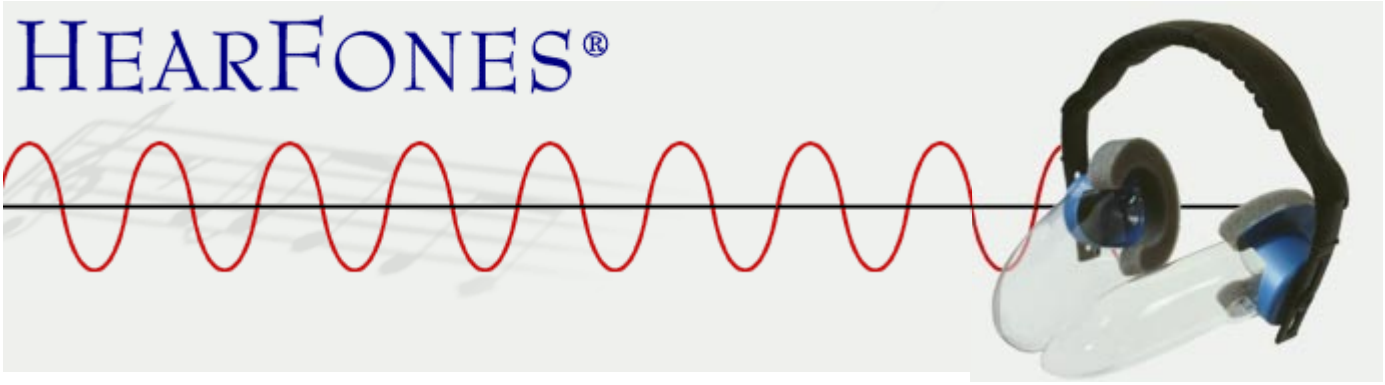
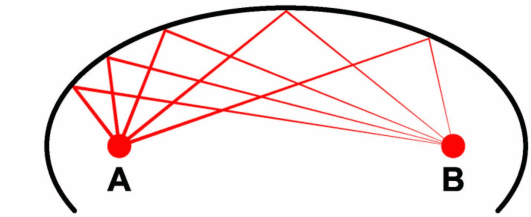


WELCOME to the World of HEARFONES®

Finally, hear your own voice in full acoustic fidelity!



The secret? Every path of sound from Point A to Point B is the same length, so there's no difference in the time the sounds of your mouth reach your ears; you hear what comes out of your mouth — acoustically and accurately! No electrons, wires or batteries.

The typical reaction if we hear ourselves played back is, “Do I really sound like that?” Needless to say, we do, but hearing ourselves afterward is like reading about your golf stroke in tomorrow’s paper — as if your eyes went blind the instant your racquet hit the tennis ball? What can you learn toward improvement?

Every muscle in our arms and shoulders and legs and feet is equipped with 'proprioceptive' nerves feeding back to the brain what's going on, at every instant. But if we can't watch the ball going away, with spin and curve and wind effects as it nears the goal, then all these signals teach us nothing.

If we watch the ball as it races away, and sense the immediate effect of our actions in terms of follow-through and results, then our brain — and even our brainstem and spinal column — will cement and solidify these motions as a memory. This feeling marks a special moment, a learning moment. We need to be sensitive to the details of how the ball is arriving, how we feel, and how it departs, in order to hone these skills to a performance level.

To be useful in motor learning, feedback needs to be immediate, appropriate, and sustained as the task is evolving. A vocal coach listening to you sing is invaluable, but their delayed verbal feedback is hard to apply to what you were actually doing *as* you sang. A whole obscure language has developed for this . . . words like “sing into the mask,” or “let it resonate behind your nose,” or “make your voice darker.”

Of course, one way to effect individual singing feedback is to use a microphone, amplifier and headphones to carry sounds from the mouth back to our ears. In general, this would work well, except for the microphone's sensitivity to distance and the impact of plosive sounds — like the letter “P” — its spectral sensitivity curve to different pitches, its wiring, and batteries, and sound isolation . . .

A simpler, more traditional method is to cup our hands to our ears (think Lily Tomlin on *Laugh In*). We've even seen people try to *plug* their ears entirely with their fingers! But hand cupping is a nuisance when you're holding sheet music and a pencil, and the sounds you hear depend entirely on resonances produced by the shape of your hand. And ear plugging — well — prevents you from hearing your voice; it cuts out all airborne sound and lets you listen to your throat shaking your inner ear.

Which is why HearFones were invented. Hands-free, binaural, live, no electronics — just simplicity.

HearFones’ direct feedback gives you the information you've never had before, to use your lungs and your throat and your mouth to produce, perfect and practice the sounds that you want to make while simultaneously learning how to do it. People who try it are always amazed at what they hear. Fully-equipped choirs instantly sound better, be they young children or seasoned adults. Individuals learn confidence as well as new tricks.

Does real-time feedback really work? We look forward to hearing *your* feedback.

TWO RECENT STORIES

I'd like to introduce you to one of the best things to ever happen to a singer or speaker wanting a better vocal sound: It's a gadget called "HearFones." I've been offering them in my private vocal coaching practice for a couple of years now, and they fly from my shelves so fast it's hard to keep them in stock!

What they do is magnify your true vocal sound back to you… and they are a major improvement over the old cup your hand in back of your ears method.

You can adjust the volume by twisting the clear plastic extensions up and down at your ears so you pick up only as much of your voice as you want.

Lots of choir members use them when rehearsing so they pick their own voices out and hear themselves individually within the group. But I also use them with soloists, recording artists and speakers I train.

Here's what I like about them:

- They let you hear how you really sound to others rather than how you think you sound. Ever been surprised at your recorded voice? You may find that your sound quality needs improvement… and the instant feedback enables you to hear whether or not the techniques you're trying are working.
- They encourage backing off excessive, pushy air pressure that causes stripped gears for so many passionate singers and speakers. They help the vocalist achieve the fine balance between breath support and breath control . . . which my students know is an integral part of my Power, Path and Performance vocal training method.
- They can help a singer focus on pitch. And yes, you can indeed hear your music with them on because they are open and let sound in from outside.
- They enable you to practice in settings where you don't want to disturb neighbors. Your voice sounds unamplified to anyone listening
- They can save you money in your music room… You don't need a live mic or PA system to practice with HearFones. Or you can wear them to practice at a mic that's turned off.
- They are great at preparation for studio or gigs because they let you experiment and memorize the techniques and muscle memory you want for your best performance.
- They are useful in loud, full band rehearsals … you don't have to scream over instruments so they help save your voice for the actual gig!

HearFones are very durable… well-built by NEXTEP Incorporated in Maine, USA. They fold for travel… perfect for the road … or a thin-walled practice room!

Judy Rodman, Vocal Coach, Nashville

* * * * *

I have been using HearFones for the last two years with school aged students who have speech, language and dyslexic learning difficulties. They enhance awareness of their own pronunciation and also seem to give them confidence which leads to greater fluency. Daily reading aloud with HearFones can be set up as a routine to reinforce pronunciation work and to develop reading fluency. The students like them too.

I have recently demonstrated your HearFones on a course about Private and Inner Speech.

We explored the importance of audible self talk in child development as a progression to inner speech, which in turn supports thought, including planning and reflection to modify impulsivity, and working memory to support learning. We know from research in the field that audible Private Speech is a stage in normal development and that high levels of Private Speech at 6 years is often correlated with high performance on tasks. The amount of Private Speech drops at around 8 years, and its use, other than in challenging situations, becomes associated with lower scores. This pattern is most pronounced in bright children suggesting that stimulating effective Private Speech is a valuable intervention for children vulnerable to language delay, attention difficulties etc.

One of the things we demonstrated and practiced was the use of audio recordings for delayed feedback followed by use of HearFones for real time feedback in order to simulate and stimulate the development of self talk as a progression to inner speech.

People liked the HearFones, and will I hope follow them up. They liked the quality of feedback, the 'hands free' element compared with some other devices, and the ability to focus attention on one ear at a time if you are working with a child with unequal processing.

Best wishes,
Diana Crewdson, Speech and Language Therapist, Cumbria

MILLISECONDS — WHAT WE'VE LEARNED FROM HEARFONES

HearFones® were invented simply to help you hear yourself better when you sing in a group. Of course, their very nature is such that you can hear yourself speak better as well.

What surprised us was that hearing yourself better with HearFones would also help you sing better. Just because you hear yourself better doesn't mean that you'll sing better.

Shortly after HearFones were introduced to the world of voice research, in 2001, the University of Tampere formulated a research study to confirm whether — or not — HearFones have any effect at all, and if so, what is the effect. They found there was a measurable and statistically significant effect on the way subjects in the study sang or talked with HearFones on, and that the effect was judged an improvement over how they sounded without HearFones.

What remains is to understand how this effect is implemented, and to what degree — if any — it helps with long-term learning. Three things come to mind:

- with HearFones, you hear greater detail in your voice;
- with HearFones, you hear yourself in "real time;"
- real learning takes place when you have real-time, accurate feedback.

Let's take a look at these, starting with this last one.

THE *INNER GAME*

Of all the subjects in psychology, the subject of "how we learn" is probably the most extensively researched — how we learn to control all the intricate muscles involved in speaking or walking, or any other complex behavior that ultimately becomes an innate habit for us.

Timothy Gallwey authored a series of books on this "inner game" of trial and error over the last forty years or so. Easy to read and appreciate, Gallwey emphasizes the importance of "simply playing with it" — messing around with your mind, your nerves and your muscles to see what happens. This casual, unstructured approach builds a vast familiarity with what it feels like when you do something. His books span the universe from *The Inner Game of Tennis* (1974) to *The Inner Game of Stress* (2009) and offer important insights on the learning process.

The premise is simple: as you stumble around and try things, your conscious mind decides "what you want to do," your subconscious mind elects how to choreograph this — which nerves to fire, and when — while your proprioceptive nerves send back signals from your muscles and physical positions to build a closed loop of "if I want to do that, it should feel like this."

Every subtle difference between one shot and another gets stored away as what we might call a "subroutine" or program of instructions and fine tuning that we can call up any moment as we see the situation developing.

The more you play around, the wider the repertoire of subroutines you store away, and the more you use them, the more available they become in the long term.

A proficient golfer looks far down the course to where she wants to plant the ball. She sets her feet just so, in relationship to the tee, the terrain and the placement of the hole. She swings her club up over her shoulder, feeling the familiar swoosh as the head finds its perfect place. She takes a breath, imagines the entire scenario in her head — wind, temperature, trees, grass . . . and ever so smoothly arcs the club down and around in this familiar pattern, unconsciously adjusting the tension in her arms, elbows, fingers, knees . . . Tock! The ball is gone, and now it's just a matter of destiny. Her job is done.

But no! She keeps her eye unwaveringly on the ball, as it follows Newton's graceful laws up into a perfect parabola, drifting gradually with the wind and settling earth-ward to where it lands, bounces, rolls and at last stops. She watches everything! Even with this one critical shot, she learns a few new things to add to her memory: her real-time, accurate feedback — proprioceptive, accidental, incidental (the wind has shifted) and optical (her own eyes and brain scrutinize every subtle movement of the ball, airborne and on the ground).

All these details and nuances gather together, into the entire compound experience of winning the hole.

BUT IT ISN'T SINGING

While the golfer, or her friend the tennis player, can try and feel and watch the ball as it races away in real time and see its every movement, our singers are different. If they want to sing, they open their mouth and just sing. Their sound projects forward ("always look a person in the eye when you talk to them"), away from their ears. Their proprioceptive nerves and inner ears feel the vibrations in their throat, but can't sense the higher frequencies emanating from their mouths.

If we record their voice and play it back, their first reaction is "Oh God! Do I sound like *that*? What's wrong?"

So, in singing, tradition holds that we need a coach, or an instructor, whose job it is to critically listen to us sing, and to offer feedback to us on how it sounds. We sing. They wince. Then they suggest what we might try differently. A whole language of subjective words (and sounds, and looks) has developed over the centuries to evoke different responses from singing students: "Try to make your voice brighter!" "You should use more support!" and of course "That was beautiful!"

If a singer were a golfer, this would be like suddenly going blind the instant the club touches the ball. You might hear the solid, familiar "tock" as the ball is hit, but that would tell you nothing about where the ball went, or how it curved, or where it ever landed.

A few moments later, the coach begins to speak: "That wasn't very good. The ball landed about twenty meters to the left of the hole, and it rolled another ten meters into the pond over there. Try again, but this time swing more gracefully."

In tennis, you might be told, "the ball hit the net that time; try a little higher, and not so near your opponent's racquet."

A WORD ABOUT DETAIL

Let's examine what we mean by "detail." To start, we'll use a visual example. If you are nearsighted, you can see the detail in this very text you're now reading because it's close to you, but when you look up to read a sign down the road, the letters look all fuzzy. You might have trouble seeing the difference between an "O" and an "X", but you certainly can't distinguish between a "P" and an "F," or probably an "R."

You can see the broad shape, but not the details.

In sounds, the detail ranges from none — a smooth "sine wave" that undulates gracefully back and forth at some given frequency — for example the sound of a tuning fork at "A-440" or the dull sound of a distant fog horn through a dark night.

We might describe it as "hollow" sound. After a few minutes, we'd be tired of it.

For detail in sound, think about the difference between a tuning fork and an oboe or violin at the same pitch. The extra details in these new sounds immediately tell us they're different. Add in a French horn, a trumpet and a chime, each still at A-440, but much more distinctive.

If we look at their sound waves, we see more detail, too. Where the sine wave sways back and forth, undulating smoothly like a rope hanging between two hands, these new sounds have "overtones" in them — jagged little crinkles in their shape at frequencies "higher" than the fundamental 440 wobbles per second. Each of their harmonic overtones, or "partials" can be seen in their shape and heard in our ears as more detail in the waveform.

Imagine the difference between what the teenage driver is hearing inside his car, compared to the booming of his 'boom-box' as he drives past us with the windows closed. The devil is in the detail.

And higher frequencies are more directional. The sound of the foghorn seems to surround us, but the sound of a bird can be instantly pinpointed. When we sing, we hear our fundamental pitch, but most of the overtones go straight ahead out of our mouth and only reach our ears by back-scattering in the air around us, by reflecting off the ceiling or walls (think singing in the shower) around us. We hear ourselves later, and jumbled up in time. What we hear isn't what we're saying or singing.

"OH GOD! DO I SOUND LIKE THAT?"

Telling the difference between a piano and a harp is easy, when you're provided the details in their sound. In singing words, we can distinguish the word by the detail in its sound as the singer moves through the word, from start to finish. If we lack the detail, the voice sounds dull an unintelligible.

Words are composed of different sounds that we call consonants and vowels. A vowel sound is one you can sustain — like an "E" or an "AH." A consonant is more of a brief transition — like a "T" or an "X." In their spoken form, we would of course say "tee" or "ekks," where we find vowels hiding in their sounds, but imagine instead the sound of "T" in "it" or the sounds of "T" and "X" in the word "tax." The "T" is formed with the tip of the tongue; the "X" is formed farther back in the mouth.

In forming words, we make gradual or abrupt changes in the pitch (frequency) of our voice, and in the way we use our vocal folds, and in the shape of our mouth. In whispering, we use our vocal folds to make a hissing sound — a sound that contains all frequencies at once (so-called "white noise") — and then control what comes out of our mouth by the shape inside it. It's amazing how well we can be understood even when simply whispering.

When we string together individual sounds into words, it's called "articulation," and a person having trouble with it is "inarticulate." As humans once spread gradually around the globe, each family settlement established its own way of articulating or "saying" words, leading to an almost infinite range of dialects and ultimately to many different languages.

There are so many dialects because all family members learn to speak without good feedback as they mature from an infant to an adult — their ears have been behind their mouth the whole time. Any one singer, depending on his or her job, may be called to sing in several or many of these variations — opera singers in different languages; folk singers in different dialects — each of which is learned just the way Gallwey describes.

THE MAGIC OF THE ELLIPSE

When we developed HearFones, we were thinking about how hard it is to cup your hand to your ear while you're rehearsing — hands full of music and pencils as they so often are. But being, as we were, at least high school graduates, we instinctively knew that the cupped hand is utterly the wrong shape. We chose instead ellipsoids as our model, because we remembered that the path from one focal point to the other is the same length.

But it never occurred to us — until we tried them — that the effect would be so profound. What happens is that the higher and higher frequencies that define the detail in our voice are more and more accurately carried from our lips to our ears, such that almost everyone who has ever tried them is amazed by what they hear.

These intricate details arrive "in phase" when we hear them, and within about half a millisecond (0.001 second) after they're created.

— WHAT YOU HEAR WITH HEARFONES® IS AMAZING —

DOES REAL-TIME FEEDBACK REALLY WORK?

A recent article in *Wired* magazine[1] by Thomas Goetz, caught our attention. *Wired* is a computer magazine, so Goetz relates how *Feedback Loops*[2] in electronic circuits model the way feedback works in human nature — a speed limit sign might be ignored, but passing a radar speed sign actually modifies our behavior.

In choral singing, we realize how rarely a singer hears the combined ensemble sound, let alone hears their own contribution to that sound. Auditions screen singers for select choirs, but after that they're usually on their own. Pitch? Vowel sound matching? Well . . .

Goetz goes into great detail to show how subtle the feedback effect can be, and how we internalize it as new neurological muscle patterns. Indeed, piano players will recognize how the sound of their playing feeds back to the movement of their fingers, and how many passages are stored away as muscle memories. Golf and tennis players have long known that their actions (and reactions) are stored away and called back when needed. Timothy Gallwey's series[3], *The Inner Game of (Tennis, Golf, Singing . . .)* points out how "just playing around" creates a wide variety of sub-routines in muscle memory, ready for recall when needed, upon an instant's notice. ACDA member Katherine Verdolini Abbott has addressed this group[4] several times on the subject.

Annual presentations at the Professional Voice symposium, hosted by The Voice Foundation, have brought to light new neurological findings that help interpret how this all works. One is the discovery of so-called 'mirror neurons' that automatically cause an observer to mimic the actions of the observed. A classic instance of this is when a freshly delivered infant, coming from a closed and secure environment — the womb — can react to the human face falling as a new light pattern on its retina. If a nurse sticks out his tongue, it's a good bet the new learner will stick out hers too. As if she knew she even *had* a tongue.

Another finding is a direct and extremely fast neural pathway through the brain stem, from the auditory area to the larynx. When we see a baseball rolling across the street, it takes 500 to 750 milliseconds to decide to hit the brakes — even with close attention. But it takes just 10 milliseconds for our larynx to react to a new sound! For a bass voice, that's like one flap of the vocal folds!

So, what can we do with these new ideas?

COLLECTIVE FEEDBACK

It's awkward, at best, for a choir on risers to rearrange itself into a circle, let alone into two choirs facing one another, but the results are amazing. As a bass, I sing in the back row, so I never, ever get to hear the soprano section, or how we and they sound together. Only the director knows, and it can take months or even years to learn her non-verbal cues (the evil eye, the deadly glare, the beaming smile) and know to whom they're being directed.

When a group of singers attacks a new piece of music, there's a lot going on, all at once:

- holding the music, reading the music, turning pages, marking the music;
- interpreting the notes and symbols to sing the right words at the right pitch;
- deciding who's on the right pitch — you or your neighbor;
- breathing at the right times, and in the right manner;
- getting the tempo right and — oh, did I forget? — watching the director . . .

In choral formation, listening is often the last thing on our minds. But as the piece starts to feel familiar, more and more of it becomes 'automatic' — muscle memory at work. We begin to pay more attention to the director, sort out the details, begin to function as a family, and at some point we find enough self-confidence to physically re-arrange ourselves, blurring our 'sections' into a homogeneous ensemble.

This is when the moment of truth hits us. We know how a fish feels out of water! A soprano stuck between a tenor and a bass, with an alto over her shoulder? Now we need to fend for ourselves, and the result — painful as it may seem — can be powerful. We're hearing, often for the first time, how our voice fits in with the others, and what their voices sound like. We learn new tricks. We start improving our skills.

If we can stretch this homogeneous mix into a single-file circle, we can finally appreciate the beauty of our collective efforts, and actually see one another. Or if we break into two balanced choirs, A and B, and have one sing to the other, we can actually hear what the director and audience hear. We hear other individuals producing our notes and words, and learn to complement what they're doing. It's those mirror neurons at work. Granted, two separate choirs is not 'real-time' feedback for us — it's more like a final exam to see how we're doing.

The one thing missing is — that none of us can truly hear ourself as we sing. Our mouth is in front of our ears, just like our sopranos stand in front of the bass section.

1 - *Wired Magazine*, 19JUL11 - <http://www.wired.com/magazine/2011/06/ff_feedbackloop/all/1>
2 - Goetz, Thomas - *Harnessing the Power of Feedback Loops*
3 - Gallwey, W. Timothy (1974). *The Inner Game of Tennis* (1st ed.). New York: Random House. ISBN 0-394-49154-8
4 - Verdolini Abbott PhD, Katherine - Professor, School of Health and Rehabilitation Sciences, University of Pittsburg

A PROBLEM IN SINGING

Most of the million or so singers in the U.S. are in vocal groups that could sound much better if they took their singing quality seriously enough to make time to improve it . . . or had an easy way to achieve this goal quickly. In most cases, the singers don't really know what sounds to make, how to make them or have a way to monitor their singing quality. Also, while performing, these singers hear mostly the ensemble sound (and any accompaniment) and may not even hear their own voice at all . . . or may not even be listening. If all the singers could hear clearly the sounds they produce, they just might take steps to improve the quality. Can HearFones save the world?

ENTER HEARFONES®

Each singer using this revolutionary new tool hears very clearly the real and total sound of his own voice which he doesn't hear now just listening to the reflections of his singing in the room. With HearFones, he hears what he really sounds like – the same voice the audience hears! In addition, while using HearFones, he hears himself much more predominantly over the rest of the ensemble, thus helping him to improve the quality of his output. You can practice your part right there while singing with the whole group! With simple instructions and a sincere effort to sound better, the singers in the ensemble can soon improve their performance dramatically.

All it takes is HearFones . . . and the desire to get better . . . to reach the goal of beautiful singing. The booklet "Singing Secrets" included with HearFones outlines simple steps needed to produce better individual sound. Many singers feel that when singing in a group their own efforts are not heard out front and thus sense that any vocal inadequacy will go unnoticed. Not so! You cannot take poor quality singing, multiply it by 40, and get good singing. The chorus director cannot monitor all the voices individually, but each singer can!

The inventors of HearFones . . . teachers and singers themselves . . . recognized these problems and believed that good acoustic design could bring the benefits of this neat concept to every singer. Imagine our surprise when testing early prototypes on singers, we found that time after time every singer sang better just by putting on HearFones! When we saw this happening, we knew we were onto something really big.

In addition, in the hands of a director, the singer can be shown the appropriate sound to sing, then, with HearFones, the singer duplicates the director's sound, often as necessary, to reproduce the instructor's example. After singing good sounds using the HearFones, the singer knows how it feels to sing this way and, in time, will be able to duplicate the sound without the "training wheels". It's that simple. The director can use some of the better "students" to teach others in the ensemble how to sound good and employ games and exercises to promote the use of better singing techniques. No step in the use of HearFones violates any recognized good singing practices. The beauty of it all is that it gets right to the heart of the matter . . . good sounding singing . . . right off! This is quality control in music, and a great way to build confident singing.

It should be emphasized that one of the most important contributions of this tool is that HearFones focuses the singer's attention on his own voice, often for the first time.

Ensembles may use HearFones to produce better quality sound in recording sessions. Soloists will find this tool most useful in their own vocal improvement in any singing style. Speakers use HearFones to monitor their own diction, modulation and delivery. HearFones also find many uses in the Speech and Hearing Therapy fields.

Not since Guido d'Arezzo's music notation in 1030 has there been such a help for the singer.

MAKE BEAUTIFUL MUSIC — THEN GO SAVE THE WORLD ANYWAY!

NEXTEP™

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3	$36	$120	13	$33	446.00	50	$31	$1,597
4	$35	$155	14	$33	479.00	60	$31	$1,909
5	$34	$184	15	$33	513.00	70	$31	$2,232
6	$34	$218	16	$33	546.00	80	$31	$2,544
7	$34	$253	17	$33	579.00	90	$31	$2,883
8	$34	$287	18	$33	613.00	100	$30	$3,079
9	$34	$322	19	$33	646.00			
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