

An examination of inner (private) and outer (public) behaviors

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If we accept that private and public events are behaviors, and as radical behaviorists we do, our next step is to classify them and then create a taxonomy in order to codify and count them. Focusing on inner behaviors, or as Skinner called them, private events, the taxonomy presented here consists of thoughts, feelings, and urges. Thoughts and feelings clearly fall within the operant realm, but urges most probably begin as respondent behavior. The paper presents the unique definitions of a thought, a feeling, and an urge.

It also states the kinds of data used to show the possibility of counting and analyzing these three parts of inner behavior. Data analyses include the analysis of frequency, celeration, i.e., the rate of learning and changing, bounce or variability, and their relationship to an outer behavior. These analyses allow the comparison of individual performance and learning across different kinds of pinpoints and inner behavior projects, between behaviors, and the relationship of inner to outer behaviors. In the final analysis, we see that inner behaviors function in the same way as outer behaviors do. Based on Skinner's premise that inner behavior is not different in kind from outer behavior, and the research of Lindsley and others using the standard celeration chart, the science of human behavior can rest assured that inner and outer behavior share much in common. In summary, the observation, counting, and analyses of inner and outer behaviors show no functional difference.

Keywords: inner behavior, private events, thoughts, urges, feelings, standard celeration chart, frequency, celeration, bounce, variability.

Inductive Exploration

There is a long history of people observing their inner verbal behavior with a level of precise detail to those observations. Most of these began spontaneously yet showed careful planning. In 1551, St. Ignatius of Loyola distributed his small book, *The Spiritual Exercises*, to his fellow Jesuits. In this self-improvement plan, he detailed a system to make dots along a line, "...as many dots as were the times he has fallen into that particular sin or defect" (p. 21). The brother was to do this at the beginning of the day and at the end of the day; he then compared the two lines to see his improvement.

Two hundred fifty years later, Benjamin Franklin, in his *The Autobiography of Benjamin*

Franklin (1791/1962), described how he kept a separate page for each week. Each page had a table with the days of the week and abbreviations for 13 virtues—temperance, silence, order, resolution, frugality, industry, sincerity, justice, moderation, cleanliness, tranquility, chastity, and humility. Four sets of the 13 pages took him through the virtues four times a year. He marked with "a little black spot" each fault he found he committed on that day.

We come to 2009, 220 years after Franklin. Technology has moved faster in 150 years than changes in people's inner behaviors has in the past 2000 years; indeed, in a sense, changes in thoughts and feelings have not progressed since the time of Plato except for a minority of people who tracked and changed them. The past 50 years has seen people use wrist and bead counters, and more recently people use hand-held electronic devices. Now people also count posi-

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What Do We Pinpoint and Count?

To look at inner behavior, we need to begin with a definition of that supposedly amorphous, subjective, elusive area of a person's inner world, that natural world most people too easily ignore. Inner behavior has three categories: Thoughts, feelings, and urges. A fourth category is an attitude, which is comprised of these three inner behavior coupled with many outer behaviors.

A thought is an idea. Whether it comes visually or auditorally, it is still dependent on the world of expression through verbal behavior. A painter who sees a visual image sees it in color, patterns, and has a visual frame for it. A musician hearing a melody puts together combinations of pitch, chords, and harmony, even if he has long forgotten that he originally learned these sounds and combinations through words as well as music.

A feeling is a thought with a physiological component. Some of these components are obvious enough that the person is aware of and can label them—chills, goose bumps, almost tears, choking up, blushing. Each of these may be obvious enough to become an external behavior as well. Sometimes the physiological sensations that accompany feelings are so mild, the person doesn't sense them and is unaware of any manifestation.

The first time an urge occurs, it probably originates as a respondent behavior. It is a compulsion to do something and is dependent on physiological components, yet of the three, it is closest to a public behavior. After its initial occurrence, this respondent behavior then moves into the realm of verbal behavior.

Fraley (2001) stated:

The actual respondent behavior is typically executed by glands that behave automatically in response to environmental stimuli by excreting chemicals into the bloodstream. The systemic after-effect of that chemical infusion is then detected in the form of feelings—mostly aversive in the case of bereavement. Apart from being felt, such changes to the body result in differences in the capacity of the body to execute certain operant behaviors.... Technically, the person's operant behavior is being executed by a body that is

temporarily changed by the chemical after-effects of the respondent behavior that was executed by one or more glands. (p. 143)

Let me hypothesize about a soldier in a combat situation. A bomb or an improvised explosive device explodes. The immediate response, an urge, is to take cover, drop to the ground, or flee in some other way to a safer spot. The second critical piece happens next. With an altered chemical state now within the body, the next actions the person does create an interaction between the urge, his verbal directions to himself and possibly to others. He has just emitted a new operant, a verbal behavior. It is my opinion that it is at this point the initial respondent behavior is now paired with the verbal operants. Thus, when a similar situation arises, the array of new operant behaviors and any additional similar respondent behaviors combine to reinforce the new behavioral and physiological patterns within the body, or as Fraley stated in the above quotation "the person's operant behavior is being executed by a body that is temporarily changed by the chemical after-effects of the respondent behavior that was executed by one or more glands." It is also possible that a similar situation may arise that is so intense it creates a new respondent behavior, thus strengthening the set of behaviors even more. Eventually, this becomes a more obvious verbal behavior in any instance of tension, e.g., repeated gunshots, a disagreement with a spouse or co-worker, contact with people who are Asian, Middle-Eastern, or those who wear ethnic or religious apparel or symbols.

In addition to the three inner behaviors above, there is a fourth area: Attitude. It is a collection and combination of outer behaviors and variants of inner behaviors. It represents a very complex set of behaviors, perhaps even multiple sets, because it combines so many behaviors and learnings. Some easily identifiable social sources we see frequently include the prejudices of race, nationality, and religion. Rosenblatt (1984) gives some excellent examples of urges and the development of attitudes in his book, *Children of War*. These are taught to children early in their language acquisition. Shortly after the breakup of the Soviet Union,

Alexei Shustov, (personal communication, July 20, 2007) a clinical and behavioral psychologist in St. Petersburg, studied the behavior of voters by looking at psychological phenomena in political campaigns—what are the practical things that influence voters and what is the stimulus field that leads to the desired behavior. He looked at voters, candidates, officials, and others, and concluded that political behavior has 97 elements.

Why Measure Inner Behavior?

We have an excellent philosophical position and basis for conceptualization on inner behavior (Skinner, 1945, 1953, 1957, 1969, 1974; Moore, 1980, 2008; Zuriff, 1979) and a vast amount of research on respondent (Pavlov, 1927/1960) and on operant behavior (Skinner, 1937; Koenig, 1972; Lindsley, Koenig, & Nichol, 1973; Sokolove, 1973; Dean, 1973; Calkin, 1979, 2002). Table I shows Lindsley's analysis of the amount of words Skinner used to discuss his thoughts on inner behavior in his various works through 1969.

We could wait until we find some guaranteed way to monitor inner behaviors, or we can proceed with the knowledge and skills we have now, knowing that some mistakes may be made. I think these potential mistakes will be minor, procedural, and correctable. It is not a strategic error to proceed, but quite the

opposite: It is a strategic error not to proceed. We currently have the capability to study inner behavior *per se* with a level of accuracy we did not have 50 years ago. To ignore this entire area leaves us mired in philosophical discussion without any data to show. We can and must do both to move forward with our current information about inner behaviors and how to change them.

Lindsley (2001) stated he learned from Greg Kimble that “you did not need to know what went on in the nervous system to understand and predict behavior” (p. 134). True. However, exploring whether the cognitive behavioral approach can make changes in the brain, Porto, Oliveira, Mari, Volchan, Figueira, & Ventura (2009) reported on 10 published studies involving investigations on whether cognitive behavior therapy (CBT) produces changes in the brain. Each of the reviewed studies found CBT modified the neural circuits involved in negative emotions. Lubinski and Thompson (1993) reported on animal and human research into the private stimulation as the possible bases of private events. They concluded that research of the past 45 years should be cause to rethink the empirical accessibility of inner behavior *because* it is accessible. Thus, we have research on behavioral *and* physiological components and the combination of them may prove useful.

Table 1. Lindsley's Table of Skinner's References to Private Events

IMPORTANCE OF INNER BEHAVIOR* TO SKINNER				
Data books	1938	Behavior of Organisms	No record in rats	0%
	1957	Schedules of Reinforcement	No record in Pigeons	0%
Graduate Courses	1950F	Psych 201a	Proseminar Final Exam	33%
	1951F	Psych 207	Analysis of Behavior exam	50%
Strategic Books	1953	Science and Human Behavior	67/449 pages	15%
	1957	Verbal Behavior	159/470 pages	34%
	1969	Contingencies of Reinforcement	75/297 pages	25%

Therefore Skinner assigned 15 to 50% of his writings to INNER BEHAVIOR which he called * Private Events!

Dec 1971—O.R. Lindsley

That same year, Lindsley (1971) also stated:

Charting may be one of the few sensitive techniques that we have to keep track of . . . inner thoughts, feelings, and urges. It could be that precision teaching will ultimately provide man with the most good and the most help by being applied to his inner behavior. It is one of the few ways to chart and change inner behaviors. (pp. 117-118)

How can we, how do we measure the inner event?

The field of the SCC started out and is still predominantly called precision teaching because that's where its major work lies. However, there has also been the study of precision nursing, precision social work, precision athletics, as well as precision inner behavior.

The charts from Lindsley (Figures 2 through 5) and others have substantiated that Skinner's statements about private events can be measured as inner behaviors and the consistent results give us information and documentation about inner behavior. Major research into this subset of verbal behavior, came after Lindsley's initial discovery and research on his smoking, reaches, and urges. Others started counting different inner behavior projects ranging from thoughts of ex-wife, feelings of hate, sexual urges, kind thoughts, to feelings of freedom and restriction.

Lindsley did the first frequency-based study of inner behavior, inadvertently coming across the pinpoint of the urge and thus the countable content of inner behavior inadvertently. He began with a plan to quit smoking. After what may stand as the longest before phase, one of 22 weeks, or five months, his intervention to quit was a statement to himself, "Stop if can." He was smoking between 18 and 62 cigarettes a day, although most commonly between 20 and 40 per day. Figures 1 and 2 show his statement had an immediate effect.

When he quit, he realized he still reached for his cigarette pack—in his drawer, on his desk, in his breast pocket. Three weeks of counting reaches and it went to one or zero per day. However, he realized he now had urges, and the link from the cigarettes, the outer behavior, to the urges, the inner behavior, was the reaches. Anyone developing a new idea goes through several machinations of it.

Figure 3, which he labeled reaches for cigarettes, shows a 3-week downward trend followed by a jump up and about 10 days later, another downward trend. His attending the annual meeting of the American Psychological Association triggered the jump up. Several charts later, the urges went to one and zero and remained

there. Figure 4 continues to show part of the creative process: The same chart is labeled differently and, in this one, he indicated when he began to count the inner behavior or urges.

Koenig's (1972), Sokolove's (1973), and Dean's (1973) written summaries of different data from the Behavior Bank prove the measurement possibilities of inner behavior. Each of them used the SCC (then called the standard behavior chart) in their research.

Koenig (1972) wrote the study and statistical summary of the Behavior Bank (Koenig, 1972; Lindsley, et al., 1973). Koenig analyzed the first 13,941 of the eventual over 32,000 projects deposited in the Bank at Behavior Research Company. Each project had a minimum of 21 charted days; some had 140 days. Koenig analyzed the data of all that had at least 5 charts deposited with the same pinpoint. Most of them were outer behaviors—academic and management, and some were inner behaviors. The analyses contained the frequencies and celerations of the first phase, the best phase, and the multipliers, which indicated variability. Sokolove (1973) analyzed a portion of the then 16,300 projects and selected phases that were no less than 20 days and no more than 29 days, 281 from inner behavior projects and 1,322 from outer behavior projects. She used information on outer and inner behaviors from both published literature, which was frequency-based but not charted on the SCC and from five years of SCC data in the Bank. Her review of the validity of counting inner behavior included finding concurrent as well as predictive validity. She found no difference in how the inner and outer behaviors looked when analyzed statistically. She focused on the functional relationship of the behavior on the environment and the environment on the behavior but not on the topography of the behaviors. Dean (1973) had nursing students count behaviors performed in their courses and hospital practica including their thoughts and feelings about different aspects of the program. These included making data-based decisions about their charted positive thoughts and feelings about their placements in geriatrics, pediatrics, and other situations within the

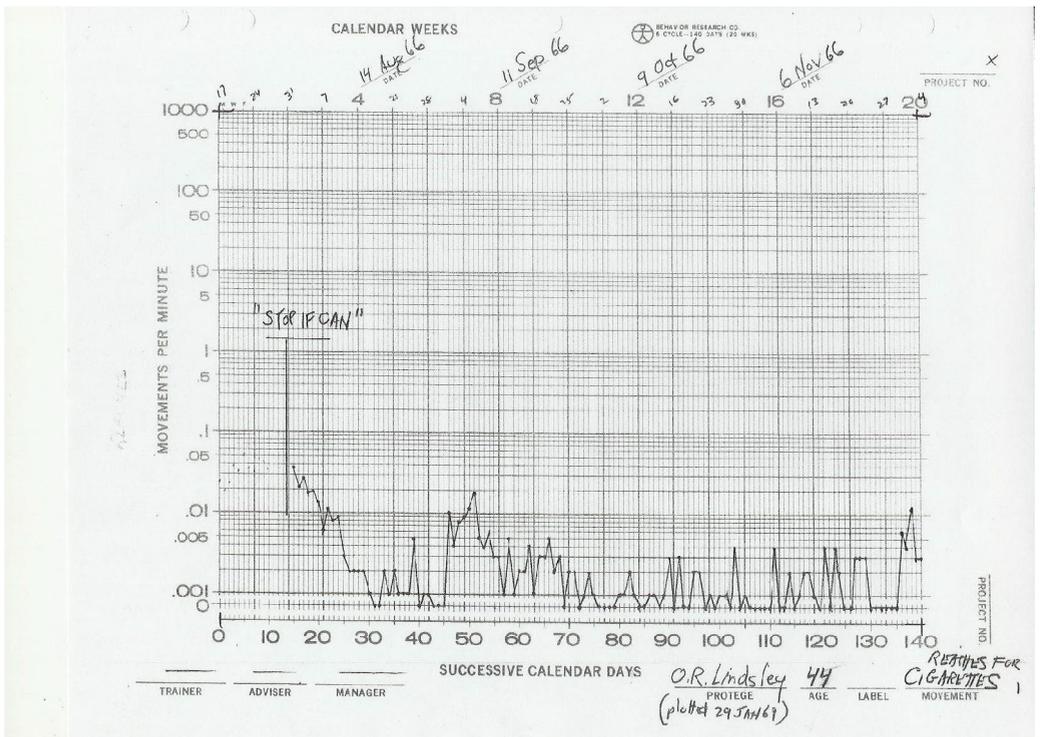


Figure 3. Lindsley's reaches for cigarettes.

hospital setting. She commented that inner behaviors were finally taken out of the strictly subjective role and responded largely to learner self-management. The use of the 1-min timing on positive inner behavior began 4 years later.

These three summary collections of thousands of charts with millions of data points has so powerfully given us thousands of pieces of information about human behavior, Lindsley listed 8 of them, calling them Laws of Human Behavior (Calkin, 2003), because they provided the information allowing us to state inductively-discovered truths about outer and inner human behavior, including that urges to do a behavior and the behavior itself celerate independently. I added two: Positive thoughts celerate independently from negative thoughts, and positive feelings celerate independently from negative feelings. Table 2 shows the studies done specific to inner behavior and the SCC. The results of these extensive analyses—over 800 charts—show there is no difference in the statistical relationships of frequency, celeration, and bounce of inner and outer behaviors.

Calkin (1979), whose initial studies included 105 participants and 161 charts, researched students' perceptions of how much they thought they learned, their feelings of fun, and their feelings of freedom in academic settings, as well as people's feelings of freedom and restriction in more free operant situations.

The use of the 1-min timing of academic behavior began in a first grade classroom in April 1968 (Starlin, 1971) and has proliferated. As well as broad use of a wide variety of durations of recording and the implementation of the 1-min timing, the work with the SCC includes direct research into inner behavior beginning in 1977, Calkin (1981). Calkin (1992), Kubina, Haertel, and Cooper (1994), Kostewicz, Kubina, and Cooper (2000), Clore and Gaynor (2006), Cobane (2006), Rich (2009), and Patterson (2009) have all researched the implementation of the 1-min timing to change inner behaviors. They provided additional documentation that people can count the inner behaviors of feelings and thoughts with efficacy and achieve levels of fluency. The

results are very promising and show that not only can we use the three-term contingency to explore inner behavior, we can also ask people to count thoughts, feelings, or urges directly. Clore and Gaynor's study compared the use of the fluency training (FT) with CBT and found both systems of change were equally effective. However, they did not use the SCC. The FT group had a greater impact, i.e., they doubled, on increasing positives while the CBT's impact was on decreasing negatives. This is contrary to the findings of Kubina et al. (1994) and of Kostewicz, et al. (2000).

The charted data from the above inner behavior studies using the SCC indicate that fluency in positive and negative inner behaviors may be the distance between the all-day frequencies of positive and negative behaviors,

x10 being the minimal desired distance with, of course, the positive behaviors being the higher.

We need to be sure that the research that we do is based on radical behaviorism, and is not based on an assumption that we can only look at the external behavior, an assumption of methodological behaviorism. The data cited throughout this article provide substantiation for Skinner's (1974) statement that radical behaviorism "does not insist upon truth by agreement and therefore can consider events taking place in the private world within the skin. It does not call these events unobservable, and it does not dismiss them as subjective" (p. 16). These 10 research studies of inner behavior, which show consistent and comparable results, substantiate what Skinner said and give us a basis to move forward.

By induction from this growing database, we can learn much more about inner behavior and its relationship to outer behaviors. John Eccles, (1970) neurophysiologist and 1963 Nobel Prize winner in medicine stated:

Observations of the objective world depend on an experience, which is just as private as the so-called subjective experiences. The public status of an observation is given by symbolic communication between observers...through the medium of language. By means of the same communication, our inner or subjective experiences can likewise achieve a public status. (p. 23)

Since inner behavior is of the same structure or nature as outer behavior according to Skinner's theoretical statements and the Behavior Bank's research (Lindsley, et al., 1973), we can look at the massive amount of precise and extensive data collected in the same way we can view the research of the early astronomers of the 16th to 19th centuries. These data from over 16,000 charts of Koenig (1972), Sokolove (1973), and Dean (1973) are available for research purposes at Behavior Research Company and soon will be available at Akron Archive of the History of American Psychology. Over 15,000 of the analyzed projects are of outer behaviors and over 800 are of inner behavior.

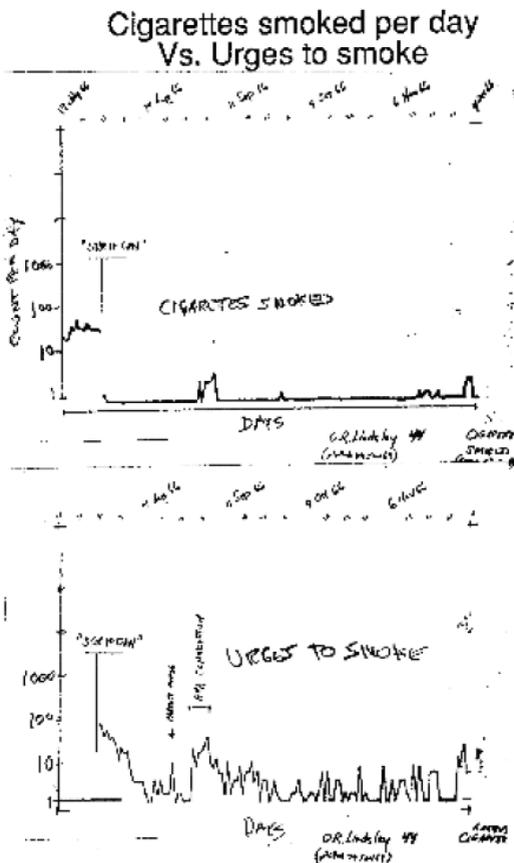


Figure 4. Lindsley's second copy of his cigarettes smoked and his progress from reaches to the inner behavior of urges.

Table 2. Inner Behavior Research Projects

Researcher	Date	Number of charts*	Number of people**
Sokolove	1973	281	281
Dean	1973	312	34
Calkin	1979	161	105
Calkin	1992	35	35
Kubina	1994	2	2
Kostewicz	2000	2	1
Clore	2006	0	10
Cobane	2006	27	22
Rich	2009	3	3
Patterson	2009	6	9
Total		829	502

* The number of charts in Sokolove's and Dean's studies separated the positive and negative behaviors, whereas the others usually combined the acceleration, deceleration, and the 1-min timings on the same chart. However, a few projects did not use a pair of behaviors. Because the influence of the intervention is looked at differently and usually produces different results for the two behaviors, they should be looked at separately and therefore, the total number of charts easily exceeds 1,000 inner behavior charts within this group of studies.

** Caveat: Sokolove lists hers as phases, so it is unclear if these are all individual people.

More Examples of Charted Inner Behaviors

Figures 5 and 6 show Cobane's (2006) work with a woman, MH, who had lost her son to suicide during The Troubles in Northern Ireland. Her aim in doing the project was to resolve her 7 years of grief and to finish her doctoral thesis. There are six different behaviors presented: 1 and 2) the bottom half of the chart shows MH's all-day counts of her positive and negative thoughts and feelings; 3) the triangles in the middle of the chart are the daily reports of the behavior intensity; 4) the line of dots that starts at about 100, is the 1-min timing MH did every day except during the after phase at the end of Figure 5; she resumed the 1-min timing during Figure 6; 5) the small squares at the top are intermixed with the asterisks and they indicate the Beck Depression Inventory (BDI) scores; and finally, 6) the asterisks indicate the number of words she wrote that day on her doctoral thesis.

This project represents a combination of a pair of all-day inner behaviors and the use of the 1-min timing to change the behavior. Coupled with the outer behavior of MH's accomplishment towards the completion of her dissertation, the project helps to show the effective use of the 1-min timing as well as the

relationship between inner and outer behaviors. The BDI and the intensity scales were added to offer validity to the data for those who may question whether a person can effectively count and record inner behaviors. There are hundreds more charts that are similar to this in showing the effective use of the antecedent event of an outer behavior to change an inner behavior, and there are also hundreds of charts pairing an inner and an outer behavior. Clearly, people have no difficulty in seeing the change in outer, or public, behaviors. Through pairing inner and outer behavior projects, we learn to examine the inner behaviors as well.

Figure 7 shows a summary of 41 months of my writing behavior. I include it here as a way of showing a comparison of the ranges of related inner and outer behaviors. All were counted during an entire day. I defined a creative writing idea as an "ah-ha" or serendipitous thought, and as rendering thoughts into a more refined, intense, and accurate expression that gave me a thrill or sense of excitement. Thinks writing ideas were just that—anytime when I thought about, heard the words of, or saw an image of what I was writing, I counted a writing idea. The third and fourth ranges indicate the outer behaviors of writing words and editing what I had written. The third and

fourth behaviors had a counting period of less than 1000 minutes, the longest being about 10 hours, the shortest an hour.

Figure 8 shows eight soldiers' statements about themselves or others. These occurred in a group setting and fell into the categories of positive, negative, and neutral statements. The group was all day, and the data for 40 minutes of that. The therapeutic intervention was the daily group sessions with some soldiers additionally on medication. Their data were the reverse of all other data collected on inner behavior. Figure 8 shows a behavior report of their thoughts, feelings, and perhaps urges, or at least the verbal behavior related to the urges. Negative self-comments were $\times 3.6$ higher than positive self-comments. Negative comments about others were $\times 9$ higher than positive comments about others. I neglected to count their raised voices and tears or almost tears, although these behaviors, like Lindsley's reaches for a cigarette, would have come closer to the inner behavior.

What We Know about Inner Behavior through the SCC

Eight conclusions have emerged about inner behavior in the past 43 years. What follows is a short summary of them.

1. People can count and chart thoughts, feelings, and urges (Duncan, 1971; Lindsley et al., 1973; Dean, 1973; Sokolove, 1973; Stromberg, 1974; Calkin, 1979, 1981, 1992, 2000, 2002; Conser, 1981; Cooper, 1991; Kubina, et al., 1994; Kostewicz et al., 2000; Cobane & Keenan, 2002; Clore & Gaynor, 2006; Cobane 2006; Patterson, 2009; Rich, 2009).

2. Frequencies of inner behaviors consistently range from 0 to about 100 per day, occasionally going above 100 per day (Calkin, 1979, 1992; Conser, 1981; Cobane & Keenan, 2002).

3. The growth of inner behavior across time (its acceleration or deceleration, i.e., its celeration) is similar to outer behaviors: it changes by a multiply factor and by the use of the 1-min timing. Further, inner and outer behaviors have similar frequency magnitudes, variability, and celerations (Koenig, 1972; Calkin, 1979). In

two studies, Calkin (1992) and Kubina et al. (1994) found that the 1-min timing on inner behavior had a greater effect on frequency than on celeration. (This is not true of 1-min timings of academic behavior, e.g., words read or math facts answered correctly.) Judy, Malanga, Seevers, and Cooper (1997) showed a significant change in celeration when implementing the 1-min timing. The area of celeration of inner behavior still warrants further study.

4. The variance of frequencies of inner behavior around the celeration line is symmetrical, that is, the bounce up or variability above the celeration line roughly equals the bounce down or the variability below the celeration line. Koenig (1972) had originally reached these conclusions about outer behaviors in his analyses of 13,941 SCC projects of academic and management behavior published in *Precise Behavior Facts* (Lindsley, et al., 1973). He stated the amount of bounce of behaviors tended to be about $\times 2.5$ up from the middle and about $\div 2.5$ down from the middle. Calkin (1979) analyzed inner behavior charts and found the frequency, celeration, and variance of inner behavior similar to those of outer behavior.

5. A 1-min timing on positive self-thoughts increased positive thoughts or feelings the person had all day, but did not influence a person's daily frequency of negative thoughts or feelings (Calkin, 1992). However, Kubina et al. (1994), and Kostewicz et al. (2000) showed the impact of a 1-min timing on negative inner behavior. Kubina et al. and Kostewicz et al. found the 1-min timing did have an impact on the negative thoughts and feelings the person had during the day.

6. Calkin (1979, 1999) found that the frequency variance and the celeration variance might co-vary (vary together), counter-vary (vary in opposite directions), or vary independently (one may stay the same while the other one goes up or goes down). The inner and outer behaviors of teenagers diagnosed with severe behavior disorders counter-varied close to half the time, while inner and outer behaviors of children and adults with no behavior disorders co-, counter- or independently varied about a third of the time. This is because an inner

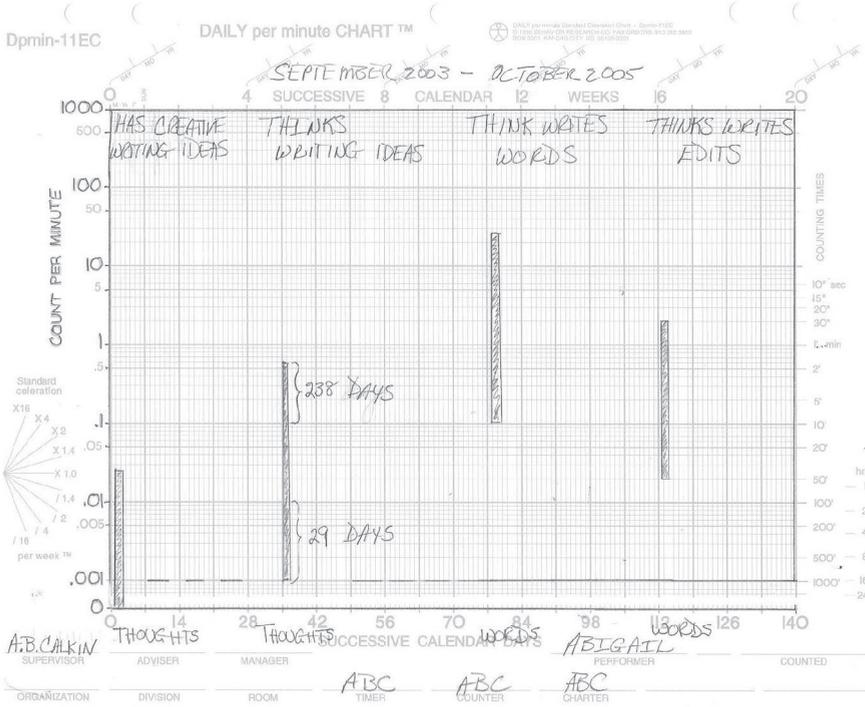


Figure 7. Frequency distribution of Abigail's thoughts about writing and words written across 3 years, 5 months.

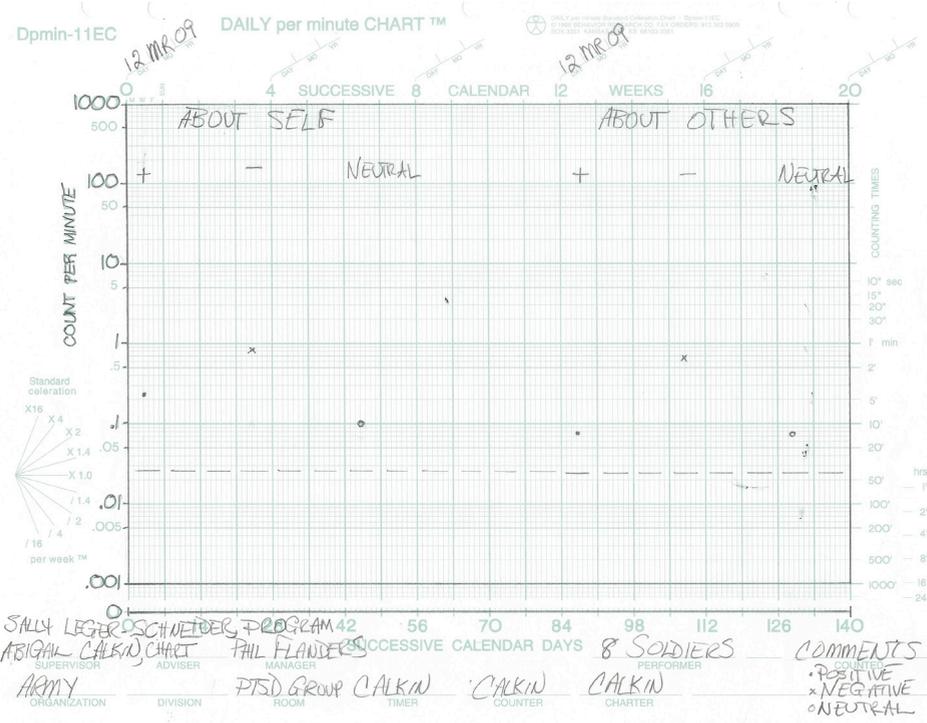


Figure 8. Soldiers' positive, negative, and neutral comments.

and its related outer behavior are two different pinpoints, two different events. To count the outer half of the behavior does not tell us what the inner half is.

7. If Cooper, Cobane, and I had not done the research we have, we would not know that we need a x10 or x20 difference between positives and negatives, obviously with the positives higher, for the person to change inner behaviors—suicide ideation, depression, self-esteem, and others.

8. These results all lead to the statement that the SCC establishes that inner behavior is of the same structure and shows the same patterns as outer behavior.

Future Directions

Having shown that inner behavior can be researched, several different kinds of possible studies remain. 1) The key one is to use behavior analysis to analyze our physiological behaviors. This may enable us to ameliorate the inner and outer behaviors of people with PTSD, including using behavioral techniques to alter or reverse the biochemical changes that have occurred within the brain. Because of the refined quality of measuring behavior with the SCC, the behavioral research would more closely resemble the measurement of biochemical changes. 2) Investigations of the relation of an inner behavior to outer behaviors need to continue, either as a paired look at the positive and negative outer behaviors displayed before, during, and after intervention, or a look at the overall outer behaviors. 3) Another more detailed research area includes further study and analysis of frequency and celeration variability. 4) More detailed investigation is needed to study the celeration of inner behavior. Is it true that inner behaviors celerate more slowly than outer behaviors, and if so, what is occurring to precipitate that? If it is not true, then we still need more data to show what may be occurring that some studies show no difference while others show a difference in celerations of outer and inner behaviors. 5) Finally, more study is needed on the impact on positive and on negative inner behaviors since Kubina, et al.

(1994), Kostewicz, et al. (2000) and Clore and Gaynor (2006) show different results.

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