

Glossary

The entries below are intended primarily to clarify the meaning of terms used in the main text. They are not supposed to be rigid definitions, nor are they necessarily valid or applicable outside the context of the present study. Many of the entries are based on, but not necessarily the same as, definitions used in acoustics [American Standards Association 1960; Beranek 1972], psychoacoustics [Zwicker 1982; Moore 1982], psychology [Drever 1964] and musicology [Apel 1970; Scholes 1970]. Some terms have been coined or redefined to clarify explanation and discussion of new and "revisited" material in the present study: these are marked with an asterisk (*).

Absolute pitch. Pitch of a pure tone (component) measured by equivalent frequency (e.g. "same pitch as a 60 dB, 300 Hz pure tone") or by pitch category (e.g. "D₄"); ability to identify absolute pitch to within a specified range of error (see perfect pitch).

Algorithm. Systematic procedure for the evaluation of a mathematical function; quantitative model.

Ambient pressure. Air pressure in the absence of sound.

Amplitude. Peak value of a function, e.g. peak sound pressure of a pure tone.

Amplitude spectrum. Amplitudes of the spectral components of a function, as a function of their frequencies.

Analysis. Spectral analysis, analytical listening, or musical analysis.

Analytical listening. Mode of listening in which: pure tone components are well discriminated; pure tone components are heard in preference to complex tone components; several tone sensations are heard simultaneously; and/or pitch relationships between sounds are influenced by pitch commonality in preference to pitch proximity.

Anchor sound. Invariant sound (compared with a number of different sounds).

Apparent. Perceived.

Arithmetic mean. Of two values: half their sum. Of n values: one n th of their sum.

Atonal. Kind of music in which harmonic relationships are avoided (e.g. 12-tone music) so that there is little or no sense of tonal centre.

Attitude. Mode of listening, e.g. holistic versus analytic, or spontaneous versus voluntary.

Attribute. Property, e.g. the pitch, loudness or timbre of a sound sensation.

* **Audibility.** Audibility of a pure or complex tone (component); depends on audible level (cf. Terhardt: *pitch weight*).

* **Audible level.** Level of a pure tone (component) above masked threshold (Terhardt: *SPL excess*); depends on auditory level and masking.

* **Auditory level.** Level of a pure tone (component) above the threshold of audibility in the absence of masking.

Auditory nerve. Nerve picking up information from the vibration of the basilar membrane in the cochlea.

Auditory stream. Stream.

Auditory system. Psychophysiological system concerned with hearing; the ear-brain system.

Augmented. Of a diatonic interval: one semitone bigger than the corresponding major or perfect interval. Opposite of diminished.

Augmented fourth (A4). Interval of 6 semitones; tritone; enharmonically equivalent to a diminished fifth.

Augmented fifth (A5). Interval of 8 semitones; enharmonically equivalent to a minor sixth.

Augmented triad. Triad with a M3 and an A5 above the root.

Augmented sixth. Chord with a M3 and an A6 (=m7) above the root.

Baroque. Period of Western music history extending from about 1600 to about 1750 (Monteverdi to Bach).

Bark. Unit of critical-band rate equal to one critical bandwidth.

Basilar membrane. Membrane in the cochlea (inner ear) enabling auditory spectral analysis.

Bass. Lowest note of a chord; low frequency or pitch register.

Bell-like sound. Sound whose spectrum is like that of a bell (i.e. like a harmonic series, but with added, missing and/or out of tune components).

Beat frequency. Modulation frequency.

Beats, beating. Amplitude modulation of the waveform of a sound, usually due to the superposition of the waveforms of pure tone components of similar frequency and similar amplitude.

Carrier frequency. The mean frequency of two beating pure tone components.

Category. Subdivision of a continuum (e.g. real numbers in the range 4.5–5.5 fall in the category "5, to the nearest whole number"); group of related words (e.g. oak, wattle and gum); range of sensory attributes (e.g. shades of blue).

Categorical perception. Perception in terms of labelled categories. For example, Western musicians hear intervals in the range 2.5–3.5 semitones as minor thirds.

Cf. Compare.

Chord. Complex musical sound comprising three or more simultaneous notes, (complex tones); triad, tetrad (e.g. seventh chord), etc.

- Chord class.** Chord whose notes are specified only by their chroma (pitch classes), e.g. C–E–G instead of C₄–E₄–G₄ or G₃–E₄–C₅. Could be in any inversion, spacing or doubling (cf. voiced chord).
- Chord progression.** Sequence of chords; homorhythmic progression of sounds made up of complex tones (notes).
- Chroma.** Pitch class, e.g. “C” instead of “C₄” (middle C), “C₇”, etc.; pitch without specification of octave register; interval in semitones between a pitch category and the nearest C below (e.g. the chroma of C₃ is 0, of D₃ is 1, of F₄ is 5, etc.).
- Chroma cycle** (or circle). Music-theoretical construct of chroma resembling a clock-face, with C at twelve o’clock, C# at 1, D at 2, etc.
- * **Chroma salience.** Measure of the perceptual importance of a particular chroma in a musical sound or sequence, as perceived by an average or “ideal” listener.
- * **Chroma tally.** Calculated average number of times a chroma is noticed; measure of chroma salience.
- * **Chroma probability.** Calculated probability that a chroma will be noticed; measure of chroma salience.
- Chromatic scale.** Scale with twelve roughly equally spaced pitch categories per octave; scale in which each pitch category has a well-tuned upper and lower octave and fifth.
- Classical.** Period of Western music history extending from about 1750 to about 1800 (Haydn, Mozart, early Beethoven, etc.).
- Close position.** Voicing of a chord class in which the lowest and highest notes are less than an octave apart.
- Cochlea.** Part of the inner ear; spiral-shaped cavity in the petrous bone housing the basilar membrane.
- Combination tone.** Tone produced by the simultaneous of other tones; pure tone component produced by non-linear interaction (distortion) among other pure tone components in an acoustical transducer (e.g. a loudspeaker, or the ear).
- Complex sound.** Sound whose pressure waveform is not sinusoidal, and whose spectrum therefore contains more than one pure tone component (e.g. a musical chord). (N.B.: This is essentially the same as the American Standards Association’s definition of a complex *tone*).
- * **Complex tonalness.** Measure of tonalness; the audibility of the most audible complex tone sensation of a sound.
- Complex tone.** Sound whose pressure waveform is (approximately or exactly) periodic (but not sinusoidal, see pure tone).
- Complex tone component.** Complex tone which is part of a sound (e.g. a note in a chord).
- * **Complex tone sensation.** Single tone sensation normally accompanying the perception of a complex tone or complex tone component (see virtual pitch).
- Components.** Waveforms (usually periodic) which add to produce another waveform (usually, of a real sound).

- Conditioning.** Exposure to regular or invariant aspects of the environment, and its effect on perception. The term is often understood to refer to more specific processes by which “unnatural” or “abnormal” responses are elicited by particular stimuli.
- Confidence interval.** Mathematical interval within which the mean of a set of numbers is expected to lie with a specified probability (e.g. 95% confidence interval).
- Consonance.** How well the tones of a simultaneity, or the sounds in a sequence, “sound together”, depending on roughness, tonalness, pitch commonality, pitch distance, context, familiarity and cultural conditioning.
- Context.** Here, all sensations which are simultaneously available to be perceived in a particular “chunk” of sensory memory.
- Contour.** The “ups and downs” in pitch of a melody, as opposed to the sizes of the intervals between the tones.
- Contrapuntal.** Polyphonic.
- Correlate.** Establish the degree to which two sets of numbers are related (implying that they represent the same or similar measurements or properties).
- Correlation coefficient.** Measure of the relationship between two sets of numbers, ranging from 1 (if one set of numbers is an exact, positive linear transformation of the other) through 0 (the numbers are totally unrelated) to –1 (one set is an exact, negative linear transformation of the other).
- Critical band.** Maximum range of frequencies over which the ear is like a single band-pass acoustic filter (so loudness is independent of bandwidth); at wider ranges, it is like a bank of band-pass filters (so loudness increases with increasing bandwidth).
- Critical bandwidth.** Width of a critical band (in semitones or Hz), equal to about 3 semitones above 500 Hz, and 50–100 Hz below 500 Hz. Contains a constant number of pitch difference thresholds.
- Critical-band rate.** Pure tone height.
- Cultural.** Due to (or specific to) a particular society or culture (as opposed to universal).
- Cycle** (or circle) **of fifths.** Music-theoretical construct of chroma in which neighbours span perfect fifth and fourth intervals. In semitones: 0, 7, 2, 9, 4, 11, 6, 1, 8, 3, 10, 5 and back to 0. Note names: C, G, D, A, etc.
- dB.** Decibel, unit of level.
- Degree.** Step (of a scale); pitch category.
- Diatonic scale.** Heptatonic scale comprising 5 intervals of a tone (whole steps) and 2 of a semitone (half steps) in each octave, such that half steps are not adjacent. Examples: standard heptatonic scale, mode, major scale, minor scale.
- Difference threshold.** Just noticeable difference, difference limen; smallest perceptible physical change in a stimulus.
- Diminished.** Of an interval: one semitone smaller than the corresponding minor or perfect interval. Opposite of augmented.

Diminished fifth (d5). Interval of 6 semitones; tritone; enharmonically equivalent to an augmented fourth.

Diminished triad. Triad with a m3 and a d5 above the “root”.

Diminished seventh. Interval enharmonically equivalent to a major sixth (9 semitones); chord class with a m3, d5 and d7 above the “root”.

Dissonance. Opposite of consonance.

Distortion. Undesired modification of a (physical) sound signal due to limitations of a transducer (e.g. a microphone or loudspeaker), filter, or amplifier.

Dominant. Diatonic scale step V, a perfect fifth above the tonic.

Dominant seventh. Major-minor seventh chord whose root is on the dominant.

Doubling. The simultaneous voicing of a chroma in different octave registers.

Dyad. Simultaneity of two complex tones (notes).

Enharmonic (or enharmonic equivalent). Having different musical note names but corresponding to the same chromatic scale step (e.g. C sharp, D flat).

Equal temperament. Tuning or intonation in which semitones cover equal frequency level intervals (one twelfth or an octave).

Equivalent frequency. Measure of pitch; frequency of a standard reference tone whose pitch is the same as that of a particular tone sensation.

Envelope (or amplitude envelope). Shape of a graph of amplitude against time.

Evoke. (Of a stimulus): produce (a sensation).

Fast Fourier Transform (FFT). Specific, efficient spectral analysis algorithm.

Fifth. Perfect, diminished or augmented fifth (usually, perfect).

Filter. Device which modifies an input signal such that, on spectral analysis, it contains more energy in certain spectral frequency ranges and less in others.

Flat, flatten. Lower in pitch, usually by a semitone.

Fourier analysis. Spectral analysis.

Fourth. Perfect, augmented or diminished fourth (usually perfect).

Frequency. Of a periodic waveform: number of cycles per unit time (e.g. per second); reciprocal of period.

Frequency level. Logarithmic measure of frequency, in semitones (or octaves) above 16.35 Hz (so that A₄, 440 Hz, has a frequency level of exactly $4 \times 12 + 9 = 57$ semitones).

Free parameter. Adjustable variable in an (otherwise fixed) algorithm.

Full complex tone. Complex tone with all pure tone components (harmonics), perhaps up to some specified limit of harmonic number or frequency.

Function. Mathematical relationship or operation with a single output value (or array of values) for each possible input value (or array of values).

Functional harmony. System of harmonic analysis in which chord roots are specified by their diatonic scale steps (I, II, III, etc.) and chords are interpreted as functionally equivalent to either I, IV or V.

Fundamental. First harmonic; lowest pure tone component of a full complex tone.

Fundamental frequency. Waveform frequency.

Gamelan. Indonesian gong orchestra.

Geometric mean. Of two numbers: the square root of their product.

Half-diminished seventh. Chord class with intervals m3, d5 and m7 (3, 6 and 10 semitones) above the (conventional) root.

Half step. Semitone.

Harmonic. Whole multiple of a specified number. *n*th harmonic: pure tone component whose frequency is (close to) *n* times the waveform (fundamental) frequency of a complex tone.

Harmonic complex tone. Complex tone whose pure tone components are exactly harmonic; complex tone which is exactly periodic (over some finite duration).

Harmonic meaning. Of a tonal sound: meaning associated with the harmonic relationship between the sound and its context.

Harmonic minor scale. Scale whose pitch categories lie 2, 3, 5, 7, 8 and 11 semitones (M2, m3, P4, P5, m6, M7) above the tonic.

Harmonic relationship. Perceived relationship between musical sounds involving intervals (e.g. P8, P5, M3) between specific pitch categories (cf. melodic relationship).

Harmonic series. Series of numbers of the form $a, 2a, 3a, \dots$

Harmonicity. How closely the spectral frequencies of a sound correspond to a harmonic series, or how closely the pitches of the pure tone sensations of a sound correspond to those of a typical complex tone.

Harmony. General term embracing consonance (especially of simultaneities) and conventions for writing tonal progressions.

Hear out. Hear, by analytic listening, something which is not normally noticed (e.g. a harmonic of a complex tone).

Heptatonic scale. Scale with seven pitch categories per octave.

Hertz (Hz). Unit of frequency; cycles per second.

Histogram. Bar chart; kind of graph.

Holistic. Opposite of analytical. Normal mode of perceiving.

Homorhythmic progression. Chord progression whose voices all move in the same rhythm (i.e. without passing notes; note against note). Here, a sequence of sounds of similar loudness and timbre (each of which lasts long enough to be clearly and separately perceived) whose overall duration is short enough that the progression may be held in auditory sensory memory (cf. polyphonic progression).

Hz. Hertz.

Integer. Whole number.

Intensity. Of a sound: amount of energy transmitted per unit time, per unit area perpendicular to the direction of propagation.

Interval. In mathematics: segment of a one-dimensional scale lying between two specified values (see confidence interval). In music: distance between two pitch categories (in semitones); inclusive number of scale steps in a

diatonic scale between two notes (e.g. major third, augmented fourth, perfect fifth).

Intonation. Frequency adjustment of a note (within its pitch category) in music performance (see just, Pythagorean, equally tempered).

Inversion. Voicing of a chord specified by the chroma of the bass note – root position, first inversion (third in the bass), second inversion (fifth in the bass), etc. – or interval which, when added to another interval, makes an octave (e.g. a fifth is the inversion of a fourth).

Impressionism. Western school of musical composition (late 19th, early 20th century) whose best-known exponent was Debussy.

Just intonation. Intonation (or tuning) in which all intervals are expressed as combinations of octaves (2:1), fifths (3:2), and major thirds (5:4), so that the frequencies of tone pairs stand in simple, small-whole-number ratios with factors 2, 3 and 5. E.g. a just minor third has a frequency ratio of $(3/2)/(5/4) = 6/5 = 3 \times 2/5$.

Key. Musical pitch framework characterized by certain chord progressions (of which the dominant-tonic progression is the most important) and a specific hierarchy of pitch classes (headed by the tonic and dominant).

kHz. Kilohertz; thousands of cycles per second.

Leading note. Note a semitone away from (usually, below) a root or tonic; diatonic scale step VII.

Level. Logarithm of the ratio of a quantity to a reference quantity of the same kind; threshold level, auditory level, masking level, audible level or (usually) sound pressure level.

Loudness. Attribute of auditory sensation by which different sensations may be ordered on a scale extending from “soft” to “loud”.

Main pitch. Pitch of the main tone sensation of a sound.

Main tone sensation. Most audible, salient or prominent tone sensation in a sound.

Major scale. Scale whose pitch categories lie 2, 4, 5, 7, 9 and 11 semitones (M2, M3, P4, P5, M6, M7) above the tonic in each octave.

Major second (M2). Interval of 2 semitones.

Major third (M3). Interval of 4 semitones.

Major sixth (M6). Interval of 9 semitones; inversion of a minor third; chord class with a M3, P5 and M6 above the root.

Major seventh (M7). Interval of 11 semitones; inversion of a minor second; chord class with a M3, P5 and M7 above the root.

Major-minor seventh (Mm7). Chord class with a M3, P5 and m7 above the root; dominant seventh.

Masked threshold. Threshold of audibility in the presence of maskers.

Masker. Sound (e.g. a pure tone component) which masks other sounds (e.g. other pure tone components).

Masking. Complete or partial “drowning out” of one sound by another.

Masking level. Degree to which a pure tone component is masked by other components; difference between the auditory level and audible level of a pure tone component.

Mean. Of two values: arithmetic (or geometric) mean. Of a continuous function: area under the function over a specified interval, divided by the length of the interval.

Mediant. Diatonic scale step III, a third above the tonic.

Melody. Sequence of tones in music perceived as related or as a whole due to their limited range of pitch, loudness and timbre (cf. stream).

Melodic minor scale. Minor scale with a major sixth and seventh when ascending, and a minor sixth and seventh when descending.

Melodic relationship. Perceived relationship between two sounds in music by virtue only of their pitch proximity (cf. harmonic relationship).

Melodic stream. Stream.

Microtonal. Relating to division of the octave into more than twelve pitch categories, or into categories less than a semitone wide.

Minor scale. Harmonic or melodic minor scale; heptatonic scale including pitch categories 2, 3, 5 and 7 semitones (M2, m3, P4, P5) above the tonic.

Minor second (m2). Smallest musical interval; one semitone.

Minor third (m3). Interval of 3 semitones.

Minor sixth (m6). Interval of 8 semitones; inversion of a major third; chord class with a m3, P5 and M6 above the root.

Minor seventh (m7). Interval of 10 semitones; inversion of a major second; chord class with a M3, P5 and m7 above the root.

Mode (or scale mode, or church mode). Version of the standard heptatonic scale centred around (and named after) one note (the final). For example, “white notes” on D constitute the *Dorian* mode.

Modern. Period of Western music history extending from about 1900 to the present.

Modulation. In acoustics: periodic change in the amplitude or frequency of a sound (beating). In music: change of key during a piece.

Modulation frequency. Frequency of the (smoothed) envelope of a waveform. The difference between the frequencies of two beating pure tone components.

Multidimensional scaling. Algorithm for summarizing data on the (apparent) similarity, relatedness or differentness of pairs within a set (e.g. a set of musical sounds). The output of the algorithm specifies the positions of the elements of the set in an n -dimensional space (where n may be specified by the user), such that distances between the elements in the space correspond roughly to their (apparent) differentnesses.

Music theory. Theory of musical structure (including composition and analysis) based primarily on the notes of musical scores.

Musical analysis. Analysis of the musical/tonal functions of tones, chords, key areas, etc., in a passage of music.

Musician. Musical performer.

Neurophysiological. Concerning brain function.

Noise. Sound whose spectrum contains continuous distributions (bands) of energy (rather than pure tone components); undesirable, disturbing or annoying sound.

Non-harmonic sound, non-harmonic tone. Complex sound which is not a tone, i.e. whose pure tone components do not conform to (or approach) a harmonic series of frequencies.

Notate. Encode sound in the form of instructions to a musical performer.

Notation. Musical performance instructions.

Note. Instruction to play a tone at an approximately specified time and frequency. (The actual onset time and frequency of a tone in performance depend on the categorical perception of pitch and time, and on context: roughness, rubato, etc.).

Notice. Consciously perceive.

Octave. Distance between two tones or frequencies corresponding to a frequency ratio of 2:1; frequency level difference of 12.0 semitones; musical interval covering eight diatonic scale steps (inclusive); distance between sequential tones perceived to lie an octave apart (see octave stretch).

Octave equivalence (or octave generalization). Assignment of the same names to notes an octave apart; assumption that notes an octave apart have the same harmonic function.

Octave stretch. Effect by which octaves in music correspond to frequency ratios slightly larger than 2:1.

Octave-generalized chord. Chord class.

Octave-spaced tone (or Shepard tone). Complex tone whose pure tone components are separated by octaves and cover most or all of the pitch range.

Optimal fit. Optimal closeness of two sets of data, minimizing the root-mean-square difference between corresponding data points.

Organum (or parallel organum). Medieval plainsong style in which parts move by parallel fifths or fourths.

Overtone. Harmonic other than the fundamental; pure tone component other than the lowest.

Pa. Pascal; newtons per square metre.

Parallel octaves, fifths. These occur when two voices a fifth or fourth apart move in parallel through the same chromatic interval.

Peak amplitude. Maximum displacement of a waveform from its mean or zero value.

Pentatonic scale. Scale with five pitch categories per octave.

Perceive. Detect, recognize or identify something (compare "notice"), usually while interacting with the environment.

Perfect fifth (P5). Interval between the first and fifth degrees of a major or minor scale, or between the second and third harmonics of a complex tone; 7 semitones.

Perfect fourth (P4). Interval of 5 semitones; inversion of the perfect fifth.

Perfect octave (P8). Octave.

Perfect pitch. Ability to identify the absolute chromatic pitch category of a musical tone; absolute pitch to the nearest semitone.

Perfect unison (P1). Zero semitones.

Period. Time interval between repetitions of a periodic waveform.

Periodic function. Function that repeats itself at regular (time) intervals.

Periodic sound. Sound whose waveform is periodic.

Phase. Position of the point at which a periodic waveform passes through zero (relative to some specified point).

Phase spectrum. Phases of spectral (pure tone) components, expressed as a function of their frequencies.

Pitch. Attribute of a tone sensation by which it may be ordered on a scale from low to high.

Pitch ambiguity. Property of a sound having various possible pitches (when perceived holistically).

Pitch category. Range of pitch (about a semitone wide) within which the harmonic meaning of a musical note or tone stays the same.

Pitch class. Chroma.

* **Pitch commonality.** Degree to which two sounds are perceived to have pitches in common, depending on the number and saliences of tone sensations falling in common pitch categories.

Pitch configuration. Pattern of tone salience as a function of pitch.

Pitch distance. Overall apparent distance in pitch between two sounds (see melodic relationship).

Pitch prominence. Essentially the same as audibility, salience (of a pure tone).

Pitch proximity. Overall apparent closeness in pitch of two sounds; opposite of pitch distance.

Pitch relationship. Extent to which two sounds of similar loudness and timbre are perceived to be similar or related by virtue of their pitch configurations. Depends on harmonic relationship (pitch commonality) and voice leading (pitch proximity).

Pitch shift. Slight change in the pitch of a tone due to change in level or the presence of masker(s).

Pitch weight. Essentially the same as (tone) audibility.

Polyphonic progression. Contrapuntal progression; music consisting of two or more simultaneous lines or melodies.

Preference. The extent to which an observer "likes" (or evaluates as "good") a stimulus presented e.g. in an experiment.

Present. Play a sound in an experimental context.

Pressure. Force per unit area; instantaneous pressure relative to ambient pressure.

Pressure waveform. Waveform of sound pressure against time; the most basic physical description of a sound.

Probe tone. Tone to which a listener refers in order to answer a question about some other sound in an experimental trial.

- Profile** (tone profile, key profile). Graph (or histogram) of salience against chroma.
- Program**. Computer (software) implementation of an algorithm.
- Progression**. Sequence of sounds which are perceptually relatable to each other and may be stored in sensory memory.
- Psychoacoustics**. Psychophysics of hearing.
- Psychophysics**. Study of relationships between (physical) stimuli and the sensations (experiences) they evoke.
- Pure intonation**. Just intonation.
- * **Pure tonalness**. Measure of tonalness dependent on the number and audibility of the pure tone components of a sound.
- Pure tone**. Tone whose pressure waveform is sinusoidal.
- Pure tone component**. Spectral component; partial.
- * **Pure tone height**. Proportional sensory measure of the height (pitch) of a pure tone or pure tone component, measured in critical bandwidths above the lower threshold of pitch.
- * **Pure tone sensation**. Tone sensation evoked solely by a pure tone or pure tone component (see spectral pitch).
- Pythagorean intonation** (or tuning). Hypothetical intonation (or tuning) in which all intervals are expressed as combinations of pure fifths (3:2) and octaves (2:1), so that frequencies of pairs of tones stand in simple, whole number ratios in which only factors of 2 and 3 appear. E.g. a Pythagorean major third has a frequency ratio of $(9/8) \times (9/8) = (81/64) = 3^4/2^6$.
- Rating**. Judgment or estimate by a participant in an experiment.
- Register**. Numerical label for the octave in which a tone, note or pitch falls, ranging from 0 to 9. The register from middle C (262 Hz) to the B above (494 Hz) is called register 4.
- Relative pitch**. How high a tone sounds relative to another, measured either on a continuous scale (pure tone height) or on a categorial scale (using musical intervals). Also, the ability to recognize musical intervals.
- Renaissance**. Period of Western music history extending from about 1450 to about 1600.
- Residue pitch**. Pitch of a residue tone sensation; pitch corresponding to a missing fundamental.
- Residue tone**. Complex tone with most lower harmonics present but with no fundamental.
- * **Residue tone sensation**. Complex tone sensation whose pitch does not correspond to that of a pure tone component.
- rms**. Root-mean-square.
- Romantic**. Western music of the nineteenth century (late Beethoven, Chopin, Brahms, Liszt, Wagner, Mahler, . . .).
- Root**. "Generating" note or chroma upon which thirds are superposed in order to construct a chord in music theory; chroma relative to which the other chroma of a chord are perceived.

- Root position**. Inversion of a chord in which the bass note is the root.
- Root-mean-square (rms)**. Average value of a function (e.g. a waveform) calculated by taking the square root of the mean of the square of the function.
- Roughness**. Sensation associated with beating at frequencies in the range 20–300 Hz.
- Rubato**. Controlled fluctuation of musical tempo.
- Salience**. Perceptual importance or prominence. Of a stimulus or environmental object: probability of being noticed. Of a sensation: probability of occurring (i.e. being experienced).
- Sample**. Particular (output) value of a function (such as a waveform), often taken at regular (input) intervals.
- Scale** (categorical or musical). Set of pitch categories in a progression or a piece of music which are used more often than others, or which act as a perceptual frame of reference. Scales normally include between 5 and 12 pitch categories per octave, and repeat (in the same pitch relationships) in different octaves.
- Scale** (sensory or psychophysical). Continuum for the measurement of a psychophysical parameter (such as pitch) in which equally sized intervals correspond to equal numbers of difference thresholds.
- Scale step** (or scale degree). Pitch category belonging to a scale; degrees of the diatonic scales are labelled I, II, . . . , VII.
- Semianechoic**. Not completely anechoic, i.e. absorbing (rather than reflecting) almost all sound so that echoes and reverberation are very weak.
- Semitone**. Unit of frequency level; twelfth part of an octave.
- Sensation**. Experience accompanying perception.
- Sensory**. Universal and perceptual; due to universal aspects of the physiology of hearing and the human auditory environment.
- * **Sensory memory**. Spontaneous memory, in the absence of awareness or noticing (at the actual time of the "memorized" event).
- * **Tonicity**. Of a chord in an octave-generalized progression: a measure of the probability that the chord will be perceived as the tonic, calculated on the basis of sensory properties of the progression.
- Seventh**. Chord with a third, fifth and seventh above the root; interval between the first and seventh notes of a diatonic scale. Major, minor or diminished.
- Sharpen**. Raise in pitch, usually by a semitone.
- Short-term memory**. Sensory (spontaneous) memory.
- Significant**. In statistics: most unlikely to have occurred by chance (e.g. $p < 0.05$ means that the probability of a given result occurring by chance is less than 5%).
- Simultaneity**. Sound; simultaneous group of tones (complex tone, dyad, chord, bell sound, etc.), usually of short duration.
- Sinusoidal**. Mathematical function of the form $y = a \sin (bx + c)$, where a , b and c are constants.

- Sixth.** Major, minor or augmented sixth.
- Smoothness.** Lack of roughness.
- Sound.** Simultaneity.
- Sound pressure.** Oscillatory part of pressure; overall pressure minus ambient pressure.
- Sound pressure level (SPL).** Level of (rms) sound pressure relative to a reference sound pressure of 0.00002 Pa; an increase in SPL of 20 dB corresponds to a multiplication of pressure by a factor of 10.
- Spacing.** Aspect of voicing involving the sizes of the pitch intervals between the notes of a musical chord.
- Spectral analysis.** Mathematical procedure by which a function (e.g. a waveform) is expressed as a sum of individual sinusoidal functions over a specified analysis interval ("window"). The output of a spectral analysis consists of an amplitude and a phase spectrum.
- Spectral component.** Sinusoidal function output by spectral analysis; pure tone component.
- Spectral dominance.** Effect by which the pure tone components with the greatest influence on the pitch properties of complex sounds lie in the (approximate) frequency range 250–2000 Hz – the range which is most important for the perception of vowels in speech.
- Spectral pitch.** Pitch of a pure tone sensation.
- Spectrum.** Any function of frequency (e.g. amplitude spectrum, phase spectrum).
- SPL.** Sound pressure level.
- Spontaneous.** Without conscious effort or intent; not voluntary.
- Standard deviation.** Measure of the spread of a set of numbers, determined by a standard mathematical formula; distance away from the mean of a set of numbers (e.g. numbers intended as measurements of the same thing) within which about two-thirds of the numbers lie.
- * **Standard heptatonic scale.** Scale corresponding to the white notes of the piano, or transpositions thereof; scale of seven pitch categories per octave corresponding to seven neighbouring chroma on the cycle of fifths. (Differs from *major scale* in that no tonic is specified).
- * **Standard pentatonic scale.** Scale corresponding to the black notes of the piano, or transpositions thereof; scale of five pitch categories per octave corresponding to five neighbouring chroma on the cycle of fifths.
- Standard reference tone.** Pure tone of frequency 1 kHz and variable SPL used for loudness measurements, or pure tone of 60 dB (SPL) and variable frequency used for pitch measurements.
- Stimulus.** Physical entity (e.g. environmental state or process, or source thereof) which may be perceived, especially in a psychophysical experiment.
- Stream.** Sequence of tones spontaneously perceived as related or as a whole due to their limited range of pitch, loudness and timbre, or perceived to stem from a single source (due to auditory familiarity with that source); auditory stream; melodic stream; sensory basis for melody.

- Style (or genre).** Arbitrary, culture-specific way of organizing music.
- Subdominant.** Diatonic scale degree IV, a fourth above the tonic.
- Subharmonic.** Whole submultiple of a particular number (e.g. 2.5 is the 4th subharmonic of 10).
- Subharmonic pitch.** Pitch whose equivalent frequency is approximately subharmonic to some other frequency (such as that of a pure tone); e.g. the subharmonics of C_5 are C_4 , F_3 , C_3 , A_{b2} , F_2 , D_2 , C_2 ,
- Submediant.** Diatonic scale degree VI, a sixth above (or a third below) the tonic.
- Subthreshold.** Below the threshold of audibility; inaudible.
- Successive.** Neighbouring and sequential.
- Supertonic.** Diatonic scale degree II, a second above the tonic.
- Synthesize.** Produce music electroacoustically.
- Synthetic.** Electroacoustically produced.
- Tetrad.** Chord of four different complex tones (notes), usually of different chroma (e.g. seventh chord, sixth chord).
- Threshold.** Value of a physical stimulus parameter (e.g. SPL, frequency) where the experience of a sound categorically changes (e.g. the sound becomes audible, the sound has pitch, . . .).
- Threshold level.** SPL at threshold of audibility.
- Threshold of audibility.** Threshold sound pressure (defined for an average "ideal" listener) below which a pure tone is inaudible, expressed as a function of its frequency.
- Threshold of pitch.** Lowest (20 Hz, E_0) or highest (16 kHz, C_{10}) audible pitch.
- Timbre.** Tone colour; attribute of a tone sensation by which different tone sensations of the same pitch and loudness may be differentiated.
- Tonal.** Of a sound in psychoacoustics: evoking pitch (i.e. tone sensation/s). Of a passage of music: exhibiting tonality.
- Tonal relationship.** Harmonic or melodic relationship, or both.
- Tonality.** Pitch structure in music in which some pitches (in particular, the tonic) are more important (salient, stable) than others; that aspect of musical structure involving pitch relationships.
- Tonalness.** The extent to which a sound evokes pitch, i.e. audible tone sensations; pure or complex tonalness; sonority, sonorousness.
- Tone.** Sound which evokes a tone sensation; approximately or exactly periodic sound in the audible range of frequencies; sound whose various possible pitches mostly belong to a single pitch class or chroma (e.g. full complex tone, octave-spaced tone, residue tone).
- Tone component.** Part of a sound which, if played by itself, would be a tone.
- Tone salience.** Salience of a tone or tone sensation.
- Tone sensation.** Auditory sensation having (one, unambiguous) pitch; other attributes include loudness or salience, timbre, and apparent duration.
- Tonic.** Most important sound, tone, pitch or chroma of a progression, acting as a perceptual reference relative to which other sounds, tones, notes, pitches or chromas are perceived; diatonic scale step I.

Transducer. Physical system converting sound into/from some other form of energy/information (e.g. microphone, loudspeaker, ear).

Transpose. Shift all notes/tones through the same (chromatic) musical interval.

Triad. Chord of three different complex tones (notes), usually of different chroma (e.g. major triad, minor triad).

Trial. Part of a psychophysical experiment, during or after which an observer makes a single rating or set of ratings and, as a result, a single piece or set of data are recorded.

Tritone. 6 semitones; 3 whole tones; augmented fourth or diminished fifth.

Tuning. Adjustment of (fundamental) frequency in music.

Twelve-tone music. Atonal chromatic music in which all twelve chroma (pitch classes) appear about equally often; based on "tone rows" (particular orders of the twelve chroma).

Unison. Interval of zero semitones.

Universal. Applying to most or all of the human race.

Virtual pitch. Pitch of a complex tone sensation.

Voice leading. Voicing, with emphasis on melodic relationships (pitch distances) between sequential sounds.

Voiced chord. Chord whose notes are assigned to specific octave registers (cf. chord class).

Voicing. Realization of an octave-generalized chord or chord sequence; allocation of notes of specified chroma to particular registers; inversion, spacing, and doubling.

Waveform. Function whose mean value over a specified range is zero but whose value at particular points (and hence its rms value) is not zero. Of a tone: graph of sound pressure against time.

Whole step. 2 semitones.

Glossary of Symbols

A	Audibility of a (pure or complex) tone component	ML	Masking level in dB (at P , due to <i>all</i> pure tone components P')
A_c	Audibility of a complex tone component	n	Harmonic number; harmonic template component number
A_{\max}	Maximum tone audibility over all P in a simultaneity	p	Sound pressure
A_p	Audibility of a pure tone component	P	Pitch category (middle C = $C_4 = 48$, $C_3 = 36$, etc.)
AL	Audible level in dB of a pure tone component; level in dB above masked threshold (cf. YL below)	P_n	Pitch category of n th harmonic
c	Chroma (pitch class) (number of semitones above C)	r	Pitch register (in octaves)
C	Pitch commonality of two simultaneities	R_e	Mean result of a single experimental trial
cb	Critical bandwidth (or Bark)	\bar{R}_e	Mean result of all trials in an experiment
D	Apparent pitch distance between two simultaneities	R_t	Unscaled, theoretical (calculated) result of a trial
dB	Decibels; (logarithmic) unit of SPL, TL, YL, ML, AL	\bar{R}_t	Mean of R_t over all trials in an experiment
e	Base of natural logarithms (≈ 2.72)	R'_t	R_t scaled against R_e by linear transformation
f	Frequency in Hz	s	Simultaneity number (in a progression)
FL	Frequency level (in semitones above 16.35 Hz)	S	Tone salience; salience of a tone sensation
H_p	Pure tone height (critical-band rate) in cb	S_p	Chroma probability (measure of chroma salience)
Hz	Hertz; cycles per second	S_t	Chroma tally (measure of chroma salience)
i	Arbitrary integer variable	SPL	Sound pressure level (in dB above 2×10^{-5} Pa)
int	Integer part (e.g. $int\{2.6\} = 2$)	T_c	Complex tonalness of a simultaneity
I	Harmonic interval (in semitones above the fundamental)	T_p	Pure tonalness of a simultaneity
k	Free parameter in model, as follows:	TL	Threshold level (level at threshold of audibility); SPL in dB of an isolated, barely audible pure tone
k_M	Masking parameter: gradient of the masking pattern of a pure tone in dB/cb (the higher k_M , the more components are audible)	W	Harmonic weight; importance of a harmonic template component
k_R	Pitch relationship perception parameter: measure of how much pitch commonality influences sequential pitch relationships, as opposed to pitch proximity	W_{cb}	Critical bandwidth (in semitones)
k_S	Simultaneity perception parameter: measure of how analytically a simultaneity is heard (the higher k_S , the higher M)	x	Arbitrary real variable
k_T	Tone perception parameter: measure of how analytically individual tones are heard (the higher k_T , the more pure tone components are heard in preference to complex tone components)	X	Apparent pitch proximity of two simultaneities
\log_{10}	Logarithm to base 10	yl	Auditory level in dB of a pure tone component of a complex tone, which (in turn) is a component of a simultaneity (cf. al)
M	Multiplicity; number of simultaneously noticed tones	YL	Auditory level in dB of a pure tone component of a complex sound; level in dB above the threshold of audibility in quiet (cf. AL)
M'	Unscaled multiplicity	σ	Standard deviation
\max_i	Maximum over all values of i [e.g. if $x(1) = 4$ and $x(2) = 5$ then $\max_i \{x(i)\} = 5$]	b	Musical flat (lowers pitch by one semitone)
ml	Masking level in dB (at P , due to a single pure tone component at P')	$\#$	Musical sharp (raises pitch by one semitone)