

Understanding and Improving Intonation

INTRODUCTION

Playing with good intonation in an ensemble is a performance *skill*. It must be practiced, just as one would practice scales, sight-reading, multiple tonguing, etc. Unfortunately, amateur musicians tend to ignore the practice of “being in tune,” either because they have underestimated its importance, or because they do not know how to work on it. The result is that during rehearsals and performances, melodic lines remain out of tune, chords do not resonate and project, and performers do not get the best possible sound out of their instruments.

Great intonation requires that you *understand* the deficiencies and tendencies of your instrument, and that you know *how to* quickly correct or compensate for them.

FACTORS THAT CAUSE POOR INTONATION

The following issues can cause poor intonation by themselves, but are usually paired with other factors:

A. *The Instrument/The Mouthpiece*

- Poorly-constructed or low-quality instruments;
- Leaking pads, water keys, and/or joints (woodwinds);
- Worn out or cracked/chipped reeds (woodwinds);
- Incorrect reed strength or placement on mouthpiece (woodwinds);
- Stuck or dented tuning slides and valve slides (brass);
- Dents in the body of the instrument or on the mouthpiece (brass);
- Poor quality mouthpiece (brass, clarinets, saxophones) or reeds (oboes, bassoons);
- Shallow mouthpieces affect the basic overall intonation of the instrument, producing sharpness (brass instruments).

B. *Basic Playing Procedures*

- Poor playing posture and/or hand or finger position;
- Poor embouchure formation;
- Insufficient air support - cold, fast air is required to vibrate the instrument’s air column...always use a focused, fast stream of air, even when playing softly.

C. *Not Playing in the Standard Tuning Frequency*

- Wind instruments are manufactured to play in tune with the main tuning mechanism pulled out part way, allowing you to make minor adjustments;
- No instrument’s main tuning slide should ever be pushed all the way in, or pulled all the way out...if that is the only way for you to be in tune, it is indicative of a wider problem;
- The standard tuning frequency is 440Hz or cycles per second, which corresponds to our Concert A. Another frequently used tuning frequency is 442Hz.

D. Insufficient Warm-up Time

- Modern-day wind instruments are constructed to play in tune at an external temperature of 72 degrees Fahrenheit, at sea level, *after* a proper warm-up;
- Because the temperature of human breath is around 98.6, the breath *gradually* raises the temperature of the air inside a cold instrument, thus raising its pitch;
- Sound travels faster in warm air than in cold, because the air molecules are less densely packed together. This is the *physical* reason why wind instruments will sound flat when cold, and sharp when hot;
- Metal instruments warm up and cool down faster than instruments made of wood or plastic (flutes are the exception, as flutes do not tend to get much warmer because the performer is breathing *across* the mouth hole, not *into* the instrument itself;
- Large instruments, such as the tuba, take longer to warm up than smaller instruments. For this reason, all wind players should warm up on their own at least five to ten minutes *before* tuning (chorales are great for this purpose in ensemble settings);
- During long rest passages, the internal instrument of your instrument can be maintained by softly and slowly blowing warm air through it. Flutes can keep their instrument warm by holding it close to the body or keeping the player's hands on the instrument;
- Always be alert for environmental factors that may affect tuning (for example, a too-cold room, a warm, humid environment, heat from stage lights, etc.)

E. Psychological/Musical Phenomena

- While sound is a physical phenomenon (in the form of vibration), the *interpretation* of that sound by our brains is a completely psychological one, and is therefore subjective and can be manipulated in several ways;
- Octaves can often sound "stretched" to our ears: the higher one will sound sharp, the lower one will sound flat. Both ends of the octave should always listen inward;
- Low tones played loudly tend to sound flat, while high tones played loudly sound sharp;
- In general, humans tend to be more tolerant of sharpness than flatness in the middle and upper registers, and more tolerant of flatness than sharpness in the lower ranges.

F. Pitch Tendencies of Instruments (and Performers)

- Generally speaking, inexperienced wind players tend to play high notes sharp (pinching and tension) and low notes flat (not enough air support);
- Brass players and flautists tend to go sharp in crescendo, while clarinetists and saxophonists tend to go flat (the reverse is true in decrescendo);
- Regardless of quality or brand, every instrument has certain notes that are inherently out of tune with the equal tempered scale. Finding these troublesome notes and working out a solution to the problem should be paramount to all conscientious wind players...for this reason, it is highly suggested that you create a tuning tendency chart for yourself once a year, or anytime you get a new instrument, mouthpiece, etc.;
- Most performers will continue to grow sharp the longer they play, until a point of fatigue is reached at which point the instrument will begin to grow flat due to embouchure issues. Be aware of this tendency and compensate!

Every bit of playing we do today, be it good, bad, or indifferent, goes toward deciding what sort of player we will be tomorrow. A player who begins his day with a load of thoughtless, shoddy flourishes is simply perfecting their faults. Time spent trying to do simple things well is like putting money in the bank. Use your warmup time to do simple things well." - John Fletcher

THE TUNING PROCESS

With the exception of oboes and bassoons, wind instruments are manufactured to play sharp when the headpiece, tuning joints, or slides are closed/pushed in. Therefore, players must lengthen their instrument by pulling out the main tuning mechanism, whatever it is for that instrument. When tuning in an ensemble setting, the following basic procedures should be followed by all wind players:

- ♪ Warm up thoroughly before you begin tuning to make sure your instrument is at equilibrium temperature with your environment. Colder environments require a longer warmup time.
 - ♪ Tune to a reliable frequency, and use the basic tuning notes recommended for your instrument (usually F for brass instruments and clarinets, A for most other woodwind instruments). While B-flat is an ok tuning note, it does induce a small element of strain in brass players, and F is a better tuning note (which also allows the clarinet to tune its barrel joint).
 - ♪ Tune at a mezzo-forte dynamic level, and do not use vibrato.
 - ♪ Humming the tuning note softly to yourself allows you to focus and internalize the pitch much better than simply “attacking” the note immediately.
 - ♪ Do not try to “humour” the tuning note...play it straight. Adjust the main tuning mechanism if your instrument is flat or sharp, do not “lip” the note into place.
 - ♪ Adjusting the tuning note with your embouchure (“lipping”) *does not* mean you are in tune...it just means you have fixed that one single pitch, and that you will have to *keep* fixing it every time you come back to it (not to mention you will have to lip all other pitches into place!)
 - ♪ The first effort you make while tuning should be to find out how far out of tune you are, and then make the length adjustment. The second effort should be to fine-tune any minor deficiencies, and the third effort should be to verify. A good player can do all of this in a few seconds.
 - ♪ In addition to tuning the main tube length of the instrument, brass players should tune the length of each individual valve in relationship to the overall length. Neglecting to do so may cause intonation deficiencies with individual fingering combinations.
 - ♪ Softly re-articulate the tuning note from time to time at random. This will allow you to “get back in touch” with your own sound, which may have become blended into the overall sound of the ensemble (which is a good thing!)
 - ♪ As soon as you have tuned – stop playing. The tuning process is not intended to be a long one. Ideally, you will already be close enough when the tuning note is sounded that it should not take you very long to ascertain where you are in relation to it.
 - ♪ Use your tuning slides to fix the overall intonation on your instrument, and use your embouchure only for correcting small deficiencies on the go. Players should practice lowering and raising pitches using this physical technique without grossly distorting the tone quality or dynamic level.
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MISCELLANNEY

The following thoughts are presented to aid in your practice and pursuit of better intonation, both in an ensemble setting, and on your own.

- ♪ Many brass teachers (and sometimes conductors) will tell you to play “in the center of the sound.” This is not normal, nor is it desirable. Most brass players play on the upper side of the note, **above** the center of the pitch (try lipping any note flat by a half step, and you should be able to do so easily...now try lipping that same note UP by a half step without “skipping” to the next partial. Not as easy.)
 - ♪ At least once a year, you should create a **tuning tendency chart**. As you progress as a musician, your intonation tendencies are forever changing. They can also be affected by new mouthpieces or reeds, new instruments, etc. Use the included chart to track your intonation on every pitch of your instrument. Get a friend to help you - if you are looking at the tuner, you will subconsciously adjust the intonation, giving you a false reading.
 - ♪ If a fixed-pitch instrument like a keyboard (or mallets) sounds flat, that means YOU are sharp.
 - ♪ Certain notes in the overtone series on *all* brass instruments are out of tune: The third partial tends to be slightly sharp, the fifth partial is quite flat, the sixth partial is somewhat sharp, and the seventh partial is extremely flat. Knowing all the different valve combinations available to you can be helpful in combating deficient intonation. For example, brass players playing in the fifth partial (flat) of their horn often benefit from a simple fingering change.
 - ♪ Mutes can raise or lower the pitch of brass instruments, depending on the type of mute being used and the playing register. Familiarize yourself with your tendencies when using mutes.
 - ♪ If you cannot easily manipulate each and every single one of the slides or mechanisms on your instrument, it is time for an overhaul. If your main tuning slide is stuck, you are forced to adjust each and every single pitch you play by way of your embouchure...not even professional players do this! Get your slides working, and you have better chance of playing in tune.
 - ♪ Overtones in the low notes of tubas and euphoniums sound in the middle of the normal playing range of trumpets and flutes! If the larger instruments are out of tune, the overtones will create beats in the fundamentals of the higher instruments.
 - ♪ Low quality (cheap) instruments are not assembled with the same care as the more expensive, better brand name instruments. Slides may not be the exact length, valves and pads can be slightly off-center, there are a hundred different things that could be wrong. This cannot be helped by some performers who may not have the financial capability of upgrading, but playing on the best horn or mouthpiece or reed you can find will yield the best results.
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