



An Econometrician Replies to Steven Shaw
By Andrew Weiss, Ph.D.

In a paper that purports to use statistical analysis to challenge claims made by the advocates of sensory integration, it is of prime importance to get the statistical analysis right. This is especially true since most of the readers are not conversant with statistical analysis and may take the assertions on face value, whereas they are actually misleading if not wrong.

The approach used by Shaw is meta-analysis, in which many different studies are combined as if they were all part of the same study. Meta studies are very controversial, to say the least. Classical statistical analysis is invalid when studies with different methodologies are combined. Indeed the major reason for new studies is to use a different research design or methodology, because the previous methodology was found to be faulty. Indeed the reference to "multiple variables" in each of the studies suggests very important methodological differences, which would invalidate the meta-study approach and would not make any tests of statistical significance wrong. The "standard errors" in a meta-study are not valid but could lead the "results" to have the opposite implications of those cited. It only makes sense to combine studies if the newer study used the same methodology as the old one in order to see if the results hold up with a different sample. There is no evidence in Shaw's paper that he restricted the studies he included in his meta-study in any reasonable way. However, even meta-studies that combine studies with the same research design have faced serious challenges because journals are more likely to publish new results that are at odds with previous ones rather than confirmatory studies. The latter are more likely to simply enter the "folk wisdom" and be cited in less formal working papers or at conferences. The consequence is that there is very little use made of meta-studies by serious statisticians. What is usually done is simply to list the studies; describe each one's methodology, including the additional variables that were included; and state the result.

Shaw asserts that poorly designed studies commonly find greater results than well designed studies. This is not true. It is well known to anyone who took an elementary statistics course that when the variable whose effect is being measured, in this case SI intervention, is being measured with error, the estimated effect is biased toward zero. Experiments on the effectiveness of SI will have great difficulty measuring the amount of SI that was employed of each patient. A poorly designed experiment would presumably have more measurement error and therefore would be less likely to obtain significant results. By contrast drug interventions can very accurately measure the amount of the drug that was administered, and thus the bias toward zero is avoided, therefore whenever SI is compared with drug therapy, the results will be biased against SI .



Shaw appears to believe that "random assignment" is always the best way to test the efficacy of a treatment. This however assumes that the aim is to see if the treatment should be used for all patients with a given disorder. However, typically the therapist has information that is available about the patient that is not available to the researcher. The relevant question is whether the patients that would be selected for SI therapy will benefit from that therapy. This cannot be measured through random assignment.

Shaw suggests that SI be measured against the "safe and effective" criterion employed by the FDA. This is a strange demand coming from a psychotherapist. I doubt if the particular therapeutic techniques he employs have been found to be "safe and effective" in well designed studies (or any studies at all). For many of the patients being treated with SI, the alternative is talk therapy or drugs. The drug use would typically be "off label" and therefore would not have been tested for whether they are "safe and effective" for treating the conditions for which they are being used as a substitute for SI. It is very difficult to test for the efficacy of interventions in which the results depend largely on the skill of the practitioner, which is why FDA approval is typically not required for surgical procedures. Numerous surgical procedures, and forms of talk therapy, have been implemented and practiced for long periods with no rigorous studies showing their effectiveness.

Shaw also challenges the use of SI on the grounds that it may be having only a placebo effect. He also acknowledges that physician treatment has placebo effects and that much of the efficacy of psychological counseling is placebo. Even if all the benefit from SI is placebo, the relevant question is whether the treatment is cost effective relative to other treatments that may also be due to placebo effects.

I strongly agree with Shaw's call for more research on the efficacy of SI and would urge him to communicate with the appropriate agencies to provide funding for those studies. Halting insurance and government payments for SI makes less sense than disallowing the "off label" use of drugs or most psychotherapeutic techniques. Those treatments are more likely to be harmful than is SI. Pending the results of those studies, I think it would be unconscionable to use Shaw's polemic to justify abandoning the use of SI to treat children with disabilities.

Andrew Weiss is a Professor of Economics at Boston University and Fellow of the Econometrics Society. He received his Ph.D. from Stanford with distinction. Dr. Weiss is one of the 250 most highly cited authors in economics and finance, and his work with Nobel Prize laureate Joseph Stiglitz (2001) was cited on the Nobel Prize web site.