INTRODUCING ACOUSTIC PSYCHOMETRY®

Acoustic Psychometry®, or "AP," is the measurement of mental states using speech acoustics. With AP, a brief sample of speech is processed to identify its essential acoustic patterns. These patterns, in turn, can be interpreted for what they reveal about the speaker's way of thinking and feeling. To understand the great potential of AP it is useful to first consider the current status of mental measurement methods.

Until now, mental states have been highly refractory to inspection by technology. The tests you hear about for autism, ADD, personality styles, and so on, are highly non-specific, and their validity is vastly exaggerated by corporate and academic marketers. Scientists who are immersed in the field recognize that decades of research in brain imaging, genomics, and other technologies have failed to yield even a single unambigouous test of mental functioning.

The problem is primarily conceptual rather than technical. It has proven impossible to translate the exciting findings of brain science--especially imaging and genomics--into the realm of psychology, because no conceptual template for doing so exists. The concepts and methods of biology and psychology have nothing in common. Speech-based methods, in particular, have relied almost exclusively on statistical correlations, generated by training algorithms, of random collections of acoustic variables and human traits, without regard for conceptual linkage. As a result, attempts to locate psychological characteristics within the brain, genome, or speech signal repeatedly fail to differentiate specific mental qualities from one another, yielding tantalizing "p values," on occasion, but discouraging "effect sizes."

Acoustic Psychometry solves these conceptual problems by focusing on what are called "acoustic transformational structures." These are the mental structures, or rules, that people employ as they speak. They are properties of the person, created over time, evolving continuously but slowly, that reside simultaneously within the neurological and the mental apparatus. They embody an utterance with specific patterns of thinking and feeling. The existence of these structures was discovered by the pioneers of speech science and psychology in the last century, and it has become possible to measure them quickly using modern methods of signal processing. It is our belief that by measuring acoustic transformational structures AP will provide the best conceptual template for linking biological and psychological systems, and that it will thereby enable mental measurement to attain the precision of biological measurement.

The method and system used to identify, quantify, and display acoustic transformational structures is called "Acoustic Psychometry ." It is patented in the United States. It is a powerful and nimble instrument, capable of extracting a variety of structures from a sample of speech thirty seconds or less. The structures are selected, displayed as images, and measured according to the needs of the user.

At this time, the interpretation of AP images and measurements requires special knowledge, understanding of the system, and a lot more research. A pilot study aimed at predicting likely placebo responders in clinical trials has yielded p values of .045 and .042, with an effect size of 1.42. If confirmed, this gives drug developers an ability to indentify 76% of likely placebo responders prior to a clinical trial and exclude them. Another pilot study identified acoustic correlates of the personality characteristic of conscientiousness with a correlation coefficient of r=.77. Studies are envisioned that would facilitate personalized psychiatric medicine, identification and differentiation of basic clinical states,, fundamental personality structure, risk of specific medication side effects, and so on. Studies that also address a variety of non-cliinical issues that are of interest in certain communities--such as predicting competitive athletic performance--are envisioned. Future users of AP will certainly find new applications for it and make original contributions to its development.

Two eminent scientists well versed in the areas of linguistics, psychology, and brain science have examined AP and forsee a prominent role for it. Ray Kent, Professor Emeritus at the University of Wisconsin and one of the world's preeminent speech scientists, has commented upon the "unique capabilities" of AP, and its "flexible and dynamic analysis that is well suited to the complexities of human speech and underlying mental states." William Sledge, M.D., the George D. and Esther S. Gross Professor of Psychiatry at Yale, has desribed AP as a "unique window to the mind" that bridges both the biological and psychological realms "without sacrificing complexity in either one."

Acoustic Psychometry and its methods are the creation and intellectual property of Dan Begel, M. D., whose company, Acoustic Psychometry Systems, Inc., is located in Santa Monica, California.