SOUND QUALITY, PART VI: ASSOCIATIVE RESPONSES

By Steven J. Orfield

In past articles over the last two years, I have attempted to introduce the broad context of sound quality to the reader, suggesting that this new method of acoustic analysis will become, over the next few years, the dominant method of acoustical problem solving in all areas of acoustics which depend on listener response as a critical variable. (See *Sound & Communications*, March, April, May, Sept, Dec. 1992).

As part of this introduction process, I have considered a variety of fields which make up the sound quality continuum. These fields are acoustics, audio engineering, audiology, marketing and market research, perceptual and motivational psychology. We have also briefly discussed the inclusion of other sensations in the practice of sound quality in terms of using visual stimuli in acoustic research efforts with consumer juries.

While there are many academic and engineering experts who have become quite well grounded in the concepts of psychoacoustics which underlie much of sound quality and specifically Zwicker's work (See *Sound & Communications*, May 1992 Review on Zwicker's Psychoacoustics: Facts and Models), there is still great difficulty in explaining, even to many of those experts, the fact that acoustic associative variables may have a far greater impact on acoustic responses than the absolute value of the sound itself. This issue is broadly characterized as the issue of associative response in the consumer's mind. It is an issue known well by many marketing and market research experts but constantly forgotten by acoustical professionals.

Sound quality has two objectives, the first being the design of better products and the second being the marketing of acoustic benefits. The most important aspect of sound quality work is in defining the SQ objective. In this article, I will discuss in more detail the issue of associative responses to acoustical variables in the sound quality process, keeping well in mind that the solving of sound quality problems has far more to do with defining those problems accurately than with the standard acoustic method of assuming one knows the problem and putting all efforts into the solution process.

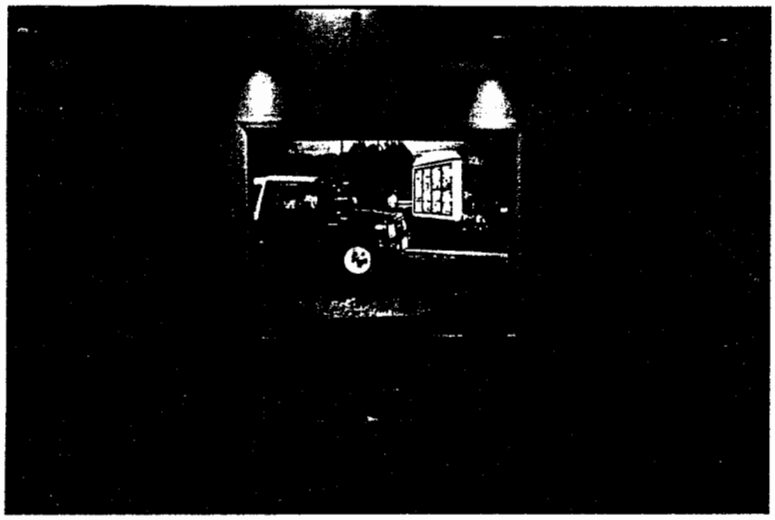
THE PROBLEM

In evaluating an acoustical product, be it a consumer product or an audio product, there are some simple methods of assessing its performance. The two most common are direct acoustical measurement and informal listening experiments. The measurements may demonstrate an analytical attribute, such as frequency response or decibel level; listening will suggest an initial response on the part of the consumer. The problem with these methods is that they fail to assess one particular variable in the consumer's mind which may govern the response to either of these sets of information, and that is the user association set.

With regard to the above variables, the consumer may have been trained via advertising to expect a "flat frequency response" on the measurement continuum. On the listening continuum, the user may expect that more expensive audio components have "more bass." Innumerable components have been sold claiming flat response and extended bass response. Researchers in the audio field know that the listener's response to both these issues often suggest that they have been biased, by marketing efforts, to prefer the purchase of audio components which claim a certain specification and sound quite bass. A large number of these products do not reproduce sound accurately and distort the audio signal by overdriving the bass response and providing poor mid-frequency response or masking mid-frequency clarity. The specification claims give comfort to the buyer, and the bass response adds a level of sensation (vibration) to the experience.

By walking into the audio retailer with these two associations in mind, the user feels confident that he has reasonable criteria for system selection, although the criteria have no correlation to high quality audio. The consumer who purchases based on this view may also conclude that he is quite pleased with the results, regardless of what many of us would call a

Steven J. Orfield is the President of Orfield Associates in Minneapolis, Minnesota.



Associative visual stimuli test (first version).

low quality audio system. There are a number of major audio manufacturers who play very heavily on this associative marketing knowledge and sell very poor products quite successfully.

In the above example, we must conclude that a decision to purchase an acoustic product has been made based on product associative response which, in and of itself, is far more influential to the consumer than is product performance. Associative response is particularly influential in the acoustics field because of a number of facts regarding this market. First, the consumer is not technically knowledgeable and therefore has little confidence in his judgments in the presence of "audiophiles." Second, his resulting criteria are often neither relevant to sound quality nor very high. Any sound system with modest performance will generally satisfy the consumer, and brand name distinctions can often succeed where sound quality has not. It must be remembered that the object of marketing is not to sell good products but to satisfy the consumer. This is often more easily and more profitably accomplished by marketing than by engineering.

In order to deal with the above problems in marketing and product assessment, the researcher in sound quality who wants to design a better product and successfully market it needs to know a number of things:

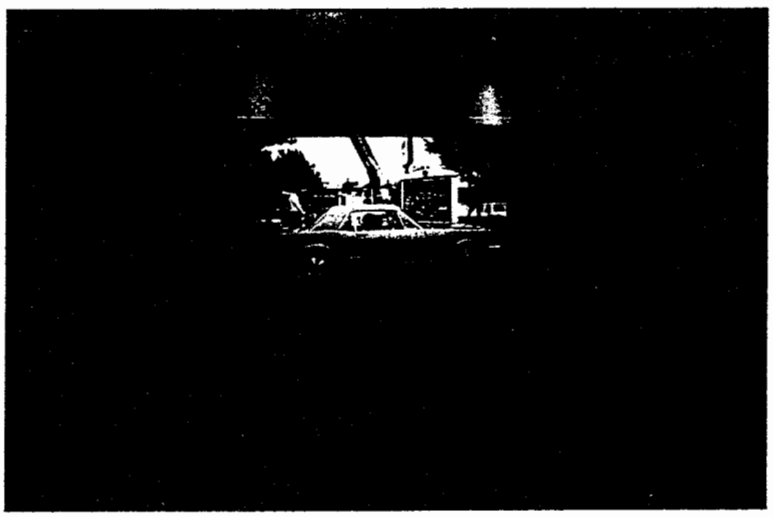
1. What is the general expectation set for this product type?
2. What are the specific brand associations for products in this market?
3. What are the expectations for the specific brand of product being researched?
4. What sort of target or final product and brand profile is needed?
5. Will a product improvement provide a significant benefit?
6. What market segment will perceive this benefit?
7. With regard to this product, in order to establish acceptance, do you need to meet expectations or to change them with regard to your field and your specific product?

This need for a definition and a control of expectations suggests that there are two separate problems which must be understood in the sound quality continuum. The first is understanding the product performance and the second is understanding the market continuum.

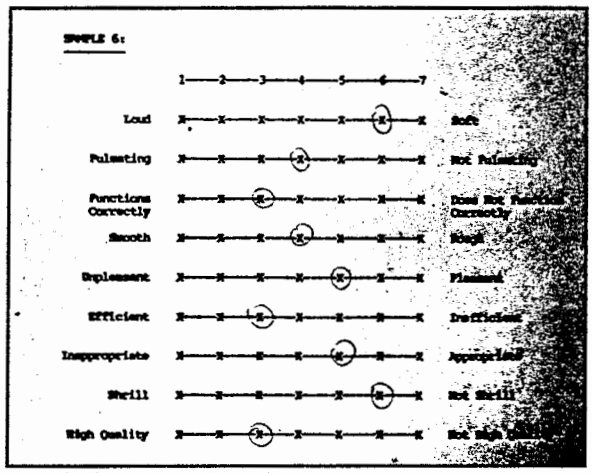
APPROACHES TO SQ

Thus, the designer of the new product has a broad definitional problem to deal with prior to engineering or marketing efforts. This problem, generally characterized as a market research problem, is that of defining the market demographic, expectations, competition, and new product needs, and this is often done with the following procedure:

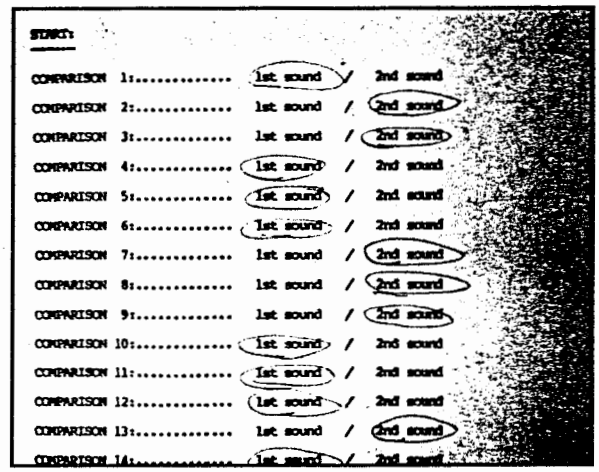
1. Select and define a market demographic of interest.
2. Meet with representatives of that demographic to discuss and determine the descriptors which they use for describing the product area and its problems and benefits.
3. Develop a product needs acoustical performance statement.
4. Develop a simulation of the current product versus the new product.
5. Perform informal listening tests with inside personnel to determine the significance of the product changes.
6. Perform a formal listening jury process to quantify user psychoacoustics and associative response. (Repeat as necessary.)
7. Determine the significance of the response and finalize the defined changes.
8. Determine the sound quality marketing program needs.
9. Perform SQ calculations to quantify the correlation between jury responses and calculations.



Associative visual stimuli test (second version).



Associative semantic differential test.



Paired comparison test.

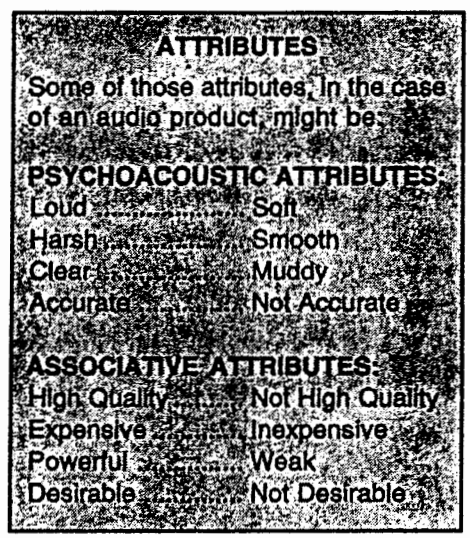
10. Perform acoustical measurements to quantify the performance.
11. Develop a technical definition of the product changes.
12. Begin the technical engineering process.

It is interesting to note that the vast majority of the tasks outlined above are not part of most product development continua. Generally, only the last two are formally used. Most of the remainder of the process requires a joint effort between the marketing and engineering departments within a given firm, and this is difficult to develop in all but the largest companies.

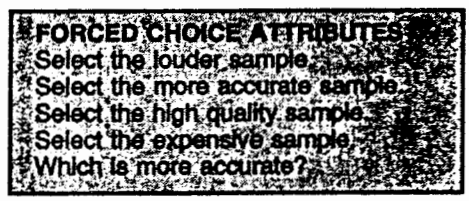
ASSOCIATIVE ATTRIBUTES

While it is not the intent of this article to discuss market research in detail, some basic discussion of attribute development is helpful. When the above jury testing is accomplished, it is generally based on one of two kinds of listening tests, the semantic differential and the forced choice (paired comparison) test. In the semantic differential test, the jury is given the task of listening to multiple samples of the product sound and then rates each of them based on a set of attribute-pairs and a 7-point scale.

The first set of attributes attempts to characterize some of the basic psychoacoustic responses of the listener to this listening test; the second attempts to elicit psychological responses which are associative to the experiment.



In the case of the forced choice test, the listeners are given paired comparisons of two sound samples and asked to chose which one best represents a given attribute; again, psychoacoustic and associative responses can be elicited.



The semantic differential test attempts to draw absolute responses to the product being listened to; the forced choice test attempts to determine the ability of the listener to discriminate between samples.

The first test is considered the most useful in most market research, and the second is useful in defining minimum thresholds of discrimination on specific continua.

In this article, we have considered the problem of non-psychoacoustic responses to acoustic stimuli and their importance. In articles to come, we will discuss sound quality marketing, multi-modal juries and SQ statistics. ■