Clear versus Correct: On the re-conceptualisation of judgments about intonation

Goetz Richter, University of Sydney/ Sydney Conservatorium

Introduction

This discussion of intonation is prompted by the striking unease with which this challenging topic is often approached by performers and pedagogues alike. While intonation is identified as one of the most central concerns for string players[1] agreement on what might define its quality seems by no means straight-forward or consistent. In fact, the judgement here can often be lop-sided. While we reach fairly ready agreement about poor intonation we often remain silent about good intonation.

The silence suggests that intonation can become the subject of a taboo where subjective fears and intuitions assert themselves without explicit reason or principle. There may be several reasons for this: Intonation is very immediate to the conception, hearing and experience of music. Confusing perceptions generate stress and undermine a capacity of clear thinking and articulation. Secondly, and as a topic of dispassionate discussion, intonation seems an immensely complex phenomenon requiring a scientific mindset. A disciplined discussion of the complexities of intonation is difficult to sustain and it is frequently unclear how aesthetic preference and objective attributes can be balanced. Thirdly, judgements about intonation are synoptic. They involve the selection of relevant information. Such selection may not be equally possible if our attention is variously engaged in the perception of musical expression or in the reflection about complex aesthetic characteristics of a performance. We simply do not divide our attention across all aspects of a performance at any one time in an equally balanced way. On reflection partial aspects and features may be singled out to explain a general sense of dissatisfaction with a performance. Intonation offers itself as a ready explanation at occasions where we may not have been captivated by the musical or expressive aura of a performance. In addition, we tend to treat intonation as a threshold issue: unless it disturbs us, we include it in our overall perception of a performance and do not single it out. When brought to consciousness by reflection and discussion we may

[1] Mantel, 9

Richter, Goetz. Clear versus Correct: On the Re-Conceptualisation of Judgments about Intonation. *String Praxis, Volume 2, No. 1, October 2013, 31-46.* © www.stringpraxis.com

not always be able to recall the precise nature of intonation or any reasons for our judgment but rather express general approval or disapproval of a performance in terms of this concept.

Such preliminary remarks indicate that a discussion about intonation among practicing musicians originates from a complex field of fundamentals that guide perceptions and judgments. Rather than tackle this complexity, musical practice often suggests that intonation should be self-evident: What could there be to discuss? If we nevertheless start to discuss intonation, what is the practical relevance of such discussion? Such questions rest on pragmatic foundations: Either we agree on intonation or we do not. If we do not agree, discussion will make no difference. In fact, disagreement may already imply a signal to disqualify one of the partners of the conversation who evidently "did not get it". There simply is no place for the question why we may have decided a particular intonation was good, average or poor. We seem to lack a platform and practical motivation for such discussions.

My argument starts from the proposal that such a position implies some serious challenges: If we treat intonation as self-evident and resist attempts to articulate our perception and explain our judgements, intonation becomes an issue of conviction, assertiveness and power. However, an exclusive reliance on ill-defined convictions and intuitions is undesirable for at least two reasons. Firstly, it undermines the purpose and methods of teaching and learning. The latter demand an explicit account how ability is formed by systematic and methodical progress. Method reflects a two-fold organisation of the subject matter and the potential response of the learner in mastering this subject matter. If the contextual account remains vague, a learner can at best achieve ad-hoc progress within a subject matter.

Secondly, attention is guided by knowledge. Being able to direct attention more consciously improves practice, teaching and learning. This will consequently improve skills. Knowledge, understanding and reasoning need not upset intuition unless the former claim absolute superiority. Instead, knowledge and rational inquiry guide and even inspire intuition. Both work in harmony if we observe with ease, resist absolute domination of always incomplete knowledge, question gently and guide thoughtfully.

Background

In order to forge a path into a complex issue I will initially discuss some mainstream pedagogical literature and its views on the topic of intonation. Following an outline of relevant acoustic fundamentals, I am additionally interested in more recent arguments by the German cellist and pedagogue Gerhart Mantel (1930-2012) about the psychological, artistic and pedagogical aspects of intonation which connect this issue with performance development and the dynamics of learning. In the second part of this paper I will explore these wider theoretical and

practical implications and I will argue for rigour in the categorisation of judgments about intonation. Rather than using an absolute distinction between right and wrong (or emotionally charged valuations about good and bad intonation) I will try to argue that intonation should be classified as either clear or confused.

Looking at the standard pedagogical literature for the violin we must feel puzzled by the lack of explicit or detailed engagement with the topic of intonation. While on one hand there appears to be wide agreement that pure intonation is perhaps "the most beautiful attribute of a good violinist"[2] and that intonation is perhaps the single most important topic string players will deal with[3], there is little explanation what is meant by "pure intonation" and even less clear or helpful advice how to deal with such a central topic methodically and productively. A case in point is Carl Flesch (1873-1944). In what remains a fundamentally reactive account Flesch emphasises that "pure intonation in the physical sense is an impossibility."[4] He concludes from this that the impression of good intonation results from a combination of alertness and rapid correction by the performer. Flesch relies on the argument that acoustic and physical demands of precision make it impossible for a finger to arrive at a precise and pure pitch and he concludes that

"so called pure intonation is thus nothing but an extremely rapid, skilled correction of the originally imprecise pitch. In case of faulty intonation the tone remains just as false during its entire duration as it was when conceived"[4]

While Flesch recognises many additional aspects of intonation such as the dependency of pitch on bow pressure and mentions the context dependency of pitch (ie. harmonic versus melodic intonation) his advice to students and teachers is simple: Since it is of utmost importance to train the ear to be as perceptive as possible and to note an impure note with the utmost irritation in order to motivate a rapid corrective reflex we need to purify the listening process by playing slowly and training the ear. Flesch recommends to

"let the pupil sustain every note (at best in a caprice by Rode in one of the sharp keys) as long as necessary to test its purity (without vibrato and if possible with the aide of open strings) until the conviction has been gained that the note is in tune. "[5]

---

[2] Rostal, 22
[3] Mantel, 9
[4] Flesch, 10
[5] Flesch, 11

While Flesch's pragmatic advice may well lead to improvements it fails to cover significant aspects of intonation comprehensively. Flesch does not question for example whether slow playing may have different intonation requirements from fast playing. He also does not consider the issue of intonation in the ambivalent context of double stopping where melodic and harmonic orientations interface in challenging ways. Such critical questions aside, there is a more troubling aspect to Flesch's discussion. The psychology of increasing sensitivity and thus motivating faster correction of impure intonation on the basis of the thought that there is no such thing as pure intonation strikes me as conflicted. If there is no purity of intonation what then is all this fuss about? Ultimately, then, Flesch seems to promote an entirely reactive approach to intonation. He remains silent about any genuinely creative responsibility of the performer and replaces creativity with the concept of corrective adaptation. But the task is not simply to fudge and eventually play in tune, but to think, imagine and co-ordinate movements in advance of the outcome of playing in tune. Flesch's discussion of intonation finds satisfaction with the physical outcome of a certain pitch and its assessment. The player is reactive to the played note as an acoustic phenomenon. However, we must remember that this phenomenon is the result of conscious, mental and physical creative processes and actions which Flesch implies, but does not unravel. For performers and their thinking Flesch cannot be really helpful at all. Directing the performer towards a reactive consciousness of a critical listener Flesch does not consider what is required to conceive and create the pitch. This is, however, the genuinely creative work of the performer and of crucial interest to any teaching.

A different, but equally pragmatic answer to the question of intonation is given by Ivan Galamian (1903-1981). To be sure, Galamian connects intonation with the mechanical and geographical orientation of the fingers on the fingerboard. He stresses the development of our tactile and kinaesthetic sense and the importance of a left hand frame- and position but he, too, falls short of clearly identifying the creative importance of such conceptions in the anticipation of the playing. This is so despite the fact that Galamian refers to the importance of "correlation" (ie. the mental anticipation of playing and performance) elsewhere.[6] Instead and like Flesch, Galamian emphasises the need to adjust intonation reactively and concludes that

"a performer has to constantly adjust his intonation to match his accompanying medium. The artist must be extremely sensitive and should have the ability to make

[6] Galamian, 6

instantaneous adjustments in his intonation … and intonation adjustable to the needs of the moment is the only safe answer to the big question of playing in tune."[7]

Galamian leaves us with the simple advice that "the ear is always the final judge in deciding what is good and what is not."[8] His advice is general. But will it help method and assist systematic instrumental and musical development bearing in mind that pedagogy must look for methodical solutions which guide creative practice ahead of outcomes? Not only does Galamian not see reasons to discuss the physical and acoustic fundamentals which underpin decisions on intonation, he also leaves us with little practical advice beyond biomechanical and structural descriptions and the occasional reference to a relation between intonation, bow pressure and double stopping.

The Galamian School is nevertheless the source of some helpful, concrete advice on intonation which directs creative practice: Simon Fischer (following Dorothy Delay) refers to the importance of using perfect intervals (fourths, fifths, octaves) for the tuning of scale intonation[9] and advocates compromises for thirds and sixths. This refers us to a range of conceptual issues including a practical insistence on the derivation of leading tones in melodic solo playing from open strings (g# tending upwards to A, but also Bflat tending downwards to A). Fischer emphasises homogenous intonation on the basis of a derivation of pitches through perfect intervals (Octaves, Unisons, Fourths and Fifths) from the open strings of a string instrument. This creates definite relationships in the scale steps and uniform (large) whole and (small) half tone steps as will be shown further below.

Fischer's view has not always been universally accepted. The violin method by Joseph Joachim and Andreas Moser includes an extensive introduction dealing with the issue of intonation and in particular the issue of intervals and their frequency relationships[10] Joachim and Moser come to the conclusion that the intonation for scale intonation relies on two different whole tone steps (the so-called small and large diatonic whole tones). This view is shared by Sevcik in his *School of Intonation*. The concrete result of their views suggests a puzzling aural tradition to us. In order to clarify why this is so I will recall some acoustic fundamentals which need to underpin any discussion about intonation and should inform the conceptualisations of this complex topic

[7] Galamian, 22
[8] Galamian, 110
[9] Fischer, 197
[10] Cited in Mostrass, 110-119

Acoustic Fundamentals

The description of music and musical intervals has a long history derived from the Greek mathematician and philosopher Pythagoras. Pythagoras is credited with experiments on a monochord, an instrument consisting of a resonance body, a string and a moveable bridge. These experiments are said to have yielded the empirical insight that the length of the string which defines the musical pitch has a proportional relationship to the intervals created by the division of the string when moving the bridge. The following relationships between length of strings and resulting intervals are believed to have been established by Pythagoras:

1:1 – unison
1:2 – octave
2:3 – fifth
3:4 – fourth
4:5 – major third
5:6 – minor third
5:8 – minor sixth
3:5 – major sixth

It is important to note that this numerical relation describes the frequency relationship between relevant pitches. That is, to ascertain the pitch of the note which is a fourth above or below A 440 we multiply this frequency with 4:3 (ascending) or 3:4 (descending). Since it appears that pitches can be derived in a mathematical process of calculation as well as through a musical process of listening and playing, a relevant exercise suggests itself to construct musical pitches of the various tonal material (in particular scales) with the assistance of a frequency calculation. This leads to some strikingly ambiguous conclusions:

Calling the original frequency for simplicity's sake 1 and using only the first four intervals (unison, Octave, fifth, fourth) and variously combining intervals (eg. fifth up, fourth down) the following frequencies and frequency relationships are calculated:

D	E	G	A	B	D
1	9/8	4/3	3/2	27/16	2

If we calculate further the entire scales we arrive at the following structure:

D	E	F#	G	A	B	C#	D
1	9/8	81/64	4/3	3/2	27/16	243/128	2
	9/8	9/8	256/243	9/8	9/8	9/8	256/243

The substructure (ie. the whole and semi-tone steps which separate the individual steps of the scale) appears a combination of two homogenous tetra-chords as the second line indicates.

If we use all intervals of the Pythagorean division including thirds and sixths we arrive at the following scale and substructure:

D	E	F#	G	A	B	C#	D
1	9/8	5/4	4/3	3/2	5/3	15/8	2
	9/8	10/9	16/15	9/8	10/9	9/8	16/15

It is immediately clear that this results in a scale with two different kinds of whole tone steps and a half tone step which seems rather large (16/15).

These derivations can become audible provided the instrument is carefully tuned in fifths (without a beat) and the derivation progresses in slow speeds, accepting in the second example only thirds that sound without a beat. This method leads to the pitches of (1) the "Pythagorean" scale thus:

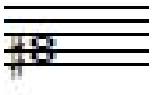
and in similar manner the pitches of (2) the "just" scale:

It is clear that (1) refers to the Delay-Fischer view while (2) underpins some of Joachim's and Sevcik's thinking. The derivation of the major third F# via a natural third (F#-A) leads to a small interval and to a smaller whole tone step E-F#. If the scale intonation is constructed in this way, we face a heterogeneous structure within the two tetra-chords. The Pythagorean scale has the advantage of being based on homogenous tetra-chords and does dispense with the two types of whole tones in favour of one standard, large whole tone and a small semitone. It conforms to the Delay-Fischer methodology of using perfect intervals only (fifths, fourths, unisons and octaves) to tune scale steps.

The Syntonic Comma

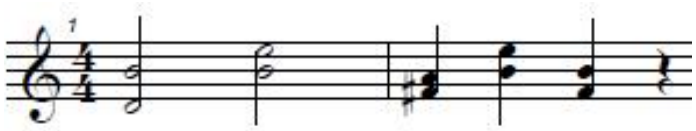
The differences outlined above are clearly audible. They describe in great brevity a phenomenon which is crucial to violin intonation and known as the "syntonic comma". The syntonic comma is the difference between a just and a Pythagorean major third. It is the difference which describes our decision to play melodic major thirds wider while playing them narrower in the harmonic context. This difference is also relevant to minor thirds and, of course, by implication to major and minor sixths.

Within a harmonic context (eg. as a slow or continuously repeated third), performers instinctively and justifiably lower eg. an F# in the following example to avoid the resulting beat from a closer (impure) third and adjust to produce an interval close to the just major third.



The decision to favour just intervals in harmonic contexts and Pythagorean intervals in melodic contexts seems well documented and practically accepted[11]. The syntonic comma is thus the important link in any distinction between harmonic and melodic tuning. In cases where we play the same interval (F# -A) in a predominantly melodic context, we will be inclined to treat the F# as a leading tone and accept the beat of the third as a result of the sharper F#.

The syntonic comma is responsible for a number of tuning impossibilities. This factual context has been well described by Heman (as well as Kimber) who remind us that the following can only be achieved with compromises to the B or the F# respectively:



[11] Greene, Nickerson, Kimber and others refer to this point.

Intonation as Interpretation

What are some of the implications of these differences and how important are they in practical terms to performers? Further, what relevance do these matters have for performance with piano which is tuned in equal temperament and supposedly uses fixed pitches and intervals different to just or Pythagorean conceptions?

The realities of the syntonic comma and the resulting ambiguities between melodic and harmonic tuning highlight the basic fact that intonation decisions are always context dependent. In this sense Galamian and Flesch make valid points. However, it also shows that the ambiguities we encounter are contingent. They are in fact dependent on assumed or pre-established interpretative contexts in our listening to music. While there are choices in terms of pitch depending on the harmonic, melodic or equally tempered context, such choices are limited.[12] It follows that effective communication about intonation requires a desire to refer back to the contexts in which decisions about pitch are made about harmonic or melodic interpretations. Naturally, this presupposes a readiness to clarify or question such interpretative listening. A discussion about intonation thus transforms into a discussion about interpretation. It recognises that the primary function of intonation is its contribution to the clarity of the musical conception and to the intention of the musician to expose music as meaningful. Intonation clarifies or confuses musical meaning.

Pedagogical implications

The interpretation of intonation as a characteristic of musical interpretation has implications for musical and pedagogical practice. In a brief paper on teaching the melodic and harmonic awareness of intonation, Michael Kimber observes that teachers need to clarify what they mean when they admonish students to listen:

"We continually urge our students to listen intently, but it is not usual to ask them to "listen melodically" or "listen harmonically."[13]

[12] We do not consider in this context the issue of additional or historically conditioned tuning systems (Vallotti, Kirnberger, etc). This would complicate matters, but it does not alter the basic conceptual circumstances in which intonation decisions must be seen as decisions of an interpretative nature.
[13] Kimber, 59

Empirical research confirms (Loosen, 1992; Nickerson, 1949) that we follow Pythagorean intonation patterns, preferring larger major – and smaller minor intervals (thirds, sixths), large whole-tone steps and close semi-tones. These intervals are established if we compare pitches internally using only fourths, fifths and octaves, as Fischer and others outline. When listening harmonically we are not satisfied with the essential 'out-of-tuneness' of the larger or smaller melodic thirds and sixths, and we seek to establish a correspondence between the relevant tones and their harmonic partials. Known as just intervals these intervals do not have the characteristic beat of the Pythagorean thirds and sixths and are in the case of major thirds considerably smaller and in the case of minor intervals considerably larger than the relevant Pythagorean thirds or sixths. Instructing the student thus to clearly identify a context of reference and to know that this context has a significant bearing on the pitch is a first step in treating intonation in terms of clarity. It relies on – and contributes to sharpening the structural understanding of the musical score. After all, at the point where discussions commence about melodic and harmonic contexts of intonation, the structure of the musical score and its conception comes into view and the musical structure is consciously perceived if not explicitly analysed.

In many cases, a decision whether harmonic or melodic intonation is appropriate is fairly straight forward. The violin frequently dominates as a melodic instrument and thus its repertoire lends itself at times to extreme melodic intonation decisions, which in some views add to the characterisation of the music. Scalar and fast, virtuosic playing tend to benefit from extreme melodic intervals (closer semitones and closer minor and larger major thirds). In addition, the tuning of the violin in fifths suggests a number of intonation considerations related to sound and tone colour. In cases where leading tones correspond to open strings – that is in keys such as F, Bflat, Eflat, Aflat major, etc sound and intonation seem to benefit from a lowering of the tonic and dominant towards the leading tone, rather than raising leading tones. This is an often neglected consideration particularly in string quartet playing and it may assist sound quality and interpretative clarity as it can highlight the expressive characteristics of these keys. It can also lead to flatness when playing with the piano and thus has to be employed with thoughtfulness.

A melodic playing which strikingly emphasises tonal and intervallic characteristics is sometimes referred to as *justesse expressive*. Rostal (quoting Casals) has the following to say on this:

"Every half tone attracts the following; the faster the sequence of notes, the closer a sensitive ear demands this characteristic interval to be, the higher or lower must the leading tones (*sensibles*) be played as they are attracted by their aims-whole tones are accordingly wider. This lends every melody its order and gives even the fastest and smallest run its physiognomy. This is a not to be underestimated but unfortunately often neglected major advantage for any interpretation. ...The

principle of *justesse expressive* which Casals formulated together with his friend Enescu is also followed by the excellent Hungarian gypsy musicians. Underpinned by the feeling which longs for expression and by musical taste it relies on conscious and attentive listening. It concerns the melodic relationship (successive relation) between the notes and is of a relative character. The slower the melody the less this is important, because the notes engage more significantly in the harmonic relationship (simultaneous relation) with other voices and this formation of chords is subject to the principle of partial harmonics."[14]

Limits of these melodic intonation decisions are established by possible conflicts with harmonic chord formations but also by any conflict when playing with instruments which are tuned according to equal temperament. Of particular importance for the violinist in particular are works with piano written in the keys mentioned above. As the equally-tempered semitones are considerably larger than the Pythagorean semitones, keys such as F major or Bflat major can no longer be intoned with significantly flattened tonic and dominant pitches when playing with piano. Decisions must stay flexible and pitches must obviously be matched to the piano context in the relevant and significant cases.

While this is true for many (but not all) contexts with piano accompaniment, it is important to remember that it does not imply adopting simply an "equal temperament" intonation - as Galamian seems to suggest. There are a number of reasons why Galamian's view cannot be supported: Firstly, even a performance with piano affirms melodic and harmonic contexts independently of the piano. Their clarification through the performers' intonation will contribute to the clarity, differentiation and beauty of the performance. Secondly, equal temperament is essentially sterile and artificial as a tuning system. It lacks definition of a sound spectrum for particular keys which we find very strongly in a string instrument. The tone colour of a violin is significantly different in C major then, for example, Dflat major. This difference of musical character would be reduced or erased if we were to commit entirely to equally tempered intonation even in circumstances where this is not demanded by the instruments. In any case the differences between Pythagorean and equally tempered intervals are most pronounced in the case of semitones and minor sixths. All other equally tempered intervals are closer to Pythagorean rather than just intervals. Thirdly, the reproduction of an equally tempered chromatic (or even diatonic) scale is not readily possible without the assistance of a tuning

[14] Rostal, 90

device.[15] This suggests the essentially artificial and somewhat unnatural character of this tuning.

These, then, are the major conclusions of my argument so far:

Intonation is context dependent. A main context is established by the melodic and harmonic interpretation of what we hear and imagine. A further context is set by the instruments of the ensemble in which the performance occurs. Certain woodwind instruments have limitations to their possibilities of intonation which are determined by the construction of the instruments. Other instruments (piano, organ) have determined and discrete pitches which are set by tuning systems which do not allow melodic and harmonic flexibilities of the same kind as string instruments who work with a continuum of pitches. In these cases, compromises are inevitable. However, in all cases we are looking at a fairly limited range of possible decisions. Knowledge of context will allow us to discuss the issue of intonation and experiment with alternative solutions to illustrate a shift in contexts and interpretative perspective. This facilitates more informed and harmonious communication within ensembles and among colleagues as the conditional nature of judgements is exposed. The melodic context in particular allows us to explore the rich resource of tone colours and expressive resources of the violin. The most striking example here is the intonation in "flat" keys, but also extreme melodic decisions articulating a "*justesse expressive*".

While general knowledge of acoustics can assist performance, the relevant, particular phenomenon for the string player is clearly the syntonic comma. Its importance needs to be understood. The syntonic comma represents the difference between a Pythagorean major third and a just major third (the latter being related to the overtones or partials). Being able to conceive this difference will assist in a clearer imagination of pitch and clarity of musical conception and listening.

Understanding the context which determines intonation implies a more courageous and confident approach to intonation. At the same time, it allows for a recognition of limits and imposes a responsibility for clarity. It encourages flexibility in practice and articulates foundations on which aesthetic discussion and decision become possible.

[15] Mantel, 34

Psychological issues: Mantel's concept of "mistake tolerance"

The latter point in particular seems worth expanding further as it leads to the performance-psychology of intonation. Identifying a context dependency of intonation signals that judgements of "right" or "wrong" intonation will need to be qualified. In fact, the usefulness of a paradigm of a "correctness" of intonation is in doubt. This has consequences on a number of levels and impacts on the psychology of performance. As Mantel points out expectations or perceptions of failure can lead to anxiety which starts to form and condition our practice. Where intonation is judged to be right or wrong, the student is more likely to practice and internalise intonation anxiety and to develop a defensive form of play with associated symptoms, including disruptions to natural movement and rhythm. This is likely to exacerbate any perceived intonation "problems". As an answer here, Mantel proposes a general concept of "mistake tolerance" which also should apply to intonation: In order to correct and improve intonation, unclear decisions in regard to intonation must firstly be registered and noted without anxiety and fear. The performer needs to develop the courage and resilience to commit mistakes and acknowledge these as the resource base for learning. Mantel states:

"As everyone makes mistakes, including the teacher, and since mistakes are important sources of information for progress, we advocate a kind of lutheran "joyous sinfulness" as a basic attitude towards intonation. The fear of faulty intonation should not inhibit the joy of "assertive" music making."[16]

Mantel argues that fear to make mistakes which is widespread in regard to intonation inhibits movement and clear thinking:

"If you are embarrassed to make mistakes, you cannot progress. We need to truly learn to make mistakes without conceiving them to be breakdowns. In the area of intonation, which allows for significant personal freedom, the fundamental fear to make mistakes is harmful in several respects. As anxiety it blocks free movement of the body, in addition, anxiety does not lead to a clear conception of the mistake and finally the many causes of the mistake are not clearly differentiated and thus not clearly recognised. Thus no methods towards a sensible correction of mistakes and towards the exploration of possibilities of correction are learnt."[17]

[16] Mantel, 119
[17] Mantel, 151

Mantel points to intentional "out of tune practice" which can be productive as in the case of practicing fast scalar passages with exaggeratedly Pythagorean intonation where the profile of the passage benefits from distinctly exaggerated placement of intervals. The student needs to be encouraged to explore intonation in regard to its musical function to explore the limits of clarity and confusion rather than conform to expectations of right or wrong. A punitive attitude towards intonation which is expressed often reflexively and at times with strong non-verbal signals by performers and teachers, does not encourage an affirmative attitude towards performance and contributes to undermine the aim of improving intonation.

Conceiving intonation within a paradigm of correctness favours defensive and reactive attitudes. Instead it seems more cogent to think of intonation as a relative challenge towards achieving musical and imaginative clarity. This creative clarity can be distributed across a number of different areas which all have an impact on intonation. Improving intonation then becomes part of the search for musical clarity and meaning in such areas as auralisation (pitch and interval), conception of interval and note-name, context of intonation (harmonic or melodic intonation), ensemble (equal temperament or other instrument specific tuning limitations), geographic orientation on the fingerboard, sound quality (contact point, bow pressure, speed), effective technical foundations and structures and mental and physical disposition.

Pedagogical implications

Mantel's psychological observations and the preceding foundational discussions suggest a number of pedagogical consequences:

Singling out intonation reactively and as an issue which needs to be conquered is pedagogically conflicted. Instead, intonation needs to be treated as a reflection of clear thinking and listening.

Mistakes, the autonomous exploration of intonation as a spectrum and clarification of distinct aspects of interpretation and understanding should be examined collaboratively with the student as creative possibilities and not rejected or censored.

Any judgement about intonation must explain itself with reference to contexts. Thus, reminding anyone to listen implies the responsibility to specify what is to be listened to and what musical aspect is the focus of attention. Equally, identifying out-of-tune playing requires the explication of this judgment according to a referential frame.

Pedagogy needs to build productive intonation habits from the early stages. This includes the coherent use of referencing contexts particularly in the methodical

instruction of students in the areas of melodic (but also harmonic) intonation. Using inappropriate referencing (in melodic contexts, thirds or sixths for example) will confuse the context of intonation that is to be established and may lead to the conditioning of inappropriate intonation decisions, such as closer whole tone steps or large semitones. The conditioning of melodic, scalar intonation can be achieved relatively easily with the use of sustained tonic or tonic-dominant drones during scale and arpeggio practice or – in the case of more advanced students- with the help of octaves, unisons, fourth and fifth comparisons.[18] The awareness of reference is easily internalised and attention in practice and performance can become clearly focussed in an affirmative stance and as a creative conception. A similar approach can be taken in regard to harmonic intonation: early ensemble work with students (violin duos, chorales, etc) can provide us with a vivid illustration of the principles of harmonic intonation. These can then be further delineated in practice against melodic conceptions. In the work on double stops, tempo decisions can play a role in confusing intonation contexts: in very slow tempi a scale in thirds seems primarily vertically defined leading to ambiguous and confusing conditioning in the early stages of learning. Thus, in these stages, the method of approach should emphasise the melodic connections of scales in double stops and only later draw attention to the necessary flexibility.

Clarity and comfort of conception shapes the student's relationship with intonation. Rather than enforcing intonation as a topic of fear and anxiety, we need to promote clarity of perception: clarity of aural imagination (inner ear); clarity of kinaesthetic and rhythmic perception of movement ("this is how the hand/finger feels on the string"); clarity of geographic understanding and mapping (finger-patterns, positions, fingerboard grids); clarity of perception of sound- and resonance spectrum.

Replacing the paradigm of correctness with that of clarity involves a shift in didactic approach towards authentic and autonomous decision making and student centric growth. In addition it connects the issue of intonation with that of musical interpretation. After all intonation is merely an aspect articulating meaning in music, a more or less systematic attempt to realise with the best clarity possible what the composer has conceived in the score and what performers imagine as a result of their reading of the music. Turning the attention from a fear of intonation to the meaning of the musical score translates into a greater focus on listening and creativity. Directing listening in itself will assist the clarity of intonation. It will also

[18] Ricci, 4

expand the freedom of conception and performance as the performer creates her performance through creative engagement and active imagination.

Goetz Richter, University of Sydney/ Sydney Conservatorium of Music
goetz.richter@sydney.edu.au

References

Auer, Leopold. (1960). *Violin Playing as I teach it*. Greenwood: Westport.
Backus, John. (1969) *The Acoustical Foundations of Music*, New York: Norton.
Fischer. Simon. (2000). *Basics- 300 Exercises and Practice Routines*, Frankfurt: Peters.
Flesch, Carl. (1929) *The Art of Violin Playing*, New York: Da Capo.
Galamian, Ivan, (1985) *Principles of Violin Playing and Teaching*, Englewood Cliffs: Prentice Hall.
Greene, Paul. (1937) "Violin Intonation", in: *Journal of the Acoustical Society of America, Vol 9, 1937* (pp. 43-44)
Heman, Christine (1969). *Intonation auf Streichinstrumenten*, Kassel: Baerenreiter.
Kimber, Michael. (1992) "Teaching a melodic/harmonic awareness of intonation" in: *American String Teacher, Spring 1992*, pp. 59-63
Loosen, Franz (1993). "Intonation of Solo Violin Performance with reference to equally tempered, Pythagorean and Just Intonation", *Journal of the Acoustic Society of America. 93 (1), 1993*, pp. 525-539.
Mantel Gerhard (2005). *Intonation- Spielräume für Streicher*, Mainz: Schott.
Mostras, Konstantin. (1961) Die *Intonation auf der Violine- Eine methodische Skizze*, Leipzig: Hofmeister Musikverlag.
Nickerson, J, "Intonation of solo and ensemble performance of the same melody", in: *Journal of the Acoustical Society of America, Vol 21, 1949*
Podnos, (1981). *Intonation for Strings, Winds and Singers: A six-month course.* Metuchen, N.J: Scarecrow Press.
Ricci, R. (1988). *Violin Left- Hand Technique* New York: Schirmer
Rostal, M. (2005) *A handbook of Violin Playing- A vademecum for students and professionals*. Berne: Mueller Schade.