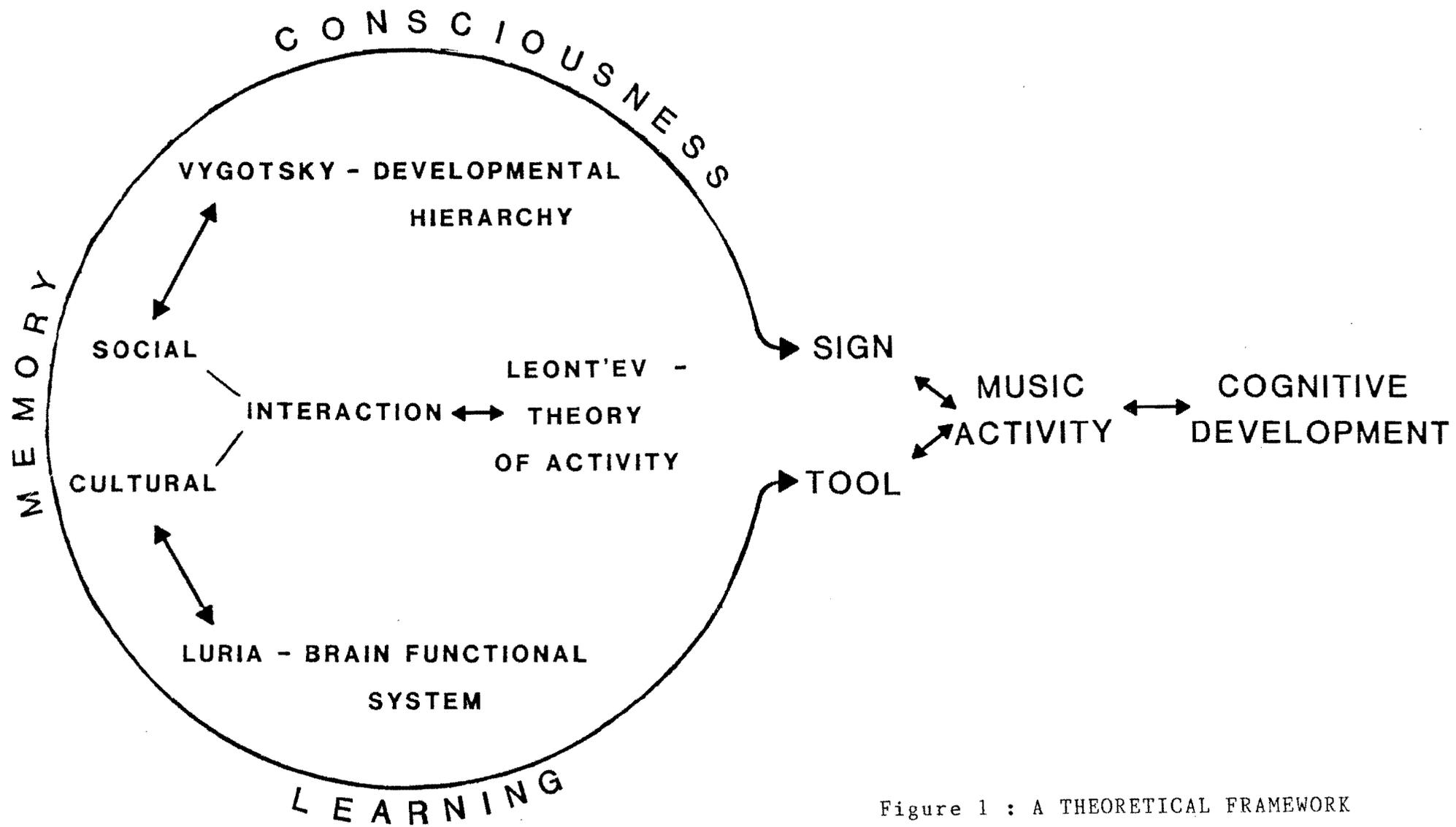


Figure 1 : A THEORETICAL FRAMEWORK

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 thus is 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 an 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 an external operation has its internal representation. In a musical learning process a child reaches a 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.

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, the components of 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's (1981) theory of activity sees activity as a fundamental concept related to external behaviour and linked to the consciousness. His 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, such as the recognition of different concepts of sound, could be illustrated as shown in Figure 2.

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 musical activity.

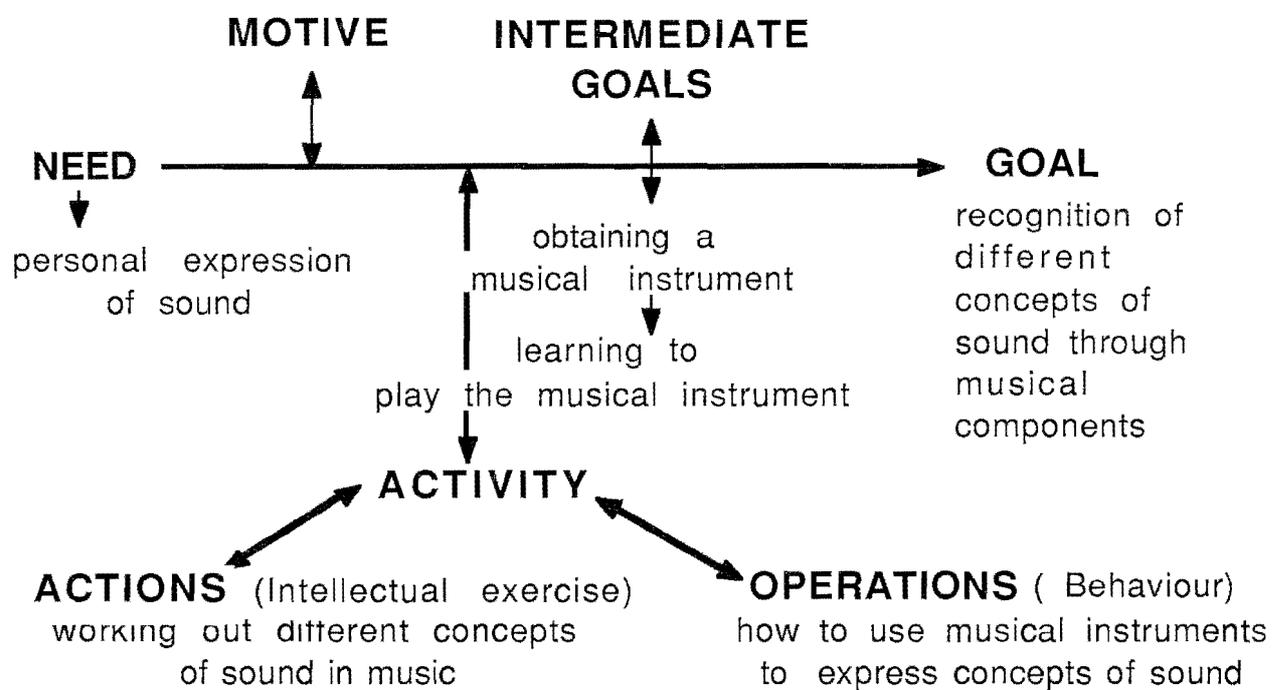


Figure 2. Music related to the analysis of activity

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 the internalisation of knowledge - 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 knowing the different concepts of sound. 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 learns to think, to comprehend, to analyse through participating in music activity, will have undeniable implications for the association of music with knowledge.

During 1989 a program of music activities was introduced into special education settings in Canberra, Australia. The children in these settings were aged from five to nine years. They had been identified as having learning difficulties, particularly in language development, and as functioning at a low level of listening. Behaviour problems and a lack of appropriate social skills often are associated with learning difficulties. Several of the children displayed such tendencies. The special education classrooms were attached to regular primary schools in Canberra and the children integrated with the mainstream children for activities such as art, physical education, social sciences and for playtime. The children had had few musical experiences and their teachers were non-music specialists and had not taught music previously. The musical activities participated in daily, involved singing, listening, moving, the playing of musical instruments and creating, and centered around learning the musical components of beat, pitch, tempo and dynamics, and their associated sound concepts - for example, beat - long/short; pitch - high/low; tempo - fast/slow; dynamics - loud/soft.

Through participation in the musical activities the children learned to recognise, discern, differentiate and analyse concepts of sound. This developing of auditory discrimination led to the childrens' improvement in literacy skills such as word-knowledge, phonological processing and listening comprehension. Their visual, tactile and kinaesthetic modalities of learning also were extended and stimulated through the operations level of the activity; for example the children playing their musical instruments to express concepts of sound.

New social opportunities in the classroom were provided through the musical activities. Initially these took place on an interpsychological level of activity with the teacher modelling the activities and the children following or copying. As the children began to master and to understand the various concepts associated with the musical activities the teachers were able to assume a more guiding and facilitative role. Soon the children showed positive social interactions during the musical activities becoming co-operative and contributing to the activities as part of a group. They demonstrated that they were able to work independently and could share and work with a partner. Similar developments also began to manifest themselves in other curriculum areas in the classroom. For example, during mathematics lessons many of the children began to work comfortably alone or happily in conjunction with a peer.

The confluence of the 'troika' theories into a theoretical framework allows for a plan of associated 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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