

More on Duration

- * How does one define the exact beginning and/or ending of a note?
 - key depression?
 - when change in amplitude or waveform can be seen?
 - when amplitude reaches a certain level? (Rasch, 1979, 1988; Rose, 1989)

Two Potential Problems

- * Wealth of data
 - C. E. Seashore (1936, 1938)
 - values of score may be raw data or expressed in relation to norm
- * Representation of data for an impression of how the performance sounded
 - original/modified visual recordings of sound (Gabrielsson, 1986b, et al)
 - motion shapes defined by pitch/intensity changes (Gjerdingen, 1988)

Early European Investigations

- * Binet and Courtier (1895)
- * Ebhardt (1898)
- * Clynes and Walker (1982)
- * Sears (1902)
- * Morton (1920)
- * Heinitz (1926)
- * Heinlein (1929, 1930)

... continued

- * Repp (1994c)
- * Taguti, Ohgushi, and Sueoka (1994)
- * Gutman (1932)
- * Hartmann (1932)
- * Truslit (1938)

Summary

- * Performance of trills, scales, accents, crescendo-descrescendo, pedaling
- * Performance without auditory feedback
- * Tempo and duration while playing and/or conducting
- * Differences between amateurs and professional musicians
- * Connection between music and motion

Iowa University, 1930s

- * Group headed by C.E. Seashore
- * Produced three volumes (1932, 1936, 1937) and a textbook
- * Comprised of performances on piano, violin, and voice
- * Data presented in “performance scores”

Piano

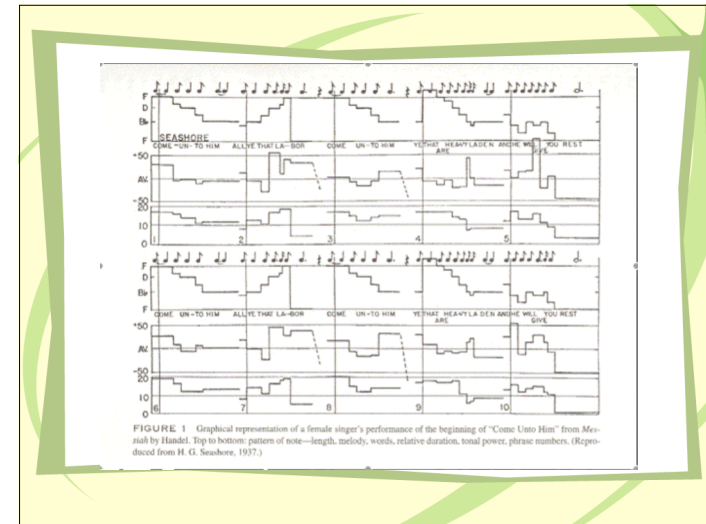
- * Filming hammer movement or analyzing paper rolls
- * Henderson (1937)
- * Skinner (cited in C.E. Seashore, 1938)
- * Vernon (1937)

Violin

- * Phonographic apparatus used to record pitch and intensity
- * Small (1937)

Voice

- * Also used phonophotographic apparatus
- * Schoen (1922)
- * R.S. Miller (1937)
- * H.G. Seashore (1937)



Vibrato

- * Schoen (1922), Metfessel (1932), and Tiffin (1932b)
- * Easley (1932)
- * Tiffin (1931)
- * Brown (1991)
- * H. G. Seashore (1932)
- * Metfessel (1932)

... more vibrato

- * G.A. Miller & Heise (1950)
- * Castellengo (1994)
- * C.E. Seashore (cited in Lundin, 1985)
- * Metfessel and C.E. Seashore (1936)
- * A.H. Wagner (1932)
- * Hattwick (1932), Reger (1932)
- * Hollinshead (1932)

Deviations

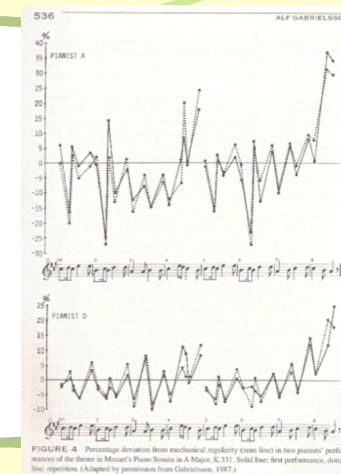
- * C.E. Seashore and Metfessel:
“the unlimited resources for vocal and instrumental art lie in artistic deviation from the pure, the exact, the perfect, the rigid, the even, and the precise”
- quoted in H.G. Seashore, 1937)

Contemporary Investigations

- * Timing and duration
- * Bengtsson, et al (initiated 1960):
 - equality (EQ)
 - long-short (LS)
 - short-long (SL)
- * Viennese waltzes and Swedish folk music

... more on rhythm

- * Bengtsson and Gabrielsson (1980)
- * Gabrielsson, et al (1983)
- * Gabrielsson (1987) *
- * Behne and Wetekam (1993), Palmer (1989a)
- * Repp (1990c)
- * Repp (1992a-b)
- * Povel (1977), Cook (1987), Shaffer and Todd (1987), Shaffer (1995)



... more on rhythm

- * Rose (1989)
- * Namba, Nakamura, and Kuwano (1977)
- * Ruggieri and Sebastiani (1987)
- * Geringer (1992)
- * J. Ross (1989, et al 1994)
- * Gabrielsson and Johnson (1985)

Structure and Performance

- * Sloboda (1983, 1985a)
- * Clarke (1988)
- * Talley (1989)
- * Edlund (1985)
- * Edlund (1994)
- * Gabrielsson (1974)
- * Drake and Palmer (1993)

Tempo

- * Mean tempo
- * Main tempo
- * Local tempo
- * Repp (1994b)
- * Clarke (1982, 1985b)
- * Desain and Honing (1994)
- * Clynes (1986a), Clynes & Walker (1986)
- * Collier and Collier (1994)

Ritards

- * Sundberg and Verillo (1980)
- * Kronman & Sundberg (1987)
- * Repp (1992a)
- * Feldman, Epstein, and Richards (1992)
- * Shaffer and Todd (1987)

Asynchronization

- * Rasch (1979, 1988)
- * Rose (1989)
- * Naylor (1992)

Perceptual Effects

- * Gabrielsson (1985)
- * Tro (1994)
- * Clarke (1989b)
- * Repp (1992c), Fyk (1994)

Intonation and Vibrato

- * Shackford (1961, 1962a-b)
- * Greer (1970)
- * Ely (1992)
- * Terhardt and Zick (1975)
- * Fyk (1994, 1995)
- * Prame (1994)
- * Fletcher and Sanders (1967)
- * Meyer (1992, 1994)

Conductors

- * C. Wagner (1974), Harrer (1975)
- * Hayes (1989)
- * Price (1983) and Cox (1989)

Intention and Performance

- * Palmer (1989a)
- * Nakamura (1987)
- * Senju & Ohgushi (1987)
- * Födermayr and Deutsch (1994)
- * Kendall and Carterette (1990)
- * Askenfelt (1986)
- * Gabrielsson (1994, 1995), Gabrielsson and Lindström (1995), Juslin (1993)

Comments

- * Apparent wealth of data, yet # of performers and pieces studied is small
- * More differences than commonalities in results (differences exist in type of music, instrument, performer, stylistic conventions, data analysis, etc.)
- * Measurements should be considered in light of intentions

Models of Music Performance

Models based on Measurements

- * Clarke (1988)
 - nine generative rules to account for expressive deviations (including changes in timing and dynamics)
- * Todd (1985)
 - parabolic modeling for phrase-endings

... Todd continued

- * Todd (1989a-b)
 - superimposition of hierarchical timing elements
 - look ahead and plan
 - algorithm for listener's perception of rubato
- * Todd (1992)
 - computational model of dynamics
- * Todd (1995)
 - coupling to physical movement

Models based on Intuition

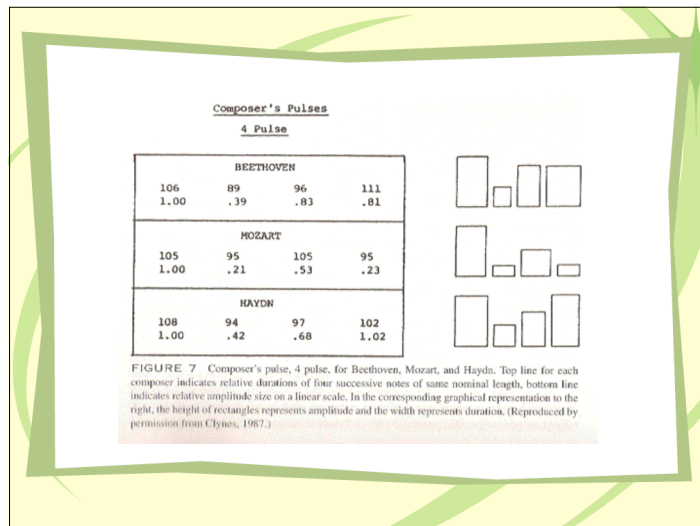
- * Sundberg, Friberg, & Frydén
 - analysis-by-synthesis
 - 20 rules affecting durations, sound level, sound level envelopes, vibrato freq. and depth, and fine tuning
 - acoustical considerations
 - melodic and harmonic charge

... continued

- * Modifications for piano vs. violin performance (Battel and Bresin, 1994)
- * Differing conventions (Friberg, 1995)
- * Only loose discussion of fact that score can be performed in variety of ways depending on performer

... another approach

- * Clynes (1987)
 - hierarchical pulse of a composer
 - predictive amplitude shaping (tone and composer-dependent)
- * Results from studies proved inconclusive



Comments

- * Each model is limited in what it covers; they focus on score and performance, but not on the interpretation of individual performers

Performance Evaluation

Types

- * Global evaluation
- * Evaluation of specific aspects in performance (intonation, tempo, etc.)
- * Watkins-Farnum Performance Scale, Farnum String Scale (sight-reading)
- * Rating scales based on factor analysis (Abeles, 1973, Bergee, 1993, Cooksey, 1977)

... more approaches

- * Judgements based on adjudicators
 - may be biased based on expectations (Duerksen, 1972), visual impressions (Boyle & Radocy, 1987)
- * Adjudicator evaluations predicted by physical characteristics (Campbell, 1971)

Take Home Message

- * Although an apparent wealth of data exist regarding performance, MUCH is left to be done
- * Models as of yet are not conclusively tested, nor do they typically consider the interpretation of individual performers
- * There are many forms of performance evaluation, all of which can be easily biased by listener expectations when people are involved