Counting Thoughts and Movements: Applying Precision Teaching to Inner Behavior and Motor Skills

Dr. Jared Van, PhD, BCBA

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Introductions

- Just finished PhD program in Special education
- Worked as Behavior Therapist for over a decade
- With students with and developmental disabilities
- In the California Bay Area and L.A.
- Board Certified Behavior Analyst (BCBA)
- M.S. in Applied Behavior Analysis
- Morningside Academy Summer Institute Graduate

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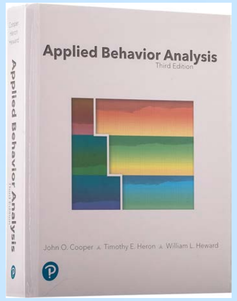
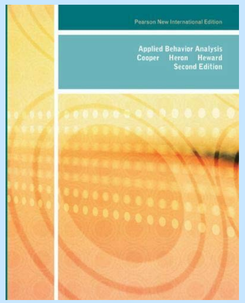
Click ABAI 2025 Webinar

Agenda

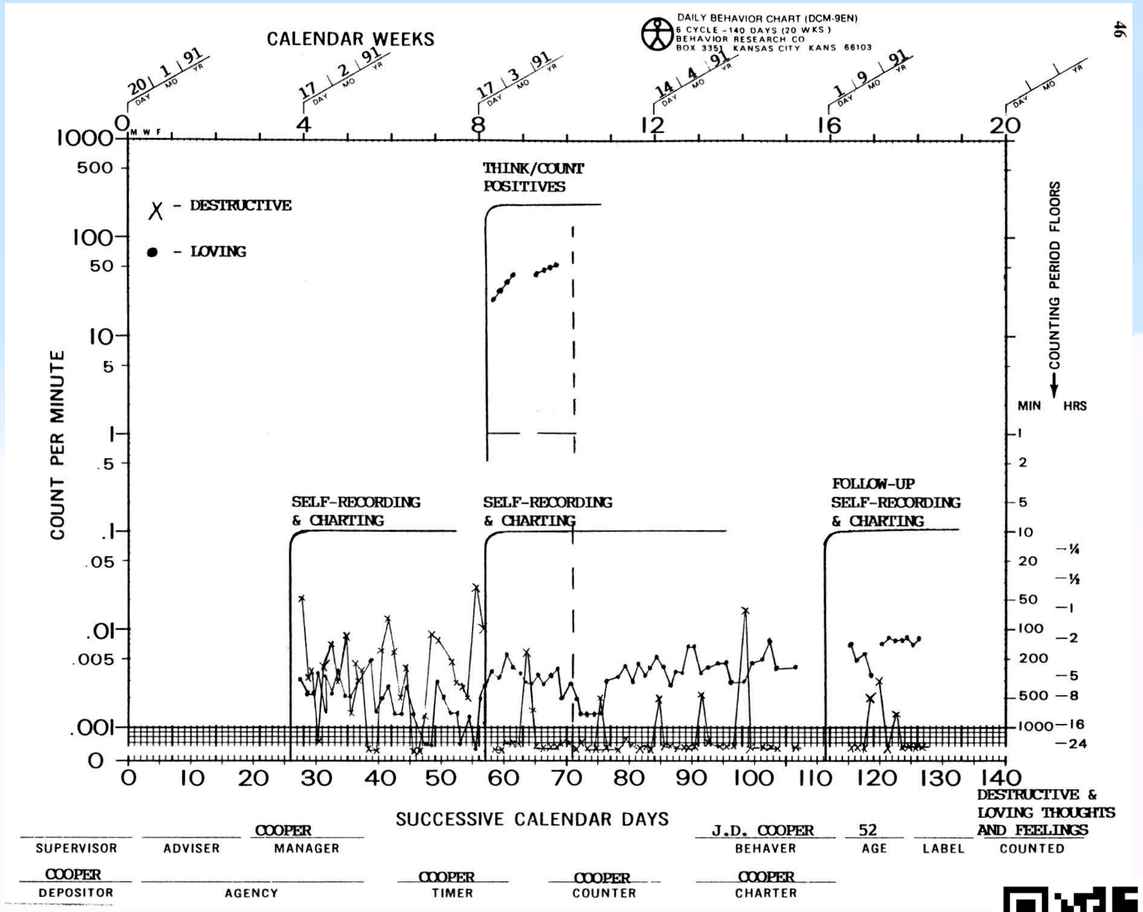
- Can Cooper Save his marriage?
- Inner Behavior Timing
- What is private behavior?
- What is Inner Behavior Research?
- What Inner Behavior Research has been done?
- How do you measure and change the frequency of inner behavior?
- Inner Behavior Timing!
- My inner behavior research!
- My Published paper on working with OTs PTs & SLPs
- Element-Compound analysis
- Big 6 + 6 & Motor movement research



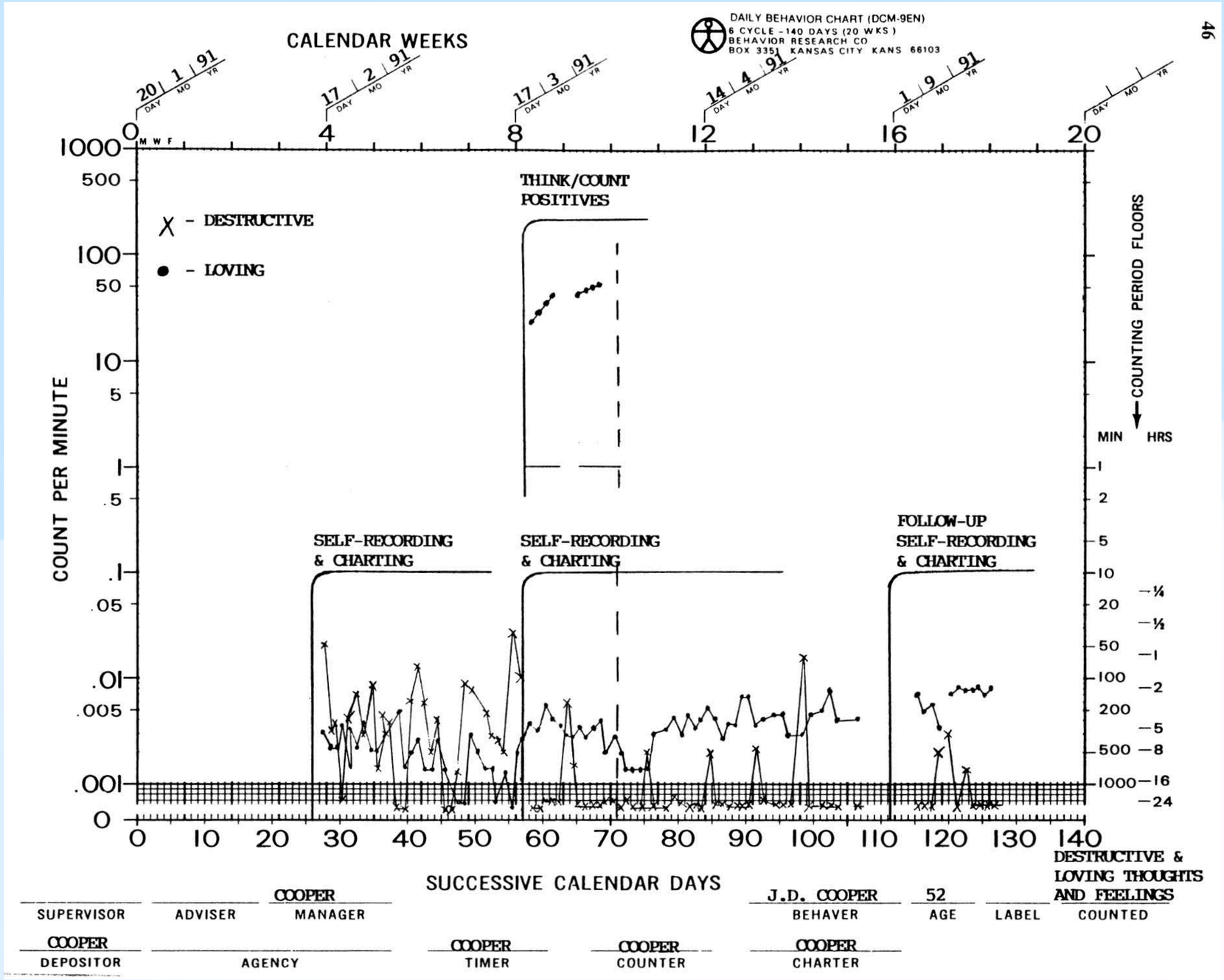
Cooper's Inner Behavior



- Cooper (1991), was experiencing frequent negative and destructive thoughts about his wife, children, and mother-in-law, which he felt were threatening his marriage.
- He decided to use an inner behavior intervention to self-manage these destructive inner thoughts and replace them with more positive, loving ones.
- For one month, he simply counted and charted his destructive and loving thoughts daily, but saw no improvement.
- He then began a daily intervention of counting all the loving thoughts he could generate about his family in one minute (think/count positives).
- Immediately after starting the think/count positives intervention, the frequency of his destructive thoughts showed a sharp drop while loving thoughts increased.
- He discontinued the intervention after 9 sessions but continued tracking the thoughts. At a 4-month follow-up, loving thoughts remained high and destructive thoughts low, indicating the intervention led to durable improvement.



(Cooper, 1991)


DAILY BEHAVIOR CHART (DCM-9EN)
6 CYCLE - 140 DAYS (20 WKS)
BEHAVIOR RESEARCH CO
BOX 3351 KANSAS CITY KANS 66103
46
CALENDAR WEEKS
20 | 1 | 91
17 | 2 | 91
17 | 3 | 91
14 | 4 | 91
1 | 9 | 91
DAY MO YR
M W F
X - DESTRUCTIVE
● - LOVING
THINK/COUNT POSITIVES
SELF-RECORDING & CHARTING
SELF-RECORDING & CHARTING
FOLLOW-UP SELF-RECORDING & CHARTING
COUNT PER MINUTE
COUNTING PERIOD FLOORS
MIN HRS
SUCCESSIVE CALENDAR DAYS
DESTRUCTIVE & LOVING THOUGHTS AND FEELINGS
COOPER SUPERVISOR
ADVISER
COOPER MANAGER
J.D. COOPER BEHAVER
52 AGE
LABEL
COUNTED
COOPER DEPOSITOR
AGENCY
COOPER TIMER
COOPER COUNTER
COOPER CHARTER

(Cooper, 1991)

Let’s do a timing!

- Use the counters I gave you or a piece of paper and a pen/pencil
- Think of as many positive thoughts as possible and tally a mark for each one
- No repeating the same positives thoughts
- It could be something someone said about you

- After the time ends count up the total number
- If you are willing to type into the chat how many positive thoughts you were able to generate

B.F. Skinner on private events

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

Inner behavior as a subset of private events

- Inner behavior refers to thoughts, feelings, and urges that occur privately within an individual.
- It is a subset of private events, which is a broader term encompassing all events that are not directly observable by others.
- Inner behavior is considered a subset or specific category of private events.
- There has been debate within psychology about the role and significance of inner behavior/private events, especially in radical behaviorism.
- However, many behaviorists and researchers acknowledge the existence of inner behavior as valid private events.
- Methods have been developed to study inner behavior, such as self-reporting, tracking frequencies of thoughts/feelings, and examining the relationship between inner and outer behavior.

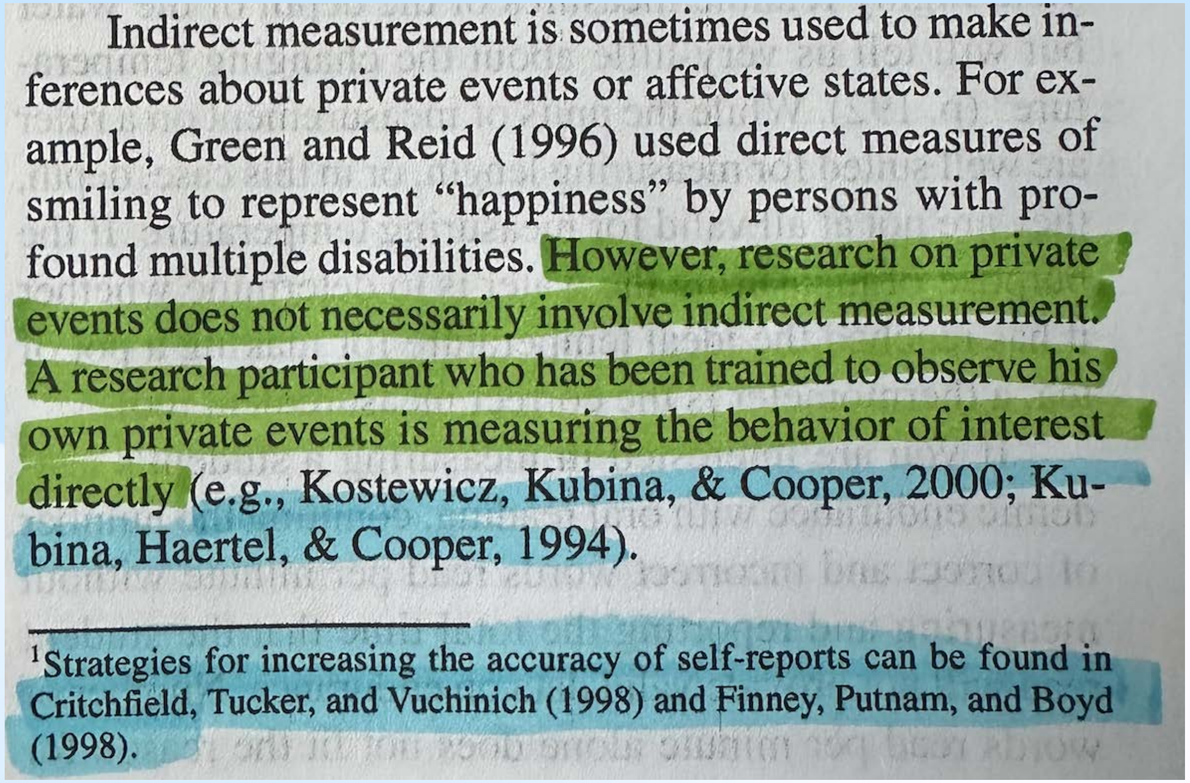
What is an Inner Behavior Intervention?

- Inner behavior interventions involve using one-minute timings and self-recording procedures to improve private verbal behaviors, i.e. people's thoughts and feelings about themselves.
- The person makes lists of their positive and negative thoughts/feelings about themselves. They then spend one minute each day writing down, saying aloud, or thinking as many of the positive items as they can and counting how many were produced in that minute.
- Doing this daily one-minute practice leads the number of positive thoughts/feelings to increase and negative ones to decrease over a period of weeks.
- It is based on Skinner's idea that private events, while harder to observe, are no different in kind from overt behaviors and can be modified using similar procedures.
- Precision teaching is used to measure, monitor, and make rapid data-based decisions.

Common objections to inner behavior

1. Lack of observable and measurable data
2. Subjectivity and interpretation
3. Reliance on self-report

Responses to Common objections



Indirect measurement is sometimes used to make inferences about private events or affective states. For example, Green and Reid (1996) used direct measures of smiling to represent "happiness" by persons with profound multiple disabilities. However, research on private events does not necessarily involve indirect measurement. A research participant who has been trained to observe his own private events is measuring the behavior of interest directly (e.g., Kostewicz, Kubina, & Cooper, 2000; Kubina, Haertel, & Cooper, 1994).

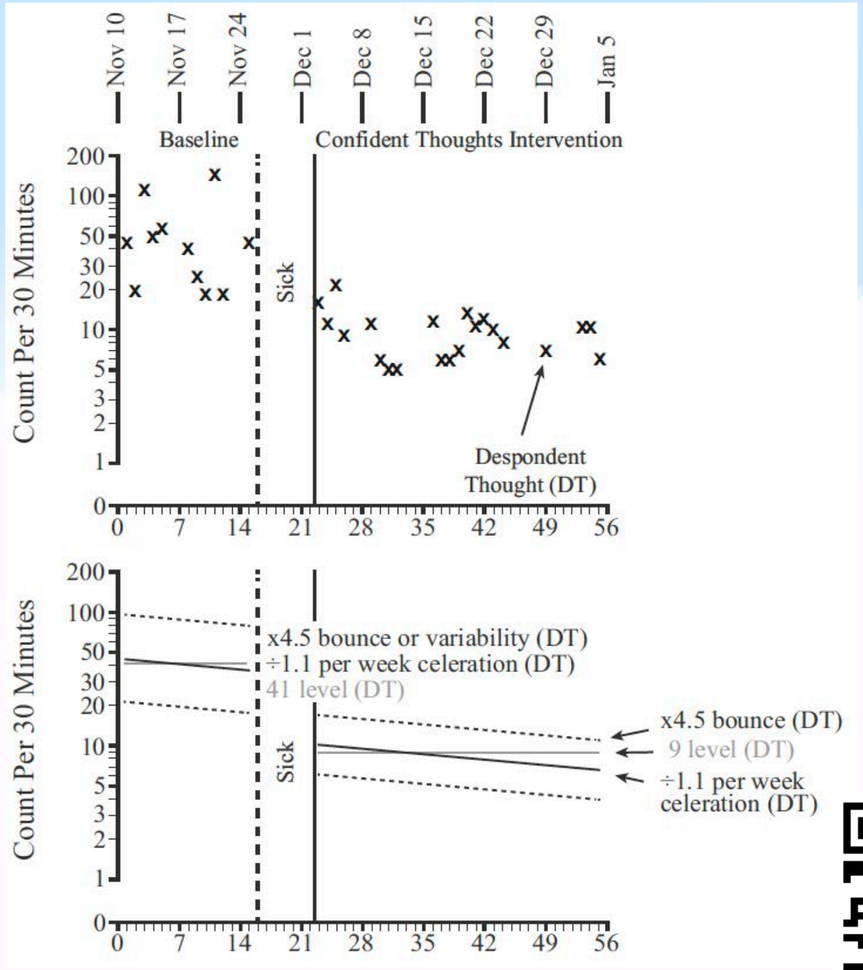
[1]Strategies for increasing the accuracy of self-reports can be found in Critchfield, Tucker, and Vuchinich (1998) and Finney, Putnam, and Boyd (1998).

P. 105

- "...research on private events does not necessarily involve indirect measurement. A research participant who has been trained to observe his own private events is measuring the behavior of interest directly" (e.g., Kostewicz, Kubina, & Cooper, 2000; Kubina, Haertel, & Cooper, 1994).
- "[Radical behaviorism] does not insist upon truth by agreement and can therefore 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" (Skinner, 1974, p. 16)

Increasing Confident Thoughts in an Adolescent With Autism

- This study examined the effects of a 1-minute daily counting intervention of confident thoughts on despondent thoughts (DTs) in a 15-year-old girl with autism spectrum disorder (ASD).
- The study used an A-B design, with a baseline phase followed by the intervention phase where the participant counted unique confident thoughts for 1 minute each day.
- The participant's average level of DTs decreased substantially from 41 in baseline to 9 during the intervention, though the rate of change (celeration) remained slow.
- The participant reported lower levels of anxiety and depression on the Beck Anxiety Inventory and Beck Depression Inventory after the intervention.
- The participant no longer reported suicidal ideation following the intervention and rated it as helpful in increasing confidence and reducing depression.



(Brown & Kubina, 2022)

Managing aggressive thoughts and feelings with daily counts of non-aggressive thoughts and feelings

- Kostewicz et al. (2000) describes a self-experiment where the participant used an inner behavior intervention to manage his own aggressive thoughts and feelings.
- During baseline, he counted and charted his daily aggressive thoughts and feelings for 6 weeks. Self-recording alone did not reduce the frequency.
- In the first intervention phase, he added a daily 1-minute counting period where he tallied as many non-aggressive thoughts as possible. This did not significantly affect his aggressive thoughts compared to baseline.
- In the second intervention, he switched to doing six 10-second counting periods of non-aggressive thoughts spread throughout the day. This produced an immediate drop in aggressive thoughts.
- Alternating between the 1-minute and distributed 10-second counting procedures, the distributed counting consistently resulted in lower levels of aggressive thoughts.
- By the end of the second distributed counting phase and a final baseline phase, Kostewicz was having mostly zero aggressive thoughts per day.
- Kostewicz attributed the effectiveness of the distributed counting to the frequent prompts throughout the day to relax and think non-aggressively.

(Kostewicz et al. 2000)

Managing aggressive thoughts and feelings with daily counts of non-aggressive thoughts and feelings

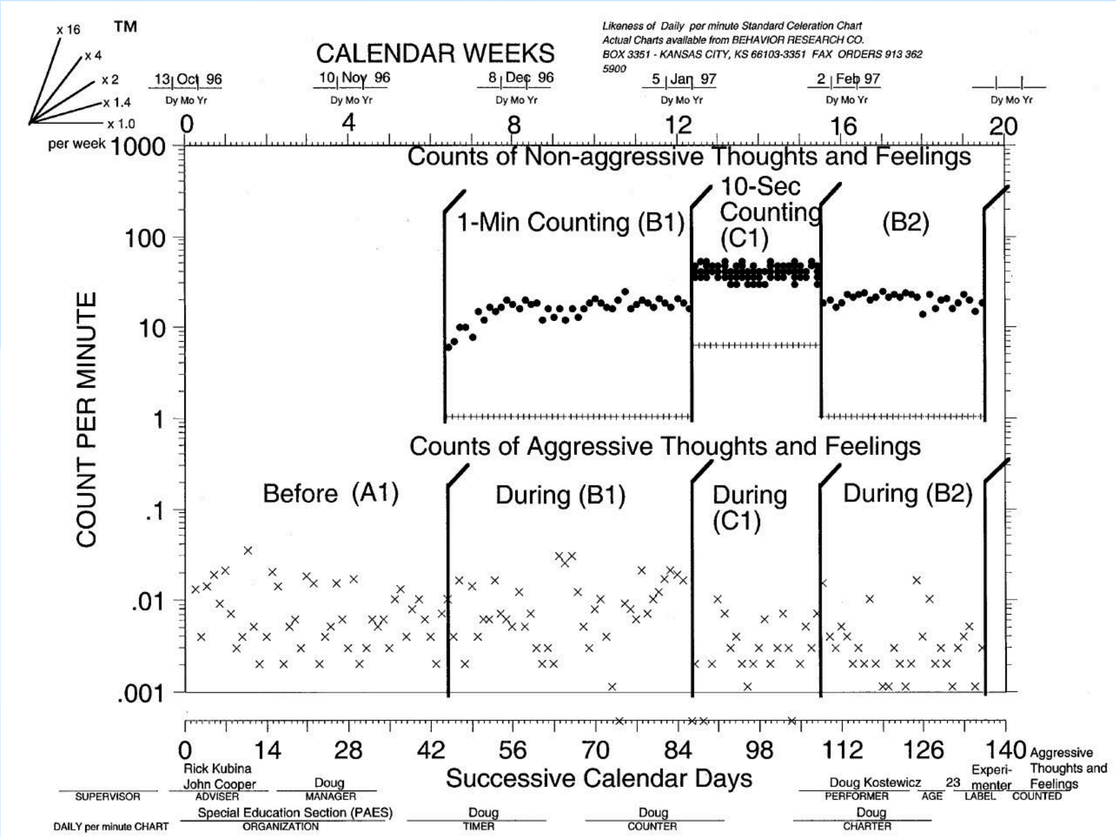


Fig. 1. Standard Celeration Charts displaying the daily counts of non-aggressive thoughts and feelings.

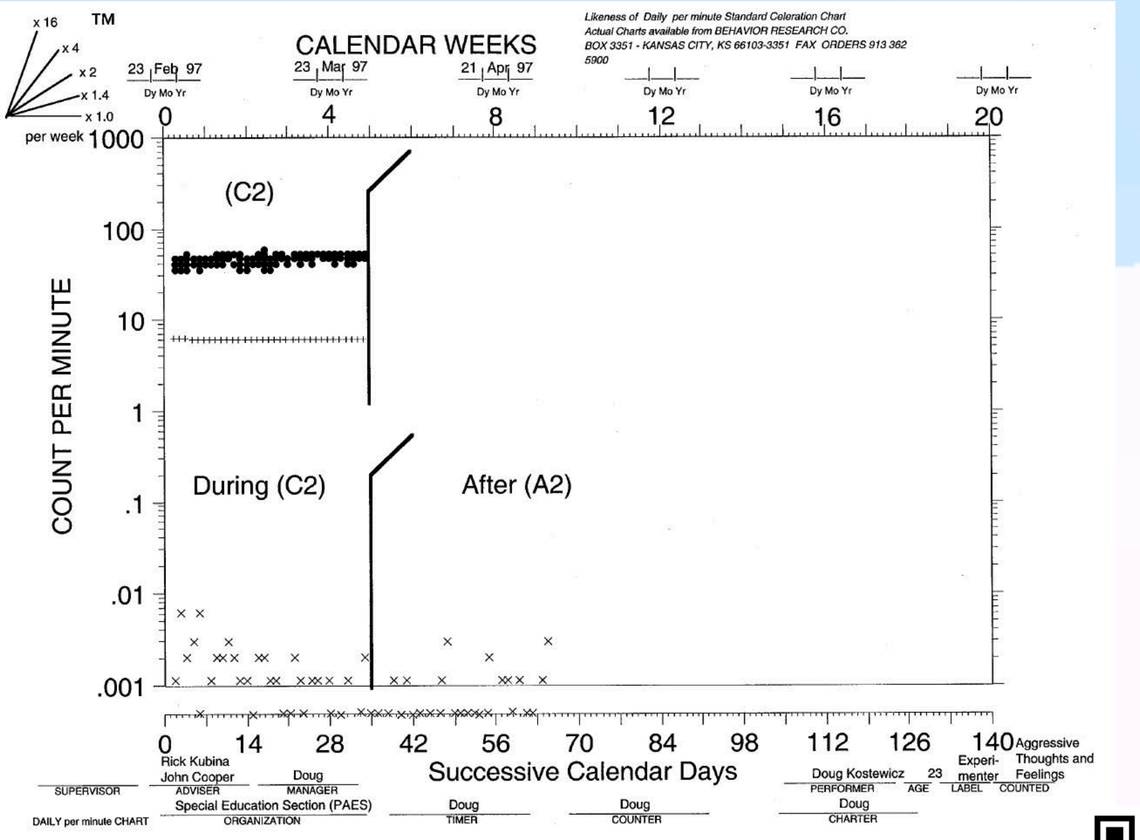


Fig. 2. Standard Celeration Charts displaying the daily counts of aggressive thoughts and feelings.

(Kostewicz et al. 2000)

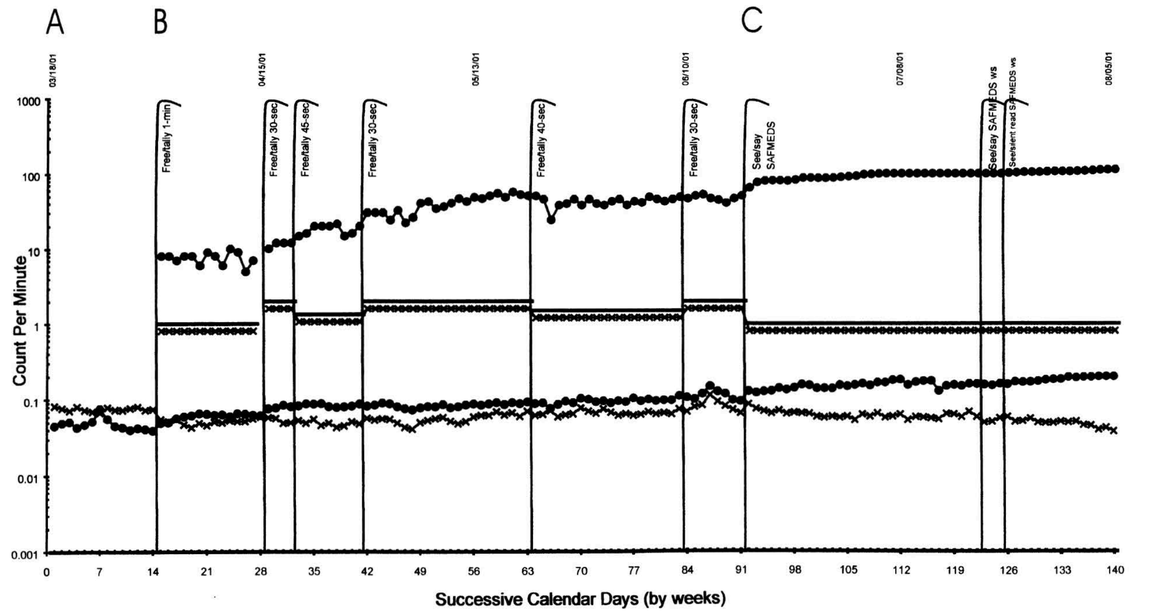
A Senior Citizen's Self-management of Positive and Negative Inner Behaviours

- This study evaluated a 66-year-old female participant's self-management of positive and negative inner behaviors.
- The study had several conditions: baseline (A), timed counting of positive inners (B), response-prompt procedures including SAFMEDS and a personalized worksheet (C), return to baseline (A), and follow-up assessment (D).
- During the timed counting intervention (B), positive inners accelerated during the counting periods but had less impact on daily totals.
- The response-prompt procedures (C), especially the personalized worksheet, were most effective in increasing daily positive inners and decreasing negative inners.
- Positive inners continued to accelerate and negative inners decelerated further during the return to baseline and follow-up, suggesting maintenance of the intervention effects.

(Cobane & Keenan, 2002)

A Senior Citizen's Self-management of Positive and Negative Inner Behaviours

Chart 1



Behaver: Kathy

Target: Positive and negtaive inners

Chart 2

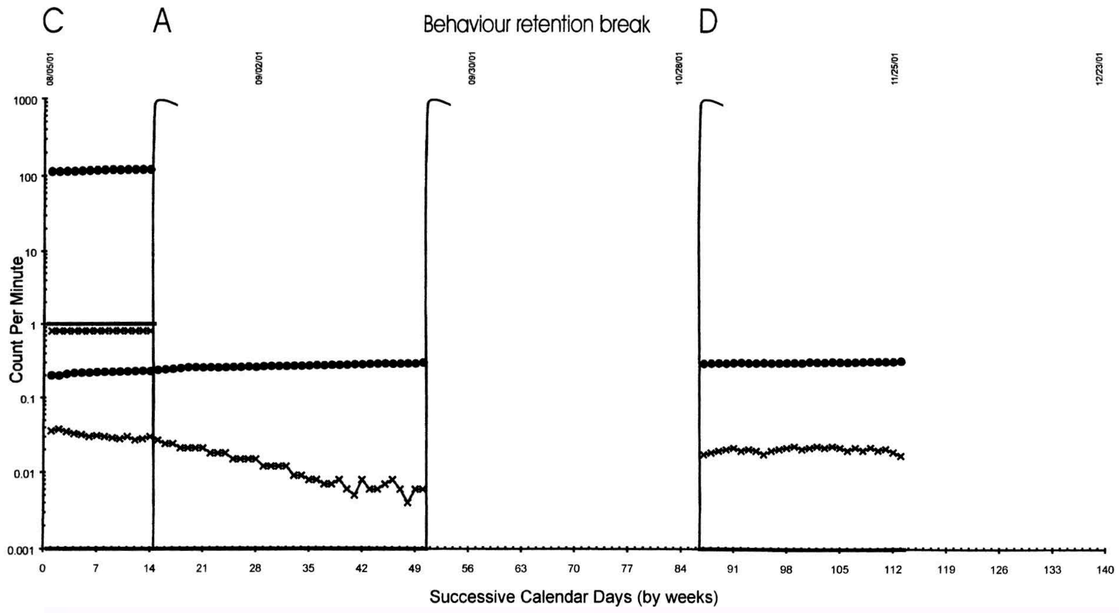
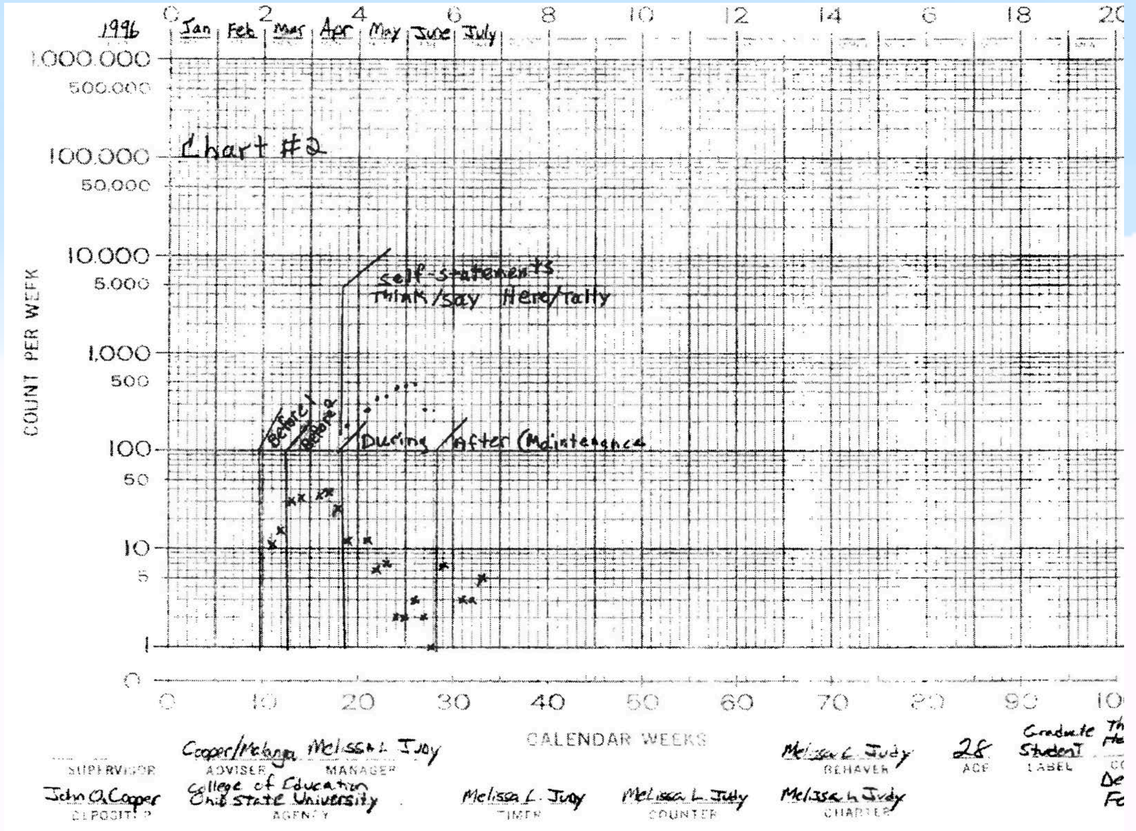


Figure 2

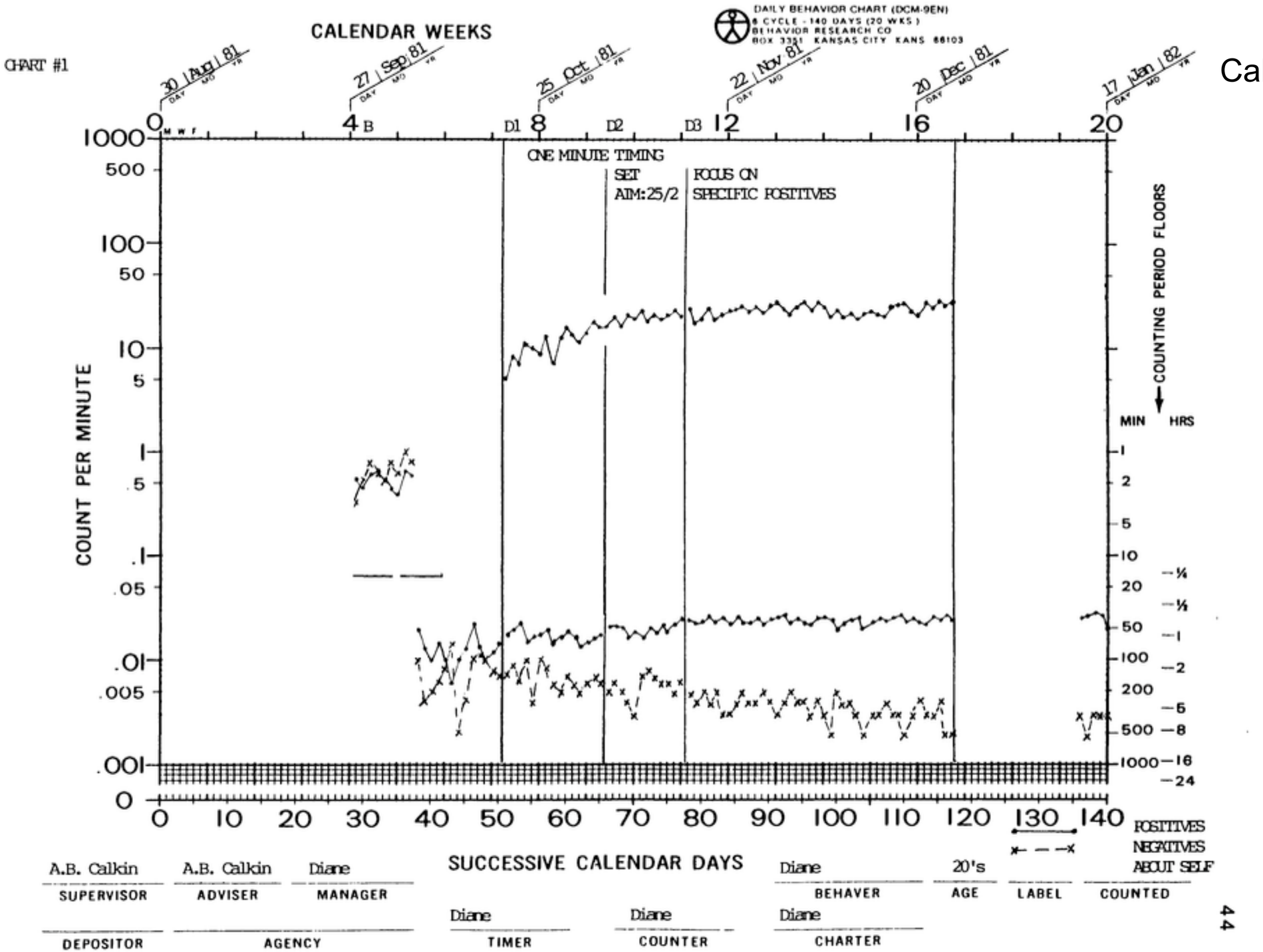
(Cobane & Keenan, 2002)

A Self-Experimentation on the Detection of Forgets: Using Encouraging Think/Say and Hear/Tally Statements

- Before the intervention, Melissa Judy tracked her "forgets" (lapses in memory or follow-through) using a wrist counter to establish a baseline frequency.
- During the 10-week intervention phase, Melissa added daily one-minute sessions of verbalizing pre-written self-statements affirming improvements in her memory, while continuing to track "forgets."
- Over the course of the intervention, the frequency of Melissa's "forgets" decreased compared to baseline, and her efficiency in verbalizing self-statements increased.
- After the intervention ended, Melissa continued tracking "forgets" without the self-statements, and the reduction in forgetfulness was largely maintained, suggesting lasting effects of the intervention.
- From an average of 12 a day to 0-4 a day.
- Intervention lasted 10 weeks



(Judy et al., 1997)


DAILY BEHAVIOR CHART (DCM-9EN)
6 CYCLE - 140 DAYS (20 WKS)
BEHAVIOR RESEARCH CO
BOX 3321 KANSAS CITY KANS 66103
CHART #1
CALENDAR WEEKS
30 Aug 81
27 Sep 81
25 Oct 81
22 Nov 81
20 Dec 81
17 Jan 82
ONE MINUTE TIMING
SET
AIM:25/2
FOCUS ON
SPECIFIC POSITIVES
COUNT PER MINUTE
COUNTING PERIOD FLOORS
MIN HRS
SUCCESSIVE CALENDAR DAYS
POSITIVES
NEGATIVES
ABOUT SELF
A.B. Calkin
SUPERVISOR
A.B. Calkin
ADVISER
Diane
MANAGER
Diane
BEHAVER
20's
AGE
LABEL
COUNTED
DEPOSITOR
AGENCY
Diane
TIMER
Diane
COUNTER
Diane
CHARTER

Calkin (1992)

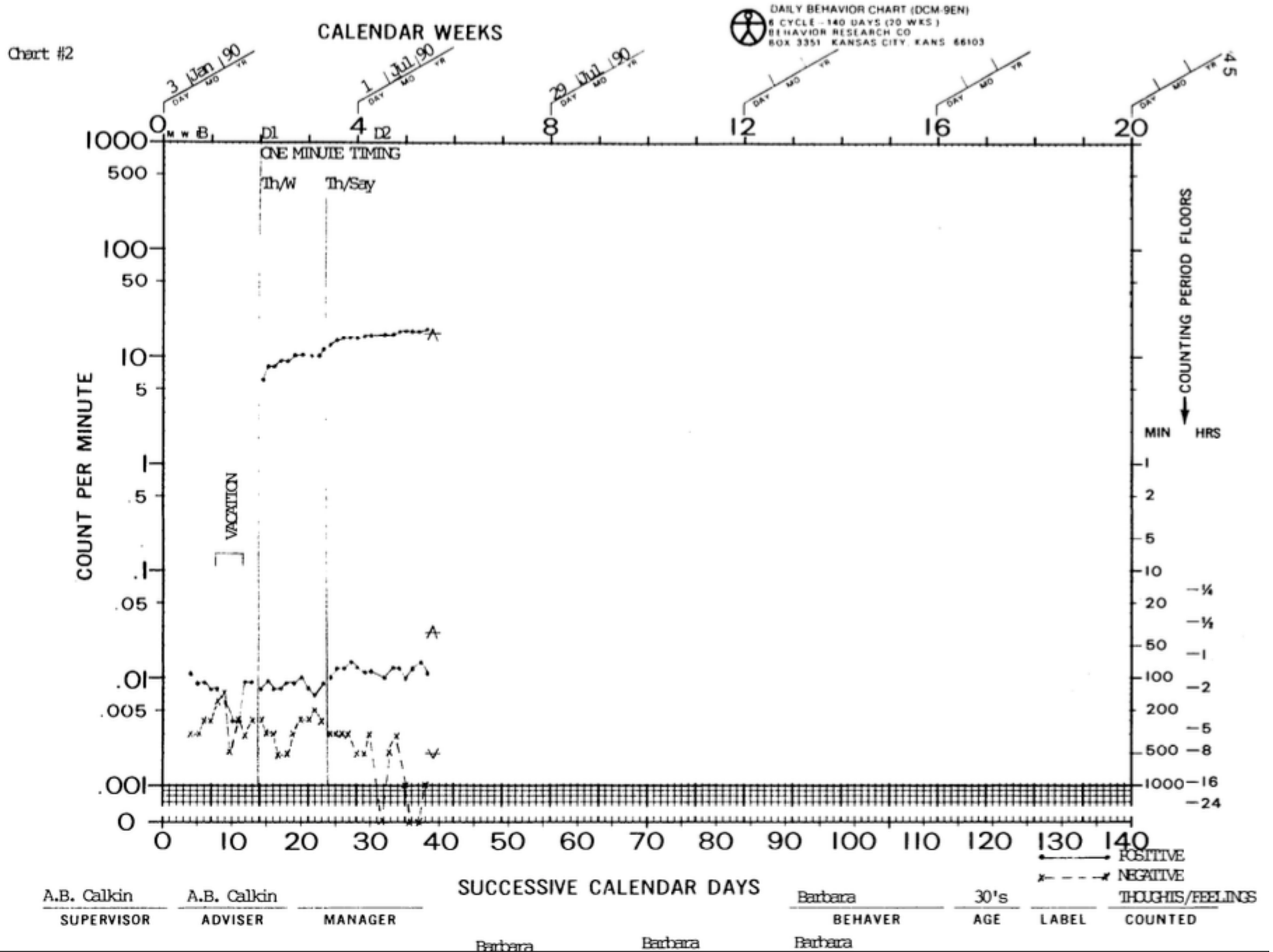


Chart #2
CALENDAR WEEKS
DAILY BEHAVIOR CHART (DCM-9EN)
6 CYCLE - 140 DAYS (20 WKS)
BEHAVIOR RESEARCH CO
BOX 3351 KANSAS CITY, KANS 66103
3 Jan 90
1 Jul 90
29 Jul 90
45
0
4
8
12
16
20
W
B
D1
D2
ONE MINUTE TIMING
Th/W
Th/Say
VACATION
COUNT PER MINUTE
1000
500
100
50
10
5
1
.5
.1
.05
.01
.005
.001
0
COUNTING PERIOD FLOORS
MIN
HRS
1
2
5
10
20
50
100
200
500
1000
¼
½
1
2
5
8
16
24
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
SUCCESSIVE CALENDAR DAYS
POSITIVE
NEGATIVE
A.B. Calkin
SUPERVISOR
A.B. Calkin
ADVISER
MANAGER
Barbara
BEHAVER
30's
AGE
LABEL
THOUGHTS/FEELINGS
COUNTED
Barbara
Barbara
Barbara

Calkin (1992)

Duncan (1971)

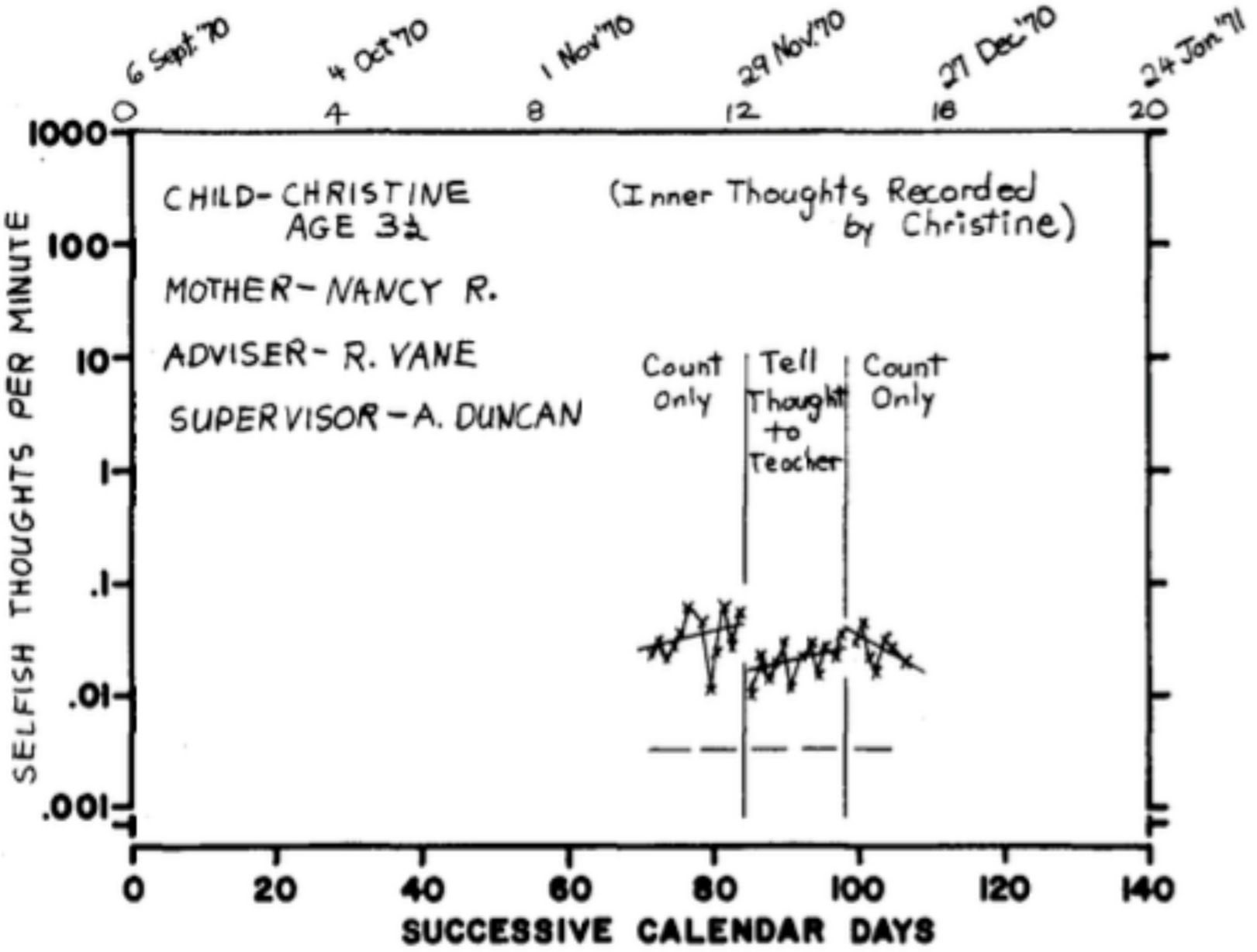
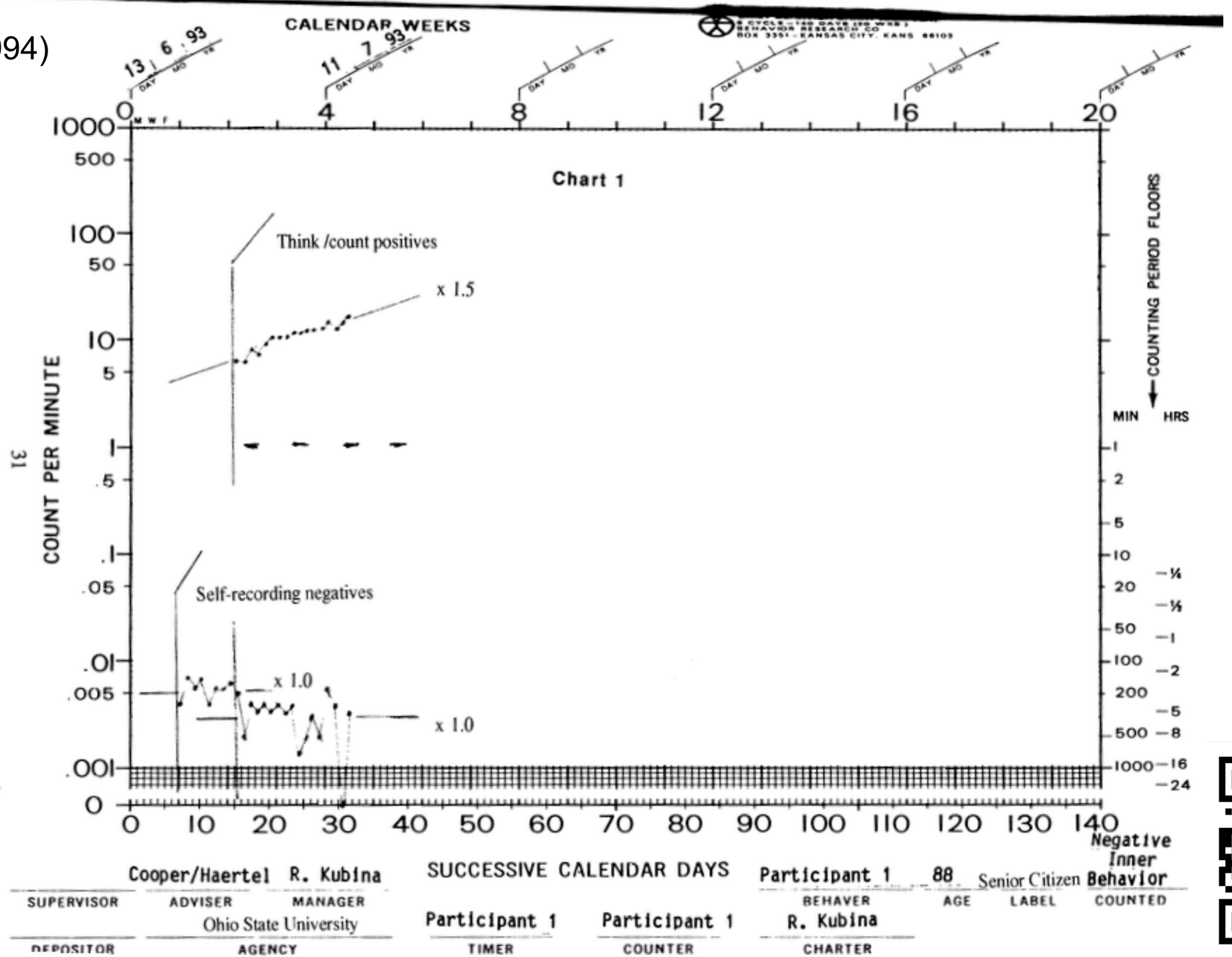
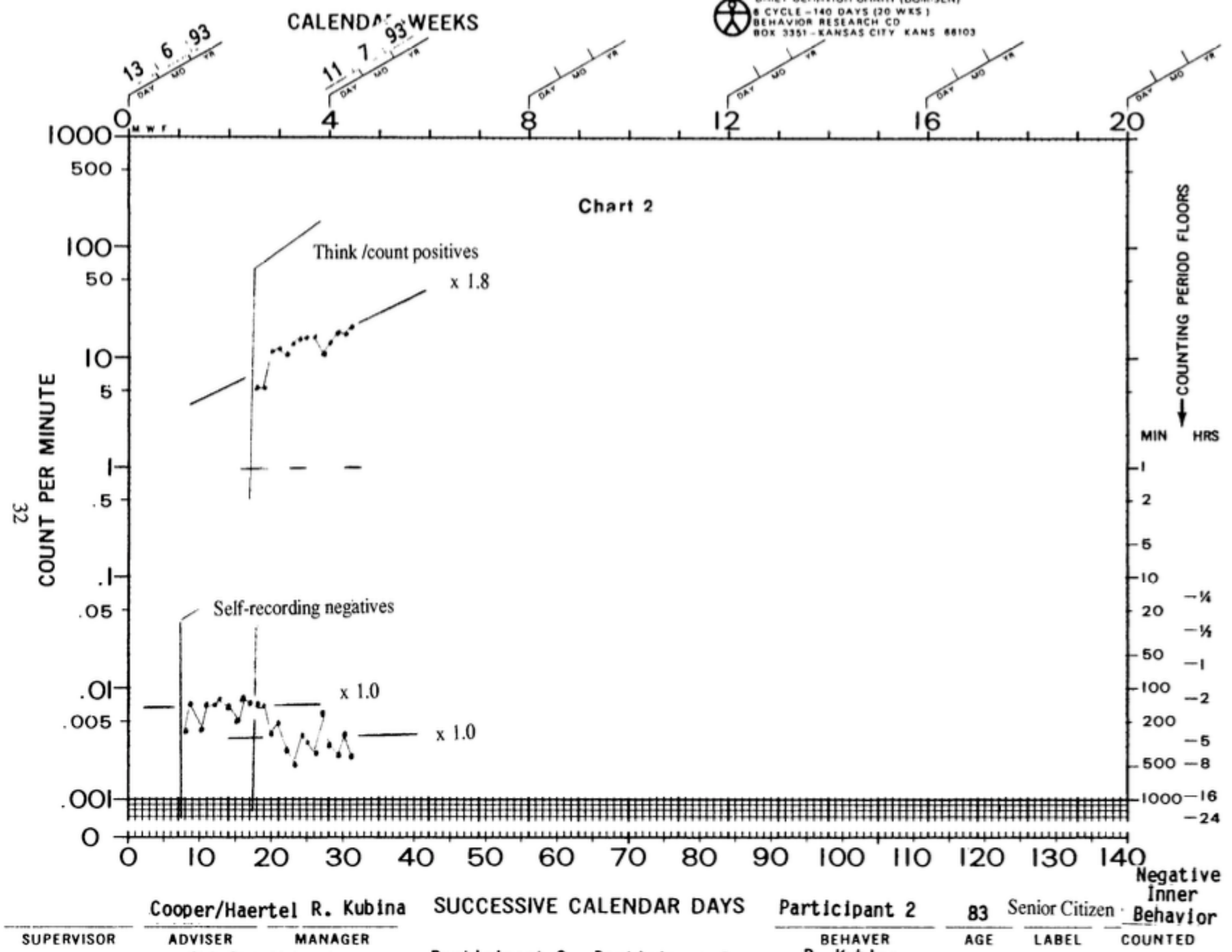


Figure 2 *Although Christine's selfish thoughts began increasing shortly after she started telling them aloud, overall they are lower in frequency than they were before this and they began going down again when she went back to only counting them.*

Kubina et al. (1994)



Kubina et al. (1994)



Inner behavior in Science

- Edwards & Edwards (1970) systematically observed and quantified fetal movements across gestational age. This demonstrates that private behaviors can be measured empirically.
- Tracking fetal movements provides insight into prenatal inner behavior and development.
- This study complements qualitative descriptions with quantitative data on in utero behavioral progression.
- The methodology provides a model for empirically studying private events over time.
- They documented the time course of prenatal motor development in humans, showing that different movement patterns have different onset times and frequency trajectories as gestation progresses.
- Monitoring this time course could potentially help detect neurodevelopmental or pregnancy issues.

Fetal Movement: Development and Time Course

Abstract. *Prenatal behavior develops in three phases: early rates, acceleration and maintenance, and deceleration to birth. Fetal activity occurs as discrete movements, bursts of activity, and prolonged activity. Four-hour samples were most representative of the daily rates of movement.*

The time course of embryonic development has been determined but the development of prenatal behavior has not been adequately described for either the normal or defective fetus, largely because adequate techniques for recording fetal behavior have been lacking. Fetal development has typically been evaluated from the mother's report of fetal activity (*1, 2*). It is

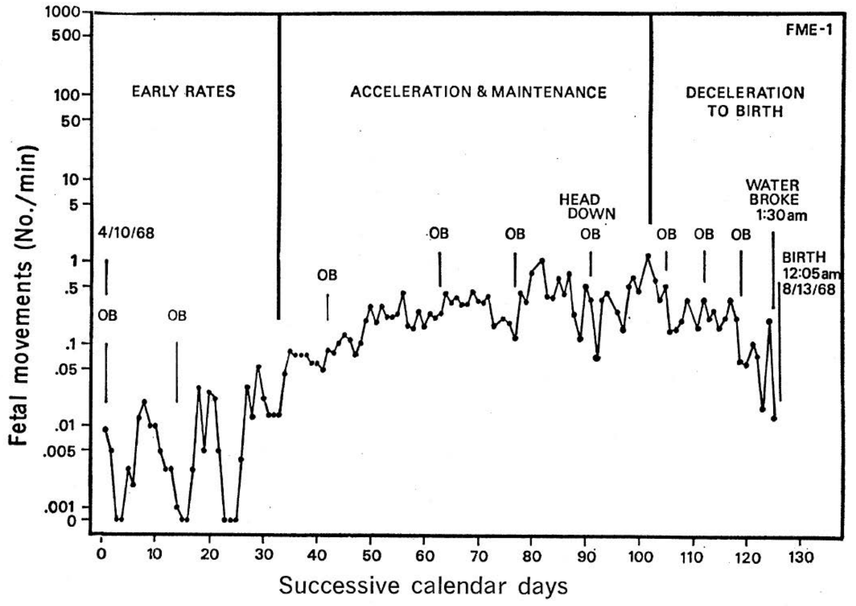
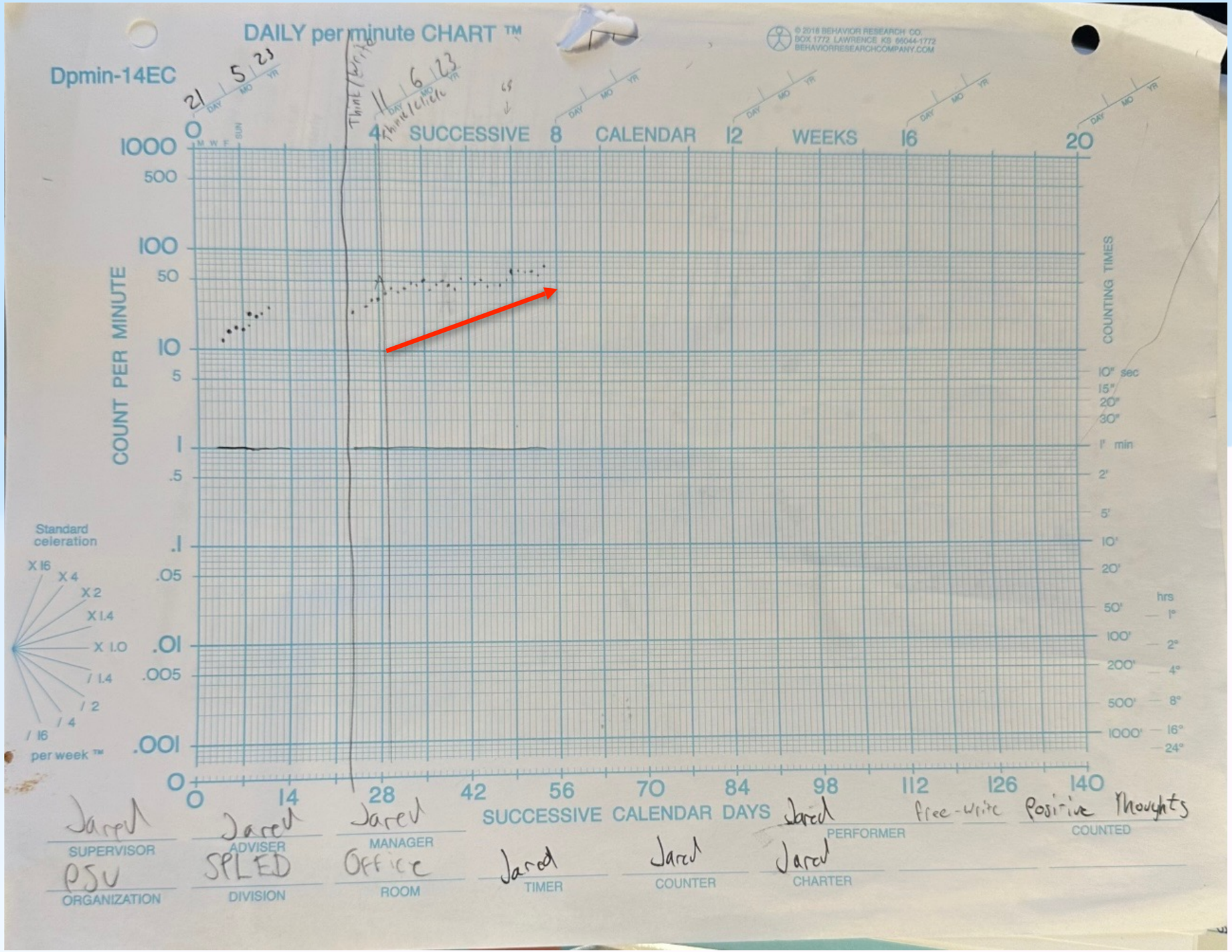


Fig. 1. Graphic presentation of the time course of fetal movements during prenatal development.

95

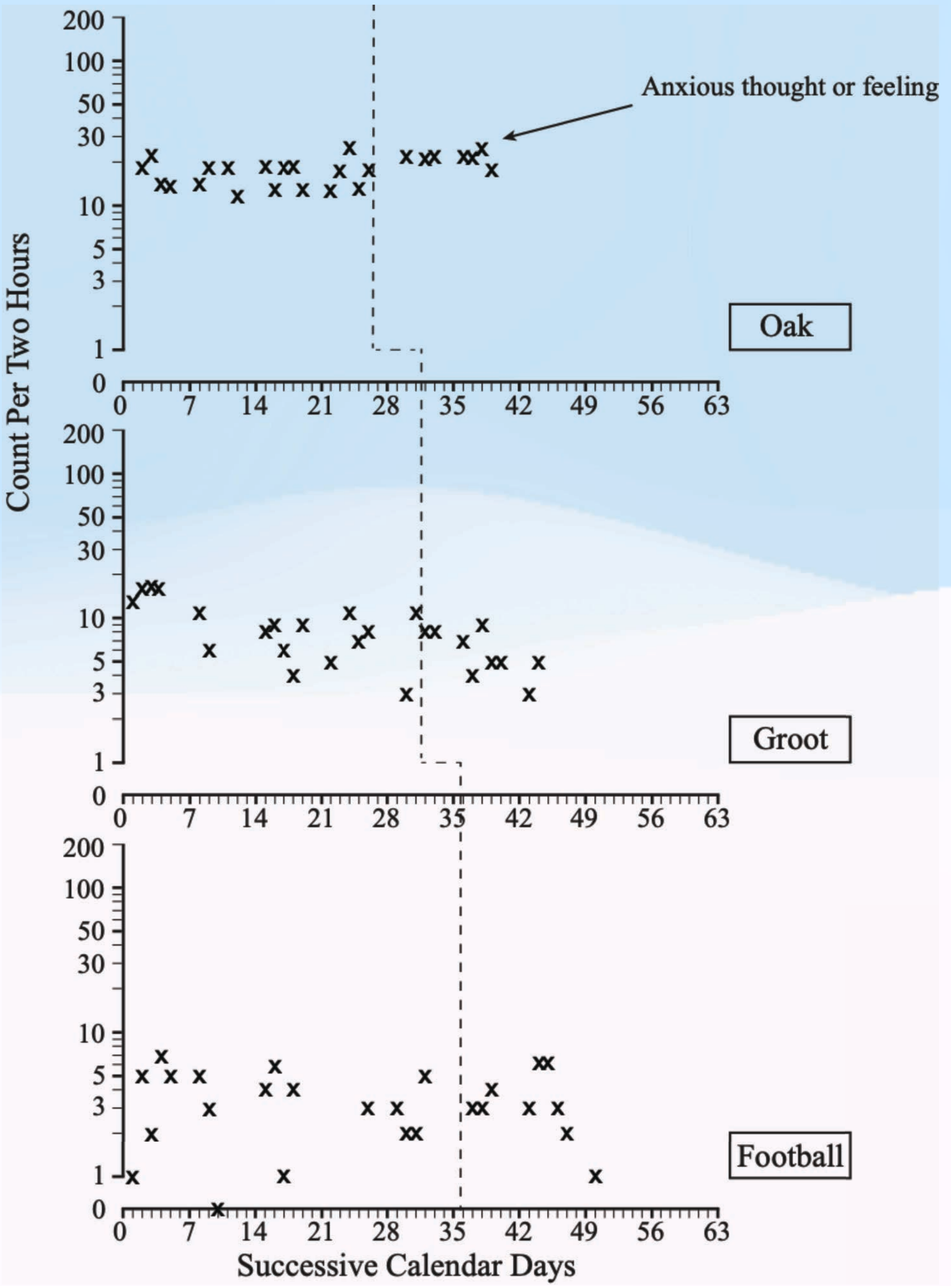
(Edwards & Edwards, 1970)

Jared's Inner Behavior



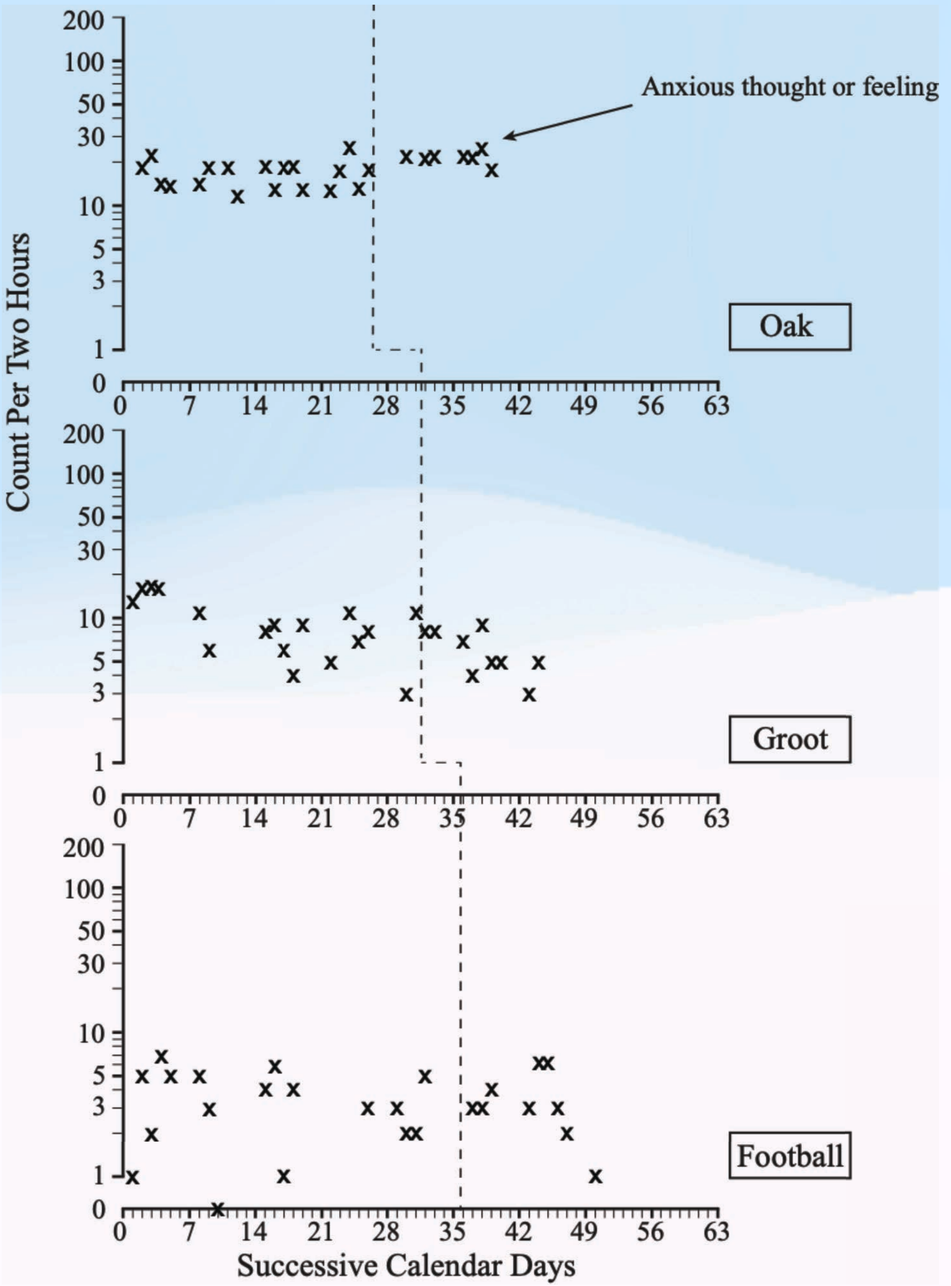
My pilot study with middle schoolers and Anxiety

- **Oak:** “Before it was more of just I hated anxiety, but now it's more of... It's kind of a protective mechanism”
- “Now stress is easier to cope with because it's now more of that mechanism instead of just an anxious thought or feeling that blocks any work from really getting done.”
- “Situations are usually less stressful and more manageable.”



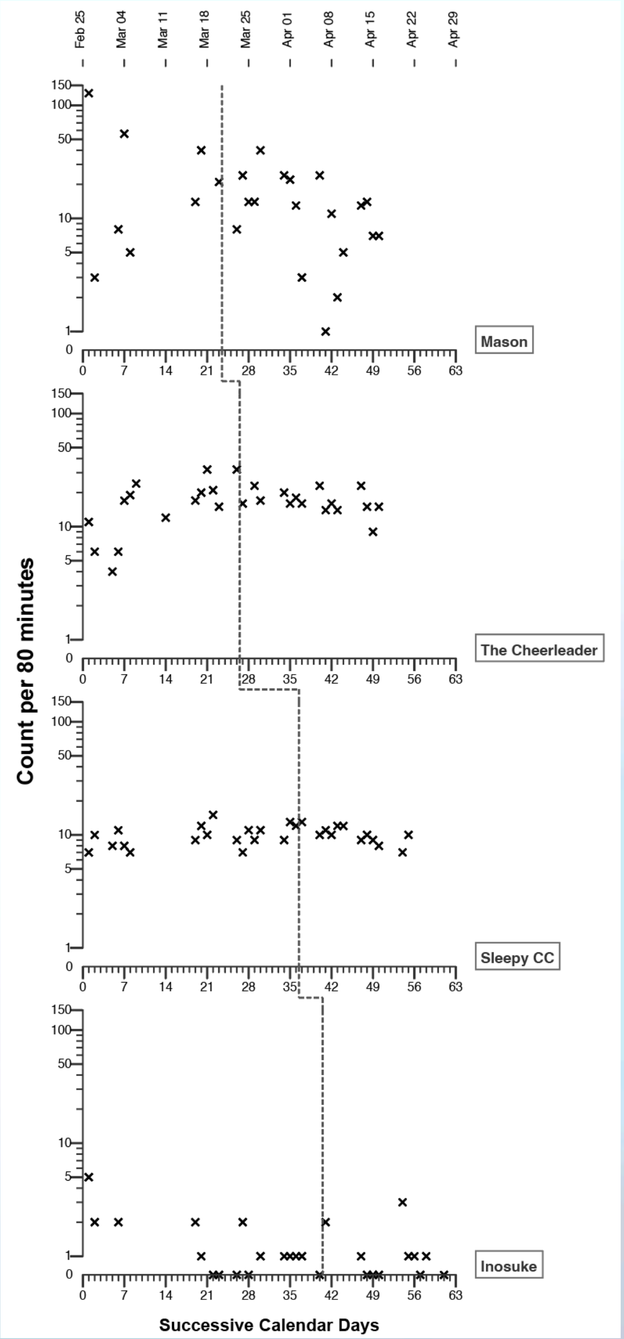
My research with middle schoolers and Anxiety

- **Groot:** “I think that they've gotten better and I don't have as many thoughts like that.”
- “When I come across an anxious thought, I like try to think of a positive one.”
- “if I can't think of like a positive thought that like I should probably talk to somebody about that.”
- **Football:** “I feel like I just don't have as much anxiety.”
- “I think the one minute timing definitely helped because it's like you can almost see the numbers increase day by day.”
- “I guess I'm doing better in school than I was… Just grades overall”



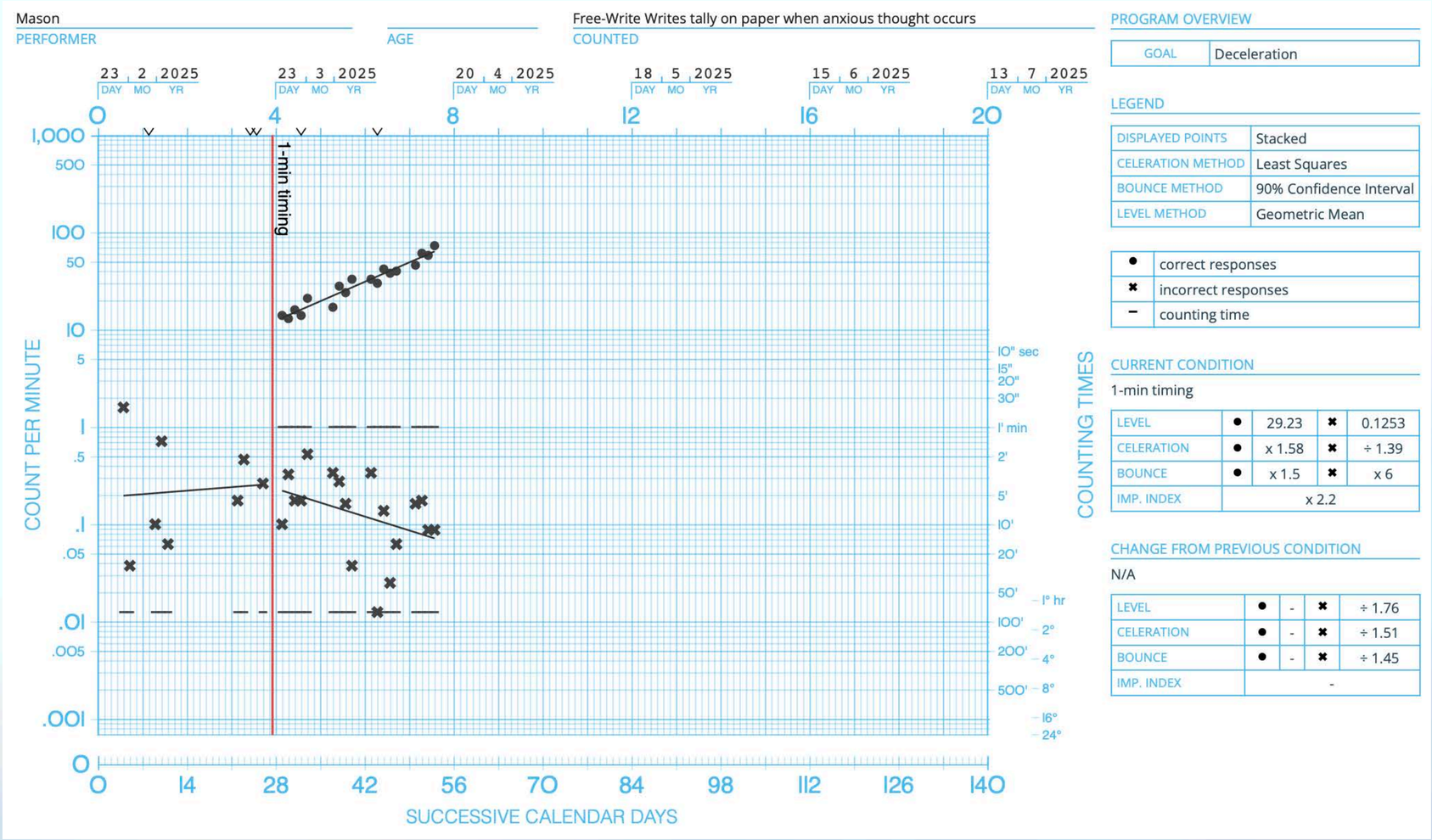
Dissertation Results

- All students showed some level of improvement
  - Reduced variability in anxious thoughts
  - Trend reversal or deceleration for most
- Even without trend change, behavior became more regulated
- Evidence of increased control and stability over anxiety



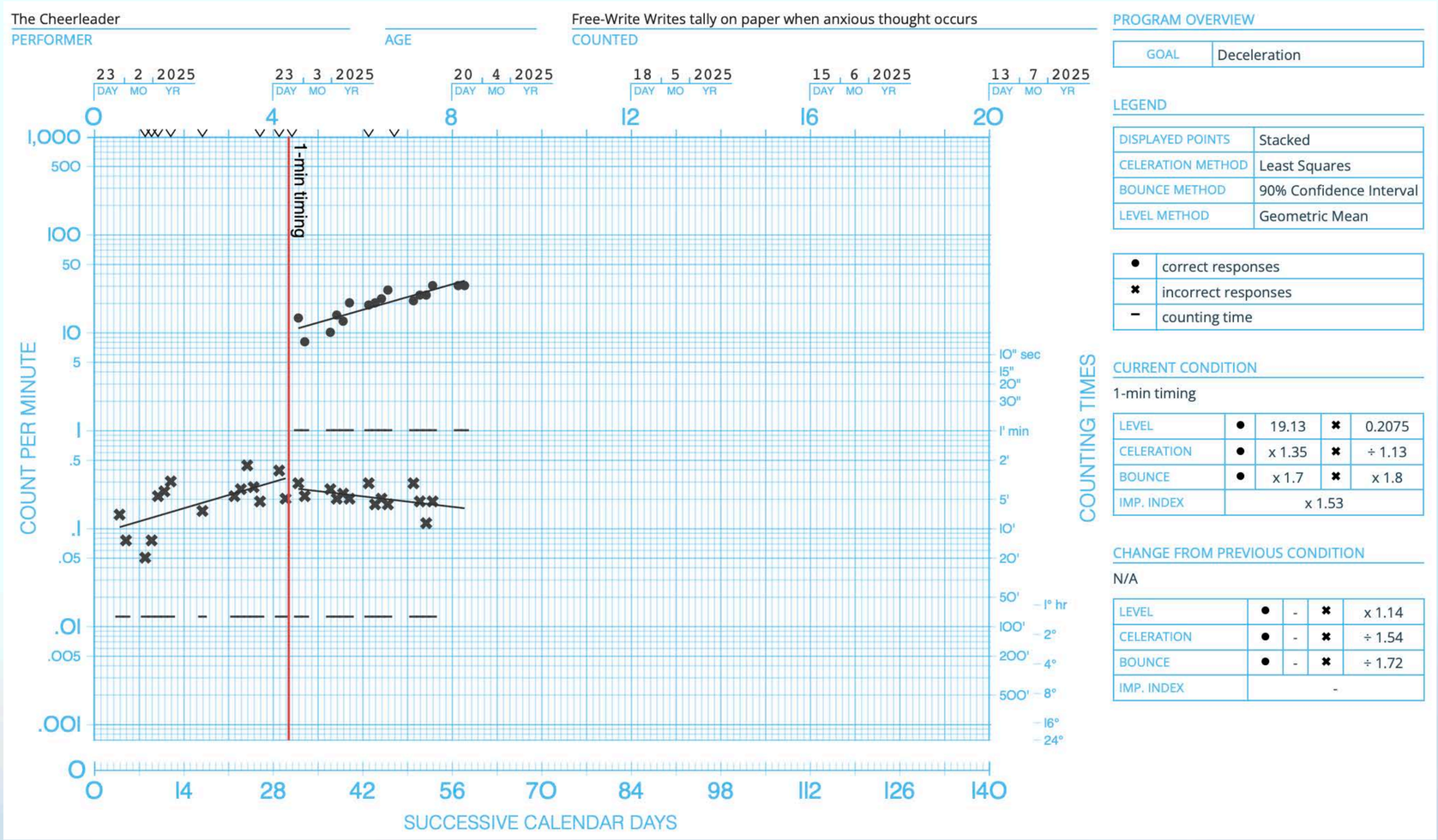
Participant Results: Mason

- Baseline: 34 anxious thoughts, celeration ×1.09, bounce ×8.7
- Intervention: 14 anxious thoughts, celeration ÷1.58, bounce ×1.45
- Highest count of confident thoughts in one minute: 73



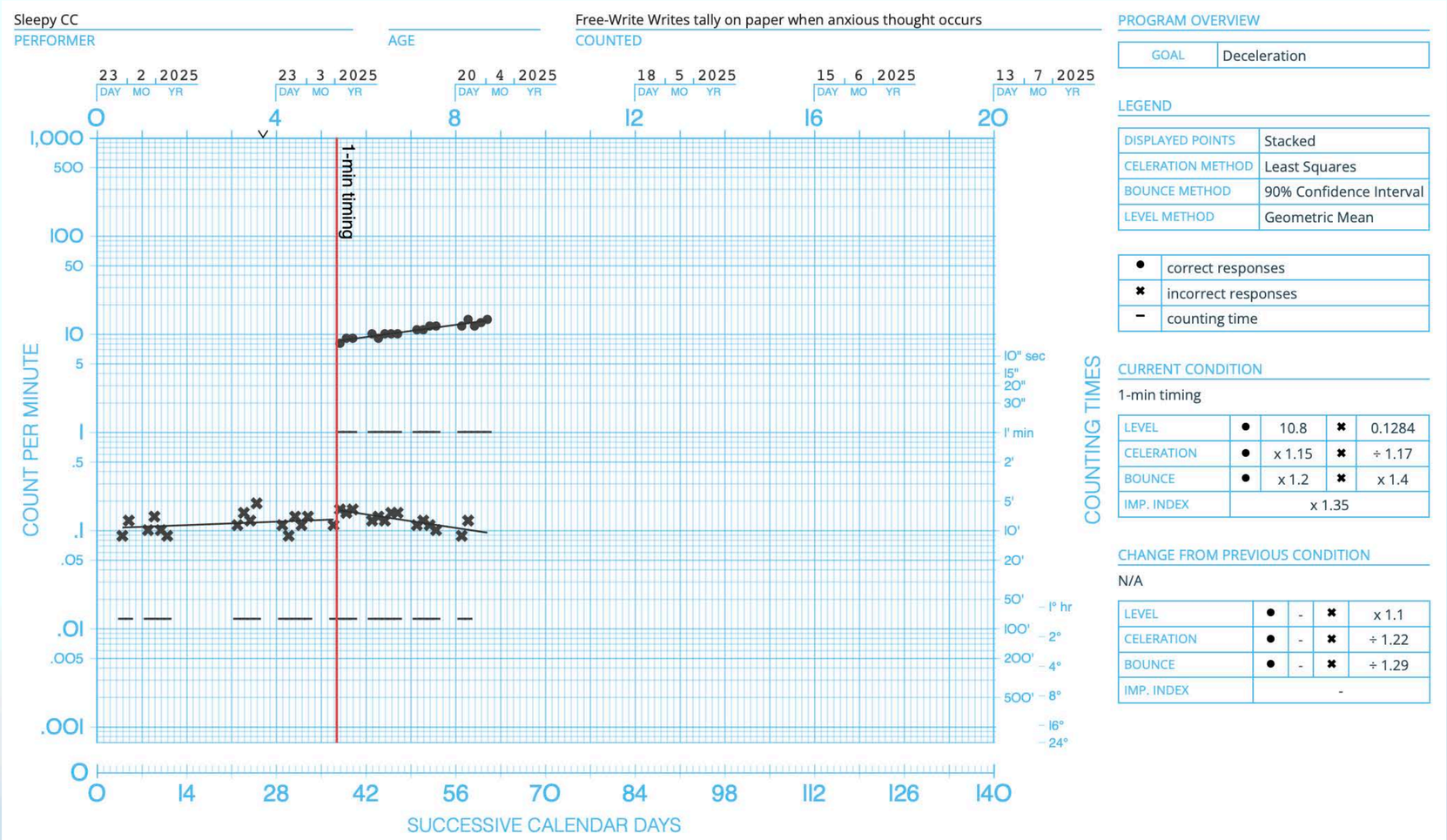
Participant Results: The Cheerleader

- Baseline: 17 anxious thoughts, celeration ×1.36, bounce ×3.1
- Intervention: 17 anxious thoughts, celeration ÷1.54, bounce ×1.72
- Strong trend reversal (counter-turn) and greater consistency
- Highest count of confident thoughts in one minute: 30



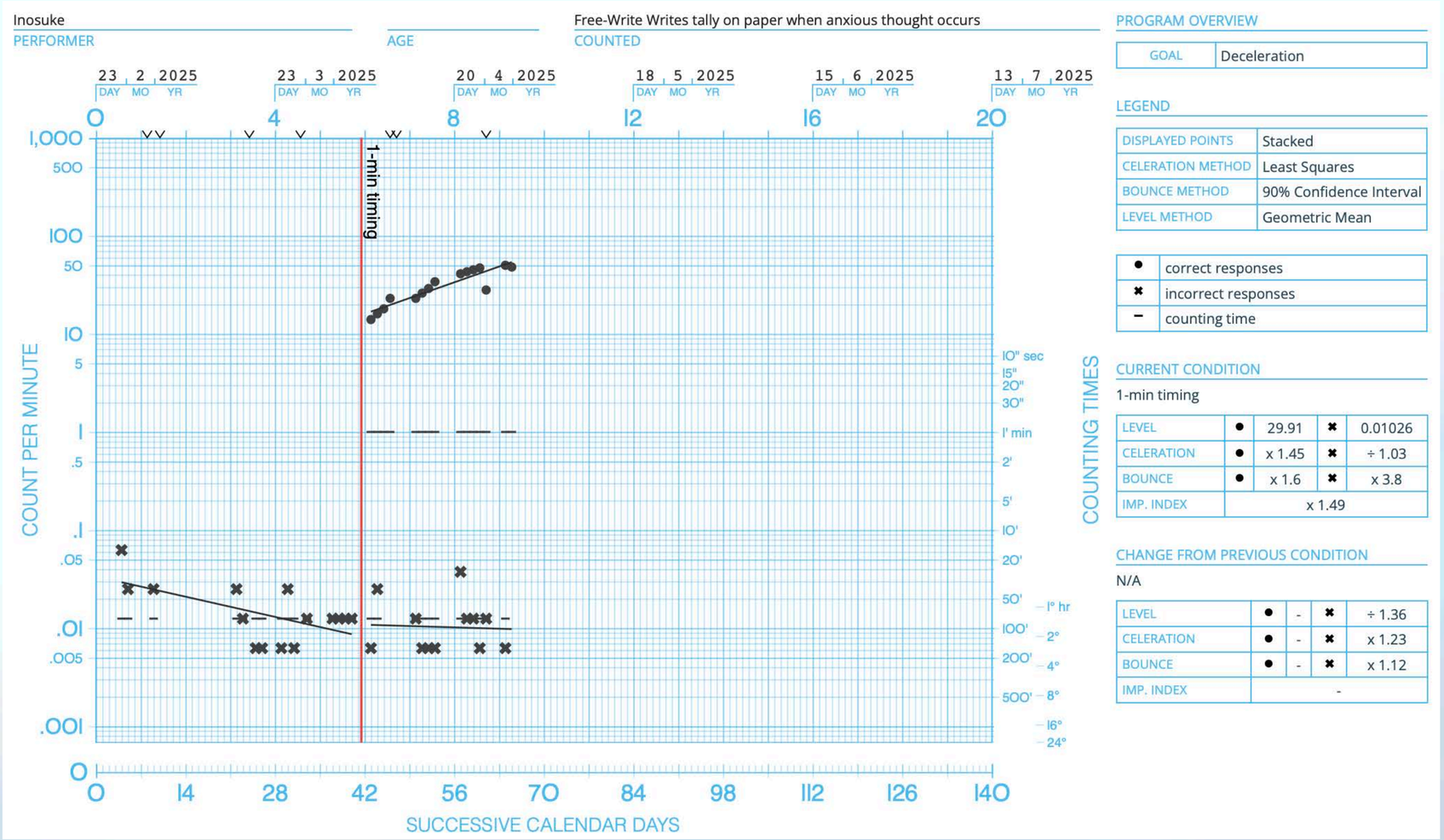
Participant Results: Sleepy CC

- Baseline: 10 anxious thoughts, celeration ×1.04, bounce ×1.8
- Intervention: 10 anxious thoughts, celeration ÷1.22, bounce ×1.4
- Behavior became more stable—less day-to-day fluctuation
- Highest count of confident thoughts in one minute: 14



Participant Results: Inosuke

- Baseline: 1 anxious thought, celeration ÷1.27, bounce ×3.4
- Intervention: 1 anxious thought, celeration ÷1.03, bounce ×2.13
- Reduction in variability (bounce), even with a floor effect
- Highest count of confident thoughts in one minute: 50



Self-Positives List #1 (243 words) (Rodriguez, 1997)

able	confident	funny	joyful	predictable	stable
acceptable	conforming	gallant	just	progressive	strong
active	conservative	generous	kind	protective	strong will
adequate	considerate	genius	knowledgeable	proud	structured
admirable	content	genuine	learner	questioning	supportive
adorable	congenial	giddy	light-hearted	quiet	sweet
affectionate	conscientious	gifted	likable	rational	swift
agreeable	considerate	giving	lively	reader	sympathetic
airy	cooperative	glorious	logical	reasonable	tactful
ambitious	cordial	good brother	lovable	reassuring	talented
amiable	courteous	good child	loving	receptive	team player
amusing	creative	good friend	lyrical	reflective	tender
animal lover	daring	good listener	mature	refreshing	thankful
animated	decisive	good sister	mellow	relaxed	theatrical
appealing	dedicated	good student	mild	reserved	thoughtful
articulate	delightful	grand	modest	respectful	timely
assertive	detailed	grateful	moral	risk taker	tolerant
athletic	determined	gratifying	neat	scientific	tranquil
attractive	devoted	hardy	neighborly	secure	trustworthy
aware	dignified	healthy	obedient	self-accepting	unassuming
beautiful	dramatic	helpful	objective	self-actualizing	understand-ing
brave	dutiful	heroic	obliging	self-aware	unselfish
bright	easy going	hilarious	open	self starter	useful
brilliant	efficient	honest	opinionated	self-reliant	visionary
calm	empathetic	honorable	optimistic	sentimental	vivacious
carefree	enchanting	hopeful	orderly	serene	warm
caring	energetic	hospitable	organized	selfless	well rounded
cautious	entertaining	humane	participant	self-pride	wholesome
certain	enthusiastic	humble	passionate	sensitive	willful
charitable	environmentalist	humorous	patient	serene	witty
charming	exciting	idealistic	peaceful	serious	worthwhile
cheerful	extroverted	imaginative	perceptive	silly	youthful
cheery	fair	independent	performer	simple	zestful
clean	faithful	ingenious	persuasive	sincere	
colorful	fantastic	innocent	playful	skillful	
comforting	festive	innovative	pleasant	smart	
comical	firm	inquisitive	pleasing	sociable	
committed	fit	inspirational	poetic	soft	
companionshp	forgiving	intelligent	polite	soft spoken	
compassionate	focused	intense	popular	spirited	
competitive	friendly	intuitive	powerful	spiritual	
complex	fun	jovial	precise	spontaneous	

Calkin's composite list from adults (1978-1993)

acceptable	hard worker
athletic	independent
attractive	intelligent
beautiful	introspective
clean	joyful
competent	kind
creative	mature
do things for others	neat laugh
empathetic	nice smile
finish things	nice figure
good artist	nice smile
good companion	open
good daughter	own style
good follow through	patient
good friend	perceptive
good mother	pretty
good musician	relate well to people
good skater, skier, swimmer	risk taker
good sister	sociable
good teacher	sweet
good wife	tall/short
good writer	warm
gutsy	well-balanced
happy	well-dressed
high energy	well-organized
honest	worthwhile
smart	self-reliant
caring	lifelong learner
pleasant	healthy self-esteem
asset	interdependent
responsible	confident
productive	self-sufficient
well-read	respectful
resourceful	problem solver
employable	enjoy learning
persevere	communicator
thinker	contributor
sense of humor	witty
curious	creative
good teacher/stockbroker…	finish projects
good job on projects	give compliments
do things for others	stick to diet
lose weight	good appearance
play the guitar/piano/violin…	easy to talk to
get along with almost everybody	get over situations easily

Self-Positives for Black people

Identity & Pride

- Beautiful melanin
- Strong roots
- Rich culture
- Brilliant mind
- Melanin magic
- Powerful voice
- Radiant soul
- Bold spirit
- Black excellence
- True beauty

Hair & Style

- Strong crown
- Beautiful curls
- Natural hair
- Beautiful hair
- Nice locs
- 360 Waves
- Great twists
- Perfect Afro
- Waves deep

Resilience & Strength

- Unbreakable spirit
- Beautiful soul
- Strong heart
- Brave soul
- Still rising
- Steady Grindin
- Steady strength
- Warrior blood
- Fearless mind
- Overcome all
- Resilient person

Joy & Creativity

- Black joy
- Creative fire
- Dope Rhythm
- Culture rich
- Good Dancer
- Good artist
- Musical
- Good musician
- Beautiful voice
- Perfect tone
- Genius
- Pure joy

Community & Legacy

- Rooted strong
- Proud Ancestors
- Legacy
- Strong family
- Deep kinship
- I matter
- I lift others
- Strong community
- Bright Future
- Guiding light

Self-Worth

- I'm enough
- Loved fully
- Worthy now
- Deserve peace
- Hope lives
- Joy within
- Rest worthy
- Sharp mind
- Dream big
- Free soul

For Black Men

- Strong Black man
- King energy
- Sharp mind
- Brave leader
- Wise brother
- Bold protector
- Steady spirit
- Loving Father
- Handsome king
- Gentle power
- Standing Tall
- Respected man
- True strength
- Grounded self

For Black Women

- Strong Black woman
- Queen energy
- Crown shines
- Beautiful curls
- Wise sister
- Loving mother
- Brave queen
- Soft power
- Resilient soul
- Gorgeous crown
- Divine beauty
- Nurturing heart
- Powerful queen
- Loved sister
- Graceful strength

For Black Trans People

- Proud trans
- True self
- Living free
- Brave journey
- Strong body
- Loved self
- Trans beauty
- Bold spirit
- Real me
- Fierce soul
- Trans power
- Sacred self
- Courage lives
- Bright future
- Valid always

For Black Nonbinary People

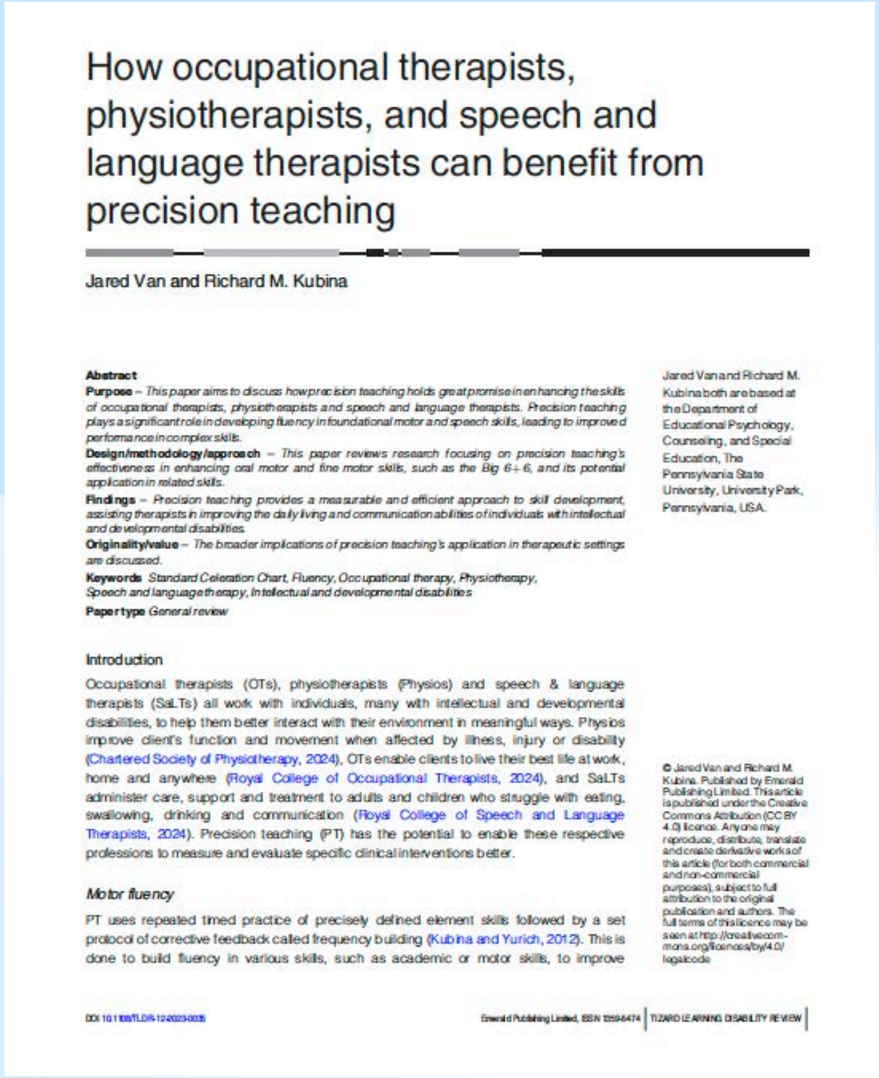
- Proud nonbinary
- Beyond labels
- Free spirit
- Valid self
- Strong heart
- Loved fully
- Beautiful being
- Bold energy
- Unique self
- True soul
- Limitless me
- Shining bright
- Radiant self
- Worthy always
- Enough now

Let’s do a timing!

- Use the counters I gave you or a piece of paper and a pen/pencil
- Think of as many positive thoughts as possible and tally a mark for each one
- No repeating the same positives thoughts
- It could be something someone said about you

- After the time ends count up the total number
- If you are willing to type into the chat how many positive thoughts you were able to generate

Published Paper



How occupational therapists, physiotherapists, and speech and language therapists can benefit from precision teaching

Jared Van and Richard M. Kubina

Abstract

Purpose – *This paper aims to discuss how precision teaching holds great promise in enhancing the skills of occupational therapists, physiotherapists and speech and language therapists. Precision teaching plays a significant role in developing fluency in foundational motor and speech skills, leading to improved performance in complex skills.*

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Paper type *General review*

Jared Van and Richard M. Kubina both are based at the Department of Educational Psychology, Counseling, and Special Education, The Pennsylvania State University, University Park, Pennsylvania, USA.

Introduction

Occupational therapists (OTs), physiotherapists (Physios) and speech & language therapists (SaLTs) all work with individuals, many with intellectual and developmental disabilities, to help them better interact with their environment in meaningful ways. Physios improve client's function and movement when affected by illness, injury or disability (Chartered Society of Physiotherapy, 2024), OTs enable clients to live their best life at work, home and anywhere (Royal College of Occupational Therapists, 2024), and SaLTs administer care, support and treatment to adults and children who struggle with eating, swallowing, drinking and communication (Royal College of Speech and Language Therapists, 2024). Precision teaching (PT) has the potential to enable these respective professions to measure and evaluate specific clinical interventions better.

Motor fluency

PT uses repeated timed practice of precisely defined element skills followed by a set protocol of corrective feedback called frequency building (Kubina and Yurich, 2012). This is done to build fluency in various skills, such as academic or motor skills, to improve

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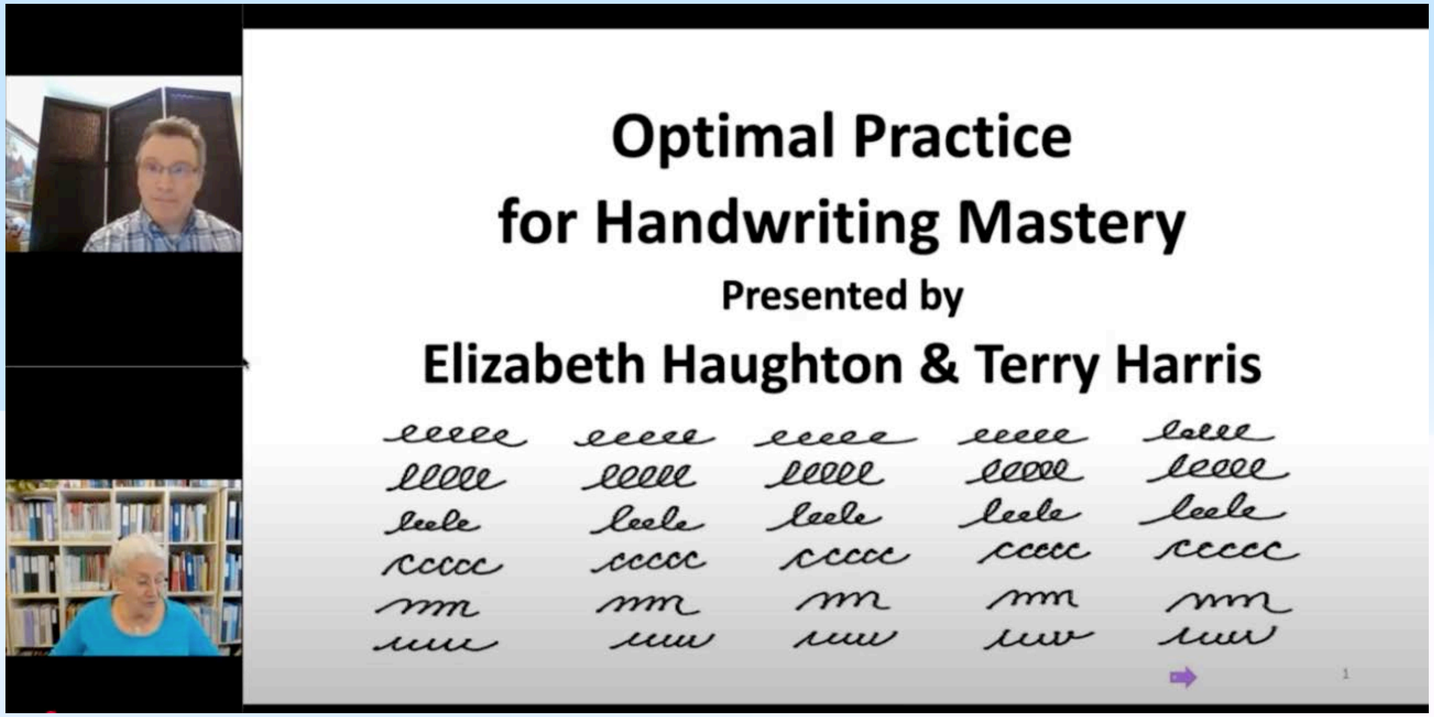
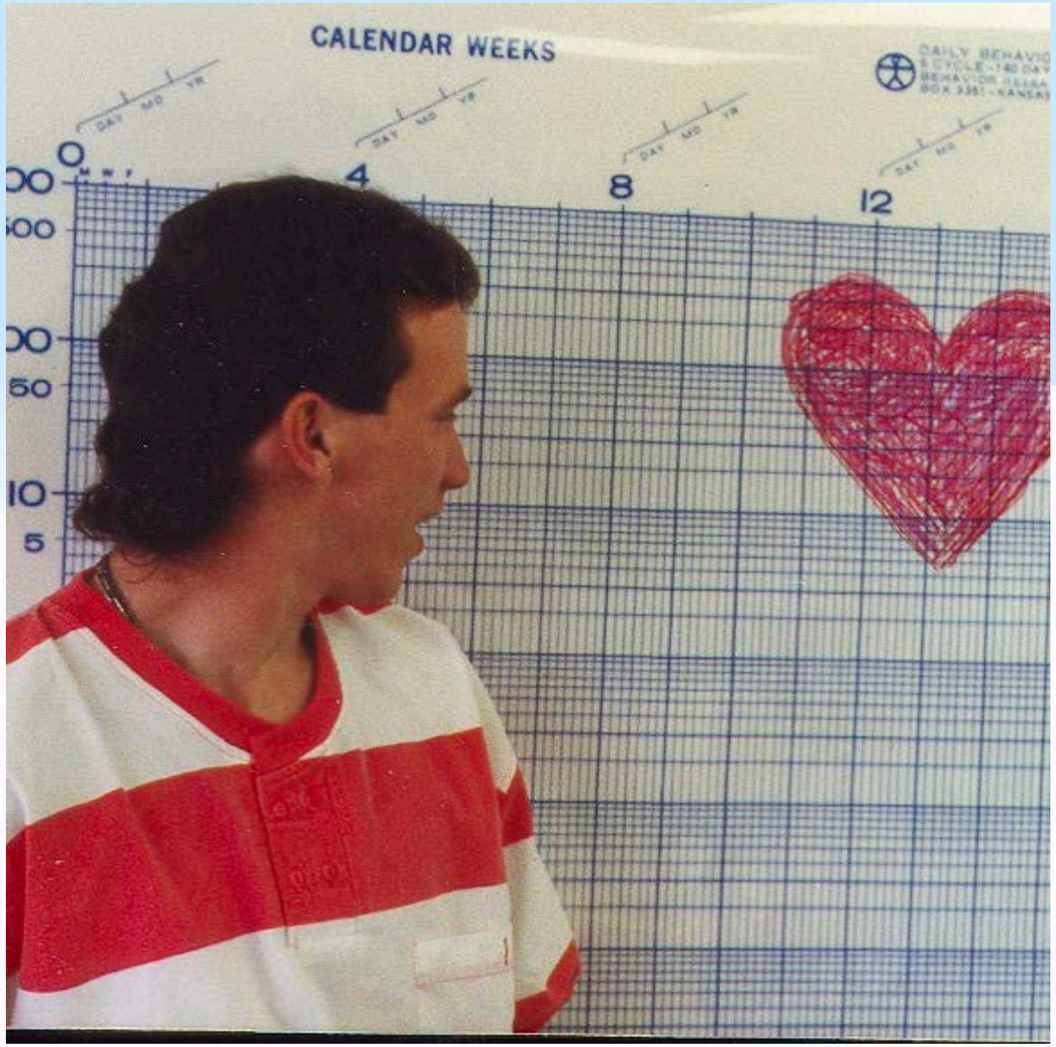
Terry Harris' story





Precision Teaching

Motor Movement

- **Speech-Language Pathologists** - Develop vocal/verbal behavior and oral motor fluency
- **Physical Therapists** - Strengthen gross motor skill fluency and movement sequences
- **Occupational Therapists** - Enhance fine motor and daily living skill performance through frequency-based instruction

Frequency Building:

Multiplication Facts to 100 (A)

Name: _____ Date: _____ Score: ____ /100

Calculate each product.

4 × 4	8 × 10	5 × 3	8 × 5	7 × 5	6 × 4	2 × 2	8 × 9	6 × 9	8 × 4
9 × 3	4 × 6	4 × 2	4 × 3	9 × 4	8 × 2	9 × 8	3 × 4	3 × 7	2 × 9
7 × 6	2 × 5	6 × 5	5 × 6	2 × 3	8 × 8	10 × 9	3 × 5	4 × 7	3 × 3
4 × 5	3 × 6	3 × 9	9 × 6	2 × 8	9 × 10	2 × 10	6 × 7	10 × 6	4 × 8
3 × 10	3 × 8	9 × 9	10 × 2	2 × 4	10 × 10	5 × 8	6 × 2	9 × 2	8 × 6
10 × 5	5 × 4	6 × 3	8 × 3	7 × 8	4 × 9	5 × 9	6 × 8	5 × 5	5 × 10
2 × 7	5 × 2	8 × 7	10 × 3	9 × 7	4 × 10	6 × 6	3 × 2	6 × 10	10 × 4
7 × 3	7 × 9	5 × 7	2 × 6	10 × 8	7 × 7	7 × 2	7 × 4	7 × 10	9 × 5
10 × 7	4 × 8	4 × 10	4 × 9	9 × 4	10 × 7	8 × 9	7 × 5	3 × 7	6 × 7
2 × 10	7 × 10	7 × 6	10 × 5	3 × 6	9 × 10	2 × 7	8 × 8	6 × 8	8 × 3

Achieving Fluency

How to do Frequency Building (10 Steps)

1. Identify the target behavior to be practiced, usually a component skill.
2. Determine the frequency aim based on real-world performance standards or competent adult (or same aged peer) frequencies.
3. Develop practice materials that allow high-speed responding, such as straw, laser pointer, or your hand.
4. Conduct short timed practice drills (e.g., 15 seconds to 1 minute) with many response opportunities.
5. Count the number of correct and incorrect responses during each timing.

(Kubina & Yurich, 2012)

Achieving Fluency

How to do Frequency Building (10 Steps)

6. Chart the frequencies on a visual display, such as the Standard Celeration Chart, to monitor progress.

7. Provide performance feedback to the learner.

8. Repeat timed drills with feedback until the learner reaches the frequency aim.

9. Gradually lengthen the timing duration to build endurance.

10. Integrate the fluent component skill with other components to build composite skills.

(Kubina & Yurich, 2012)

Benefits of fluency

- **<u>Helps learners in all “AREAS”</u>**
  - Application
  - Retention
  - Endurance
  - Adduction
  - Stability

- Fluency describes performance that is readily applied to “problems” like the ones learners have practiced and can integrate component response classes into composite response classes, can be easily done after a long period of time without doing it, can endure long performances of the behavior, is easily recruited to new problem solutions, and is stable in the face of distraction.

Ten Products of Fluency

- **Helps learners in all "AREAS"**
  - Application
  - Retention
  - Endurance
  - Adduction
  - Stability

"Fun GC"

- Fun
- Understanding
- No Cheating
- Confidence
- Generativity

Terry Haris story pt. 2

Terry

I heard a lot about Terry while I was at Morningside Academy's Summer School Institute.

> Eric [Haugton, one of the creators of precision teaching] helped his wife Elizabeth plan for a kindergarten student named Terry Harris. Terry had cerebral palsy, and walked with crutches. Elizabeth was teaching him to write his name. It had taken from September to Christmas vacation to teach Terry how to write his first name. Elizabeth wondered if there wasn't a better way to teach him to write his last name. Even though there were only four new letters to teach, it still seemed like a daunting task. Eric asked her if Terry could write 250 to 200 vertical stokes in a minute. Elizabeth mentioned that Terry was quadriplegic — Eric replied, "I didn't ask what he looks like, Elizabeth — can he do 250 to 200 vertical strokes per minute or not?" Elizabeth admitted that she didn't think so. "Can he do 140 to 120 zero's in a minute?" Again Elizabeth said he probably could not. "Those are the elements that make up the compounds for every letter or number we write. If they are not fluent, then learning to write numbers and letters will fail."
>
> Returning to school Elizabeth and Terry spent the next three weeks working on strokes and 00s. Terry went from about 50 vertical strokes to over 175, and from 25 zero's to over 90. "But Terry and I were getting tired of this drill, and we were ready to try going back to writing his name." So they did; how long did it take for Terry to learn to write Harris?
>
> Terry learned it in five minutes.

https://kitchentablemath.blogspot.com/2012/08/terry.html

Element-Compound Analysis

AKA Component-Composite analysis

- **Tool Skills** are minimal response sets that underpin virtually all other skills (Johnson & Street, 2004)

- **Elements/Components** are the second level building blocks that depend on one or more tool skills (Johnson & Street, 2004)

- **Compounds/Composite** are higher level performance skills (Johnson & Street, 2004)

Tool	Component	Composite
Writing a letter	Writing a word	Writing a complete sentence
Writing a - / | \	**Writing a letter**	Writing a word
Holding a pencil	Writing a - / | \	**Writing a letter**
Being able to free-say ABCs outload in order	Writing a letter when told what letter to write	Writing letters in order
Writing a paragraph in APA academic structure	Writing a research proposal	Writing a research paper
Answering math facts	Completing multi-step operations (e.g., rounding, place value, multiplication facts)	Applying to a word problem
Saying greeting word	Greeting a known person	Having a conversation

Element-Compound Analysis

AKA Component-Composite analysis

Teach to fluency

Get for free!

Tool	Component	Composite
Writing a letter	Writing a word	Writing a complete sentence
Writing a - / | \	**Writing a letter**	Writing a word
Holding a pencil	Writing a - / | \	**Writing a letter**

Breaking down complex skills into fluency targets

Sock donning while standing

- Tool Skill → Element → Composite → Chain → Kinesthetic Repertoire
- **Example Task:** Putting on Socks
- **Tool:** Reach, Grasp
- **Element:** Pull, Squeeze, Push
- **Composite:** Align foot, insert heel
- **Chain:** Pull sock to calf while balancing
- **Kinesthetic Repertoire:** Sock donning while standing on various surfaces

Breaking down Complex behavior

Drinking water

Motor	Rules	Physics
Wrist	Amount	Force
Fingers	Duration	Trickle
Elbow	Placement	
Lips	Suck or sip?	
Arms		
Neck		

(Jonathan Amey)

Breaking down Complex behavior

Task Analysis: Putting Hair in a Pony Tail

Motor
Wrist
Fingers
Elbow
Arms
Neck

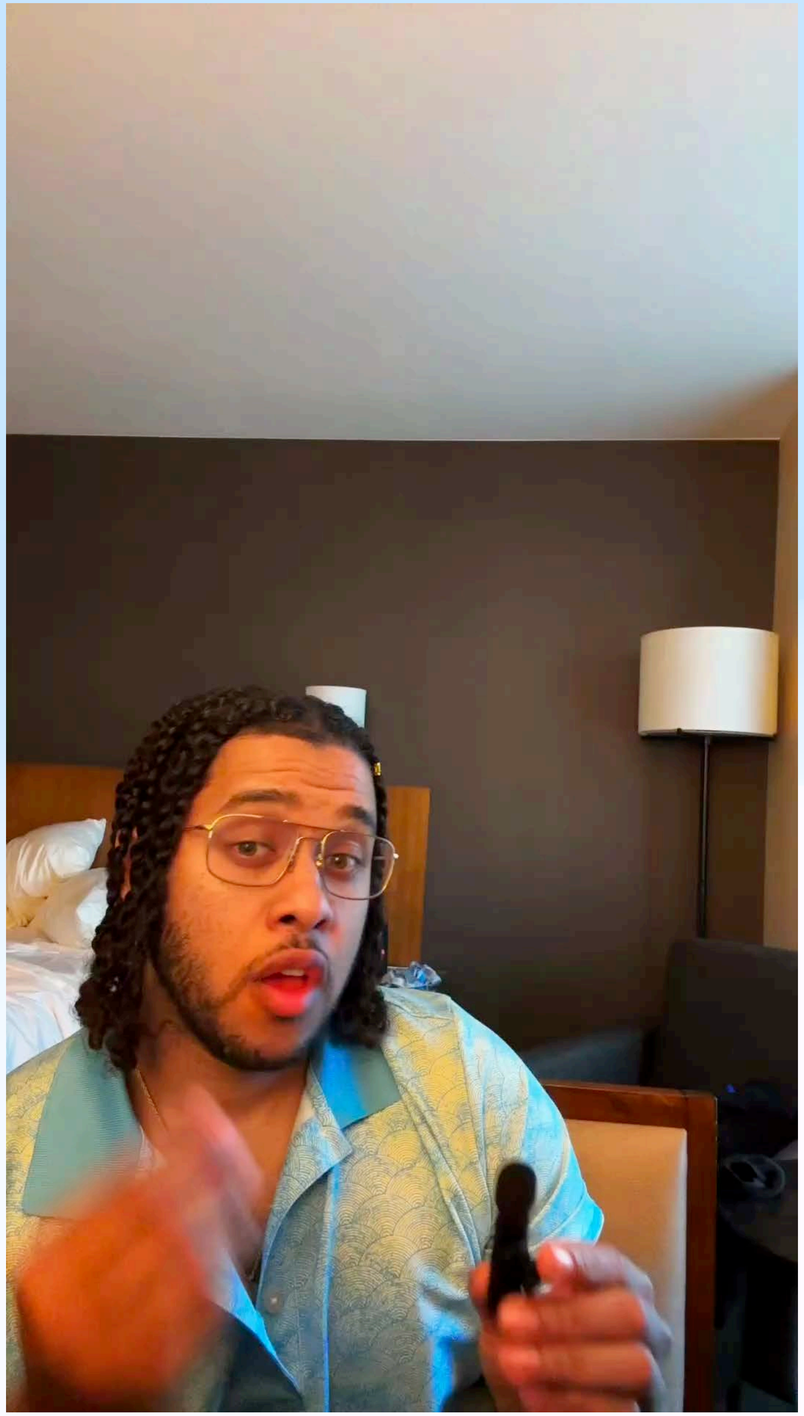
Steps

1. Stretch elastic around right wrist
2. Gather hair in right hand
3. Pull elastic from right wrist with left hand
4. Pull hair through elastic with right hand
5. Keep holding ponytail with right hand
6. Put left hand through the elastic and twists it ONCE
7. Let go of ponytail with right hand

Steps

8. Pull elastic over with right hand
9. Grasp ponytail with left hand
10. Pull hair through with left hand
11. Let go of hair from both hands
12. Grasp ends of ponytail with both hands to form two tails
13. Pull outward at ends of ponytail to tighten

(Jonathan Amey)



Big 6 + 6

- Reach, point, touch, grasp, place, release,
- Push, pull, shake, squeeze, tap, and twist.

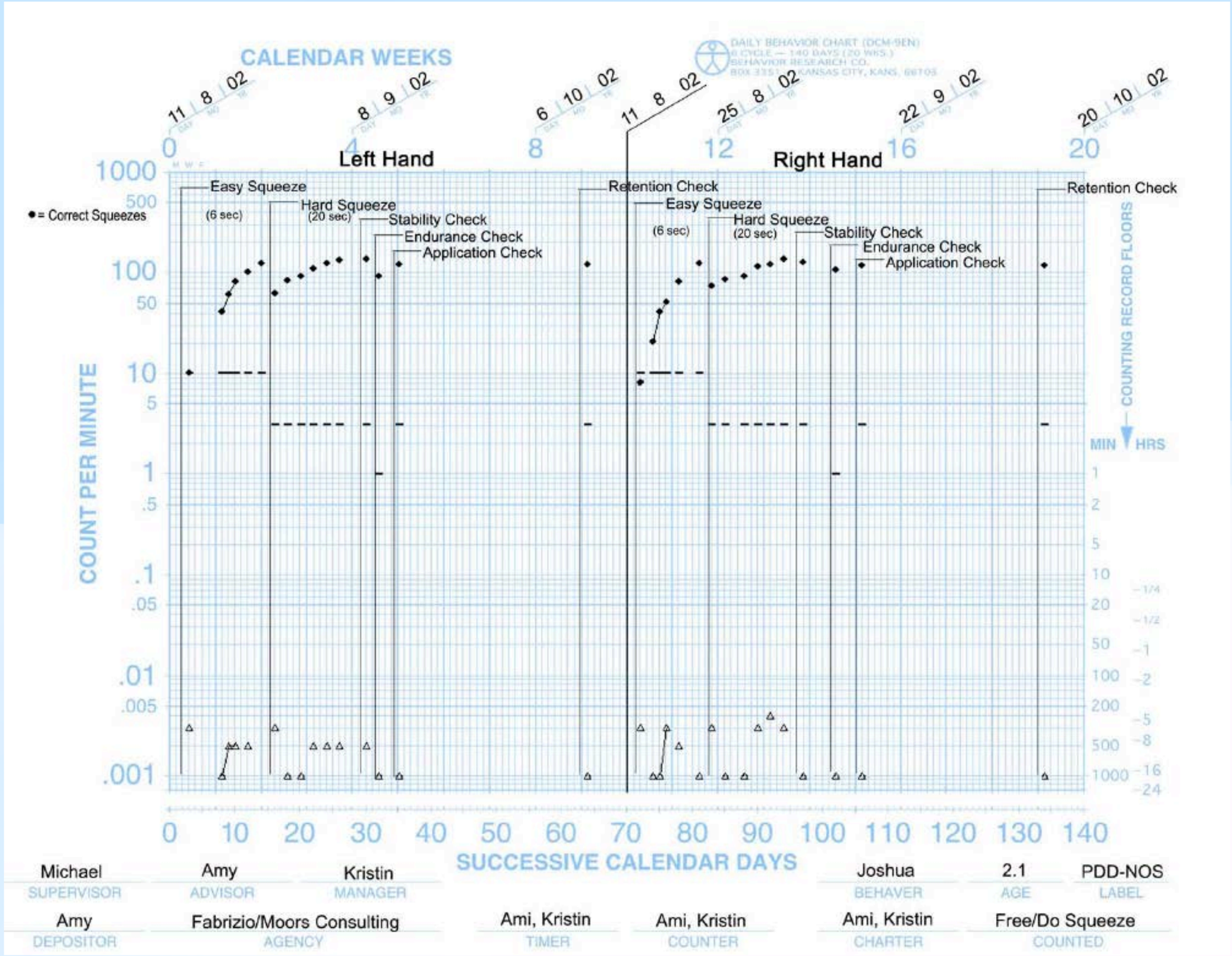
- Teaching the Big 6+6 has helped people by improving their fluency in performing complex daily living skills
- By building up the frequency of the skills in a precision teaching setting, individuals can learn to perform the tasks more accurately and quickly.
- This can lead to increased independence in their daily activities, and an overall improvement in their quality of life.

Collaborations

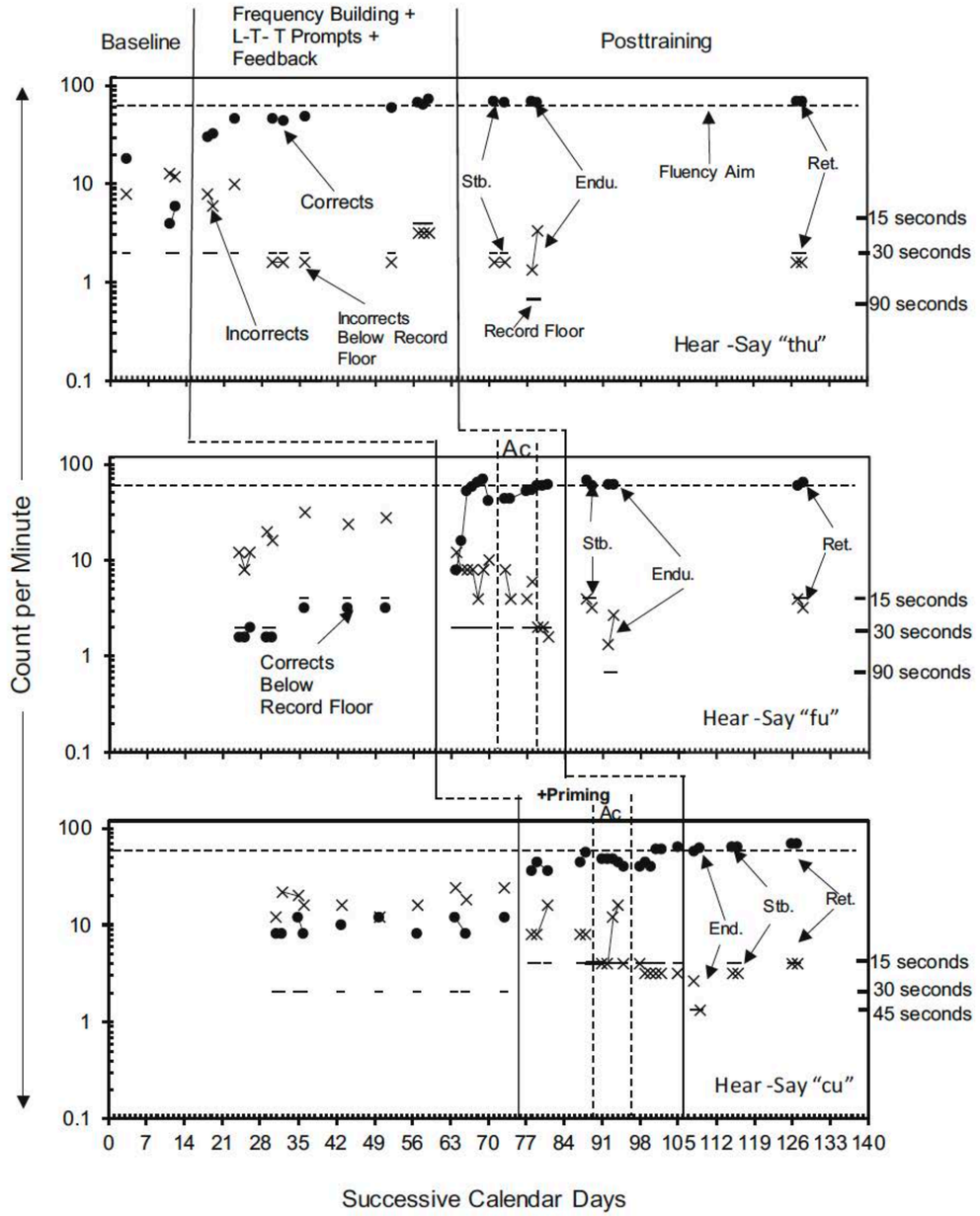
Between Precision Teachers & OTs, PTs, & SLPs

- Occupational therapists, physical therapists and speech-language pathologists are the subject matter experts
    - Precision teachers help with measurement, frequency building, element compound analysis
- Precision Teachers measure learning and provide recommendations based on SCC data.

Fabrizio et al. (2007)



Aravamudhan & Awasthi (2022)



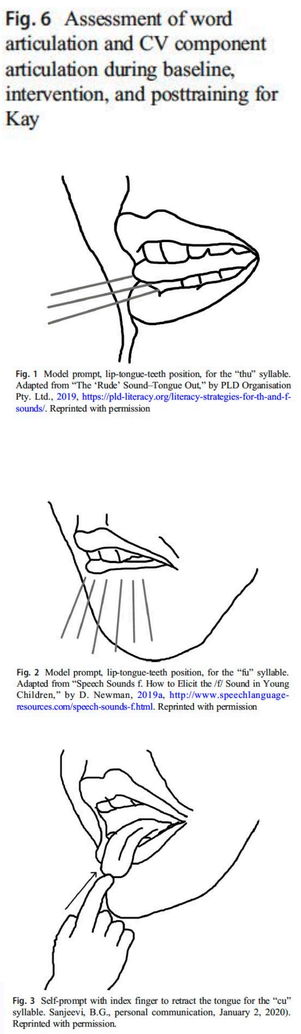
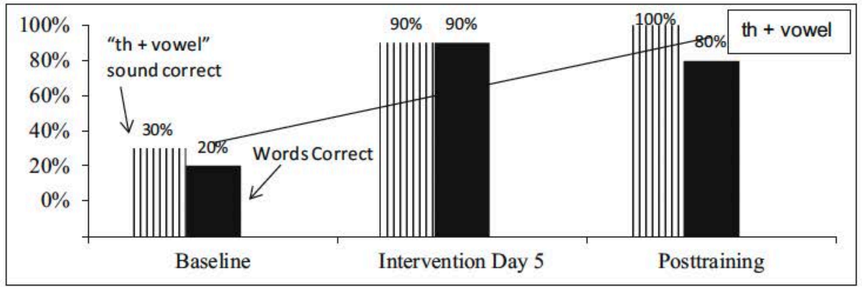


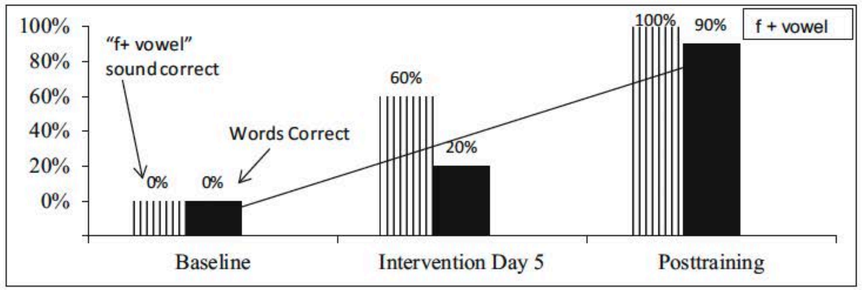
Fig. 6 Assessment of word articulation and CV component articulation during baseline, intervention, and posttraining for Kay

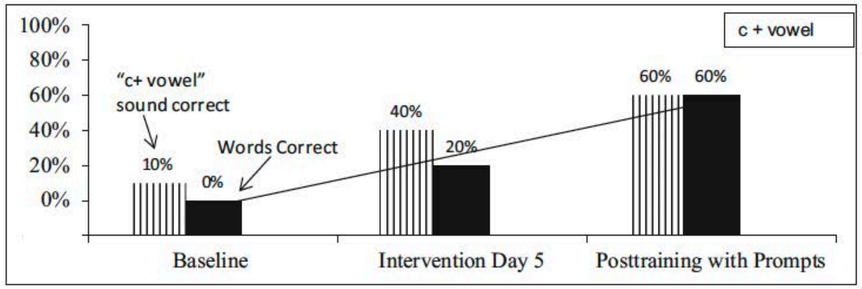
Fig. 1 Model prompt, lip-tongue-teeth position, for the "thu" syllable. Adapted from "The 'Rude' Sound-Tongue Out," by PLD Organisation Pty. Ltd., 2019, https://pld-literacy.org/literacy-strategies-for-th-and-f-sounds/. Reprinted with permission

Fig. 2 Model prompt, lip-tongue-teeth position, for the "fu" syllable. Adapted from "Speech Sounds f, How to Elicit the /f/ Sound in Young Children," by D. Newman, 2019a, http://www.speechlanguage-resources.com/speech-sounds-f.html. Reprinted with permission

Fig. 3 Self-prompt with index finger to retract the tongue for the "cu" syllable. Sanjeevi, B.G., personal communication, January 2, 2020). Reprinted with permission.





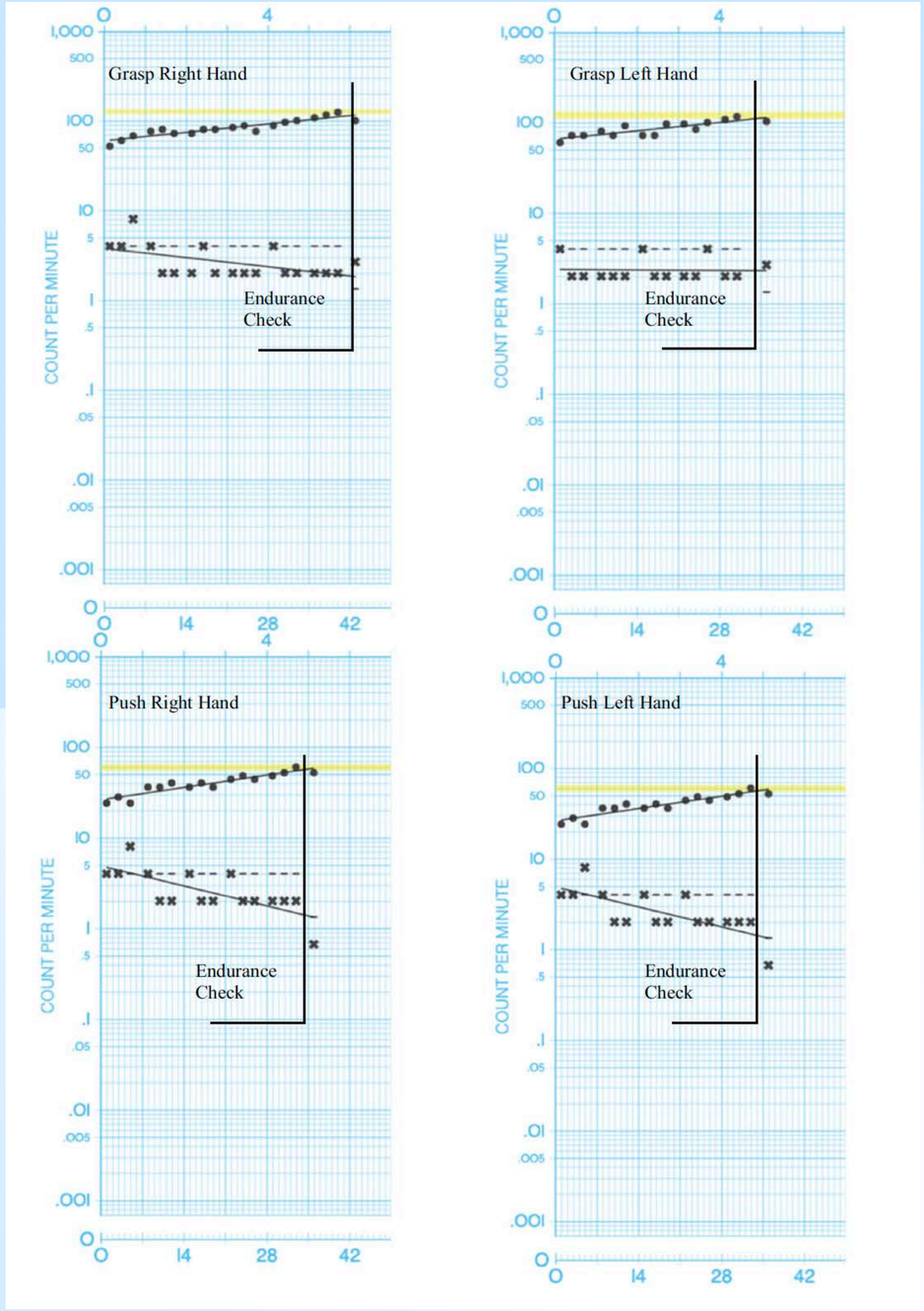


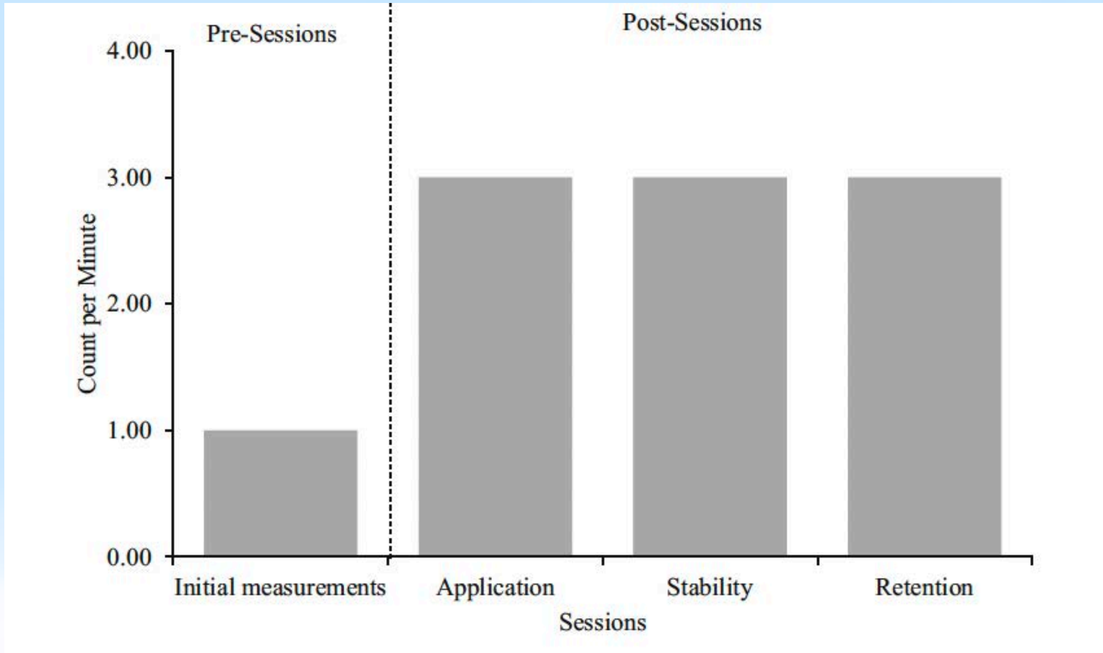
"Thu" syllable: Reached the frequency aim in just 7 days (30 minutes total training time)

"Fu" syllable: Achieved fluency in 18 days (42 minutes total training time)

"Cu" syllable: Met criteria in 16 days (24 minutes total training time)

Vascelli et al. (2020)





<u>Right hand grasping:</u> Improved from 54 to 124 per minute (x2.29 improvement)

<u>Left hand grasping:</u> Improved from 60 to 116 per minute (x1.93 improvement)

<u>Right hand pushing:</u> Improved from 32 to 72 per minute (x2.25 improvement)

<u>Left hand pushing:</u> Improved from 24 to 58 per minute (x2.42 improvement)

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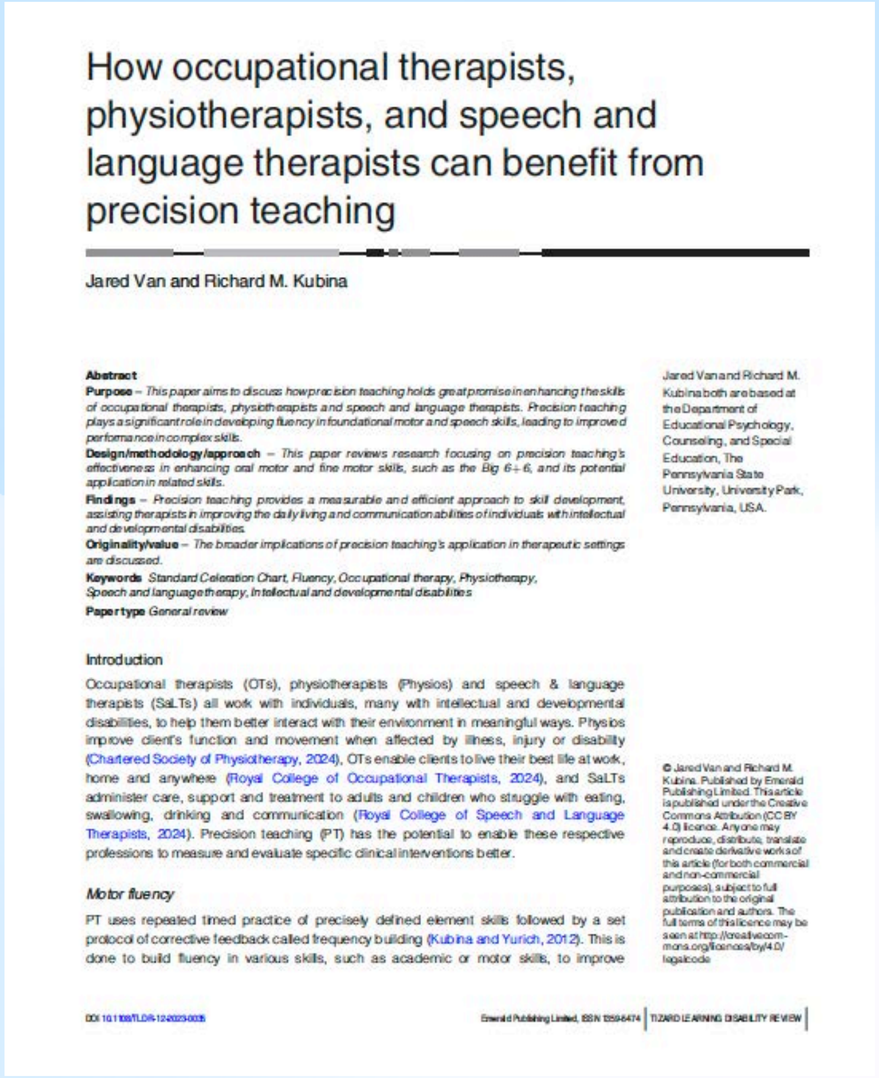

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- Teaching Motor Plans for Language, Daily living, and Vocational Skills **(Must Watch!)**
  - https://www.youtube.com/watch?v=3v9O6Fcpnbk
- The Daily BA: What is a component-composite Analysis
  - https://www.thedailyba.com/episodes/2018/212/the-component-composite-analysis-the-daily-ba-s1w6e1
- Some Principles of Instructional Design for Academic Skill Building: Component-Composite Analysis and Concept Analysis
  - https://www.abainternational.org/learning-center/version3/watch-video.aspx?ikey=32577&trackid=EDC

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Contact me

- Jared.Van92@gmail.com
- JaredVanEducation on Instagram/TikTok/YouTube

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- JaredVanEducation on Instagram/TikTok/YouTube

Questions