A TAXONOMY OF TONAL PATTERNS AND RHYTHM PATTERNS AND SEMINAL EXPERIMENTAL EVIDENCE OF THEIR DIFFICULTY LEVEL AND GROWTH RATE

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INTRODUCTION
- Reading with comprehension
- Language and music literacy parallel
  - Readiness
- Importance of patterns
  - Indirect research

PROBLEMS
1) To develop separate taxonomies of tonal patterns and rhythm patterns, and
2) To experimentally establish the aural perception difficulty level and growth rate of the individual patterns in the taxonomies.
   - Literacy and combined aspects will be studied in future research
   - Limitations of the initial published study
     - Not expressly derived patterns
       - Based on ITML
     - Not all types of classifications and categories
     - More than one pattern in an item but tonal and rhythm not confounded
   - Benefits of the initial published study
     - Direction for establishing the taxonomies (EXPRESSLY DERIVED)
     - Confounding factors eliminated
     - Statistical aspects of design and analysis established

TAXONOMIES
- Tonal classifications and categories (Overlay 1)
  - Pentatonic and harmonic minor
  - Intertonal and multitonal music
    - Notated examples (Overlay 2)
- Rhythm classifications and categories (Overlay 3)
  - Explain classifications and categories (Use chalkboard and text)
    - Need for new explication and traditional approach
      - Notated examples (Overlay 4)
- Harmonic, bitonal, polytonal, monometric, polymetric, and multimetric not accounted for
  - Reference for Learning Sequence and Patterns in Music
- Sequences
  - Rhythm Programmer

DESIGN
- Tonal patterns=862; rhythm patterns=533; total of 1395
- Moog Sonic Six Synthesizer, Revox A77, and Rhythm Programmer
- 42 tapes
- Answer sheet (Overlay 5)
- 10,121 students, 48 school systems, five states (Overlay 6)
  - Grades 4, 5, and 6; also grades 3 and 7 through 12
- All groups took standard order, and reverse and random order tapes
  - Parallel-forms reliabilty and validity of sequence and order
- Machine scored; 1=Same and 0=Not The Same
- Two classes were administered each set (pair) of tapes

ANALYSIS (Overlay 7)
- Raw scores, means, SD's, reliability, and pattern (item) difficulty and discrimination (point biserial) indexes; no item intercorrelations
- Pattern distribution difficulty level means and SD's for combined classes
- Pattern distribution difficulty level parallel forms reliability
  - Ancillary correlations between two classes
    - Standard order-different administration
    - Random and reverse order-different administration
    - Administered first-standard order
    - Administered second-random and reverse order
    - Both classes in one grade with both classes in the other two grades
  - Pattern difficulty level distributions for separate groups (each class, both tapes), combined groups (both classes, all tapes), and the composite group (all classes across grades, all tapes) means and SD's
- Verbal definitions by SD's (Overlay 8)
  - Difficulty; within one SD=Moderate, higher than one SD above the mean=Easy, lower than one SD below the mean=Difficult
  - Growth Rate; combined grade 4 group minus combined grade 6 group difficulty above two SD's=High, between the mean and one SD=Typical, no difference or a negative difference=Static-Regressive
  - Standard Deviation of a Difference Score (SD of the DS)

RESULTS
- Reliability for tests and pattern distributions is substantial, especially in terms of parallel forms reliability
- Discrimination indexes are high
- Ancillary correlations are low
  - Scattergrams
    - Slight numerical fluctuations, especially around the mean
    - Error of measurement
    - Skewness
    - Rounding error
- Statistical technique lacks precision but none other known
  - Very few (less than 7%) difficulty discrepancies among grades
- Difficulty indexes consistent with those patterns included in the initial study
- Future research
  - Stratified sample in aptitude and achievement
  - Within category, not classification, comparisons
  - Practice exercises (non-learning situation)
  - Include NS items as correct but not scored

IMPLICATIONS
- Difficulty levels do not follow traditional music terminology
  - New terms needed; not number of notes, diatonic or stepwise movement, sequence and order of notes and pitches, range, length of notes, etc.
- Same difficulty and growth rate for the same patterns in different classifications
- Major and mixolydian
- Double leading tone in phrygian
- Teaching to individual differences

TONAL AND RHYTHM PATTERNS: AN OBJECTIVE ANALYSIS

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Introduction
- Audiation and syntax. A series of studies.
  - Tonality and meter.
    - Patterns.
  - Literacy.
    - Language parallel.

Problems of most recent study of series
1) Develop separate taxonomies of tonal and rhythm patterns, and
2) Experimentally establish the aural difficulty level and growth rates of the patterns.
- Sequential problems will be studied in additional research.
- Limitations of first study.
  - Not expressively derived patterns; based on ITML.
    - Limited categories and classifications,
    - More than one pattern in an item, but tonal and rhythm not confounded.
- Benifits of first study.
  - Developed taxonomy.
  - Statistical analyses.

Taxonomies
- Tonal classifications and categories. (1)
- Notated examples. (2)
  - Harmonic minor, pentatonic, and multitonal. Also polytonal.
- Rhythm classifications and categories. (3)
- Notated examples. (4)
  - New explication.
  - Multimetric, monometric, and polymetric. (Polyrhythm).
- All classifications and categories not accounted for in first study.

Design
- Tonal patterns=862; rhythm patterns=533; total 1395.
- Moog Sonic Six Synthesizer, Revox A77, and Rhythm Programmer.
  - Sequences.
- 42 tapes.
- Answer sheet. (5) Machine scored after transcription. S,D, ?.
- 10,121 students; 48 school systems; five states. (6)
  - Grades 4, 5, and 6. Also Grade 3 and high school.
- All took standard order and reverse-random order tapes.
  - Parallel forms reliability.
  - Validity of order and sequence.

Analysis (7)
- Test statistics.
  - Item indicies. (8)
- Difficulty distribution statistics. (7)
- Verbal definitions. (8)
  - Difficulty; within 1 sd=M; above 1 sd=E; below 1 sd= D.
  - Growth; grade 6 minus grade 4; SD of a Difference Score.
    - Above 2 sd=H; between mean and 1 sd=T; mean or below = SR.

Results
- Reliability for tests and difficulties are high.
- Discrimination good.
- Ancillary correlations low.
  - Scattergrams; unreliability around mean, rounding, skewness.
- Statistical technique unique and lacks precision.
  - Less than 1% discrepancies among grades.

Implications (9) and (10)
- Need additional research on this issue before sequential problems are studied.
- No consistency nor systemattic.

(over)

PAST, PRESENT, AND FUTURE OF MUSIC LITERACY IN AMERICAN MUSIC EDUCATION

INTRODUCTION

Literacy includes reading and writing.
Must hear what you see, and see what you hear to truly read and write music.
Literacy goes beyond reading and writing; comprehension is most important.
We read and write melody, rhythm, harmony, form, style, dynamics, phrasing, and other elements including scores.

TONAL

PAST

1. Chinese and Indians had systems of notation but little is known about them. Greeks had letters but it is not known if they were used in notation. Our notation is related to Greek and Oriental recitation symbols.
2. In medieval music, there was little need for notation. Music was learned through master-apprentice relationship. Only wealthy indulged in the arts.
3. In 11th century, Guido (990-1050) devised the system of solmization from the Hymn of St. John which he probably composed. His purpose was to help monks read music notated with neumes. At that time, hexachords, not Greek tetrachords, were used. The syllables were ut, re, mi, fa, sol, la. Later, compound syllables were used to give letter and syllable names, such as Desolre. Before solmization, all reading was with letter names. There were three hexachords based on C, G, and F, and they overlapped.
4. In Guido's time, a three and four line stave was used. The first stave appeared in 900. The five line stave appeared in 13th century with polyphonic music. Guidonian hand also appearded in 13th century.
5. In renaissance music (14th to 16th century), the scale was increased to seven tones; ut changed to do and si added as seventh step. With the increasing use of the church modes, which were based on the Greek modes, key transpositions and chromatics could be dealt with efficiently.
6. Key signatures were introduced into notation in late 15th century with one flat (musica ficta), two flats in 16th century, and sharps in 17th century. Accidentals were used before key signatures. Partial signatures were also used; no flat six in minor or sharp seven in major. The three clefs were also introduced in the 15th century. Keys and clefs were necessary for instrumental reading and for vocal reading with solmization.
7. In 18th century, fasola system was introduced into the United States in the South. It was fa, sol, la, fa, sol, la, mi, fa and it was in shape notes. Northern Singing School masters urged the use of the system being used in England in the 19 century which was different in syllables and did not use shape notes.
8. In the 18th and 19th centuries, the Italian and French used the immovable do system which are the letter names. This was done in music schools but not in general education. No chromatics are used and si is retained.
9. In 19th century, English and Germans used the movable do system, changed si to ti, and introduced chromatics. Do is always the tonic; the problem of the same syllables are associated with different sounds was acknowledged. Sarah Glover and then John Spencer Curwen (1816-1880) used tonic solfa system with hand signals. In France, Emile-Joseph Chevé (1804-1864) used movable do system along with numbers, and later in Germany, Agnes Hundoegger published a book (1897) using movable do. The United States finally adopted the movable do system for public education in the 19th century. The English and Germans used letters and syllables whereas the French and Italian used only syllables. Loe Kestenberg carried on the work in Germany through Orff and it was called Tonika-do system.
10. Kodaly system based on Curwen system, tonal but not rhythm.
11. In 19th and 20th centuries, movable do syllables were used in American public education and letters in instrumental music. After World War 1, and progressive education, letters remained with numbers. Literacy abandoned.

PRESENT

1. In American public education, letters are taught as theory and numbers are used for reading in most cases. In vocal performance, rote teaching is necessary because literacy is not taught in a functional manner. There is practicaly no writing taught and all other dimensions of music are taught as definitions in a theoretical manner. Literacy is more the exception than the rule, particularly when scheduled teaching time is considered.

FUTURE

1. Patterns will be taught in a function manner rather than individual notes.
2. Use learning sequence for efficient and appropriate understanding.
3. Literacy will be taught through audiation (ear before eye) in a composite way. Theory will be taught last as in language.
4. Writing will be as important as reading.
5. Hearing, singing, and reading will not be taught simultaneously.
6. Tonal and rhythm pattern literacy will not be confounded.
7. Movable do syllables will be used again.

RHYTHM

PAST

1. Before 12th century, notation was tonal, in the form of Phonecian and Gregorian neumes.
2. In early 13th century, BLACK and SQUARE notation was used for rhythm. It was modal (poetic metrical or prosody) and used by Leoninus and Perotinus in Notre Dame school. All modes were triple: trochaic, iambic, dactylic, anapestic, spondaic, and tribrachic.
3. In middle 13th century, PRE-FRANCONIAN notation divided the modes into smaller divisions, or subdivisions.
4. In late 13th century, FRANCONIAN notation was introduced. It was mensural or prolation (relationship among notes). Meter sign was used to indicate triple, with and without numbers. Only religious (sacred, not secular) music was notated and triple for trinity. The notation was multiproportional with modus, tempus, and prolatio.
5. In early 14th century, DiVitry followed Franconian tradition. Used new meter signs and included duple. Notation became uniproportional and notes were given values along with subdivisions. Time signatures were not used but signs and numbers appear at the beginning od music to indicate meter, change (cancelation) of meter, and relative tempo. Bar lines were used to mark off measures but not for meter or accents. In contrast to the FRENCH system, DeCruce followed the Franconian system, and it was called the ITALIAN system.
6. In the middle 14th century, the French and Italian combined into a MIXED system. Machut and Landini.
7. In late 14th century, MANNERED notation followed and it was esoteric. Netherlands school had divisions of 5 and 7. Many signs and numbers at the beginning of the music, sometimes combined.
8. In 15th and 16th centuries, WHITE notation replaced black. This tended to make notation less complicated but it is difficult to understand it all. Many systems were still being used concurrently, within and between the same pieces of music. Editors, publishers, and errors had an effect on the confusion in interpreting the meanings.
9. In 17th and 18th centuries, time signatures and bar lines are used in current sense. Dance movements appeared. C and ¢ were only signs to survive as time signatures.
10. Theorists made the facts fit their theory of time signatures, not values, and bar lines. Meter was defined, then, in terms of the time signature. This was most influential in 19th and 20th centuries.
11. Guido was not concerned with rhythm reading; rhythm syllables were not used until the 19th century but tonal syllables were used in 11th century. Curwen used dots, stokes, colons, and commas to indicate rhythm under the notes. Chevé used syllables but based on time values of the notes. Kodaly uses the Chevé system but confounds tonal and rhythm reading. Dalcroze influenced Orff and Kodaly in inportance of eurhythmics but not in literacy.
12. In late 19th century and 20th century, various systems for rhythm reading were used: the traditional time value and time signature approach, the simple time keeping device of "1 e and a", eurhythmics, mnemonics, syllables based on time values, and syllables based on mensural functions.

PRESENT

1. In American public education, and in many conservatories, time signatures are given improper definitions and meter is defined by time signature.
2. Time value names of notes are taught non-functionally as theory in instrumental music. Trial and error, and rote imitation, learning are the bases of rhythm reading. In general music, time value names are non-functionally taught along with eurhythmic and mnemonic devices without follow through.
3. Practicaly no rhythmic writing is taught. Most performance groups read through rote imitation, by counting, and no grasp of meter or tempo.

FUTURE

1. Patterns will be taught in a functional manner rather than individual notes.
2. Use learning sequence for efficient and appropriate understanding.
3. Literacy will be taught through audiation (ear before eye) in a composite way. Theory will be taught last as in language.
4. Writing will be as important as reading.
5. Hearing, performance, and reading will not be taught simultaneously.
6. Tonal and rhythm patterns will not be confounded.
7. Rhythm syllables based on rhythmic functions will be used.
8. Time signatures will be defined correctly.

TONAL

PAST

1. Greeks and Indians used letter but not known if for notation. Probably used recitation symbols. MAINLY ACOUSTICAL TIMBORISTS, MOST BY ROTIE,
2. Guido 990-1050. Hexachords C F G. Movable syllables and Desolre. Three and four line staves. BROTHERS (AUDIATION)
3. Renaissance 14th to 16th century. Seven tone scale, modes, accidentals-chromatics, keys, and transposition. LAYMAN, PROFESSIONAL
4. In 15th century, polypohony, Guidonian Hand, five line stave, key signatures (sharps after flats) and partial signatures. LIKE CORRECT SYSTEM.
5. In Italy and France in 18th century, immovable do. No letters. PERFECT PITCH
6. In USA (South) in 18th century, fasola with shape notes.
7. In England and Germany in 19 century, movable do with letters. Sarah Glover, John Spencer Curwen 1816-1880, and Agnes Hundoegger (1897). Tonic solfa and Tonika do systems. Leo Kestenberg carried on through Orff.
8. In France in 19th century, movable do used in public education by Emile-Joseph Cheve (1804-1864).
9. In USA, (North), movable do from England in 19th century. SINGING SCHOOL
10. In USA in 20th century, effect on instrumental music by World War I and progressive education movement on singing and general music.

PRESENT

1. Numbers and theory in general music and singing among some use of other systems. Literacy nonfunction without audiation readiness. Instrumental uses names and theory. Nonfunctional literacy, mechanical. No writing. GUIDO IDEALS LOST.

FUTURE

1. No isolated notes, all patterns.
2. Audiation readiness; learning theory. Language parallel. VOCATION, AVOCATION
3. Movable do.
4. Theory de-emphasized.
5. Do signature.
6. Music writing.

- - Readiness requires speaking; singing and rhythmics in music.
- - We bring meaning to words, not take it; same for patterns.
- - Thus we read with comprehension; same for patterns.
- - LITERACY REQUIRES AND BROADENS COMPREHENSION

FUTURE

AUDIATION / LANG PARALLEL

PATTERNS

NO THEORY

WRITING

RHYTHM

PAST

1. Black or square notation in early 13th century. Modal; trochaic, anapestic, etc.
2. Pre-Franconian in middle 13th century. Modal with smaller divisions.
3. Franconian in late 13th century. Multiproportional; modus, tempus, prolatio. Meter sign with and without numbers for only triple. Mensural.
4. DiVitry in France in early 14th century. Uniproportional. New meter signs to include duple. Smaller divisions. Meter signs indicate meter, cancellation, and tempo. Bar lines not for meter, only to visual a measure for all parts. DeCruce in Italy carried Franconian tradition. DiVitry basis of modern notation.
5. Mixed notation in middle 14th century.
6. Mannered notation in late 14th century. Confusing, included 5 and 7.
7. White notation in 15th and 16th centuries. Many systems and signs.
8. Signatures, bar lines, and note values in 17th and 18th centuries like current system. C and ¢ survive. Transition from 15th to 17th century unknown.
9. Theorists made theory fit the facts. Called it a time or meter signature, not a measure signature. Compound and simple. Defined a time signature. All in late 19th and early 20th century.
10. Dalcroze recognized problem, began eurhythmics. (1865-1950).
11. Guido was not concerned with rhythm reading or syllables. Cheve first to use syllables in France (Kodaly based on these) and based on note values. Curwen used dots, stokes, etc. in conjunction with tonal syllables.

PRESENT

1. Time value names and theory in general music; also time keeping device of l e and a. Same for instrumental music. Both create nonfunctional literacy. Some Kodaly syllables and some eurhythmics. Primarily readiness activities with mneumonic and eurhythmics systems. No writing. Nonfunctional literacy in rhythm easier to cover up than nonfunctional tonal. The effect of World War I and progressive education on tonal also effected rhythm. No writing.

FUTURE

1. No isolated notes, all patterns.
2. Audiation readiness; learning theory. Language parallel.
3. Rhythm syllables based on rhythmic functions.
4. Theory de-emphasized.
5. Measure signature and correct understanding of meter and signatures.
6. Music writing.

- - Readiness requires speaking; singing and rhythmics in music.
- - We bring meaning to words, not take it; same for patterns.
- - Thus we read with comprehension; same for patterns.
- - LITERACY REQUIRES AND BROADENS COMPREHENSION