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The Impact of Salient Naming Targets During Aphasia Therapy

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Background & Significance

Aphasia Defined

- Aphasia currently affects 2-4 million Americans (Simmons-Mackie, 2018)
- Aphasia is an acquired communication disorder caused by damage to the language areas of the brain
- All modalities of communication including reading and writing may be affected
- Word retrieval difficulty is the most ubiquitous characteristic of aphasia (Davis, 2005)
- 30% of stroke survivors develop aphasia but infections, traumatic brain injuries, tumors, and neurologic disease can all cause aphasia (NIH, 2017)
- Persons with aphasia (PWAs) often experience limited communicative and social participation and reduced psychosocial well-being (Davidson et al., 2008; Gialanella et al. 2011; Cruice et al. 2003; Hilari et al. 2003; Hilari & Byng, 2009; Hilari, et al., 2012; Ross & Wertz, 2003)
- The World Health Organization (WHO- ICF,2001) assesses the personal impact of aphasia on an individual's ability to participate and engage in activities across multiple environments

Aphasia Treatment

- Translational research between speech-language pathologists and neuroscientists has led to therapies that incorporate principles of neuroplasticity (Raymer et al., 2008)
- Neuroplasticity principles of constraint, intensity, and repetition have been used to treat aphasia induced word retrieval but they do not address the personal factors of the WHO-ICF model (Pulvermuller et al., 2001; Meinzer, 2007; Mozeiko et.al., 2017)

Salience as a Principle of Neuroplasticity

- The neuroplasticity principle of salience has received less attention from researchers than other principles such as dose and intensity (Pulvermuller et al., 2001; Meinzer, 2007; Mozeiko et.al., 2017)
- Neuroscientists have identified a salience network (Menon,2015; 2017) in the brain that identifies biologically and cognitively relevant events that shape behavior (Besissner et al., 2017).
- Language therapies that incorporate salience rely on personally important and motivating stimuli
- Preliminary studies that incorporate salience during picture word matching and script-training therapies are promising (McKelvey et. al., 2010; Cherney et. al., 2015)

Research Question

Does using salient naming targets increase naming accuracy during confrontational picture naming tasks for stroke survivors with chronic aphasia?

Method

Research Design

- Single subject A-B-A research design was implemented to assess the role of saliency during naming acquisition

Participants

- 2 stroke survivors with chronic aphasia enrolled in 2018 Big Sky Intensive Comprehensive Aphasia Program (ICAP)
- Impairment based measures-*Western Aphasia Battery-R, Boston Naming Test, Assessment of Living with Aphasia*

Table 3

Participant Characteristics

Characteristic	P1	P2
Age	64 years	65 years
Gender	Male	Female
MPO	48 months	31 months
CVA –location/type	LMCA/ischemic	LCA/ ischemic
Education level	Master's	Master's
Marital status	Married	Single
Race/ethnicity	Caucasian	Caucasian

Note. MPO = months post-onset of stroke, LMCA= Left middle cerebral artery, LCA= left carotid artery

Table 4

Pretreatment Assessment Scores

Assessment	P1	P2
WAB-R Aphasia quotient	70.1/100	89.4/100
WAB-R Spontaneous speech	13/20	18/20
WAB-R Auditory verbal Comprehension	9.1/10	9.2/10
WAB-R Repetition	6.2/10	9.4/10
WAB-R Naming	6.8/10	8.1/10
BNT-2 (standard form)	40/60	35/60
ALA	3.5/4	3.11/4

Note. WAB-R= *Western Aphasia Battery Revised*, BNT-2= *Boston Naming Test-2*, ALA= *Assessment of Living with Aphasia*

Picture Naming Stimuli

- Participants chose 25 salient words from a list from 100 word list (Palmer, et. al., 2017) and 5 personally salient words.
- Control stimuli were selected to match salient targets' syllable length and frequency.
- Photographic pictures were created for all salient and control stimuli

Probe Sessions

- Three baseline naming probes given to assess pre-treatment naming
- Three naming probes given during treatment
- Treatment consisted of twelve, 45 minute evidence- based naming therapies provided by supervised graduate clinicians.
- Three post therapy naming probes
- All probes and interventions given over 5 weeks of the ICAP
- All control and salient stimuli were presented each session.
- All probes were randomized
- Naming results were recorded and scored for accuracy and errors were analyzed

Data Analysis

- Descriptive statistics and effect sizes calculated for treatment effects using the control vs salient stimuli
- Probe results presented in graphs to visualize changes in naming accuracy

Results

RQ1: Does the incorporation of salient targets increase naming accuracy during confrontational naming tasks?

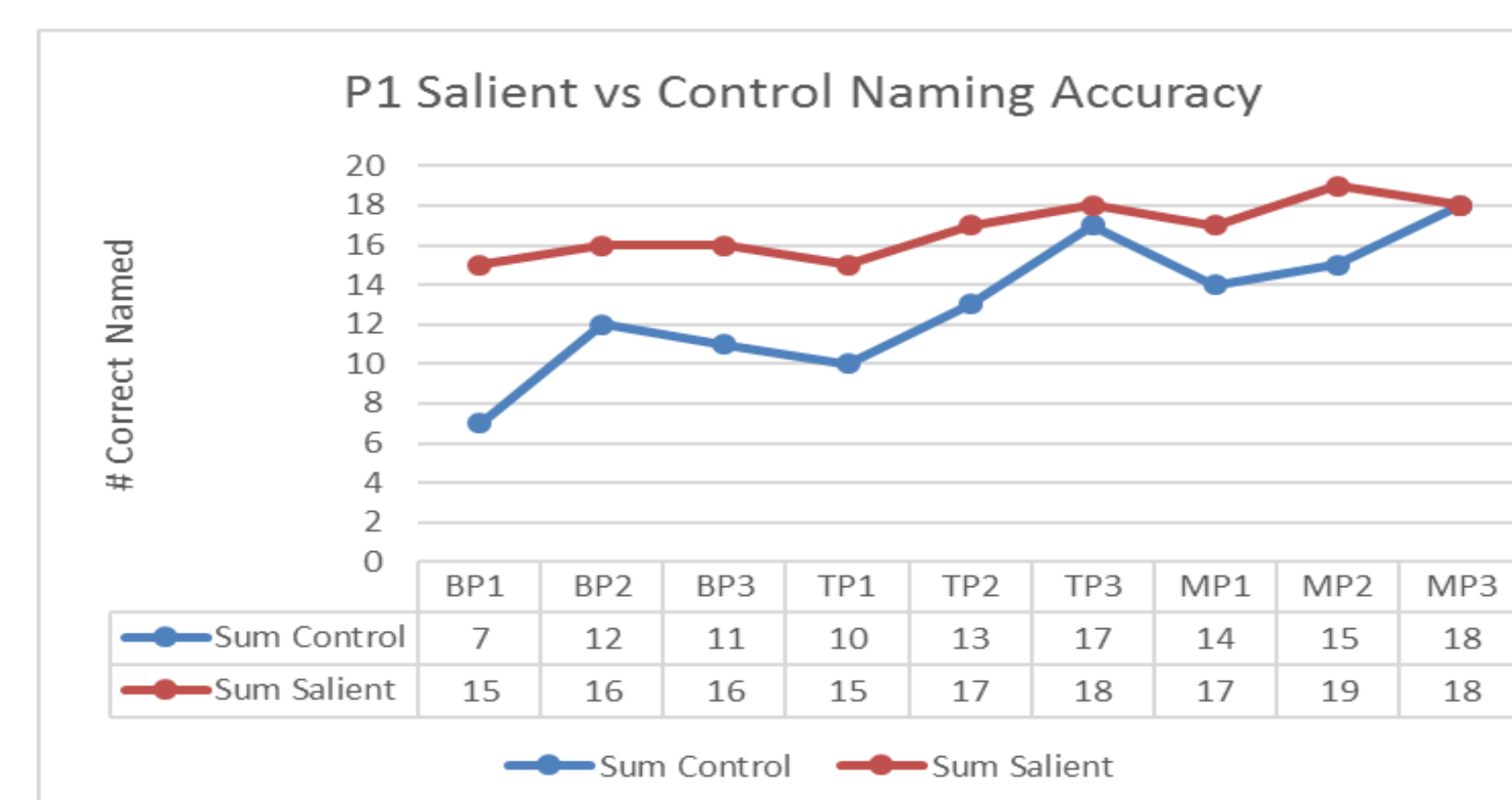


Figure 2. Participant 1's naming accuracy for baseline, therapy and post-therapy confrontational naming probes. Results are Presented as #correct/20 photographic control stimuli and the #correct/20 photographic salient stimuli.

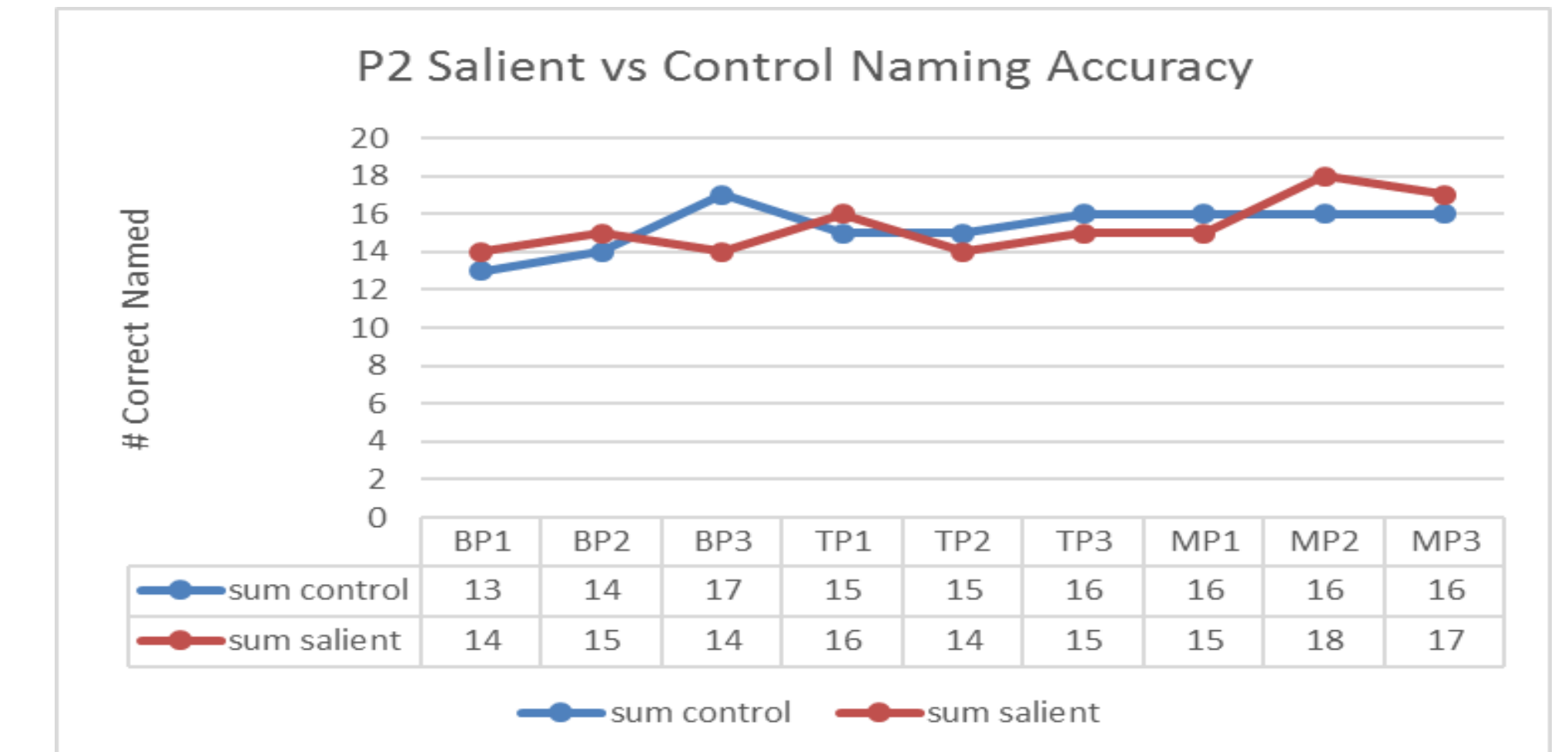


Figure 3. Participant 2's naming accuracy for baseline, therapy and post-therapy confrontational naming probes. Results are presented as #correct /18 photographic control stimuli and the # correct/18 photographic salient stimuli.

Table 9

Salient vs Control Stimuli Effect Sizes

Participant		BP Mean	BP SD	PTP Mean	Busk & Sterlin's d	Effect size
P1	Salient	15.67	.58	18	4.04	Large
	Control	10	2.65	15.67	2.14	Large
P2	Salient	14.33	.58	16.67	4.04	Large
	Control	14.67	2.08	16	.64	Medium

Note: BP = baseline probe; SD = standard deviation; PTP = post treatment probe. Effect sizes-Busk and Sterlin's (1992) variant of Cohen's d (1988)

Effect sizes demonstrate a large therapeutic effect size for the use of salient targets for both participants. The effect sizes For the control stimuli were large for Participant 1 and medium for participant 2.

Discussion and Limitations

- This phase I-2 study has demonstrated that incorporation of salient targets increases naming accuracy.
- Salient targets provide personally relevant, motivating therapy
- Results are applicable across multiple environments.
- Example: "coffee" salient in terms of ordering a cup of coffee during a individual's morning coffee group.
- Limitations:** selection of salient targets since both participants could name several targets prior to treatment. Choose targets participants are unable to produce prior to initiation of study.
- Multiple Participant study for further analysis of saliency used in aphasia therapy