Clinical Application of Evidence-Based Treatments for Aphasia and Acquired Apraxia of Speech

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Session Overview

Lexical retrieval treatments

Language production treatments

AOS diagnosis and assessment – new developments

AOS treatments – overview of new developments

Articulatory – Kinematic AOS treatment

Rate/rhythm control treatment

Word-Retrieval Treatments

Majority of evidence focused on confrontation naming of object names

Increasing research concerning action naming / verb retrieval

- ◦ Evidence supporting verb retrieval in isolation
- ◦ Evidence supporting verb retrieval in sentence contexts

Limited, but increasing research concerning other grammatical classes (e.g., adjectives)

Types of Treatment Effects

Acquisition – improvement of naming of trained items in probes (similar to tx)

Response Generalization - to untrained items
- ***To untrained exemplars –*** within category
- ***To untrained items*** - across categories

Stimulus Generalization - to untrained contexts (using trained behaviors in stimulus contexts that differ from treatment)

Semantic Feature Analysis (SFA)

Appears to have more evidence supporting its use relative to other approaches

- Maddy et al. (2014). The effectiveness of Semantic Feature Analysis: An evidence-based systematic review. *Annals of Physical and Rehabilitation Medicine, 57*, 254-276.

Ongoing research using SFA.

Strengths

- Strong theoretical foundation
- Robust effects for treated items
- Positive, but inconsistent, generalization to untreated items

SFA

Originally developed for tx. of TBI (Haarbauer-Krupa et al., 1985)

- ◦ "structured thinking procedure"
- ◦ "for thought organization and verbal expression"

Adapted for use with persons with aphasia (Boyle & Coelho, 1995; Lowell, Beeson, & Holland, 1995)

- ◦ Strengthen semantic networks – within category generalization
- ◦ Use as a compensatory strategy – across (& within) category generalization

SFA – Basic Procedures

- Uses a standard template for each trial/presentation of target item

- Picture placed in center

- Semantic feature boxes (labels, but w/o specific features) surround the picture

- Therapist guides the PWA in retrieval of features associated with the target item

Cooking thing

Bowl, beater, stand, motor

Mixes things

In kitchen on counter

Heavy noisy

Grandma's Chocolate cake

CONTEXT

SPECIAL FEATURES

PERSONAL/OTHER

GROUP	DESCRIPTION	FUNCTION
Bird	Feathers, wings, beak	Lays eggs, we eat it

CONTEXT	SPECIAL FEATURES	PERSONAL/OTHER
On a farm, at a petting zoo	Doesn't fly much, used for food	Neighbors have some

Considerations for Clinical Application of SFA

SFA: Typical Application in Research Studies

~ 3X per week

~ hourly sessions

8-10 items treated

Number of trials??
 ~30 min+ for a single trial

SFA: Candidates

PWA with significant word-retrieval deficits

Comprehension adequate for understanding feature labels

Types of aphasia: any, with exception of Global (but, limited data precluding)

Item Selection

One semantic category or across-category ?
◦ No data comparing within vs. across
◦ Boyle suggests across-category may be preferred (anecdotal)

Evidence base for SFA – positive results based on repeated training with the SAME items
◦ i.e., NOT different items every session
◦ Items trained to criterion, then other items trained
◦ Boyle – many exemplars vs. few exemplars

Item Selection Cont.

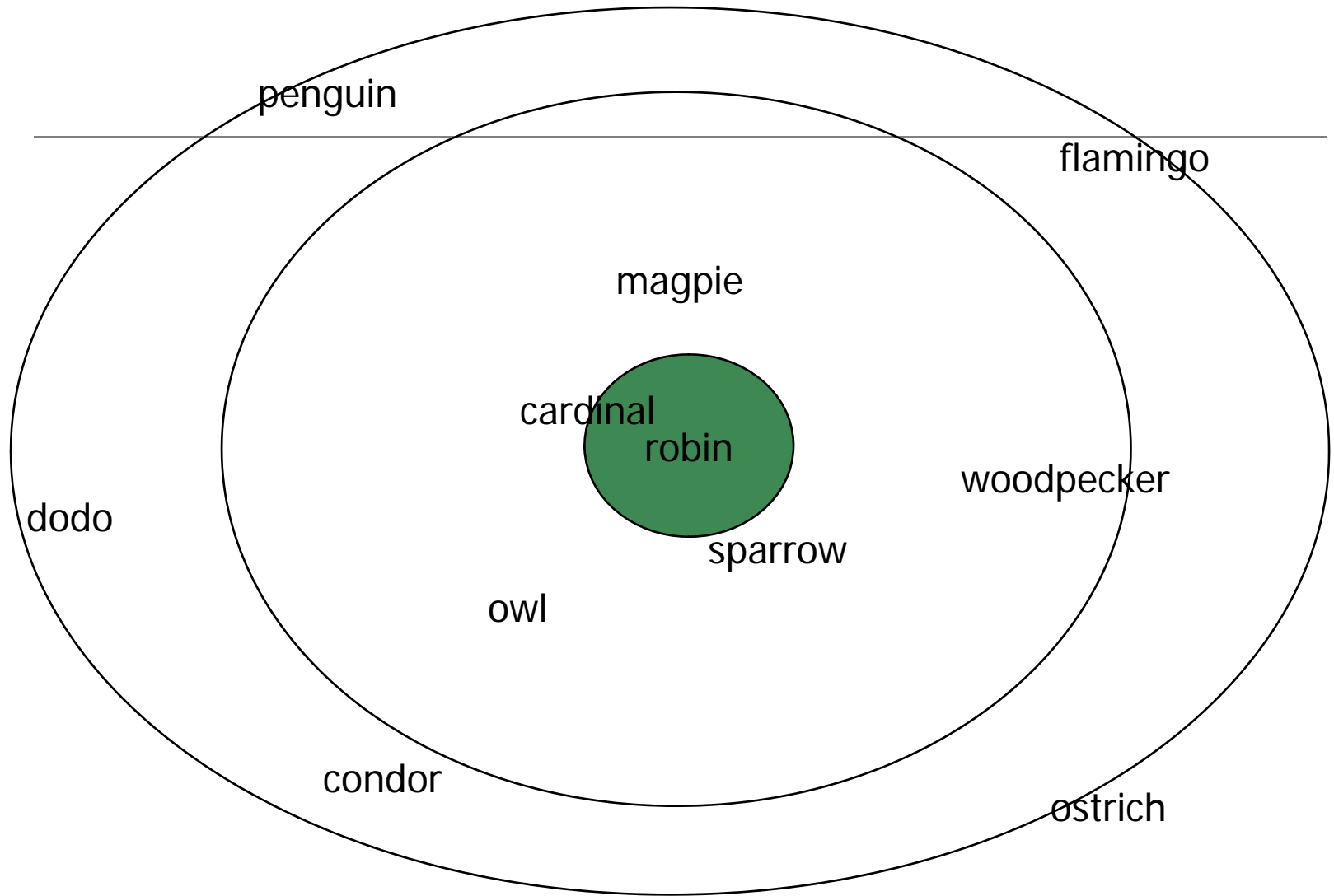*What about typicality?*

Exemplar Typicality (Kiran and colleagues)

Generalization within semantic categorie

Atypical ➡ Typical

Typical ➡̸ Atypical

Based on Plaut (1996) – computational modeling

Exemplar Typicality (Kiran & Thompson, 2003)

Why?

Atypical exemplars are at the periphery of the semantic categories

Training features associated with atypical exemplars emphasizes the *variation* of features within a category

- ◦ **Ostrich** – runs, long legs
- ◦ **Penguin** – swims, eats fish
- ◦ **Robin** – lays eggs, has beak

Training features associated with typical exemplars emphasizes only the *core* features of the category

Exemplar Typicality (Kiran et al.) Evidence Base

Demonstrated with animate & inanimate natural language categories, well-defined, & goal-derived categories

Confrontation naming & generative naming

Effects found for most, but not all participants

Effects most consistent with persons with *FLUENT* aphasia

Few nonfluent cases studied

SFA + Typicality Tx. (Wambaugh et al. 2013)

Typical and atypical exemplars treated with SFA + typicality treatment

Multiple categories trained sequentially

9 PWA (6 Broca's, 2 Anomic, 1 Wernicke's)

8/9 demonstrated gains in treated items

Limited generalization

Atypical ❌ typical

Typical ❌ atypical

Feature Labels: Which to Use?

Lowell et al. (1995)
- action/use, group, where, parts, properties, same group, other

Boyle (2004)
- group, use, action, properties, location, association

Wambaugh et al.
- group, description, function, context, special features, personal/other

Feature Labels Cont.

Animate & Inanimate Categories (living vs. artifact/non living)

Verbs (Wambaugh & Ferguson, 2007)
◦ subject (agent), purpose of action, body part/tool used, description, usual location, related objects/actions

Fewer categories
◦ Hashimoto (2011) used only 3 categories

Learning Theories: Application to SFA

Errorless vs. Errorful Learning

◦ Hebbian learning – neurons that fire together, wire together

◦ But…we do learn from errors

Retrieval vs. Study (relates to depth of processing)

◦ Additional testing has been shown to be more beneficial than additional study

So….

How often do you provide the name of the target (if at all)?

So…how are features identified?

- Clinician provided (study only)

- Clinician provides choices (identification)

- Clinician ask PWA to generate (retrieval)

- Clinician provides cues? (assisted retrieval)

GROUP	DESCRIPTION	FUNCTION
Type of transportation	4 wheels Engine Made of metal	Drive it places

In garage	Goes fast Costs a lot	1st car was a Beetle

CONTEXT	SPECIAL FEATURES	PERSONAL/OTHER

Consider a Hierarchy

1. Request a self-generated response

If no response or incorrect/inadequate..

2. Provide response options

If incorrect...

3. Provide cues

If incorrect...

4. Provide the feature

Other Considerations Re: Features

How many features to elicit per category?

What if provided features are not the best but somewhat appropriate?

Session to session…same features or varied?

Testing Effects (Retrieval Effects)

Consider adding a "test" at the end of the session

Additional testing provides greater learning than additional study

Boyle's generalization findings tend to be stronger than those of other investigators – probes conducted at the end of session

May want to test/probe generalization items relatively frequently

SFA: Application to Discourse

Peach & Reuter (2010)

Elicited samples of narrative (i.e., picture description) & procedural discourse (e.g., How do you trim a Christmas tree?)

Identified word retrieval failures in the discourse production

Then, applied SFA to the identified failures

SFA: Application to Groups

Antonucci et al. (2009)

Small group (n=3) – tx. 2X/week

Practiced SFA procedure with single pictures for a few session

Then, applied SFA using PACE-like procedures

Outcome measure = CIUs (correct information units)
◦ Found large increase in production of CIUs
◦ Production of words increased too, so % CIUs remained the same

Antonucci et al.: Progression of Tx.

Single scene pictures

Single scene pictures – depicting a problem

Picture sequences

Telling story from picture sequence when pictures removed

Fairy tale

Movie plot

SFA: Application to Action Names

- Limited findings to date (Wambaugh & Ferguson, 2007; Wambaugh, Mauszycki, & Wright, 2014)

- Similar findings to object naming SFA studies

- Slightly different feature labels required.

SFA: Outcome Measures

Correct naming of target item

Latency of naming

Use of circumlocutions (qualitative changes in naming errors)

Ability to generate features

Other??

When to measure?
◦ Probes
◦ Using tx. data

Consider Qualitative Scoring (e.g. qualitative scoring for verbs

9   Accurate, immediate (<5 sec)

8   Accurate, delayed (>5 sec)

7.5 Uninflected or incorrectly inflected

7   Self-corrected

6A Phonemic paraphasia (single phoneme subs)

6B PP (recognizable with at least 50% of sound correct)

5.5   Partial retrieval (noun form, word embedded)

Qualitative Cont.

5   Semantic paraphasia (5N=noun)

4.5   Mixed semantic & phonemic pp

4   Appropriate gestural or written response

3   Circumlocution

2.5   Tangential speech

2   Neologism

1   Perseveration

0   No response

Using Tx. Data as Outcome Data

Wambaugh, Mauszycki, & Wright (2014)

SFA (verbs) – 4 participants

Compared probe data to 1st naming attempt during treatment application

3 participants (good responders) – high positive correlations (r = .80 to .94)

1 participant (poor responder) – mixed results
- One list – good performance in tx., but poor performance on probes (r=.28)
- One list – poor performance in tx. & probes (r=.73)

Typicality Tx.: Candidates for Tx.

Typicality effect (non tx. studies)

◦ Nonfluent pts. have been shown to be responsive to typicality effects in non tx. studies (e.g.., can name typical exemplars faster than atypical – "normal" performance

◦ Fluent pts. often do not show the typicality effect in non tx. studies

  ◦ Judging category membership

  ◦ Ignore category boundaries

This tx. *may* be better for pts. who do not have typicality effect difficulties

Kiran et al. (2007) – *semantic* deficits associated with typicality effect (rather than aphasia type)

Symptoms of a Semantic Deficit

Semantic paraphasias

Categorization difficulties

Semantic judgment problems
- Is it in the category of _____? (e.g., Is it a tool?)
- Is is similar to a <u>coordinate</u>? (e.g., Is it similar to a wrench?)
- Is is used by a(n) <u>associate</u>? (e.g., Is it used by a mechanic?)

Word – picture matching problems

Synonym – antonym task difficulties

Semantic Deficit Symptoms Cont.

Semantic relatedness judgments
◦ car:　dog　　truck　　table　　glass

Pyramids & Palm Trees (Howard & Patterson, 1992)

The Psycholinguistic Assessment of Language Processing in Aphasia (*PALPA;* Kay et al., 1992)

Kiran (2008) - <85% on 3 *PALPA* subtests/*PPT*

Typicality Treatment: Item Selection

Select a semantic category to be trained
- Natural language categories (living & non living)
- Well-defined categories
- Ad hoc, goal-derived categories

Select ~ 8-10 atypical exemplars

Select other exemplars for measuring generalization

Typical – Atypical – Mid Typical

Existing literature or estimate

Considering evaluating pt.'s familiarity with items

Examples: Birds
Kiran & Thompson (2003)

TYPICAL	ATYPICAL
Bluebird	Pheasant
Bluejay	Peacock
Cardinal	Pelican
Robin	Chicken
Crow	Ostrich
Woodpecker	Turkey
Hummingbird	Penguin
Parrot	Flamingo

Examples: Vegetables
Kiran & Thompson (2003)

TYPICAL	*ATYPICAL*
Carrot	Scallions
Broccoli	Parsley
Cauliflower	Artichoke
Lettuce	Kidney beans
Radish	Pumpkin
Spinach	Rhubarb
Celery	Olive
Cucumber	Garlic

Typicality Treatment Tasks/Steps Kiran et al.

Naming

Category sorting

Identifying semantic attributes

Yes/no questions concerning semantic features

Naming

Step 1: Naming

Show picture, ask pt. to name it

Regardless of accuracy, explain that he/she will be assisted in learning more about the item

Correction?

Modeling?

Practice in production?

Step 2: Categorization

Written category cards placed on table in random order
 ◦ Birds/vegetables, animals, fruits, instruments

60 pictures presented one at a time to sort into correct category
 ◦ 24 from target category
 ◦ 12 from each of 3 distractor categories

If incorrect, picture moved to correct location

Eliminated for each item after 100% correct sorting in 10 consecutive sessions – used only once at start of session

Step 3: Feature Selection

Board with slot for target picture and 6 semantic features

Examiner provided written semantic feature cards pertaining to the category (e.g., flies distance, swims, is eaten for food, lays eggs)

Pt. required to select 6 features that applied to target item

After selected, had to read aloud

Step 4: Yes-No Questions

Therapist asks **15 questions** about the target item

5 acceptable about item
- ◦ Does it lay eggs?

5 unacceptable using features from target category
- ◦ Does it swim?

5 unacceptable from a different semantic category
- ◦ Is it made of metal?

Step 5: Naming

Same as Step 1

Treatment Materials Needed

Pictures

Category Labels for Sorting

Pictures for Sorting (12 for 3 distractors; 24 for target category)

Semantic features for each item & category in general (printed on cards)
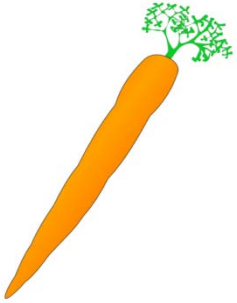
Fruits	Birds	Musical Instruments	Furniture

Yes – No?

Is it made of wood? (other category)

Does it fly fast? (item specific)

Does it eat fish? (same category)

Does it migrate in winter? (item specific)

Is it used for fixing things? (other category)

…..15 questions

Length of Tx.

2 sessions/week (Kiran & Thompson)

Max. 20 sessions per set of items (same items every session) (Kiran & Thompson)

Consider using behavioral criterion
◦ 90% correct naming in 3 sessions
◦ Verify with probe

Phonological Components Analysis (Leonard et al., 2008)

Limited study to date

However, recent findings by van Hees….
- 7/8 PWA had significant increases in naming with PCA
- 4/8 (same PWA) had significant increases in naming with SFA
- 12 sessions total – ½ with SFA ½ with PCA

Phonological Components

Rhymes: "What does this rhyme with?"

First Sound: "What sound does it start with?"

1st Sound Associate: "What other word starts with the same sound?"

Final Sound: "What sound does it end with?"

# of Syllables: "How many beats does the word have?"

Rhymes with

First Sound

fog

d

First Sound Associate

Ends With

Syllables

dad

g

2

Response Elaboration Training (RET)

RET (Kearns, 1985)

Designed to increase creative use of language (as opposed to focusing on predetermined , "correct" responses)

Intended to facilitate verbal productivity
◦ content and length of utterances

Capitalizes on patient-initiated utterances

Modeling, forward-chaining , and feedback are used to expand utterances

Response Elaboration Training (RET)- Kearns et al.

__Rationale__: that overly structured treatment may inhibit the patient from using language creatively.

No "correct" or "target" response specified by therapist

Considered a "loose-training" procedure – approximates natural communication

RET Investigations

RET: Kearns and colleagues
- Kearns (1985), Kearns & Scher (1989), Kearns & Yedor (1991),Gaddie et al. (1991), Yedor et al. (1991)

Modified RET (Wambaugh et al., 2000, 2001, 2012, 2013)
- Options for AOS speakers
- Application to personal recounts
- Application to procedural discourse

RET + SFA (Conley & Coelho, 2003)

Accessing Early RET Reports

www.clinicalaphasiology.org

Tab – "Abstracts and Proceedings"

Select "Clinical Aphasiology University of Pittsburgh Library Archive"

Then…browse or search (>1600 documents)

Modified Version of RET (M-RET)

1. Present picture stimuli & elicit a response
   - model 2 response options (e.g., "you could say NP or VP")
   - model a 1-word response - request repetition
   - use integral stimulation

2. Repeat patient's production & reinforce

3. Ask a question to elicit an elaboration of the original response
   - model 2 response options (e.g., "you could say NP or VP")
   - model a 1-word response - request repetition
   - use integral stimulation

Modified Version Cont.

4. Repeat & reinforce the new production; model combined productions (1 + 3)

5. Model combined production and request a repetition
   ◦ if correct - 3 more productions
   ◦ if incorrect - use integral stimulation to elicit multiple productions

6. Remove picture for 5 seconds - request repetition of description
   ◦ if correct - reinforce
   ◦ if incorrect or partial response - model and use integral stimulation to elicit response

Outcome Measures: Correct Information Units (Nicholas & Brookshire, 1993)

Content measure in discourse

Narrative & procedural discourse elicited systematically

Measures
◦ Total # words
◦ Total # CIUs
◦ Efficiency measure

Normative data

CIU Elicitation

4 single pictures (cookie thief, picnic scene, cat up tree, dog & birthday cake)

2 sequences of pictures

2 response to requests for personal information
- Do on Sundays?
- Where live? Describe.

2 procedural descriptions
- Doing dishes
- Write & send a letter
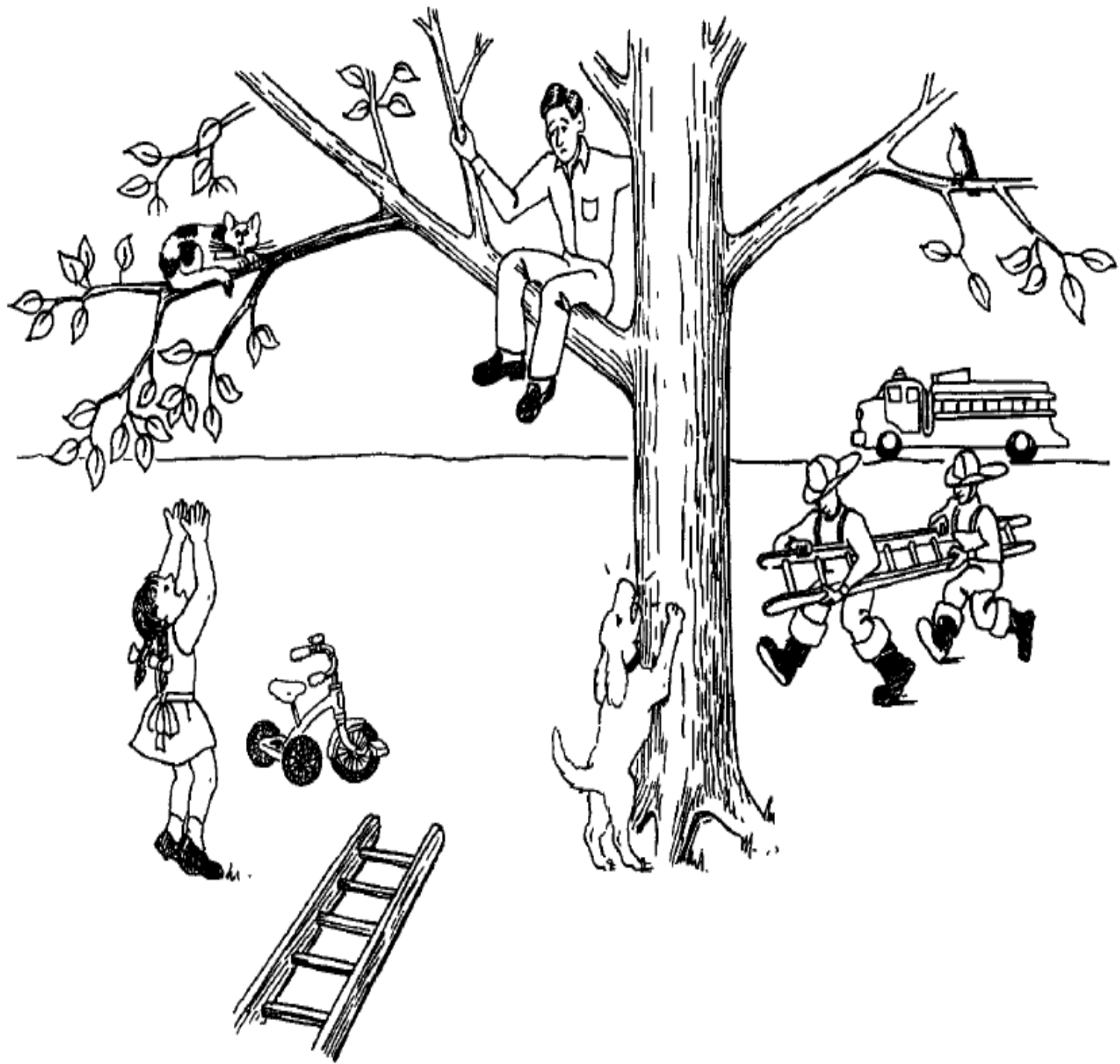
CIU Example

TREE: Ah how say that cat cat da ah dog ahm
 man bird girl ah bike bike ahm how say that two men
ahm how say that hm ah gi gi truck truck trunk

Words: 22

CIUs: 9

CIU Reference

Nicholas, L.E., & Brookshire, R.H. (1993). A system for quantifying the informativeness and efficiency of the connected speech of adults with aphasia. *JSHR, 36*, 338-350.

Speaker 1
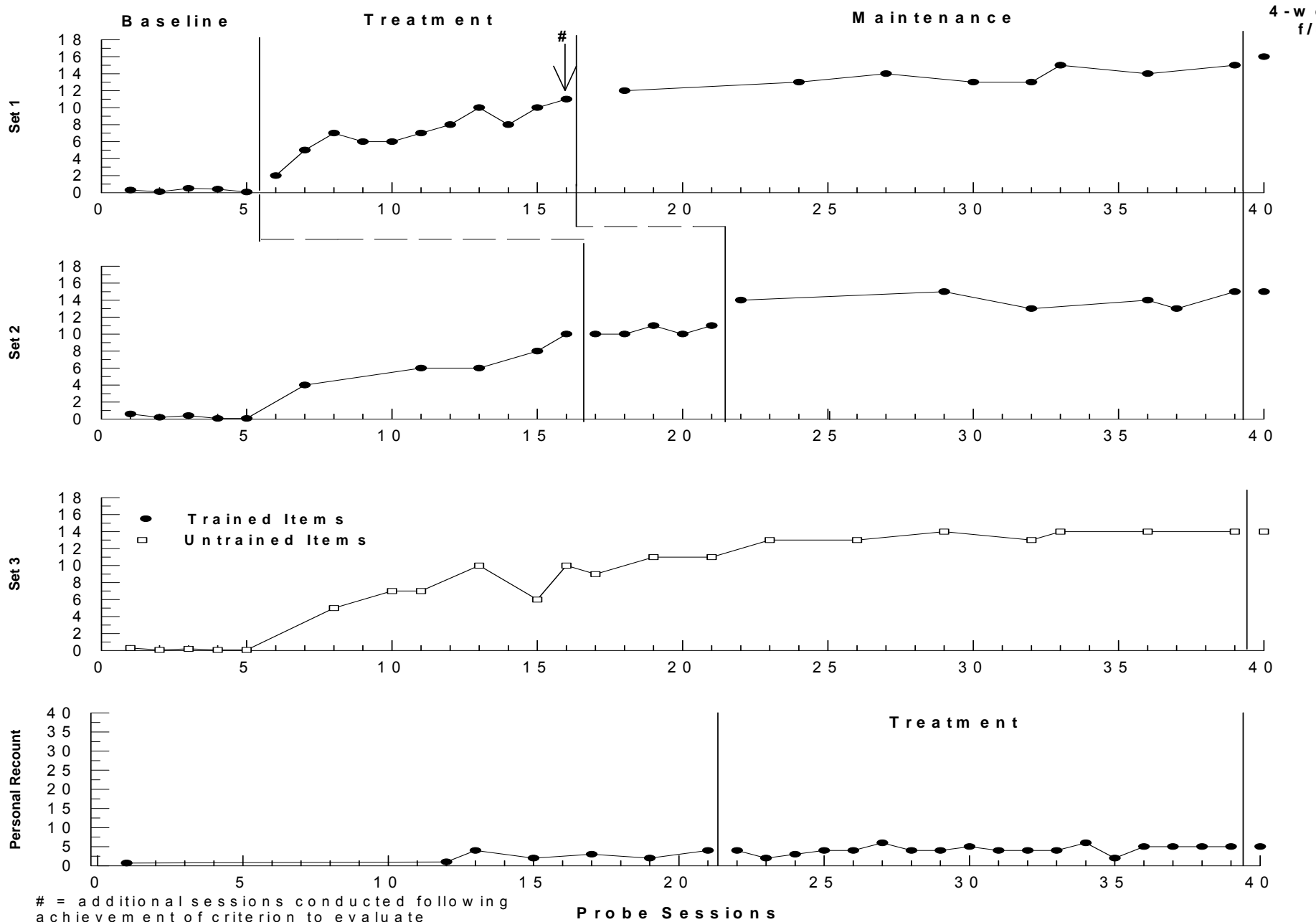
= additional sessions conducted following achievement of criterion to evaluate stability of gains and/or promote additional gains.

RET Tx. Session

RET Example Response

Speaker 1
- *Pretreatment*

- *Posttreatment*

RET: Pre and Post Treatment Samples

PRE TX.

WAB AQ = 35.5

PICA OVERALL = 36TH%TILE

4 CIUS

106 WORDS

EFFICIENCY = 4%

POST-TX.

WAB AQ = 47

PICA OVERALL = 43RD%TILE

35 CIUS

385 WORDS

EFFICIENCY = 9%

Pre vs. Post-treatment
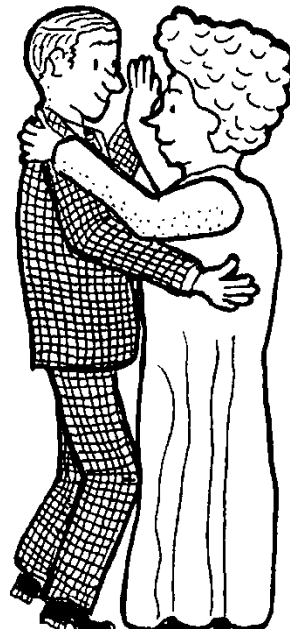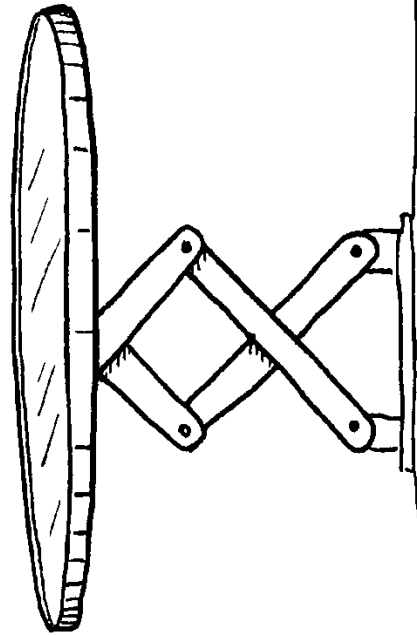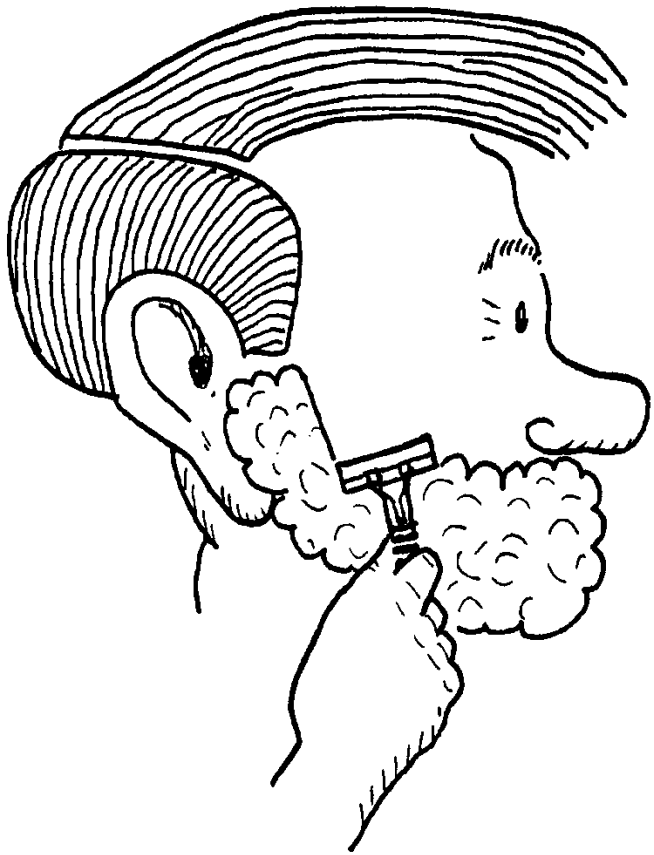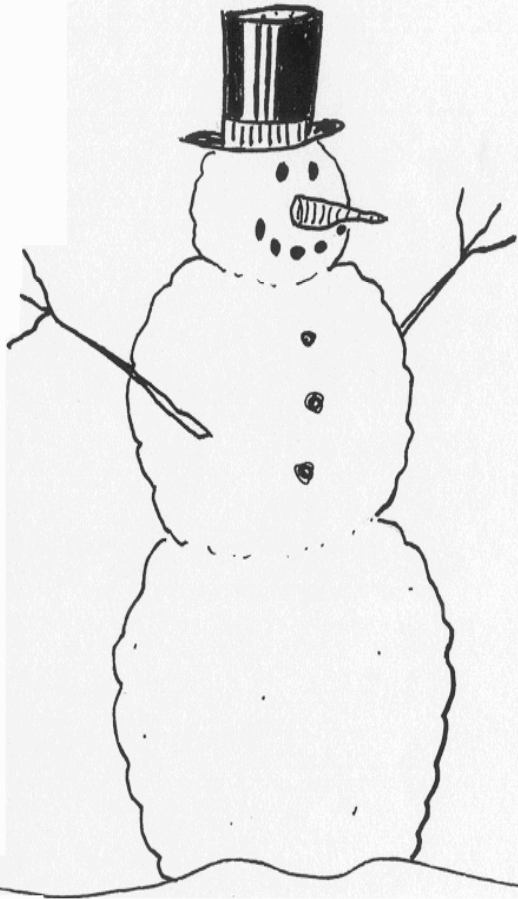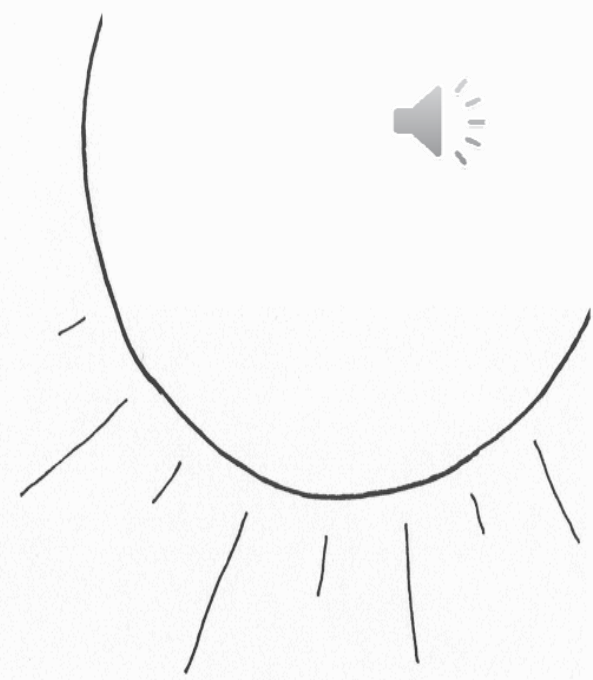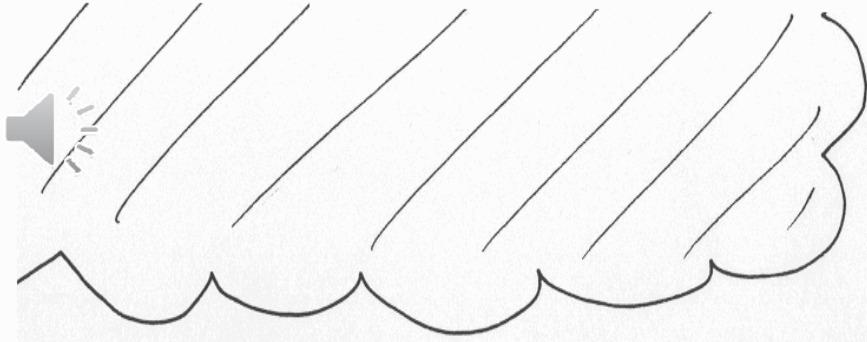
M-RET for Clinical Application

Select picture stimuli for use (~10 pictures)
- Action pictures suggested
- Personal pictures?

Select outcome measures

Measure behaviors pre treatment
- May need repeated measurement – particularly for less severe pts.

Decide upon desired criterion for terminating tx.

Apply to picture set (see other handout)
- 1-2 trials per 45-60 min. session

Outcome Measures for M-RET

CIUs

MLU

Different words/lexical inventory

Word types

Phrase and/or sentence types/counts

Initiations in discourse

Turns in discourse

Candidates for M-RET (picture level)

Non fluent aphasia
- ◦ Most evidence in literature

Severity: moderate-severe to mild-moderate

Limited ability to describe pictures
- ◦ Few CIUs/picture
- ◦ MLU < 5-6

AOS ok

Severe word-retrieval difficulties??

Fluent aphasia
- ◦ Some evidence - consider

LIV Cards (Life Interests and Values; Haley et al., 2010)

121 cards – to "facilitate self-determination and autonomy" in the process of management of communication disorders

95 cards depicting activities of interest to adults – corresponding composite cards

◦ Home/community activities
◦ Relaxing & creative activities
◦ Physical activities
◦ Social activities

Sorting process used to prioritize interests

Haley, KL, Womack, JL, Helm-Estabrooks, N, Caignon, D, McCulloch, KL, (2010). The Life Interest and Values Cards. Chapel Hill, NC: University of North Carolina Department of Allied Health Sciences.

LIV: Home & Community Activities

LIV: Home Maintenance

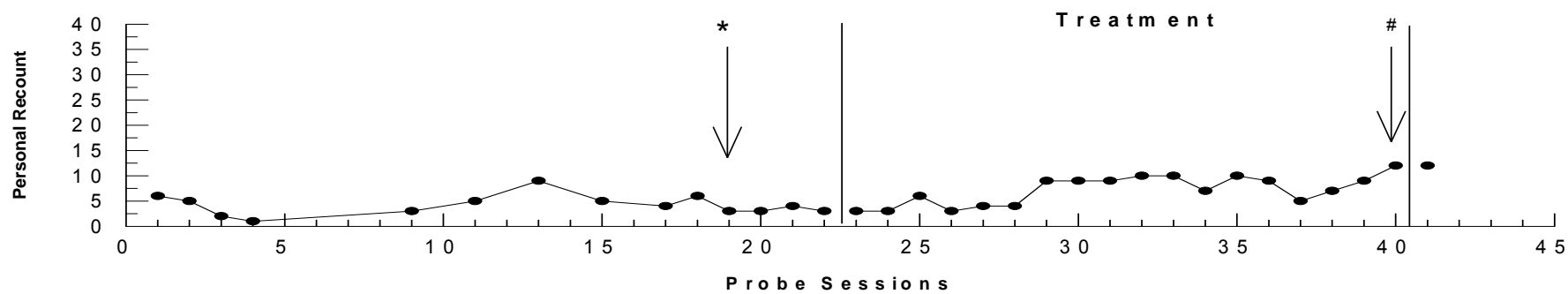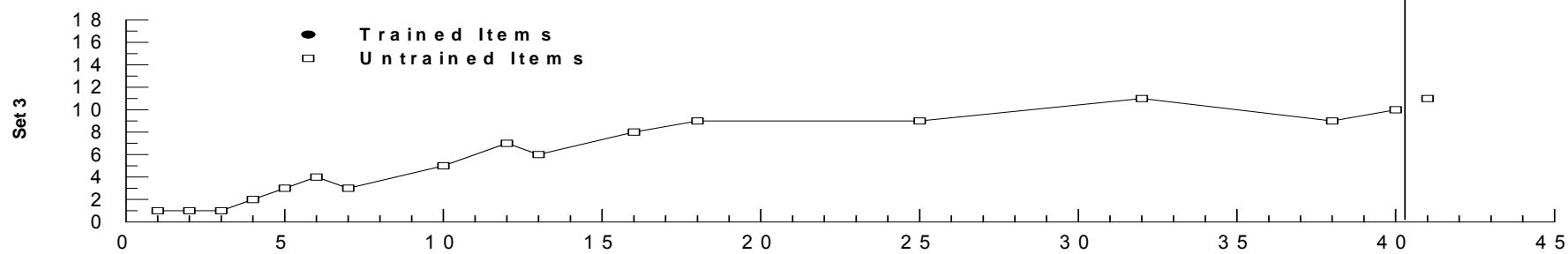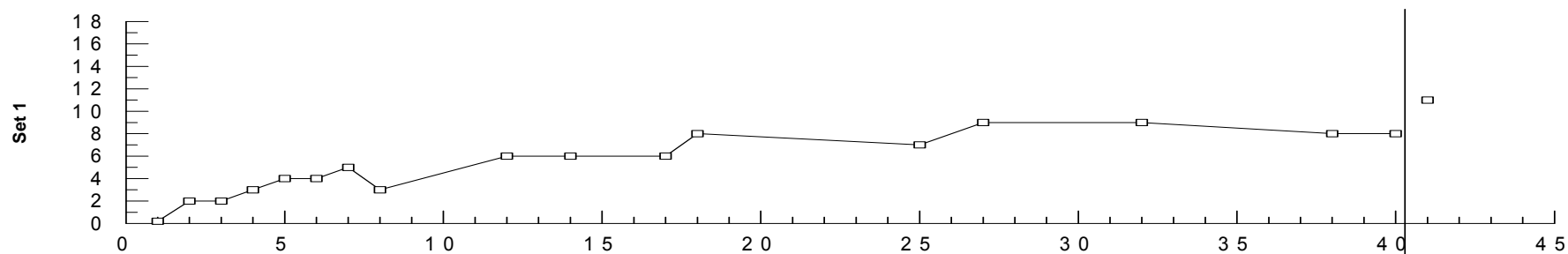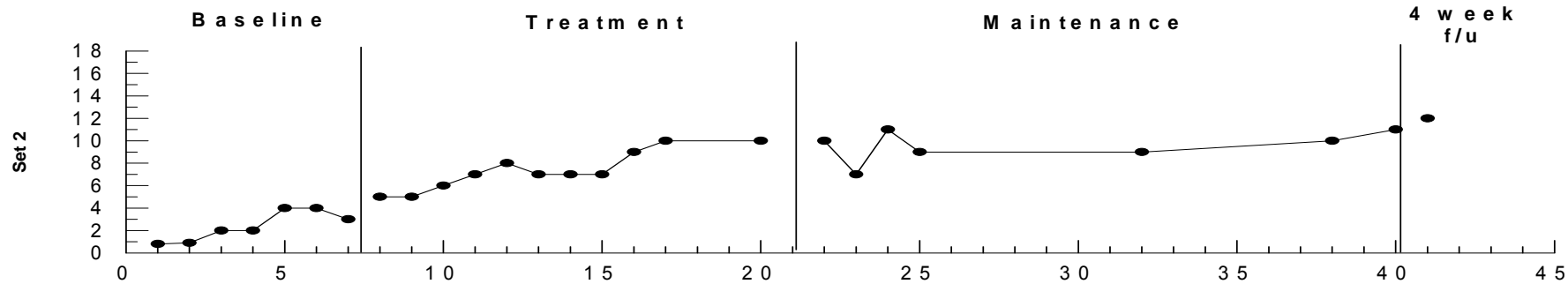# LIV: Physical Activities
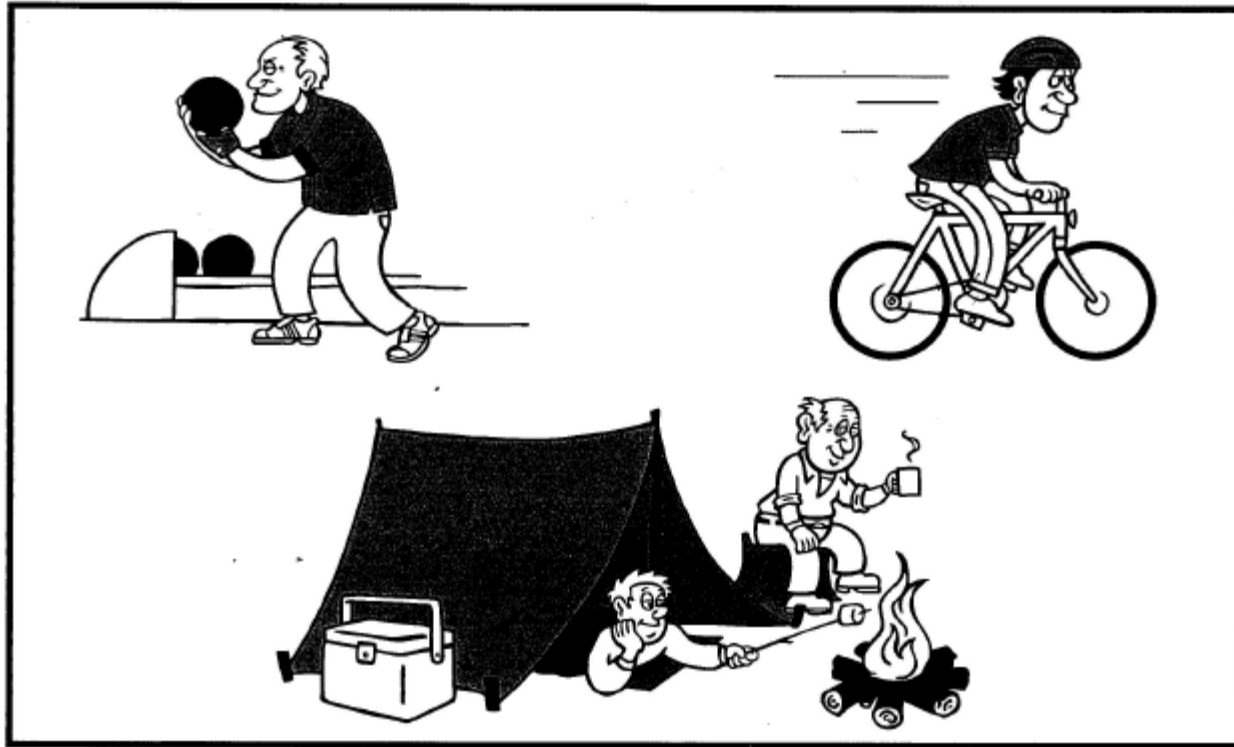
LIV: Racquet Sports
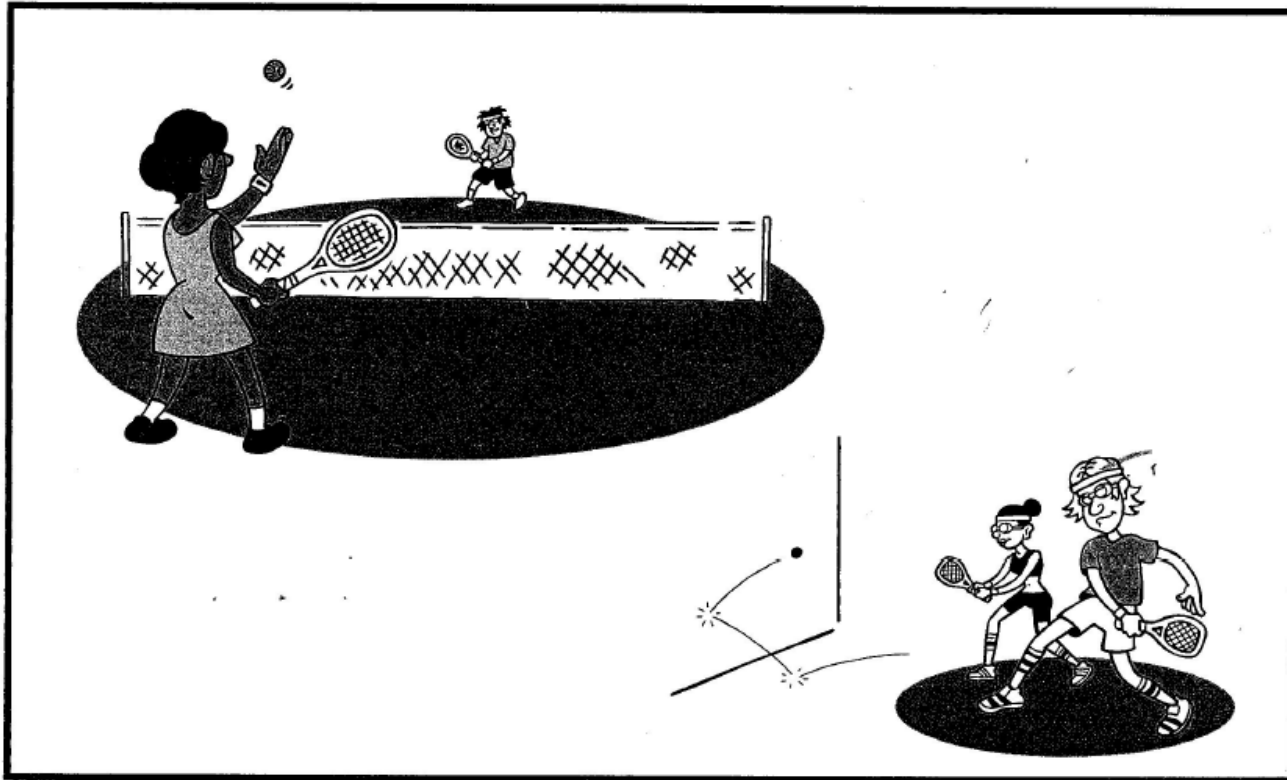
Participant 3
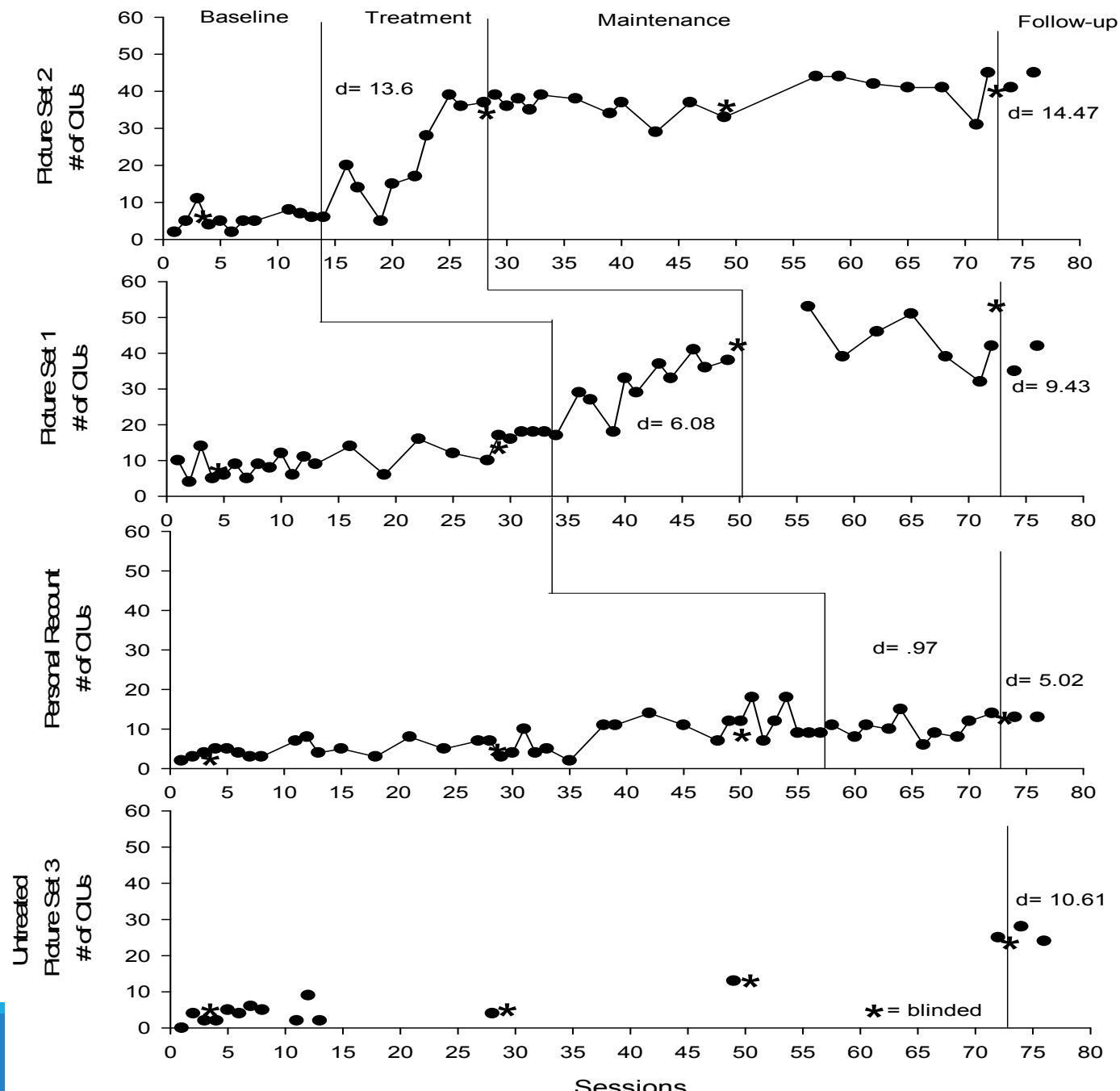
RET Applied to Personal Recount

- no picture stimuli

- patient instructed to "Tell me *something* about *anything* that you would like to talk about."

- treatment hierarchy applied as before

- at least 14 topic attempts elaborated upon per session

Speaker 3

Average Number of CIUs Produced per Picture

Baseline — Treatment — Maintenance — 4 week f/u

Set 2

Set 1

Set 3

● Trained Items
□ Untrained Items

CIUs/min

Personal Recount

Treatment

Probe Sessions

* = began collecting 6 min. samples

Results from Personal Recount Tx.

- Positive findings for 3/9 participants

- Consider as an option

- May need to follow picture level M-RET

Procedural M-RET

WAMBAUGH, J.L., NESSLER, C., & WRIGHT, S. (2013). APPLICATION OF RESPONSE ELABORATION TRAINING TO PROCEDURAL DISCOURSE. AMERICAN JOURNAL OF SPEECH-LANGUAGE PATHOLOGY, 22, S409-S425.

Pool of Procedural Items
Tell me in detail how you would go about....

GETTING GROCERIES

PUTTING UP A FENCE

PLANTING A TREE

HAVING A PARTY

MAKING THE BED

MAKING LEMONADE

BUYING A CAR

FIXING A DRIPPING FAUCET

SEEING A DOCTOR

GIVING A TALK

MAKING A TUNA SANDWICH

GETTING READY FOR CHURCH

WASHING A CAR

DOING THE LAUNDRY

GETTING GAS

GETTING THE OIL CHANGED

SHAVING

FIXING BREAKFAST

LAYING A CEMENT PAD

MOVING TO A NEW HOUSE

Modified RET – Procedures

1. "Tell me how you would go about _____"
   ◦ model 2 response options (steps in procedure)
   ◦ model a 1-word response - request repetition
   ◦ use integral stimulation

2. repeat patient's production & reinforce

3. request elaboration or clarification about specific step in the procedure
   ◦ model 2 response options
   ◦ model a 1-word response - request repetition
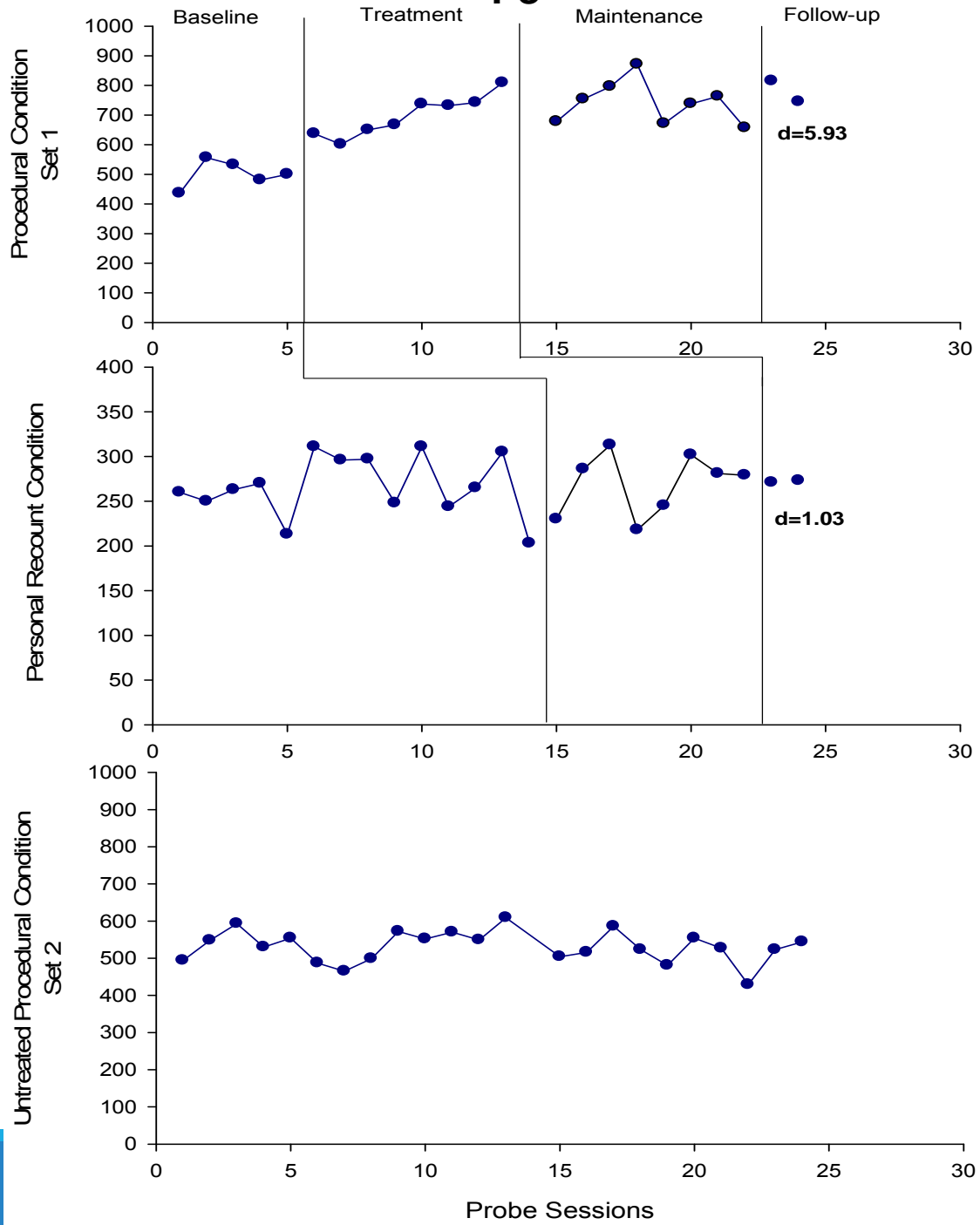   ◦ use integral stimulation

Modified RET: Procedures

4. paraphrase step being targeted and request a repetition.

5. wait 5 seconds and request a repetition of step 4

P1
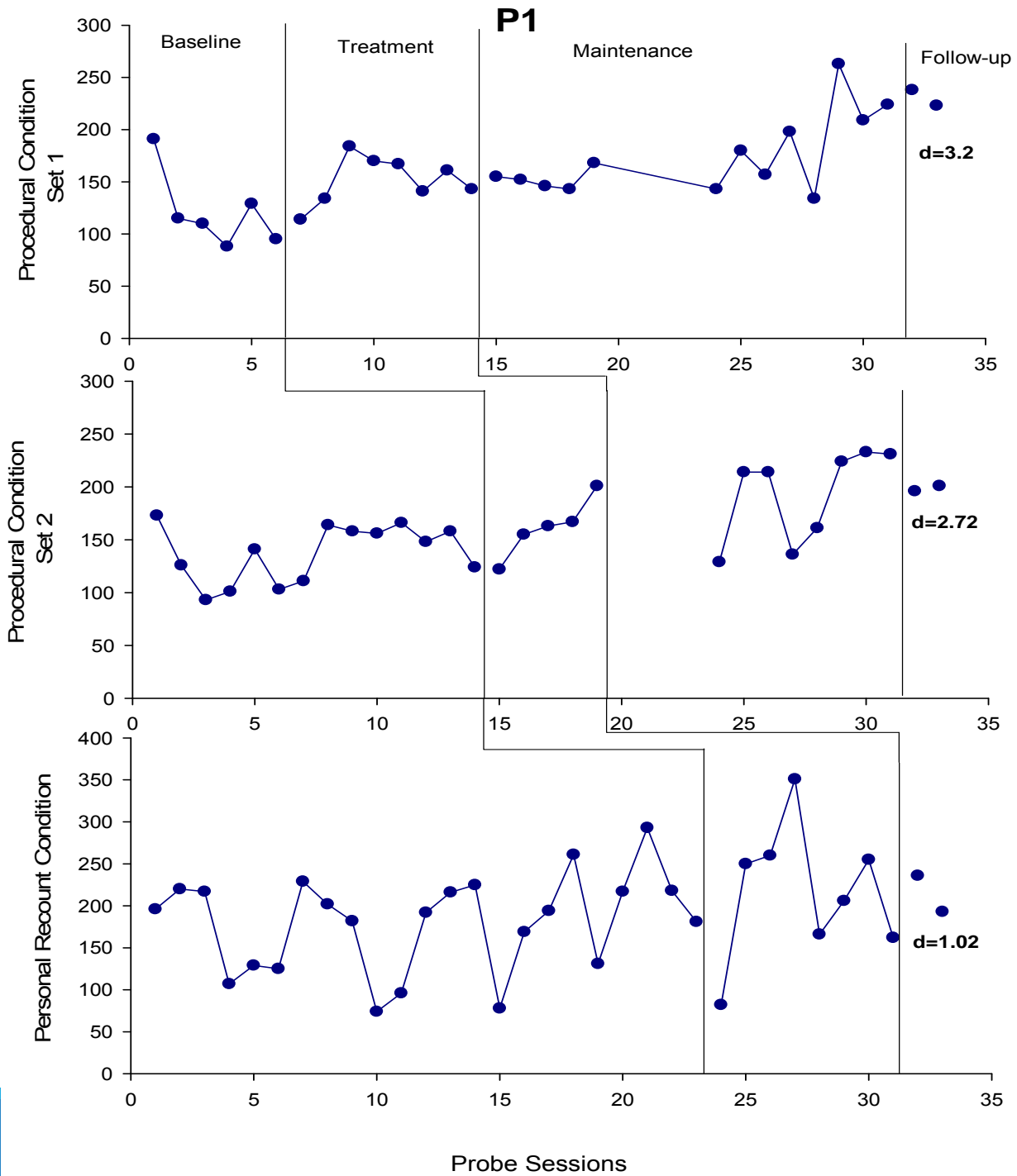
P2
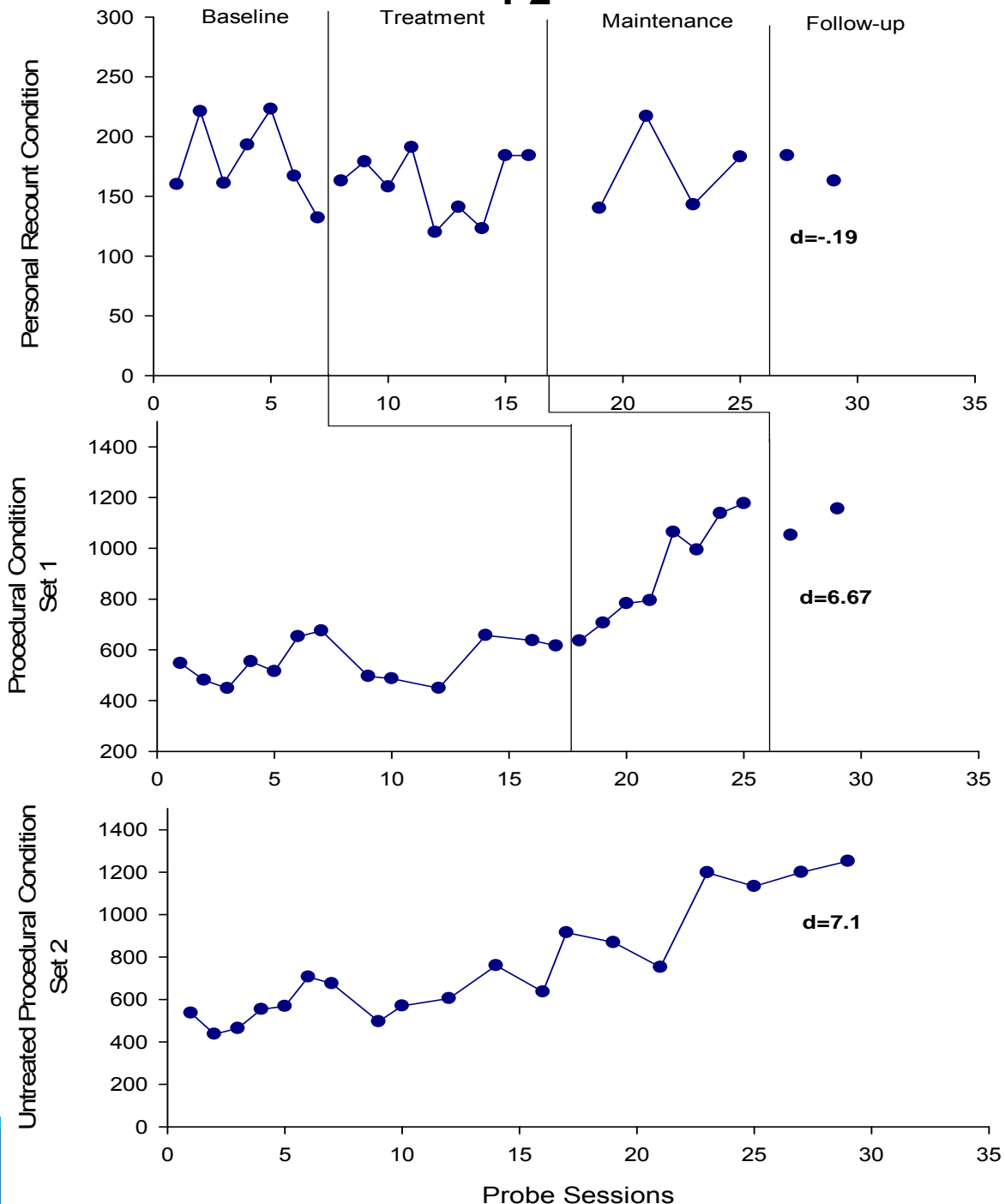
P3

Number of Novel Words

	Condition	Highest Baseline	End of Tx.
P1	PR	114	106
	Set 1	108	**123**
	Set 2	111	**123**
P2	PR	133	101
	Set 1	294	**388**
	Set 2	295	**376**
P3	PR	158	161
	Set 1	224	**254**
	Set 2	250	198

Pre vs. Post-tx. Assessment

	P1		P2		P3	
	pre	*post*	*pre*	*post*	*pre*	*post*
Nicholas & Brookshire **# CIUS**	498	584	554	760	902	949
% CIUs	45%	59%	42%	34%	67%	59%
PICA : %tile	46	47	79	72	83	86
CETI	61	64	89	73	32	41
CADL-2	53	83	96	92	95	97

P1: How to give a party

Post Treatment: uh xx pick uh xx right people that will be with you at the party then have a party that it won't be so noisy and that will be respectful with the people

Last Baseline: first get a big group uh can't do it can't do this this story decide what to do at the party (cue) no

First Baseline: I don't have any parties (cue) loud ones and bunch of music that's about all I know

P2: Baseline #1…How to give a talk

talk um go to the pay'by (probably) the the usually thum the x the x know the subject well I don't know but the or the um the topic the write down all the heals on notes here the fork and go to the computer the type everything here thum th-the printed here go to the um thum the go to the thum invitation or the church or thum xx talk and x go to the um sit down   the talk   x in a nice dress xxx (C) xx nope

P2: End of Tx…How to give a talk

x went to the computer the rechuch the research the topic the um I the um x the type the rough draft first thum thum out pashe no outline first here thum go to the um thum the mirror my mirror the give my talk to myself the um call the two friends come to my apartment thum I the um I may the three copies myself and the my friends too   thum I x x word x x the I'll x leave my talk to my friends they always x criticize me the um the slow down enunciate the the thum x mumbling x x always but thum but thum I my friend my friend left I thum wash my hair dress here take a shower everything comb my hair dress x dress up for the church or the audi word gym x x audi   x   auditorium x close x thum I go drove to the um the church or the auditorium x park the go to the um the place here I waiting for the x   my time to speak the give the x talk again or the church the um the um the sit down drove back home   yes   (C) nope

P3. Post-tx - How to fix a leaky faucet

BASELINE

xxx um fixing a dripping faucet um my wife does all that kind of stuff um you gotta get under the sink to find the hole um and then find a hole um xxx that's for a clog um make sure the water's off and then replace the sink I don't know idea have no idea (cue) no

POST TX.

um first of all under sneak under the sink um I need check there any loose fitting clamps or pipes and then after that I call Batley Plumbing in the yellow pages because Dairy Gary's dad is a plumber and he doesn't charge me for the diagnostic fee he only charge me for the repair he does if he doesn't have the tools he'll wait a couple of days then he'll fix it for free all I gotta do is pay him for the parts (cue) uh-un

Combined Aphasia and Apraxia of Speech Treatment (CAAST)

RET (M-RET) ➡ CAAST

RET was designed to increase production of content and length of utterance (Kearns, 1985)

Robust literature supporting effects

Modified-RET

For use with persons with aphasia & AOS
◦ Similar language outcomes to RET
◦ No measurement of impact on speech
◦ Increased productivity, but speech production difficulties are not addressed

CAAST

Sentence frame introduced (1X)

M-RET

Picture stimuli used to elicit any utterance (models, repetition, integral used as needed)

Utterance is reinforced, written in frame and then elaborated

Elaborated utterance is presented for repetition

Sound errors are targeted using SPT

SPT

Designed to improve articulation of preselected problematic sounds produced in the context of words/phrases/sentences

Response contingent hierarchy
◦ Modeling/repetition
◦ Orthographic cuing
◦ Integral stimulation
◦ Articulatory cueing

Consistently results in improved production of targets in treated items with generalized production to untrained items
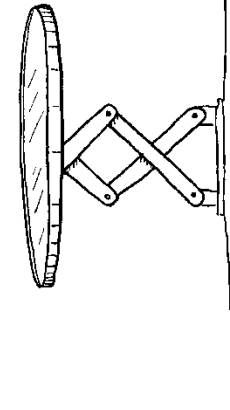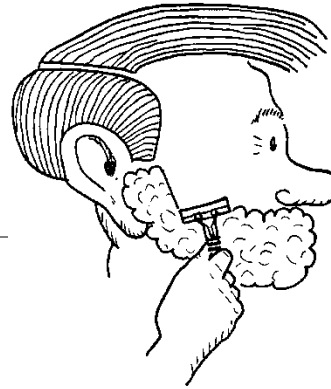
Doer	Action	Theme	Other
MAN	SHAVE		

CAAST Steps – see handout
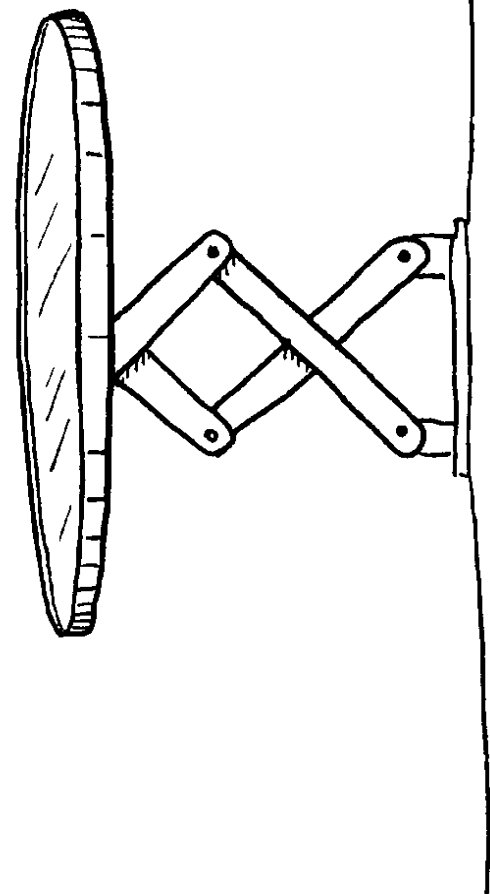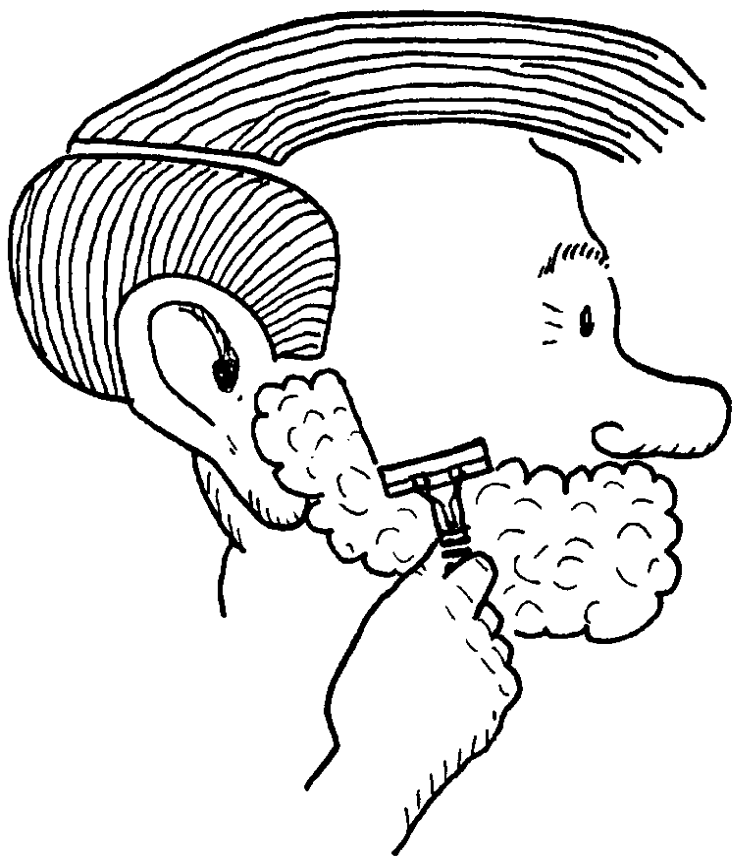
CAAST Tx. Example

Outcome Measures

CIUs (Correct Information Units; Nicholas & Brookshire, 1993)
- With experimental stimuli (trained & untrained pictures)
- With N & B stimuli

Percent Consonants Correct – sentence repetition
- With printed sentences
- Without printed sentences

Word Intelligibility

Initial CAAST Findings (Wambaugh et al., JSLHR, 2014)

All 4 participants (chronic AOS+aphasia)- ⬆CIUs for 2 applications of CAAST

Positive generalization to untrained sets

Gains were seen for 2/4 Ps on the Nicholas & Brookshire (1993) task

⬆in speech intelligibility for 1/4 Ps

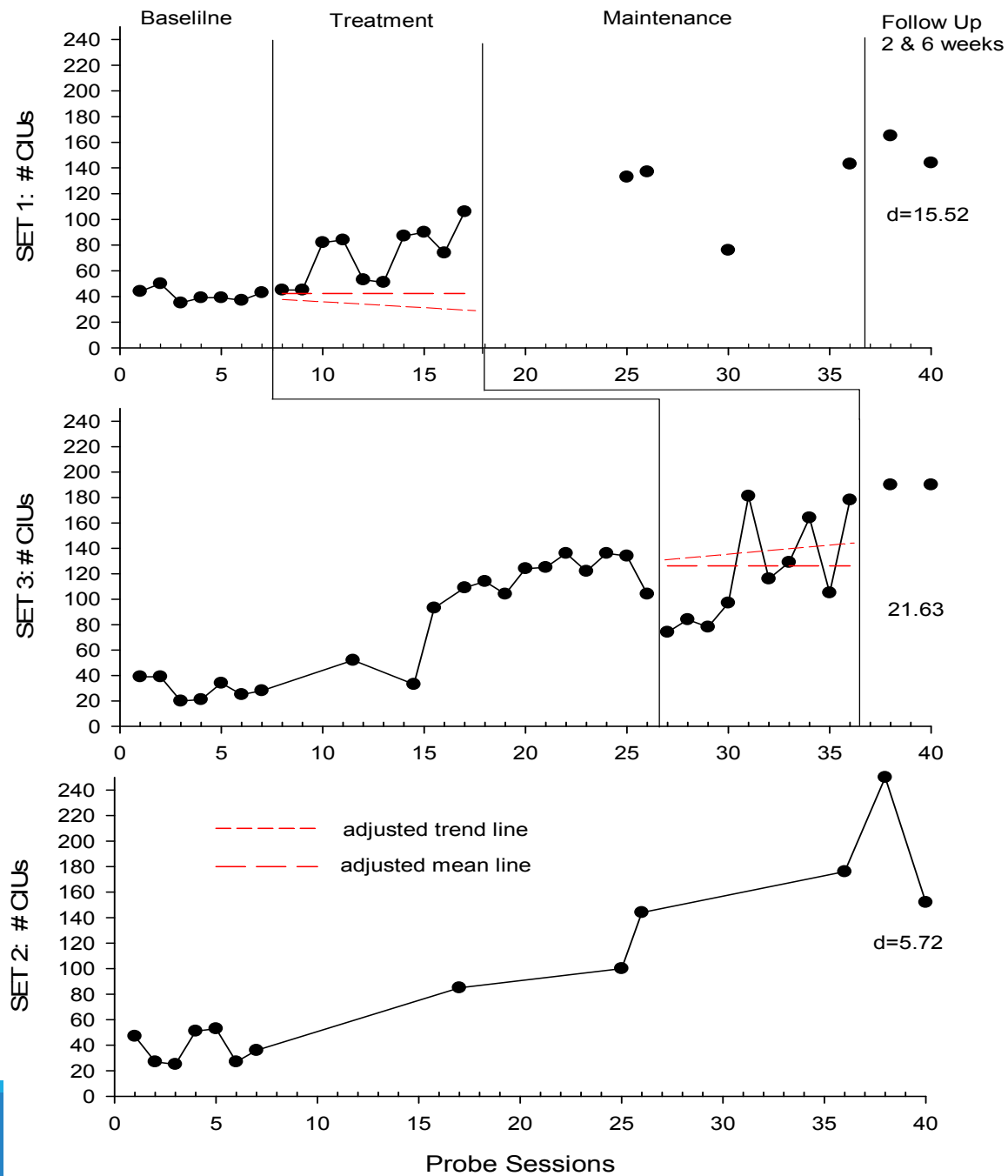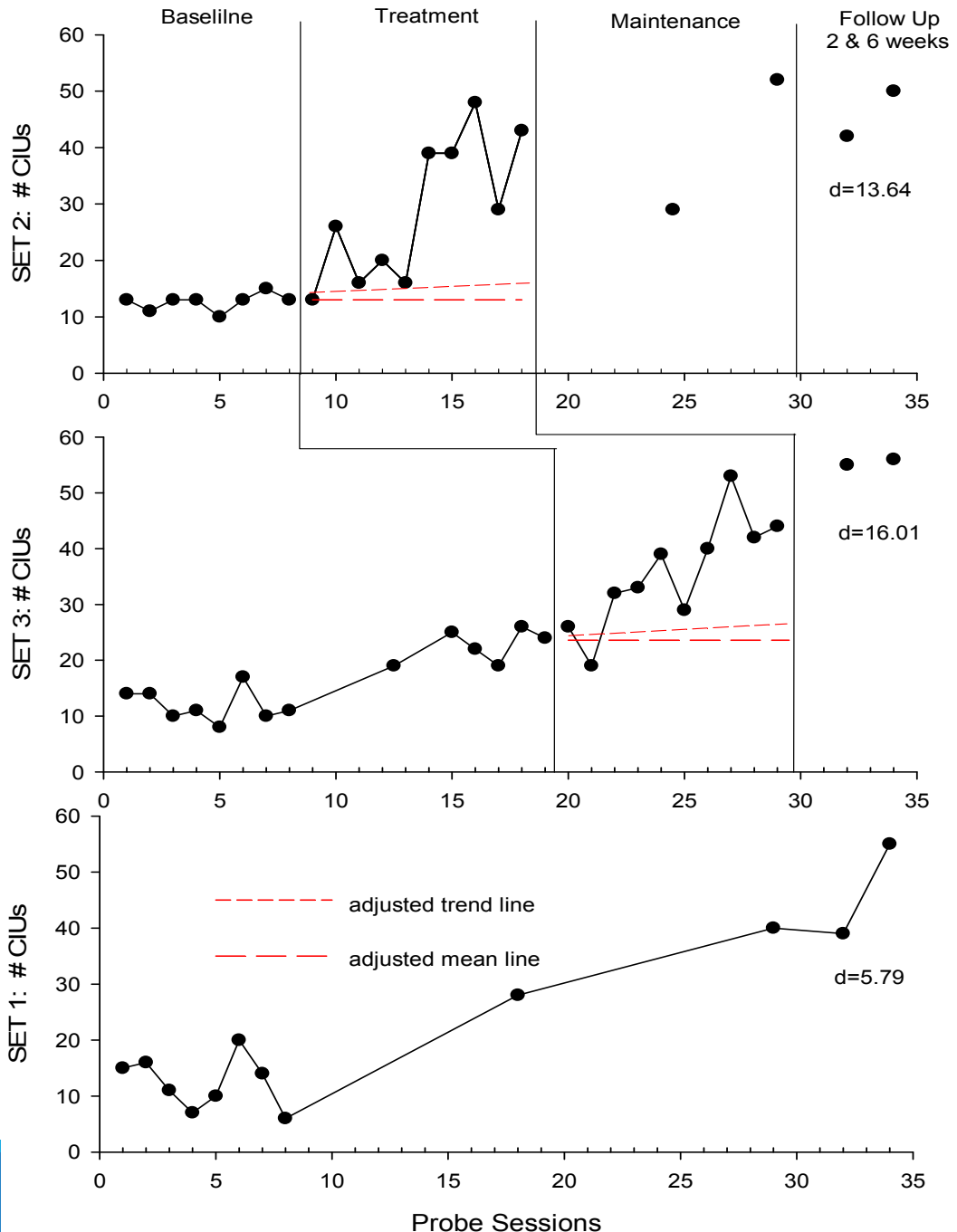⬆in accuracy of articulation in sentence repetition for 2/4 Ps

Participant 1
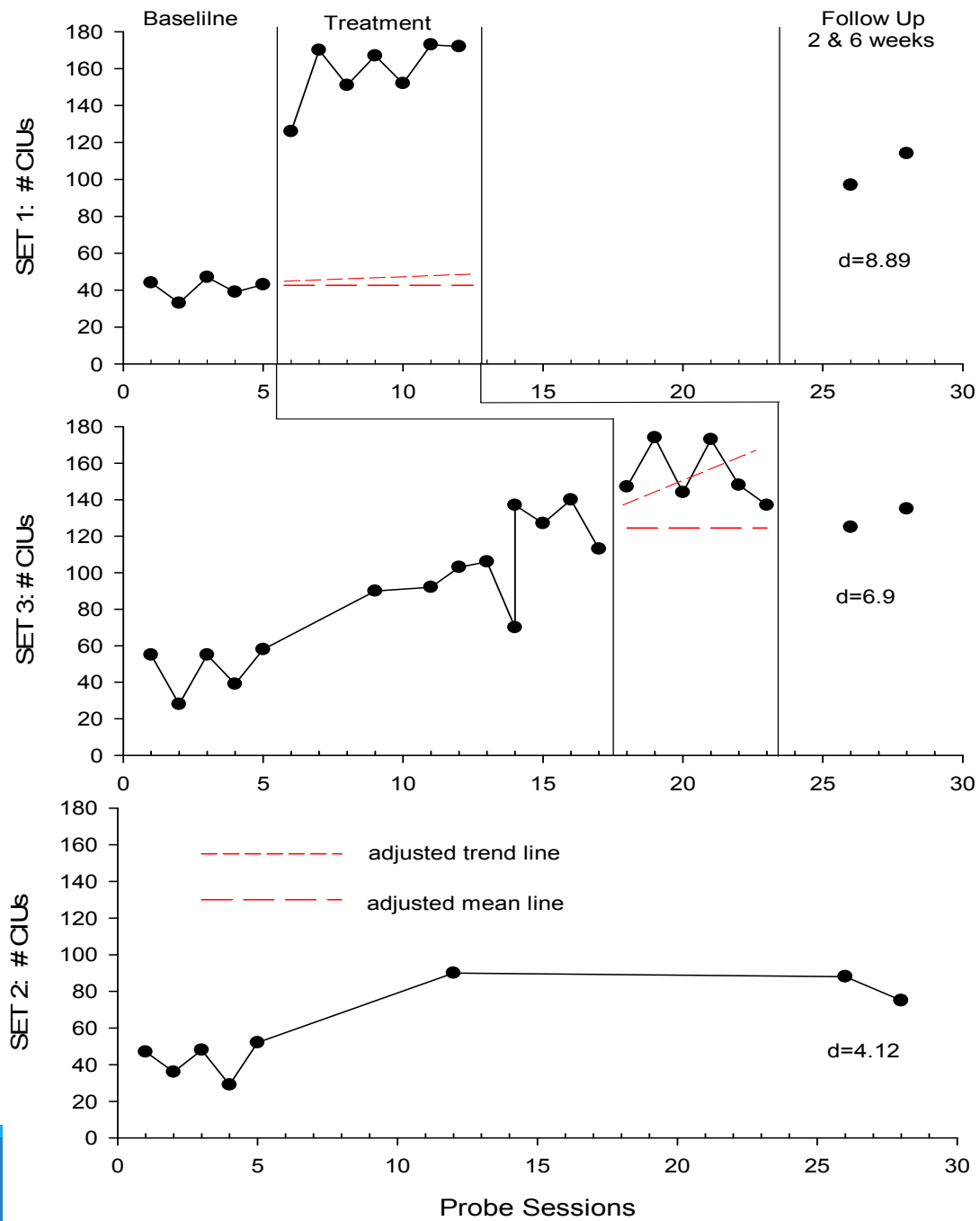
Participant 2
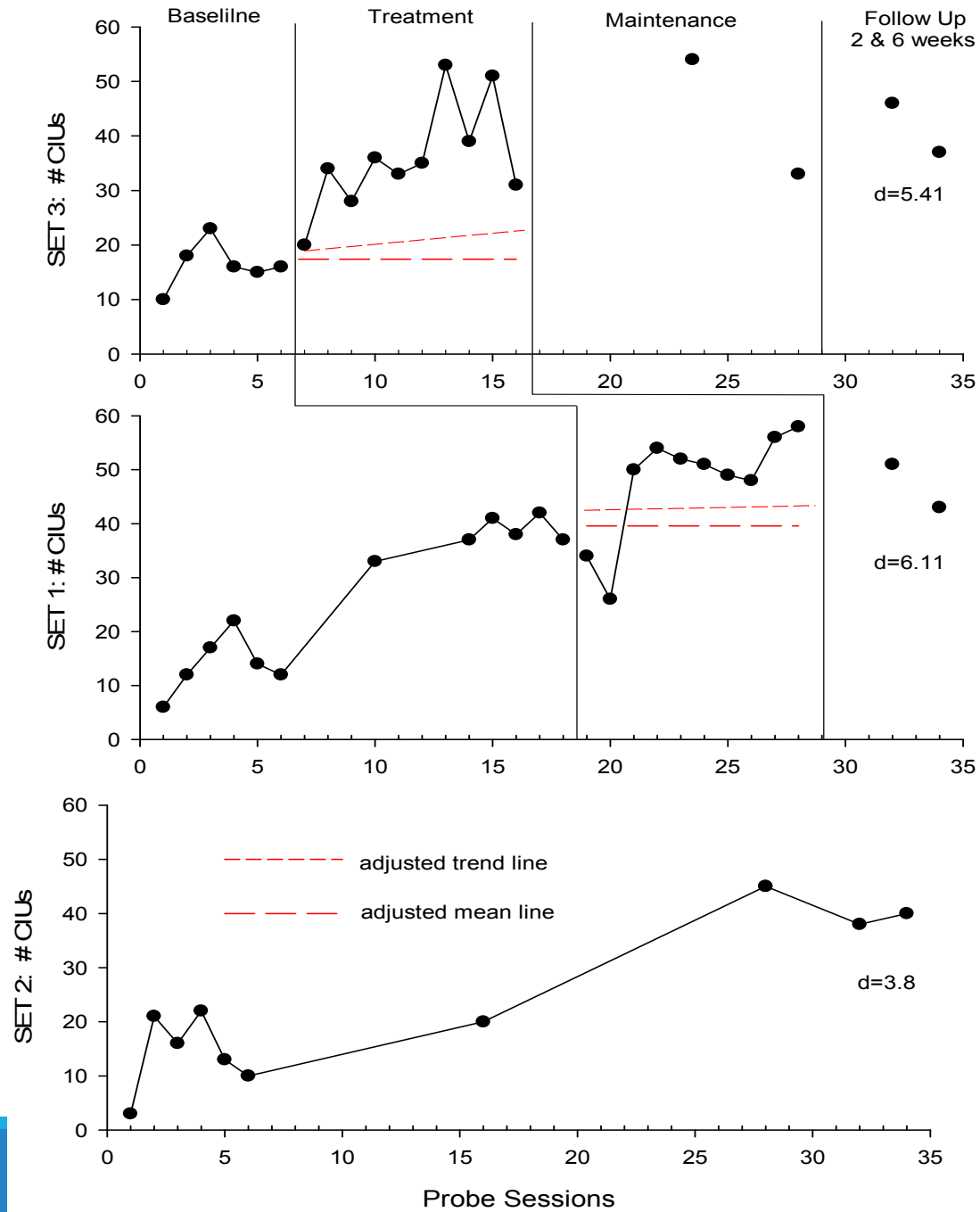
Participant 3

Participant 4

Modifications for 2nd CAAST study

8 pictures instead of 10

SPT completed one additional time with each elaborated utterance

Generalization practice (one picture per session)

"We're going to practice talking about this picture like we do in our probes. We want you to be able to put words together in longer phrases or sentences as much as you can…"

"That's great. There are probably many more sentences you could make about this picture, but we won't practice them now. Of course, when talking about this picture, it is also fine to say as much as you can using individual words. But, we hope therapy helps you put the words together as well."

Summary of CAAST-2 Findings

3/4 participants ↑ CIU production with experimental stimuli
  ◦ Trained pictures
  ◦ Untrained pictures

4/4 participants ↑ CIU productions in Nicholas & Brookshire task

4/4 participants ↑ PCC in sentence repetition at 2 weeks – larger increases with written stimuli; but 3/4 maintained at 6 weeks

3/4 participants ↑ intelligibility