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GUEST EDITORIAL

There are several frontiers in biofeedback research and clinical application. In this issue of *Behavior Research Methods & Instrumentation*, for the first time, papers have been assembled which deal with problems related to biofeedback instrumentation. The first three papers point to what I consider to be the most salient problem in biofeedback instrumentation, specifically, the lack of basic research upon which to base the design of biofeedback instruments. Schandler and Grings review the importance of the different sensory modalities used in biofeedback devices. Lubar and Culver next discuss the variety of signal processing methods that may be employed in biofeedback devices. These diverse methods of filtering, integration, and signal averaging provide dramatic differences in the nature of the feedback signal, the data recorded, and, possibly, learning. Taub and School discuss factors that influence thermal biofeedback training. Is digital display of temperature better than an analog display? Is performance better with displays showing hundredths of a degree change than with tenths of a degree change? Can learning be improved by presenting audible and visual feedback simultaneously, or does this confuse the subject? As Taub notes, we now have only general ideas, based upon anecdotal evidence, of what instrument parameters are ideal for optimum learning. The first three papers clearly document problem areas where further research is needed.

Pulse transit time (PTT) measurement of blood pressure is a relatively new noninvasive psychophysiological technique that may have wide laboratory and clinical applications. Obrist, Light, McCubbin, Hutcheson, and Hoffer carefully explore the relationship between PTT and both systolic and diastolic blood pressure in an elegant treatment of the topic.

Problems of electrical safety, instrument specification, and manufacturing are discussed by Pope, Burgar and Rugh, and Garlington in three separate papers. Pressures from the FDA and professional societies will likely force dramatic changes in commercially available instruments in the near future. Aside from recently accepted Safe Current Limit Standards, commercial biofeedback devices are unregulated and lack standards. The variability in signal processing, specification techniques, and calibration now found in commercial biofeedback devices makes comparison of results of different laboratories risky and the development of standard clinical procedures impossible.

Biofeedback subassemblies instruments and systems are described in the remaining four articles by Shartner, Boudrot et al., Fridlund and Fowler, and Glaros et al., respectively. The availability of commercial subassemblies has greatly simplified the construction of special-purpose biofeedback devices. The digital temperature device described by Shartner, for example, makes use of an analog-to-digital converter assembly which reduces design time and construction costs.

It is hoped that this series of articles will help pinpoint problems in biofeedback instrumentation, as well as serve to stimulate research directed at these problems.

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