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An Educational Psychologist Considers the Work of Edwin Gordon

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As someone with little musical aptitude other than the ability to produce strange, rasping noises on the "symphonet" when I was 8, I accepted the request to review Edwin Gordon's work with considerable trepidation. I was aware of his research in the assessment of musical ability from my doctoral training in the 1960s and additionally recalled a research study of his which had demonstrated the value of possessing information about students' musical aptitude as an aid to instruction in instrumental performance (Gordon, 1970). Not being a music educator, however, I was fearful that my comments as an outsider would be simplistic or irrelevant and would not do justice to the task.

After having reviewed Gordon's prolific scholarship of the last 25 years, I now am less concerned. So much of his work meshes so well with topics important to educational psychology that transfer has been relatively easy. Readers may still find some of my comments naïve, but representative of a different orientation that will, I hope, prove valuable.

Trends in Educational Psychology

In order to place Gordon's work in proper perspective, it is necessary to first describe contemporary educational psychology. The field is extensive and overlaps with a number of different areas that have been included in traditional experimental psychology, e.g., human learning, development, and motivation. As a foundations course in most teacher-training programs, educational psychology has become more applied in recent years as it focuses more specifically on the instructional process.

Anyone who attempts to teach others can benefit from knowledge of educational psychology. For example, a music educator needs to determine the amount of information to present in one training session, and the sequence in which to present it, as well as what material students can master through rehearsal. Music educators, like all other educators, need to define their goals, select criteria for meeting those goals, and assess conditions that will enhance their students' motivation to master the intended material.

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Educational psychology provides a framework for looking at the student, the learning process, and the learning situation. It can be divided into the following areas:

- a) development of the learner in terms of intellectual aptitude, physical maturation, and socio-emotional growth;
- b) principles and theories explaining how individuals learn;
- c) the psychology of teaching methods, including the selection and organization of materials as well as motivating learners and presenting content;
- d) classroom management (preventing and responding to behavior problems, facilitating student cooperation, and allowing students to assume responsibility for their own learning);
- e) measurement and evaluation; and

(f) educational objectives and instructional design (Good & Brophy, 1990).

As with most fields in education, there is a continual emergence of new directions and trends in educational psychology as basic theories are revised, research questions are refined, and new research strategies become available. Educational psychology in 1991 is not the same as it was ten years or even five years ago. In order to analyze Gordon's work, it is necessary to consider not only how his ideas compare to present positions, but how his efforts have contributed to the evolution of educational psychology and education through recent years.

Development

Let us begin by identifying important ideas that currently predominate in each of the six basic areas of educational psychology and relate these to Gordon's contributions. In the area of development, recent years have witnessed a movement away from the cognitive-stage view of Piaget and others to a focus on change in mental structures or schemes. Stages (preoperational, concrete operations, etc.) implied an age-related discontinuity in development; it was assumed that children moved through qualitatively different periods of cognitive growth.

Recent research has tended to reveal that the acquisition of logical thought processes is more gradual and continuous than previously thought. What appears to be most important in cognitive development is the nature of the scheme employed by the learner and how these particular schemes affect the learning of the school tasks. For example, as the concepts of commutativity ($3 + 5 = 5 + 3$) and reversibility ($3 + 5 = 8$, $8 - 3 = 5$) are acquired, how do they interact with instruction in mathematics? (Lunzer, 1986).

In the development of musical literacy, Gordon has stressed the emergence of a sense of tonality and a sense of meter as prerequisites to the understanding of the aural elements of music. Together, these compose the process of audiation, in which one can "hear" music through either recall or creation, with the actual musical sound not present. If one is to understand music, Gordon believes, audiation must precede the use of both descriptive words and the

definitions of music symbols and structures.

In the language of developmental psychology, audiation would be viewed as a scheme. Schemes are intellectual structures that organize events as they are perceived by the learner and allow events to be classified into groups according to common characteristics. Within these structures resides that which can be recalled or brought to conscious awareness (Wadsworth, 1989).

Gordon's notion of audiation as being essential for intelligent listening to music and as providing the "immediate readiness for the development of music literacy skills" (Gordon, 1977, p. 2) fits nicely with current developmental emphasis on schemes. Just as the possession of schemes such as reversibility are necessary for mathematical learning, Gordon stresses the presence of basic audiation prior to instruction in the reading and writing of music. He points out that music educators will be thwarted in their attempts to teach music literacy if students have not developed the ability to audiate patterns in given tonalities and meters, and may mistakenly assume in students a lack of interest, a lack of talent, or a lack of cooperation. A failure to assess and attempt to understand the development of cognitive schemes is viewed by developmentalists as a major factor in ineffective teaching, and Gordon's work appears to support this view in the area of music education.

Another way in which Gordon's ideas have evolved in congruence with current developmental theory is his emphasis on musical aptitude as a distinct form of intelligence. A reformulation of the definition of intelligence is currently occurring in educational psychology. An important contemporary position is that of Gardner (1983, 1988), who has argued that intelligence is not a single entity composed of multiple abilities, as traditionally believed, but seven independent "multiple intelligences," each important in its own right. He defines intelligence as the ability to solve problems or to fashion products that are valued in a particular cultural setting. One type of intelligence is logical-mathematical, which Piaget studied. Others are linguistic, spatial, bodily-kinesthetic, interpersonal, intrapersonal, and musical.

Gardner believes that individuals differ in the particular intelligence profiles with which they are born, and they certainly differ in the profiles that they eventually acquire. He further states that the purpose of education should be to develop these intelligences and to help people reach vocational and avocational goals that are appropriate to their particular spectrum of intelligences. He proposes an entirely different approach to assessment in order to validly measure these multiple intelligences. Traditional measures have depended on linguistic and logical-mathematical thought as "lenses" which have obscured the accurate assessment of other forms of ability. Gardner recommends assessment of each one in a manner that is not confounded by the presence of others.

Multiple Intelligences

Gordon has been a major contributor to the multiple-intelligences model throughout his career. In developing the *Musical Aptitude Profile* (1965) and the *Primary and Intermediate Measures of Musical Audiation* (1982), he has emphasized that musical aptitude has more to do with sensitivity to musical expression and musical meaning than it does technical skill. While musical aptitude may be partially determined by early exposure (as Gardner argues is frequently the case in the development of other intelligences), it is primarily grounded in innate potential (1971). The validity data Gordon reports suggest that the *Musical Aptitude Profile* (MAP) is only slightly correlated with traditional measures of intelligence (1967a) and support the existence of musical aptitude as a unique intellectual trait.

The testing procedures insisted upon by Gordon in using the MAP and later tests provide additional support for Gardner's contention that each intelligence should be independently assessed. In administering the *Primary and Intermediate Measures of Music Audiation*, for example, there is no requirement that children read or manipulate numbers in order to respond successfully. The response of circling similar or different faces if the musical phrase is the same or different from the one previously heard is a technique designed to minimize reliance on other abilities. Those interested in designing

instruments for the assessment of Gardner's multiple intelligences might profit from studying Gordon's approach to measurement.

Music Learning Theory

Gordon's theory of music learning most closely approximates contemporary cognitive information-processing models of learning. His statement that the "general purpose of music education should be to teach students to understand the music they hear" is congruent with the basic assumption of all cognitive models—that learning entails the acquisition of meaning. The cognitive information-processing view holds that learning occurs due to the interaction of the environment and the previous knowledge of the learner. Past learning is hierarchically organized, allowing the individual to actively process new information as it is initially perceived. Existing knowledge is referred to as "cognitive structure" or "schemata," which must be connected to new input for meaning to emerge. In a sense, existing cognitive structure is the base from which we assume "readiness" to learn something new.

Current Theories

Current psychological theories agree with Gordon in viewing readiness as a specific set of previously acquired skills and understandings that must be present for new, meaningful learning to occur; not as a generalized, rather vague state of the organism, as traditionally conceived. Without previous learning to serve as readiness, new responses can be acquired, but they often appear as rote learning, are likely to be rapidly forgotten, and are not transferable to subsequent learning situations.

Gordon exemplifies this point of view when he states that "the ability to audiate musical sound in terms of tonality and meter provides the basic readiness for the interpretation of metaphors and for the theoretical understanding of music symbols and structures" and "basic audiation provides the immediate readiness for intelligent listening to music" (1977, p. 2).

Gordon also draws upon cognitive learning theory in his description of the two generic functions of learning: discrimination and inference. Discrimination is based upon

perception, while inference emphasizes conceptualization. Discrimination is most basic and begins with

- 1) aural/oral recognition of tonality and meter, followed by
- 2) verbal association or applying labels to tonal and rhythm patterns,
- 3) partial synthesis, in which aural/oral recognition and verbal association become integrated (audiating tonality and meter in conjunction with music style),
- 4) symbolic association (notational audiation), and
- 5) composite synthesis (all previous stages are integrated).

The inference function includes generalization, creativity/improvisation, and theoretical understanding, all processes which require meaningful learning.

Cognitivists would agree with Gordon that failure to understand and follow an appropriate learning sequence will create problems for students. Gordon criticizes music teachers for trying to teach symbolic association before students have learned aural/oral recognition and for expecting generalization such as sight reading before the learner acquires composite synthesis (the ability to read familiar patterns). He believes that theoretical understanding should not be taught until previous skills are acquired. Theoretical understanding is not a readiness for music reading; rather it is an outcome of music understanding.

Gagné's Model

Another learning theory that Gordon has incorporated into his theory of music learning is the cumulative learning model of Gagné (1985). Gagné believes that there are five different varieties of learned capabilities:

- 1) intellectual skills;
- 2) verbal information;
- 3) cognitive strategies;
- 4) motor skills; and
- 5) attitudes.

These varieties may be differentiated in terms of the conditions for their learning, conditions both internal to the learner and originating in the external environment. The learning of each type of new capability starts from a different point of prior learning and is likely to demand a different external situation. Gagné's model is considered a cumulative learning approach because each

variety develops from previously learned behaviors which in turn were dependent upon earlier and more basic responses. For example, in the learning of intellectual skills like reading, the ability to acquire meaning from novel text material would be considered the highest level; Gagné would call this problem-solving, or the development of higher-order rules. In order to read at this level, with meaning, one must learn basic rules of reading, the key concepts that compose the rules, and multiple discriminations among similar stimuli.

These four levels of the skill correspond to Gordon's inferential function of learning. For these levels to be attained, verbal associations such as learning the alphabet in order along with the most fundamental conditioned responses involved in reading, such as identifying letters, serve as prerequisites. These levels in reading correspond to Gordon's discrimination function of learning.

Gagné has recently limited this particular hierarchy to the learning of intellectual skills, arguing that the subcategories of the other four categories have yet to be determined. Gordon has appropriately related the sequential development of music learning to Gagné's cumulative learning model, but the relationship applies most clearly only if music is conceived of as an intellectual skill.

It would appear that the learning of musical performance and music appreciation fall into Gagné's categories of motor skills and attitudes. While intellectual skills associated with musical understanding clearly interact with the learning of technical skills and positive attitudes toward music, it is equally clear that the steps leading to these other outcomes of music education have yet to be identified.

Teaching Methods

Much of what Gordon advocates in his books *The Psychology of Music Teaching* (1971) and *Learning Sequence and Patterns in Music* (1977), as well as in his published music curriculum *Jump Right In: The Music Curriculum* (Gordon & Woods, 1986), conforms to recent recommendations described as "active teaching" or direct instruction (Brophy & Good, 1986). This approach consists of teacher identification of clear

learner objectives, the use of advance organizers to help students relate new learning to old, demonstration of new skills and/or teacher-led descriptions of content to be mastered, student practice, close monitoring of student work by the teacher, evaluation, and reteaching if necessary. Such a model of instruction has been found to be associated with higher student achievement and is descriptive of what research has labeled "effective teaching."

Gordon's approach to the teaching of music incorporates all of the above with the possible exception of close monitoring as students practice the new skill. In the *Jump Right In* series, it is unclear what the teacher is doing during the many classroom activities recommended, although monitoring is certainly a possibility. It would appear necessary that monitoring be frequent, since three different ability groups of students work simultaneously on three different tasks.

Activities

The many activities recommended in *Jump Right In* foster the sequential learning of tonal patterns, rhythm patterns, and other musical skills. They are designed at three levels of difficulty. It is assumed that teachers would assign students to groups based on evaluation of music aptitude and solo performances on earlier objectives.

Gordon pays little attention to the motivational value of these various activities other than to establish their difficulty level. Some seem fascinating, but others are little more than drill and practice. One research area now generating interest in educational psychology is how to motivate reluctant learners to acquire new skills. Other than designing diverse difficulty levels and activities, Gordon says little on this topic.

According to the cognitive information-processing model, meaningful learning can be enhanced when new content is related to another, already existing cognitive structure. The best of Gordon's recommended classroom and home activities serve that function well in that they often bring in other curricular areas and skills and relate them to musical learning. For example, the Words and Sounds Project of *Jump Right In*, Activity #1485, requires students to select 20 nouns

and identify corresponding sounds that could be produced to represent them, e.g., "onion" represented by a swish of the sand blocks, or "rain" by repeated finger taps on a hand drum (Gordon & Woods, 1986). Groups then write a story in which each student makes "his sound" when the key word occurs. Such an activity promotes attention, helps in vocabulary building, stimulates creative thought, and encourages what cognitive psychologists call "encoding"—the analysis and reorganization of new content. It also draws upon learning in other academic areas such as writing and dramatics, further enhancing the recall of the musical concepts involved.

Special Needs Students

Another way in which Gordon reflects current research directions in teaching is in his adaptation of tasks and materials to benefit handicapped students. Recommendations on Special Needs Activities in *Jump Right In*, such as "take all the bars off a barred instrument except those used in a special song, so that multiply-impaired students can strike them with ease," are in the best spirit of the current mainstreaming movement. Not all Special Needs Activities capture the unique requirements of activities for handicapped learners, but there are enough suggested so that the music educator working with special populations can use *Jump Right In* with ease.

In general, the instructional methods to be followed by Gordon's approach yield a tightly structured, sequential arrangement of objectives and accompanying activities. There is considerable pre- and posttesting and diagnostic evaluation of the learning of individuals. For those who prefer structure as either a learner or as a teacher, such an approach would seem ideal.

There is, however, an alternative position that decries teacher-controlled curricula. Those who advocate student choice of objectives and activities would probably feel uncomfortable with Gordon's model.

Evaluation and Measurement

Gordon believes that good instruction begins and ends with assessment, both as a diagnostic guide to the formation of ability

groups during the learning process and as a final check on learning products. Through the tests he has developed and his well-documented arguments for employing them as critical adjuncts to teaching, he has earned the reputation as the most well-known measurement specialist in the music education field.

Gordon's articles and writings describing the development of his testing instruments have set the standards for determining the psychometric properties of good tests (Gordon, 1967b; Gordon, 1970; Gordon, 1974; Gordon, 1978). Educational measurement experts and others interested in assessment have rarely ventured into the intricacies of evaluation of music aptitude and performance; if they do, they must look to Gordon for leadership.

Curriculum-Based Measurement

A recent trend in educational testing is the movement toward curriculum-based measurement (CBM) (Tucker, 1985). In CBM, material to be learned is used as the basis for assessing the degree to which it has been learned. This approach allows classroom teachers to efficiently gather information on student achievement, establish baseline levels of performance, set goals, monitor progress, and determine when a change in instruction is necessary. CBM would appear to be an extension of the kind of evaluation Gordon has stressed over the years, with the exception that it is intended to replace, not supplement, traditional standardized testing.

Standardized tests have been criticized because they are often biased and are considered technically inadequate for making decisions about individuals. CBM is said to be an improvement because test performance can be more closely associated with direct instructional or curriculum effects.

Whether the CBM movement will continue to draw advocates and prove to be a superior substitute to traditional testing methods is uncertain. It does pose an interesting question for music educators: Should standardized measures of aptitude such as the MAP continue to be employed, or should increased attention be placed on teacher-made tests, as CBM suggests? Clearly, part of the answer to that question depends upon

what it is we really want to know after assessment is concluded, and Gordon's ideas are most instructive on that point.

Educational Objectives and Instructional Design

One of the great strengths of Gordon's approach to the design and presentation of instruction is that it is closely allied to his views of music learning and development. Educators have eagerly sought learning-theory driven views of instruction, because they promise to take the guesswork out of the how and what of teaching. The popularity of operant conditioning and its application to programmed instruction in the 1950s and 1960s can be attributed to that desire. The problem is that one theory of learning rarely explains all of the varieties of learning, so that direct application is often limited. Moreover, there are so many ways of effectively teaching different students in different contexts that possessing only one theoretical approach would severely limit a teacher's flexibility. Nevertheless, Gordon's view of music learning is appealing because it does seem to offer a straightforward instructional approach that is directly derived from an analysis of how musical skills are acquired.

The heart of Gordon's approach to instructional design is the establishment of instructional objectives which are arranged sequentially, generally from simpler skills and knowledge to more complex ones. An advantage of such an approach is that curricular content and instructional strategies are easily organized and followed. In addition, formative and summative evaluations are facilitated because measurement of the achievement of objectives becomes the only criterion. Grading is thus based on the attainment of course objectives, as Gordon recommends for music educators (1971).

Potential Disadvantages

There are two potential disadvantages of this form of instructional design. The first is that the curriculum and its sequence become "locked in;" once begun, the chain of objectives must be followed. When John Cage comes to town, does the high school music theory teacher ignore his presence because the students have not yet mastered

or been exposed to the objectives concerning improvisations or atonal music? If primary level students have not yet mastered simple rhythms by Christmas, does the teacher delay the winter concert until spring? Psychologists often speak of incidental learning, the kind that is not planned or anticipated but occurs through exposure to content. The structured curriculum designed by Gordon faces the danger of minimizing those unique, unexpected opportunities that arise in classes and that lead to meaningful "incidental" learning.

The second potential problem is that Gordon's approach seems to require application at all grade levels to be effective. In *Jump Right In*, Gordon and Woods (1986) designed a K-12 curriculum that, to be most effective, would require school or district-wide adoption so that continuity of students' progress might be maintained. There would need to be agreement among those charged with music education that this is the approach to be followed for all students.

Such agreement is rare in most curricular areas; yet without such coordination, it would seem particularly tempting to "pick and choose" from the many objectives and activities available. Selecting activities without consideration of their rationale, the timing of their use, or the objectives they help students attain would be a major disservice to Gordon's model.

On the other hand, the worst-case alternative to a highly structured, sequential approach to music education is to have no direction or plan, no theoretical rationale for what one does or what one expects students to learn, and a total reliance on incidental learning to somehow define the curriculum. Gordon's approach is a marked departure from that orientation; whether it is successful for the individual teacher as an aid to instructional design seems to depend on how closely the user understands and values its basic assumptions.

Conclusion

I have tried in these comments to objectively evaluate Gordon's monumental contribution to music learning, evaluation of music aptitude, and music education. Gordon is as much a psychologist as he is a music educator, and consequently I found myself in

agreement with a large majority of his theoretical assumptions and recommendations. He has provided a coherent rationale for the teaching of music, with consideration of how children develop music aptitude, how they acquire musical understanding, and how teachers should structure educational processes. His ideas are buttressed with supportive research findings, sound reasoning, and considerable insight. Gordon's foundation of research and theory not only provides good advice for the present but suggests a research and development agenda for the future of music education.

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