

The Effects of Hippotherapy on Repetitive Behaviors and Verbalization in Children with Autism Spectrum Disorder

Elizabeth Knocke, MS, SPT¹, Deanna Longo¹, Madeline Tavino¹, Brooke Gillespie, COTA², Lauren Janusz, MOT, OTR/L², HPCS, Anjana Bhat, MSPT, PhD^{1,3}



1. Department of Physical Therapy, University of Delaware, Newark, DE 19713

2. Brandywine Occupational Therapy LLC., Wilmington, DE 19803

3. Biomechanics and Movement Science Program, University of Delaware, Newark, DE 19713

Email: ehknocke@udel.edu, lauren.janusz@yahoo.com, abhat@udel.edu

INTRODUCTION

❑ Social communication impairments and repetitive/maladaptive behaviors (RMBs) are the diagnostic features of Autism Spectrum Disorder (ASD) (*American Psychiatric Association, 2013*).

❑ Social communication impairments include complete lack of or delays in verbal and non-verbal communication in a social context (*Eigsti et al., 2011*).

Repetitive/maladaptive behaviors in children with ASD range from repetitive sensory exploration of objects, whole-body stereotypies, as well as negative/problem behaviors. (*Leekam, Prior, Uljarevic, 2011, Dominick et al., 2007*).

❑ There is a growing body of research that reports sensorimotor comorbidities in children with ASD such as atypical sensory preferences and poor motor coordination and balance (*Bhat et al., 2011; Kaur, Srinivasan, & Bhat, 2017*).

❑ Traditional autism interventions, like Applied Behavioral Analysis (ABA) utilize principles of reinforcement, modeling and repetition to facilitate communication and behavioral skills of children with ASD. However, ABA does not address the sensorimotor impairments of children with ASD (*Srinivasan & Bhat, 2013; Srinivasan, Cavagnino, Bhat, 2018*).

❑ Hippotherapy, a treatment tool used by OTs, PTs, and Speech Therapists, is an understudied multisystem intervention, that addresses both the core impairments and sensorimotor comorbidities of children with ASD (*Srinivasan et al., 2018*).

❑ We conducted a preliminary study evaluating the effects of an 8-week hippotherapy intervention on the repetitive/maladaptive behaviors and communication skills of young children with ASD.

- ❑ We hypothesized a reduction in repetitive/maladaptive behaviors following intervention.
- ❑ We also hypothesized an increase in communication behaviors following intervention.

METHODS



❑ *Participants*

- ❑ 5 children with ASD (3 to 7 years; M=3, F=2)
- ❑ ASD diagnosis confirmed using medical/school records
- ❑ Comorbid diagnoses included Williams Syndrome, ADHD
- ❑ Verbalization level – 4 out of 5 children had low levels of vocalizations, while 1 child had high levels of verbalization.
- ❑ Hippotherapy treatment was provided by OTs/co-authors, BG and LJ.
 - ❑ Prior hippotherapy treatments had been provided from 3 months to 3 years.
 - ❑ Other services received during period of study: ABA 1-5 days/wk, Speech therapy 1-3 days/week, OT 1-2 days/week, PT 1-2 days/week

❑ *Training & Study Protocol:*

Parameters	Training Characteristic
Frequency	1 session/week
Duration	8 weeks (with one participant only completing 6 weeks)
Time	45-60 minutes/session

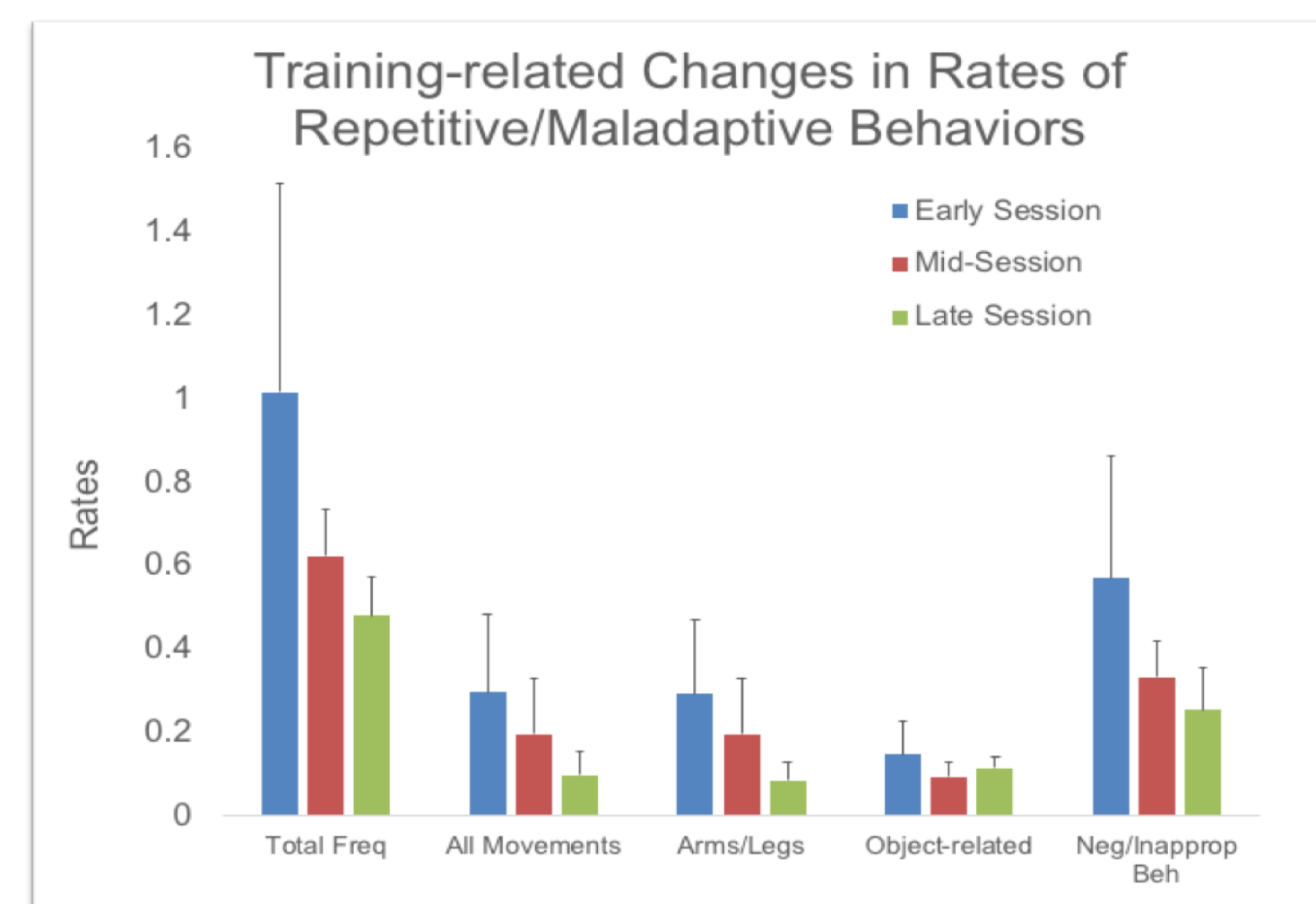
Condition	Description
Play	Reciprocal ball activity with 5 repetitions
Transfer on	Donning helmet and transfer on horse
Trail	Equine movement warm up on trail; starts with verbalization or ASL sign for "go"
Forward	Forward sitting astride, moving forward; then abrupt stops and starts of movement
Backward	Sitting astride backwards
Sideways	Sitting side ways on barrel to right and left on a Figure 8
Activity on Horse	Occupation-based balance, fine or visual motor activity
Transferoff/Feed	Transfer off horse, preparation and feeding horse treat

❑ *Dependent Variables:*

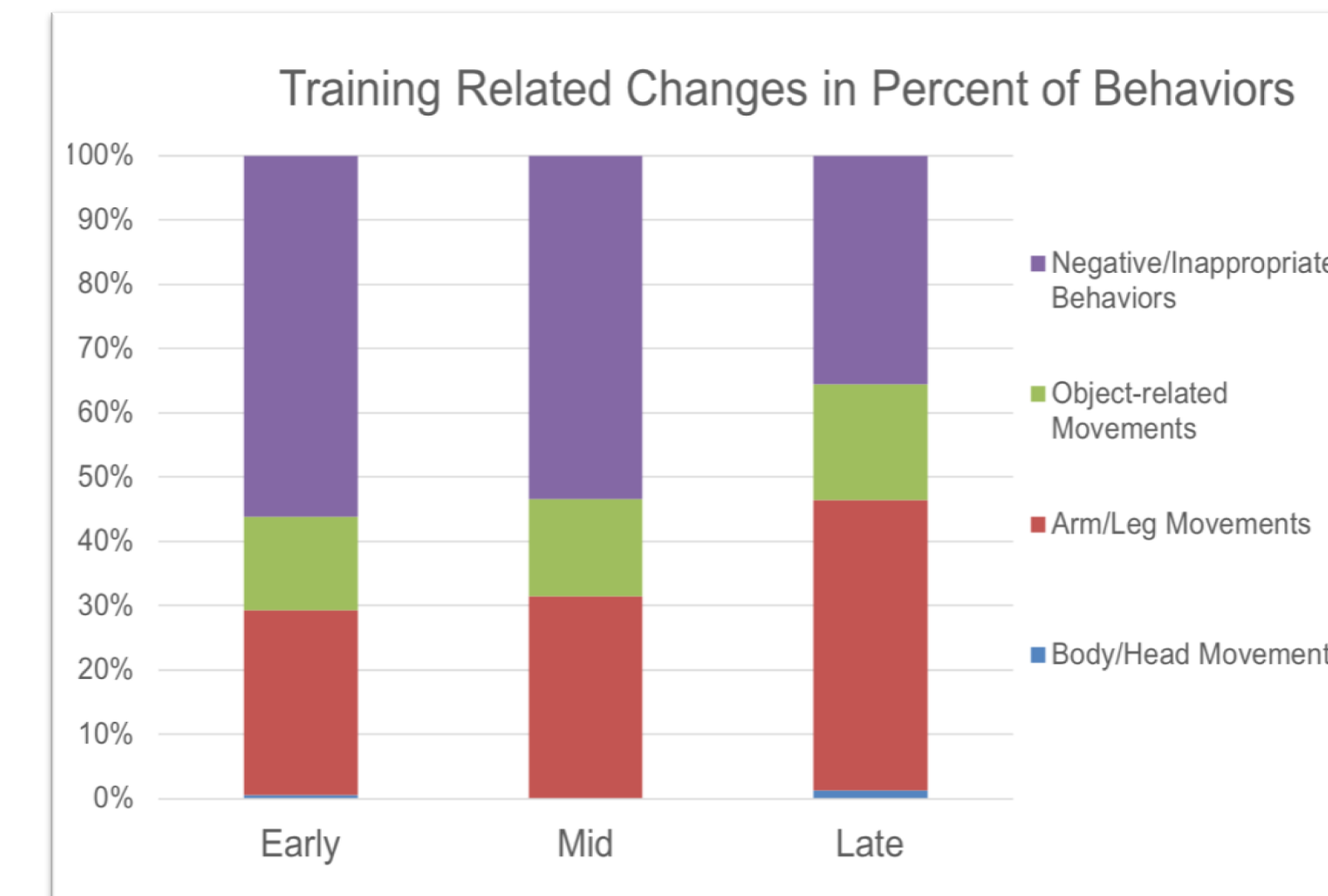
- ❑ Frequency of Repetitive/maladaptive behaviors (RMBs) per minute
- ❑ Communication: Vocalizations/Verbalization quantity and quality/complexity (type 1: spontaneous or responsive; type 2: jargon, stereotypical, responsive, functional).

Category	Definition	Examples
All Movements	Movements that include whole body, head, hands, arms, feet and leg movements	Rocking, swaying, jumping, flapping arms, kicking legs
Arms/Legs	Movements isolated to the arms, hands, legs and feet	Flapping arms, hands to mouth, kicking legs
Object-Related	Behaviors related to any toys, personal objects, riding materials, or treats throughout the session	Chewing on object, playing with helmet, putting treat in mouth
Negative Behaviors	Self-injurious, aggressive, and inappropriate behaviors	Scratching, hitting, biting, throwing, not listening to direction, crying, tantrums

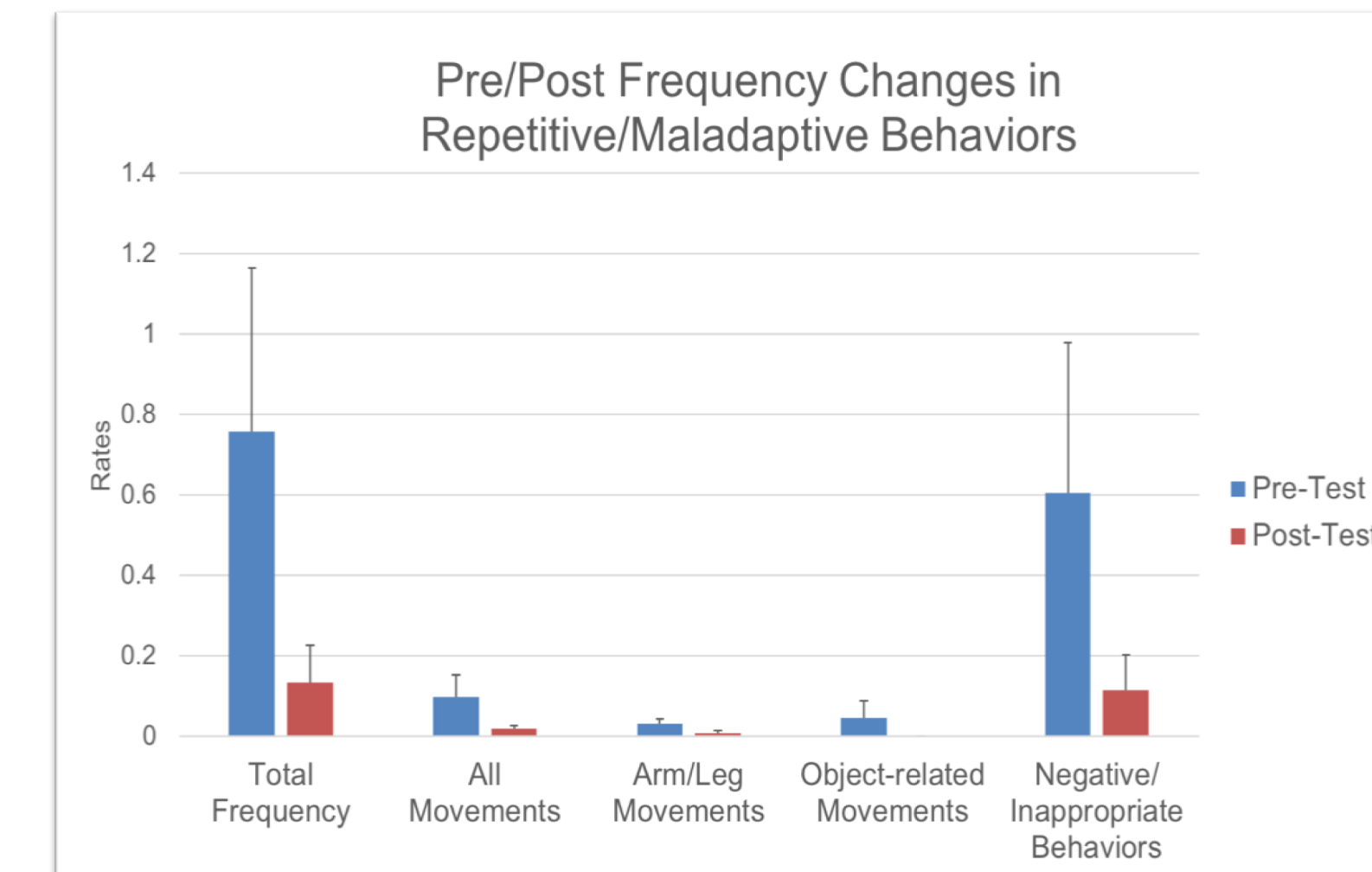
RESULTS



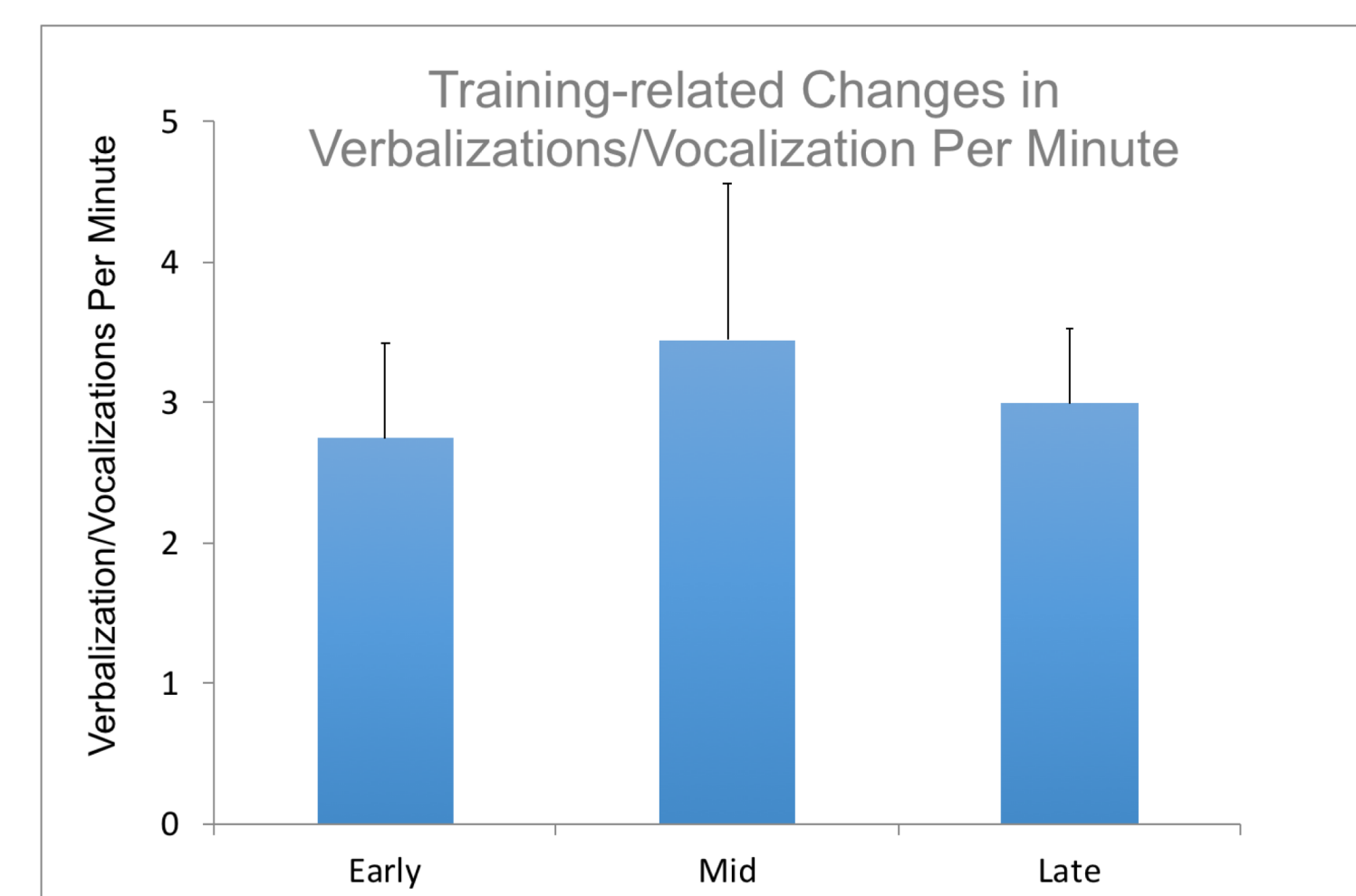
- RMB Rates: ↓ Early -- Mid -- Late



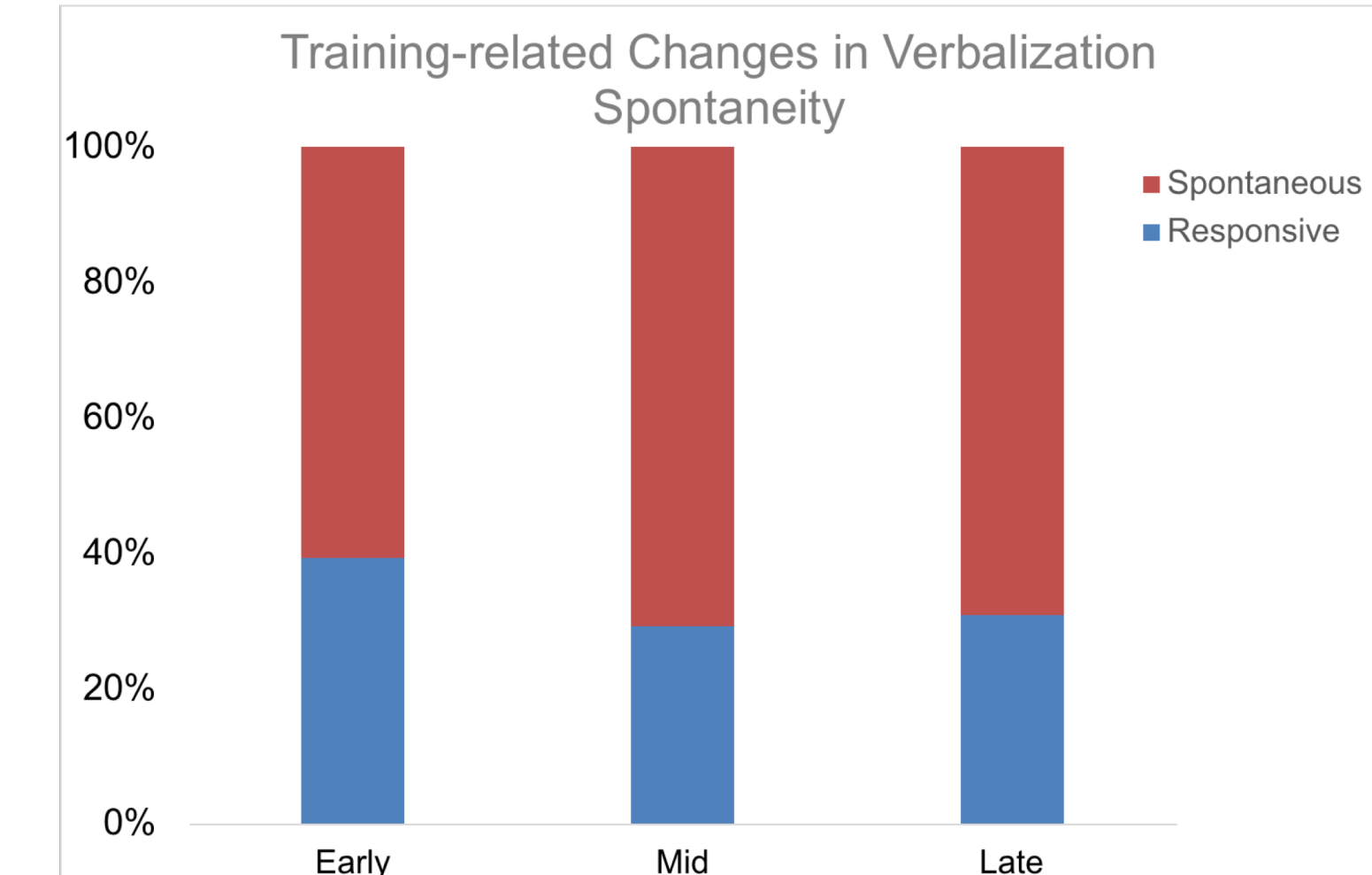
- % Negative Behaviors: ↓ Early -- Mid -- Late



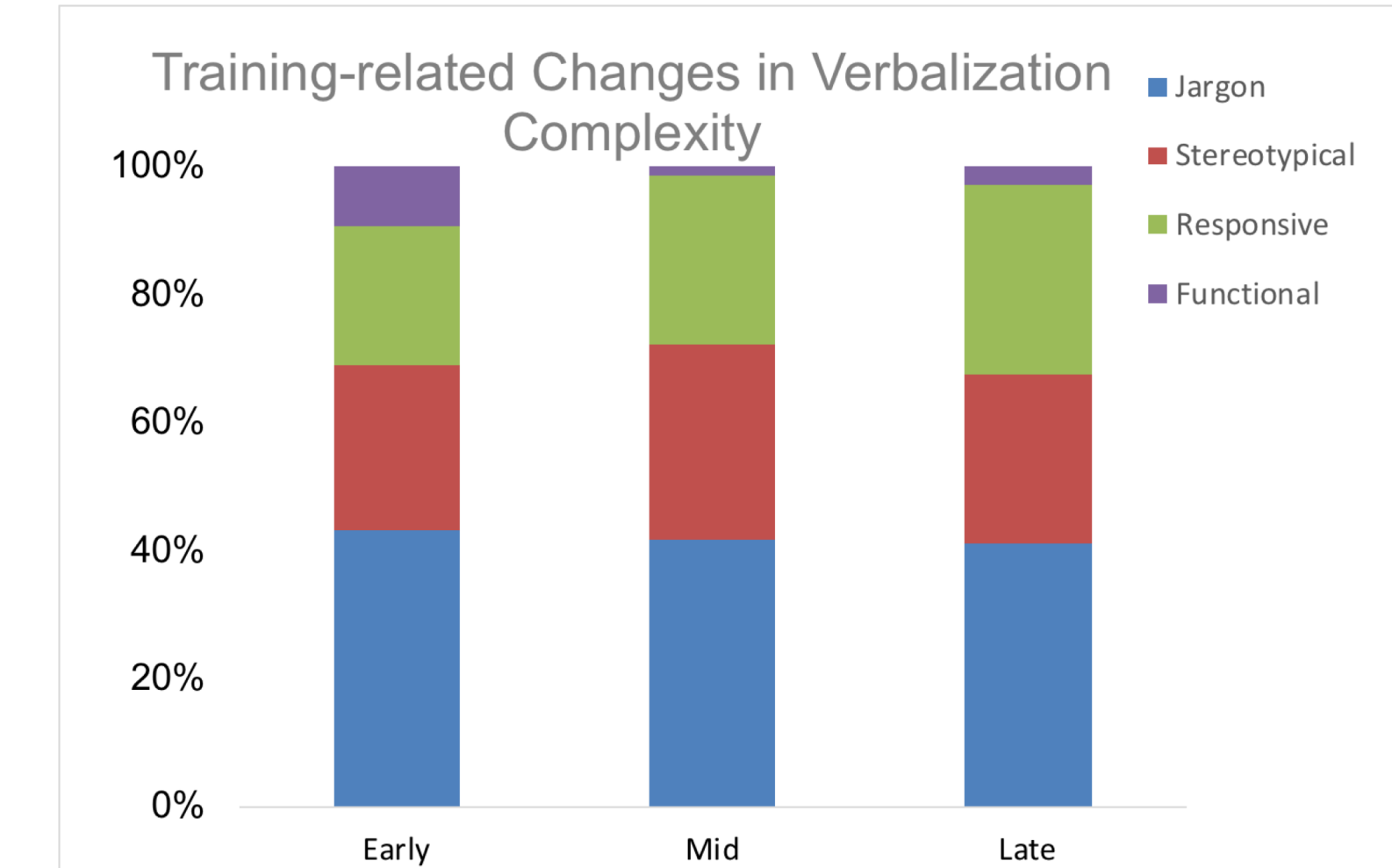
- Rates of RMBs and Negative Behaviors: ↓ Pretest -- Posttest



- Verb./Vocalization bouts: ↑ Early -- Mid -- Late



- % Spontaneous communication: ↑ Early -- Mid -- Late



- % Responsive communication: ↑ Early -- Mid -- Late

SUMMARY OF RESULTS

- ❑ RMB rates decreased from early to late sessions across all children.
- ❑ Percentage of time engaging in negative and inappropriate behaviors decreased from early to late sessions.
- ❑ Total frequency of RMBs and frequency of negative and inappropriate behaviors specifically decreased significantly from pre-test to post-test after completing the hippotherapy sessions.
- ❑ Vocalization/Verbalization quantity increased from early to mid and was somewhat retained in the late sessions as well.
- ❑ The majority of the vocalizations/verbalizations were spontaneous and not responsive and the proportion of spontaneous vocalizations increased in the mid and late sessions compared to the early sessions (type 1 analysis).
- ❑ We also see a small increase in responsive vocalizations in the mid and late sessions compared to the early sessions (type 2 analysis).

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DISCUSSION

- ❑ In our study, we found improvements in RMBs and communication from early to late sessions, and from pre-test to post-test.
- ❑ We found a decrease in arm and leg movements, object-related movements, and repetitive/negative behaviors across all training variables for all 5 children in this study.
- ❑ On close observation, forward riding showed the most improvements among all variables.
- ❑ Negative/maladaptive behaviors consisted of approximately 55% of all behaviors in early sessions, and by the end of intervention, negative/maladaptive behaviors only made up about 35% of all behaviors.
- ❑ Verbal communication improved in terms of quantity and quality following intervention with more spontaneous and responsive speech.

CLINICAL IMPLICATIONS

- ❑ Hippotherapy intervention reduced the RMBs and negative behaviors of young children with ASD while improving their social communication skills with others.

LIMITATIONS

- ❑ This preliminary study was conducted over a short time period with few participants.
- ❑ Future studies must consider adding appropriate control groups, larger sample sizes, prolonged treatments as well as other clinical disciplines (PTs and Speech Therapists).

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