Measuring Inner and Outer Behavioral Effects of Hemi-Sync

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One primary goal of the Monroe Institute since its inception has been stated succinctly: To provide "something of value". Defining that something can be an elusive process. Even when agreement exists that something of value has been provided, the quantitative aspects of that value often seem difficult or impossible to measure. What I'd like to share involve some of the insights gleaned working in a field—the measurement of behavior— where some of these measurement difficulties have been solved. Unfortunately, resistance to new technology seems to be the general case rather than the special case, regardless of the particular topic area. Much of what follows has yet to be incorporated in the very specialty that spawned it. For that reason the "Tomorrow is Now" theme chosen for 1992 seems particularly appropriate. By gathering and sharing information from the cutting edges of various technologies, those of us using Hemi-Sync in research and practice can indeed make tomorrow today.

Something of Value

When something of value has been provided, behavior becomes possible that wasn't occurring before, or wasn't occurring often enough or fluently enough. In other words, behavior **changes** provide the substantiation of value. In the parlance of science, you try to vary some condition by adding it or subtracting it, control everything else and measure the effect. Hemi-Sync serves as an added condition and the person's behavior who uses Hemi-Sync serves as the effect to be measured.

How can one determine the significance of behavior change? Traditionally in the behavioral sciences the approach has been to use inferential statistics. After making the assumption that no difference occurred between two or more conditions, results can be quantified to state how likely the obtained differences would occur if only chance were operating. A multitude of statistical tests, each with its own requirements and special considerations, often produces a nightmarish quagmire into which many of us fear to venture. The good news? With appropriate measurement and appropriate charts, determining the significance of behavior change can be done using one's own eyes rather than someone else's statistical tables.

This sophisticated visual statistical technology, ideal for determining significance of behavior change, can be used by anyone with just some rudimentary training. Known as Standard Celeration Charting, it contrasts to typical social science and industry applications where Analysis of Variance (ANOVA) and Statistical Process Control (SPC) have been promoted as the processes necessary to answer questions about behavior change.

What is Behavior?

Behavior can be classified along several dimensions, one of which consists of outer and inner. Outer behavior involves everything we do that an ordinary observer could perceive occur, whether it be scratching one's head, typing at a keyboard, running across a field, or talking to a friend. Inner behavior involves the domain of activity within us that an ordinary observer cannot perceive. Access to inner behavior seems to be limited to the behaver. Any behavior, inner or outer, has a beginning and an ending .This key feature to behavior has been called a behavior cycle. In other words, defining a behavior, one needs to consider what constitutes the start of the behavior and what constitutes the end of the behavior.

Another useful notion involves the "Dead Body Test" to determine whether one has appropriately defined a behavior or not. Since the physical body of a dead person cannot behave, one can apply the test to any "behavior", asking, "Could a dead body do this?" If one can answer "yes", then attempt to redefine the behavior appropriately. For example, suppose we consider "lying on a bed". Could a dead body do it? Yes, so we'd classify this phrase as nonbehavior. We could change this nonbehavior to a behavior by clarifying the cycle—the starting and ending. The

initial action of lying down, then lying on the bed, then getting up—constitute a cycle and a behavior. A dead body could not perform the entire cycle.

How Do You Measure Behavior?

We have found in Standard Celeration Charting that attempts to measure behavior need to be sensitive to several characteristics of measurement . Measures should preferably be universal, standard, direct, counted, and visual. The following descriptions provide a brief elaboration of what these terms imply.

Universal. If you find a measure that exists in any behavior, it can be considered universal and you can use it as a compare-all within and across behaviors, since every behavior can be identified on the basis of that measure.

Standard. You need a measurement tool which incorporates standard features. Developing a different behavior measure for every different behavior which you desire to investigate produces problems in comparison and interpretation. Standard features require that aspects of your behavior measure remain the same from instance to instance both within a behavior and across different behaviors.

Direct. A direct measure represents original data, whereas a derived measure such as an average or a percentage puts you in the position of creating something different and usually doesn't allow reconstruction of the original information.

Counted. If you can count a behavior, you can represent the behavior by that count. If it happens once and then happens again, you count it as happening twice. This contrasts with an inferred measure, such as a rating scale response, in which you assign some arbitrary value to a response, rather than counting it.

Visual. You need a measure which can be visually represented. You can see where it currently lies and whether it increases or decreases, or improves or worsens. Such a visual representation if chosen carefully should reflect changes in the behavior measure that correspond to changes in the behavior itself.

Frequency, Celeration, and Bounce as Behavior Measures

The three behavior measures of frequency, celeration and bounce meet the above criteria. Frequency consists of the count of a behavior divided by the amount of time within which the counts occurred. So frequency equals count over time. Examples would be: Count per second; count per minute; count per day; count per week; count per month; count per year (Fig. 1).

A celeration represents the trend in frequencies of behavior across time and appears as a straight sloped line through the frequencies (Fig. 2). Does the example show an acceleration, a deceleration, or no celeration? It shows an acceleration since the slope is up from left to right.

Bounce represents the variability in behavior. With no bounce, all the frequencies would fall on the celeration line. With bounce, the celeration line has frequencies which fall above it, on it and below it (Fig. 3). The vertical distance from the celeration line to a parallel line running through the frequency farthest above the celeration line represents the up-bounce. The vertical distance from the celeration line to a parallel line running through the frequency farthest below the celeration line represents the down-bounce. The total bounce consists of the vertical distance from the up-bounce line to the down-bounce line.

The Standard Celeration Chart

A tool developed to incorporate all the above considerations, the Standard Celeration Chart (SCC), was developed by Ogden Lindsley at the University of Kansas around 1965. Lindsley (1992) set a slope of 34° to represent a doubling every celeration period on all SCCs. This standard slope parallels a line from the lower left to the upper right corner of each chart. Frequencies are dots on the chart from 1 at the bottom to 1,000,000 at the top on a multiply scale up the left. Time goes across the bottom on an add scale as seconds, minutes, days, weeks, months, or years. This produces a standard graphical system on a multiply scale.

Behavior frequencies accelerate and decelerate by straight lines on the SCC. This allows one to project the course of a behavior visually with accuracy. Also, the up-bounce tends to equal the down-bounce and the total bounce stays the same as the frequency changes. This allows one to see the difference between abrupt frequency changes and gradual celeration changes. Thus one can

visually discriminate the occurrence of abrupt Jump-ups, No-jumps, Jump-downs and gradual Turn-ups, No-turns, and Turn-downs. Such jumps and turns have been found to be independent and therefore occur in any combination.

Applications to Hemi-Sync Research

A brief review of past reports from the **Hemi-Sync Journal** illustrates the potential utility of application of a standard measurement system incorporating the above features. Whether inners or outers, think of the power of reporting effects of Hemi-Sync in a way that quantifies the "something of value" which takes place across so many different behaviors and behavers. From reducing fears of cancer patients (inner), decreasing drug use in cocaine addicted individuals (outer), positive thoughts of individuals recovering from surgery (inner), T-cell production in AIDS patients (outer), to learning new material in military training programs (outer) with less perceived task stress (inner), and improving golf scores (outer) with increased feelings of confidence (inner) and less fear emotions (inner)—all involve counts over time that can be charted for feedback and substantiation of behavior change.

Word count = 1490

Measuring Inner and Outer Behavioral Effects of Hemi-Sync

- **Main point: One way of MAKING TOMORROW NOW — substantiating the value of Hemi-Sync by utilizing state-of-the-art measurement technology**
- **Essential in the substantiation of value - some change in behavior**
  - **One of the primary goals of the Monroe Institute has been to provide something of value.**
    - What behavior now possible that one could not do before
  - **At least two levels of analysis operate**
    - Attempts to understand the Hemi-Sync process
      - **Descriptions of Brain states and brain mapping**
      - **Theories of operation**
    - Attempts to show behavioral effects
      - **Our emphasis in this article**
      - **What behavior now possible that one could not do before**
  - **Parlance of science**
    - Independent variables: what you manipulate
      - **Use of Hemi-Sync tapes**
      - **Attempts to perform without tapes**
    - Dependent variables: what you measure
      - **Inner Thoughts**
      - **Inner Emotions**
      - **Outer Responses**
      - **Outcomes**
      - **Accomplishments**
- **How do you determine significance of behavior change?**
  - **Is this only for the professional statistician?**
    - No, care-giver or client should be able to see what's happening
  - **Is this only do-able with statistical tests?**
    - No, can be done within a visual medium
- **Why is this important for Hemi-Sync Researchers?**
  - **Tools 25 years old still don't reach mainstream from water's edge**
  - **Extremely sophisticated science possible with extremely easy to use tools**
- **What is behavior?**
  - **Behavior broken up into inner and outer**
    - Usually think of outer only (body movements)
    - Inner behavior equally as important (urges, thoughts, emotions)
    - Dead Person Test to decide whether it's behavior
    - Cycle with beginning and end clarifies most instances
- **Next: How do you measure behavior?**
  - **Vital characteristics of measurement**
    - Need a direct measure, not a derived one
      - **Charting original data = direct**
      - **Calculating averages, ranges, percentages = derived**
    - Need a counted measure, rather than an inferred one
      - **Count per time = counted**
      - **Rating scale response = most often inferred**
    - Need a measure that is visually representable, not just statistical
      - **Frequency, celeration, bounce = visual**
      - **ANOVA, t-test, correlations = statistical**

Need a measure that is standard, rather than idiosyncratic

Need a Multiply scale rather than an Add scale

Six cycle multiply chart x 20 add time periods = standard

Different up-the-left and across-the-bottom scales for each experiment and experimenter = idiosyncratic

Need a measure that is universal, not unique

Frequency, celeration a dimension of any behavior

Other measures common to some but not all behaviors

Need a measure that is free operant, rather than restricted operant

Free operant behavior allows fluency, unlimited

Restricted operant behavior follows pace of tape, etc.; limited

Characteristics of behaver

Need to practice daily

One minute a day = daily 7 days a week

Once/week; once/month; 3/week, etc. = not daily

Measures that meet the vital characteristics

Frequency: Count divided by Time

What frequency looks like when charted on a Standard Celeration Chart

What nonexamples look like

Celeration: trend of Frequency across Time

What celeration looks like

What nonexamples look like

Bounce: variability around celeration

What bounce looks like

What nonexamples look like

Applications of these measures in HemiSync research

Nonexamples of frequency/celeration

How to convert the nonexamples

MEASURE DURATION OF TAPE USE

HemiSync literature

Bob Monroe (Journeys Out of the Body) (1971)

Inner-Outer analysis sample possibilities

Physical response factors

Dated & reported OOBEs per year across yrs in JOOTB

Cultural response

Laura Batchelor (Use of Hemi-Sync Playing Golf) (F90)?

Outcome areas

Quality of performance

Strokes per minute across weeks

Drives hit successfully per minute across weeks

Drives hit unsuccessfully per minute across weeks

Irons hit successfully per minute across weeks

Irons hit unsuccessfully per minute across weeks

Putts hit successfully per minute across weeks

Putts hit unsuccessfully per minute across weeks

Level of enjoyment

Rate of learning

Inner-Outer analysis sample possibilities

Thought factors

Positive thoughts per minute during round across weeks

Negative thoughts per minute during round across weeks

Emotion factors

Episodes of fear per minute during round across weeks

Episodes of elation per minute during round across weeks

Physical response factors

Susan Cord (Hemi-Sync as an Aid in Recovery From Surgery)(W92)

Outcome areas

Level of relief

Pain episodes per minute across days

Rate of recovery

Steps taken per minute across days

Inner-Outer analysis sample possibilities

Thought factors

Positive thoughts per minute across days

Negative thoughts per minute across days

Emotion factors

Pain episodes per minute across days

Physical response factors

Requests for pain killer per minute across days

Suzanne Evans Morris

Outcome areas

Quality of performance

Level of enjoyment

Rate of learning

Inner-Outer analysis sample possibilities

Thought factors

Emotion factors

Physical response factors

James Greene (Positive Immunity Pilot Program) (F91)

"The most difficult problem I have is determining exactly how beneficial the tapes are." (Hemi-Sync not used exclusively of other systems)

Outcome areas

Quality of performance

Level of enjoyment

Rate of learning

Inner-Outer analysis sample possibilities

Thought factors

Positive thoughts per day across weeks

Negative thoughts per day across weeks

Emotion factors

Physical response factors

T-cell production per month across 6 months

Helene Guttman (Hemi-Sync Sounds for ...Horses)(F91)

Outcome areas

Quality of performance

Level of enjoyment

Rate of learning

Inner-Outer analysis (Horse)

Physical response factors

Right-brain cycles per second across minutes

Left-brain cycles per second across minutes

Raymond Waldkoetter (Hemi-Sync Uses in Military Settings) (F91)

Outcome areas

Quality of performance
Level of enjoyment
Rate of learning

Inner-Outer analysis sample possibilities

Thought factors

Positve thoughts per minute across weeks
Negative thoughts per minute across weeks

Emotion factors

Feelings of stress per minute across weeks
Feelings of nervousness per minute across weeks

Physical response factors

Items correct per minute across weeks on exams
Items incorrect per minute across weeks on exams

Gregg Carroll

Outcome areas

Quality of performance
Rate of learning

Inner-Outer Analysis sample possibilities

Physical response factors

Ed Wilson (Psychophysiological Study of Hemi-Sync Process) (F91)

Outcome areas

Quality of performance
Level of enjoyment
Rate of learning

Inner-Outer analysis sample possibilities (90 seconds x7 conditions)

Thought factors

Thoughts per minute across minutes
Attempts to change thoughts per min. across min.
Experiences release of personal inhibition per minute across minutes

Emotion factors

Feels thankful per minute across minutes
Feels delight in experience per minute across minutes
Feels fear per minute across minutes

Physical response factors

Temporal lobe activation per minute across minutes
Reverasal of Skin polarity
EEG
Digital temperature
Respiration
GSR (galvanic skin response)

F. Holmes Atwater (Hemi-Sync and the Sleep State) (F91)

Outcome areas

Quality of performance
Level of enjoyment
Rate of learning

Inner-Outer analysis sample possibilities (90 minutes x1)

Thought factors
Emotion factors
Physical response factors

EEG brainwave patterns
delta-theta-alpha-beta ???

Brief history of frequency and celeration measurement

Work of Ogden Lindsley

Behavior grows and decays by multiplying, not adding

Development of Standard Celeration Chart

Inner behaviors have frequencies and celerations same as outers

Feelings vs. Urges

Types of behavior change: Jumps, Turns, Verges

Frequency Jump-ups and Jump-downs
Celeration Turn-ups and Turn-downs
Bounce Convergings and Divergings

Future directions

Help with design of what to measure

Different concern from experimental control of independent variables
Measurement deals with the dependent variable

Concerns

Won't counting of inners disrupt the experience

Evidence from TMI Explorers talking in sleep would seem to indicate not; counting less complex than talking