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Inner Behavior: Empirical Investigations of Private Events

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The special section on private events in the Spring 2000 issue of *The Behavior Analyst* discussed the exploration of private events. The four articles focused on conceptualizations of issues related to private events and on behavior analysts' neglect of the area. This response cites 19 data-based articles and two doctoral dissertations involving measurement of what precision teachers term inner behavior—thoughts, feelings, and urges. Of the estimated 1.2 million standard celeration charts, at least 1,600 are inner behavior charts. These extensive data indicate that people can and do count and chart their inner behavior. This response discusses findings on inner behavior and its frequency, celeration (growth), variability, and improvement using antecedent and consequent events.

Key words: inner behavior, private events, thoughts, feelings, urges, cognition, emotion

The Spring 2000 issue of *The Behavior Analyst* contained a "Special Section on Private Events." Anderson, Hawkins, Freeman, and Scotti (2000) stated that there is "a dearth of research and conceptualizations on private behavior" (p. 1). There is, however, a sizable and relevant body of research on private behavior within the precision teaching literature.

The approach used in precision teaching (e.g., Calkin, 1979, 1992, 2000; Cooper, 1991; Kostewicz, Kubina, & Cooper, 2000) differs slightly from that taken in the special section articles on private events (Anderson et al., 2000; Dougher & Hackbert, 2000; Moore, 2000; Wilson & Hayes, 2000). Precision teachers use the term *inner behavior* or just *inners* (Duncan, 1971). Inner behaviors include thoughts, feelings, and urges. Potts, Eshleman, and Cooper (1993) stated that "'inners' are stimuli and behaviors that only the person experiencing them can apprehend and possibly measure" (p. 184). It is possible for a person to count these as observable behavior, albeit observable only to the person engaged in the inner behavior. There are 21 published studies relevant to an analysis of data on inner behavior. Table 1 lists the studies by year, and shows that the 1990s had about the same number of studies as the previous two decades combined. Each of these studies, published since 1971, presented data using the standard celeration chart. Two recent articles (Calkin, 2000; Kostewicz et al., 2000) offer contemporary insights and empirical investigations of inner behavior. Calkin described how she and others counted and charted positive and negative thoughts and feelings about self. The article presented data from four separate projects. Kostewicz et al. described a successful self-experiment to manage aggressive thoughts and feelings.

From 1965 to 2000, precision teachers collected and charted human behavior data on an estimated 1.2 million standard celeration charts (Calkin, 2002). To obtain this figure, I asked people on the standard celeration list serve to send an estimate of the number of projects they had supervised and done to date. I also contacted people not on the list serve who had generated large numbers of charts over the years. These charts included measures of behavioral frequency per unit of time, where the unit of time varied across charts from 1 min to daily, weekly, monthly, or yearly measures. Most of

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TABLE 1

Publications of studies on inner behavior

Decade	Author	Year
1970	Duncan	1971
	Sokolove	1973
	Dean	1973
	Stromberg	1974
	Calkin	1979
1980	Bartels & Calkin	1980
	Albrecht	1981
	Calkin	1981a
	Calkin	1981b
	Conser	1981
1990	McCrudden	1990
	Cooper	1991
	Calkin	1992
	Kubina, Haertel, & Cooper	1994
	Spaulding, Haertel, Seevers, & Cooper	1995
	Calkin	1997
	Judy, Malanga, Seevers, & Cooper	1997
	Albertson & Billingsley	1998
	Calkin	1998
2000	Calkin	2000
	Kostewicz, Kubina, & Cooper	2000

the daily charts contain at least 3 to 4 weeks of data, and a large portion have 18 to 20 weeks of daily data. Of the 1.2 million charts, about 1,600 are of inner behavior (thoughts, feelings, and urges), thus indicating that precision teachers have extensively studied the pinpointing, counting, charting, and statistical analyses of inner behavior.

Researchers who use standard celeration charts have reached the following conclusions about inner behaviors. The number of individual charts on which each statement is based is also provided.

First, people can count and chart thoughts, feelings, and urges (Calkin, 1979, 1981b, 1992, 2000; Conser, 1981; Cooper, 1991; Dean, 1973; Duncan, 1971; Kostewicz et al., 2000; Kubina, Haertel, & Cooper, 1994; Sokolove, 1973; Stromberg, 1974). These citations represent 221 charted projects.

Second, frequencies of thoughts and feelings, gathered across 35 charted projects, ranged from 0 to 82 per day (Calkin, 1992). From these charts of positive and negative feelings about oneself, the smallest frequency range was from 10 to 13 per day, or ×1.3; the greatest frequency range was from one to 48 per day, or ×48 (Calkin, 1992). Across the 14 charts of individuals counting feelings of freedom and feelings of restriction, feelings of freedom ranged from 0 to 100 per day. (For comparison, the charts of thousands of students show that reading words ranges from 1 to 250 correct per minute, a frequency range of ×250.) However, there are reported cases of inner behaviors with frequencies above 100 per day. For example, Conser (1981) reported inner behavior frequencies of positive thoughts and feelings about self above 100 per day.

Third, the growth of inner behavior across time (its acceleration or deceleration, i.e., its celeration) is similar to outer (public or overt) behaviors. Both types of behavior change by a multiple factor rather than by an additive factor (Koenig, 1972). In other words, behavior accelerates by doubling (×2), tripling (×3), quadrupling (×4), even by a 10-fold increase (×10) or decelerates by halving (÷2), quartering (÷4), or by

a 10-fold decrease (÷10). In addition to having similar celerations, inner and outer behaviors have similar frequency magnitudes and variability (Calkin, 1979; Koenig, 1972; Sokolove, 1973).

Further, both inner and outer behaviors change when learners use 1-min timings. During this intervention procedure, the number of occurrences of the specific behavior is counted during the timing, thus giving the frequency of the behavior per minute. Early on, Lindsley (1964) had urged the direct and continuous measurement of free-operant behavior. However, when Haughton and Kunzelmann (Lindsley, 1995) took this idea to public school classrooms, timings of 35- to 50-min timings of a student's classroom performance were soon shortened to 1-min timings. According to Haughton and Kunzelmann, the use of the 1-min timing started in early 1968 (Calkin, 1981b). Lindsley (1995) stated "Soon, Haughton and Kunzelmann and their students were producing such excellent learning results from the one-minute daily practice sessions" (p. 3). As a result of the success of the daily 1-min timing intervention, its use has become a common procedure for changing learning within the field of precision teaching. When using the 1-min timing as an intervention with inner behavior, the individual either writes or says as many positive instances of the behavior as possible in 1 min. The impact of this intervention is then assessed based on all-day counting of the inner behavior. Other timing periods are sometimes used for this intervention; for example, Kostewicz et al. (2000) used six 10-s timings distributed throughout the day, and Albrecht (1981) used 1-min and 10-min timings when teaching creative writing.

In two studies involving a total of 37 people, Calkin (1992) and Kubina et al. (1994) found that the 1-min timing of inner behavior had a greater effect on frequency than on celeration; that is, the daily frequency of positive or negative thoughts or feelings increased or decreased by factors of ×1.4 or ÷7, respectively, while celerations of positive thoughts and feelings about oneself remained low at a middle celeration of ×1.2 per week, or a +20% change per week. This is not true of 1-min timings of academic behavior (words read or math facts answered correctly) in which celeration slopes are sometimes as steep as ×2, a doubling per week, or ×4, a quadrupling per week. However, Judy, Malanga, Seevers, and Cooper (1997) showed a significant change in celeration when implementing the 1-min timing with 1 subject who counted items forgotten. Thus, the celeration of inner behavior still warrants further study.

Fourth, the variance of frequencies of inner behavior around the celeration line—a single straight line that indicates the accelerating or decelerating growth of the behavior and that mathematically best fits the trend of at least seven to 10 frequencies—is symmetrical. That is, the bounce up or variability above the celeration line roughly equals the bounce down or variability below the celeration line. Koenig (1972) had originally reached these conclusions about outer behaviors in his analyses of 13,941 standard celeration chart projects of academic and management behavior. He stated,

> The average up bounce or variance above the least-squares and quarter-intersect straight lines was about ×2.5 (×2.4 and ×2.5 respectively), while the average down bounce or variance below the same straight line was about ÷2.9 (÷2.8 and ÷3.0 respectively). This means that the highest frequency was usually 2.5 times larger than the frequency estimated by the straight line, and that the lowest frequency was usually 2.9 times smaller than the frequency estimated by the straight line. (Koenig, 1972, p. 22)

Sokolove (1973) analyzed 281 phases from inner behavior projects, and Calkin (1979) analyzed nine inner behavior charted projects. Both found the frequency, celeration, and variance of inner behavior similar to those of outer behavior.

Fifth, a 1-min timing of positive self-thoughts and feelings increased the frequency of positive thoughts or feelings counted throughout the 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 that timings of positive thoughts can have an impact on negative inner behavior. In those studies, 1-min timings of positive self-thoughts decreased the daily frequency of negative thoughts and feelings. The number of subjects in these three studies was 38.

A need exists for more research comparing the data of inner, academic, and management behaviors, partly because (a) Calkin (1992) and Kubina et al. (1994) found the celerations less steep for thoughts and feelings about self than Koenig (1972) found for outer behaviors; (b) a paucity of analysis of inner data compared to academic data remains; and (c) some data appear to conflict with the following quotation from Lindsley. Based on work with his graduate students at the University of Kansas in the mid-1960s, Lindsley stated,

> If you covered the labels of the charts, you could not tell urges and feelings charts from external behavior charts. The frequencies, celerations, total bounce, up and down bounce and projected envelopes were the same. It was all just behavior. Some outer and public. And others inner and private. (O. R. Lindsley, personal communication, March 10, 2001)

One reviewer of this article commented, "A science cannot advance if it cannot manipulate variables. Apparent exceptions (astronomy, evolutionary biology, etc.) all rest on a foundation of research conducted on observable, manipulable variables." The research cited in the present response shows that a person can observe and count inner behavior and, further, that people can and have manipulated these behaviors using antecedent events (the 1-min timing) and consequences (Duncan, 1971).

The "Special Section on Private Events" compels behavior analysts to investigate the data on private events or inner behavior. A close look at data such as those gathered by precision teachers provides a good starting place. In an exhortation to behavior analysts, Skinner stated,

> A science of behavior must consider the place of private stimuli as physical things, and in doing so it provides an alternative account of mental life. The question, then, is this: What is inside the skin, and how do we know about it? The answer is, I believe, the heart of radical behaviorism. (Skinner, 1974, p. 233)

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