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The Effects Of Using Baby Sign Training On The Interactions Between Mothers And Infants

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Dedication

This work is dedicated to my family, my husband, kids, mom, brother, and grandparents. Thank you for all your help and support during my graduate school, I sincerely could not have done without you. You all were and always have been my cheerleaders through everything, this research is also yours.

THE EFFECTS OF USING BABY SIGN TRAINING ON THE INTERACTIONS BETEWEEN MOTHERS AND INFANTS

by

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Abstract

Baby sign has been becoming more popular and known through the publication of parenting books and websites dedicated to its use. Research continues to blossom on the subject, demonstrating that it is indeed beneficial on many levels for both the infant and their caregiver. Several researchers have implicated the effects of baby sign on infants' cognitive and behavioral development. The purpose of this research is to analyze the effects of a baby sign training on the interactions of mothers and their babies. Five typically developing infants between the ages of eight and fourteen months and their parent participated in this study, however, only one infant-mother dyad completed the study. The Infant and Maternal Rating Scales (Mahoney, G. 1998; Mahoney, G. 2008) were used to determine the effectiveness of the baby sign treatment. The results indicate that the majority of the ratings increased during the treatment phase of the study. Overall, the baby sign training demonstrated effectiveness.

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INTRODUCTION

When parents find out they are expecting a baby, the flurry of activity begins. Parents often track the baby's size each week, what to eat for a healthy pregnancy, what you need for the hospital, and so on. Once baby arrives, parents investigate milestones; when the baby should hold up their head, sit on their own, crawl, say their first words, and walk. There is much individual variation in development. Parents feel the weight of responsibility of teaching their children the most they possibly can, which may lead to baby sign. A baby communicates in one primary way, through crying. It may be difficult for a parent to know when their baby is hungry versus tired. Parents may seek out baby sign as a sort of communication bridge during this time before functional symbolic communication develops more fully.

As baby sign becomes legitimized as a beneficial tool, rather than just a social trend, more research is needed to support the best baby sign practices in areas such as language and social development, and in parent-child interactions.

Chapter 1: Literature Review

What is Baby Sign?

Baby sign is an augmentative communication approach that has been developed for use with hearing preverbal infants, which involves teaching infants key words before they initially begin using first words (Doherty-Sneddon, 2008). Baby sign has gained in popularity primarily because it is seen as giving infants a way to communicate. Baby sign is used to aid the parent or caregiver in understanding the wants and needs of the infant. It does not require the caregiver to be particularly fluent in sign language, but to learn the key signs they would like to implement with their baby. For example, a mother who uses baby sign with her infant may use the following

phrase, “Do you want milk (MILK)?” The sign for MILK would be produced while simultaneously saying the word.

A common misconception between baby sign and gestures is that they are the same. They may be similar in the fact that they are both produced with the hands but they differ in two ways. For one, sign language is a rule-governed way to form a whole, the meaning of the whole is determined by its parts, in contrary gesture are the parts gaining meaning because of the meaning of the whole (Capirci et al., 2002). Results of a case study (Acredolo & Goodwyn, 1985) and cross-sectional and longitudinal studies (Acredolo & Goodwyn, 1988) have shown that infants between 10 and 20 months are so highly motivated to communicate that they often spontaneously recruit such "symbolic gestures" as a way around the obstacle posed by the articulatory demands of verbal words.

Benefits of Baby Sign

Communication development in infants is crucial for the cognitive, emotional, and social development of a child. Difficulty communicating can lead to difficulties in behavior (Paul & Kellogg, 1997). Children who were labeled “late talkers” at age two years, were perceived as more shy and much less outgoing by the age of six (Paul & Kellogg, 1997). The challenges continue in the form of poor social-emotional adjustment, thus leading to more conflicts between the parent and the child (Irwin et al., 2002). Research conducted by Irwin (2002) used the Parenting Stress Index Form (PSI-SF) to assess maternal stress. The results indicated that based on the Infant-Toddler Social and Emotional Assessment, “late talkers” were rated higher in depression/withdrawal, lower in social relatedness, pretend play/imitation, and cooperation, and more withdrawn on the Child Behavior Checklist than those in the controls. Additionally, the participants who were late-talkers also demonstrated a more serious demeanor and were less

interested in play. Providing an intervention to improve the communication of late talkers, including baby sign, could potentially help to alleviate some of these challenges in the child and parent's life. When sign teaching was combined with extinction, a decrease in crying and whining occurred, which may help prevent the development of problem behaviors (Brady 2007).

Anecdotally, there may be the belief that learning sign could delay a child in their speech development or that the child may choose not to talk and use sign instead. The results of several research articles, however, provide evidence that this belief is incorrect (Paul & Kellogg, 1997). The observed delay between the onset of communicative purpose and first words in children learning spoken language has been related to challenges with oral articulation (Capirci et al., 2002). Since early sign production occurs in the manual modality, it should be unaffected by the difficulties in oral articulation that impede early word production. As a result, researchers have found it is possible that signing children will make their initial signs at an earlier age than speaking children producing their first word (Bonvillian & Folven, 1987). Those who are taught baby sign tend to have a larger expressive and receptive spoken language vocabularies, more advanced mental development, a reduction in problematic behaviors like tantrums resulting from frustration, and improved parent-child relationships (Doherty-Sneddon, 2008). The following mechanisms are considered to support these benefits: an increase in the number of episodes of joint visual attention between parents and toddlers during interactions, which has been linked to improved language skills; the infant's ability to focus on the topic and context of conversation; and the discussion and clarification of concepts (Doherty-Sneddon, 2008).

Purpose of Study

In order to provide more evidence for the effect of baby sign use on the parent-child interactions, the current study was conducted. The research question asked was, "What are the

effects of using baby sign training on the interactions between mothers and infants?" It was hypothesized that including baby sign into the everyday life of the infant will help them communicate their wants and needs, leading to qualitatively better interactions between infants and their primary caregivers.

Chapter 2: Methods

Design

The research is a case study. The independent variable was the baby sign training that was implemented for mothers of typically developing infants. The dependent variables were rated measures of infant/mother interaction with established scales, Maternal Behavior Rating Scale, and Infant Rating scale. (Mahoney, G. 2008; Mahoney, G. 1998). See the rating scales in Appendix E.

Participants

The participants of the study were five typically developing infants, four females and one male and their parent. Baby 1 was an eight-month-old female, Baby 2 was a 12-month-old female, Baby 3 was a 9-month-old female, Baby 4 was a nine month old female, and Baby 5 was an 8 month old male. Each parent who participated was over the age of 18 and provided consent before beginning. Baby 1 and Baby 4 had mostly their mother in videos, with father in three of the videos. All participants were monolingual English speaking and were typically developing based on the milestone checklist parents completed.

Table 2.1: Participants

Participants		
Baby	Age	Gender
Baby 1	8 months	Female
Baby 2	12 months	Female
Baby 3	9 months	Female
Baby 4	9 months	Female
Baby 5	8 months	Male

Setting

Baby 1's primary setting was at their home. All the settings were the following: 1. Kitchen, primarily at the kitchen table in their highchair, 2. Bath time, where infant was given toys and support from mother/father, 3. Living room on the floor mat with a variety of toys, and 4. Playroom on the floor with a variety of toys and books. Each video provided, consisted of one of the four settings in a rotating manner, with sibling in occasional videos.

Baby 2's settings were the following: 1. Floor of living room with mom and/or sibling present and 2. On the couch in the living area. Either setting had sibling present throughout the recording.

Baby 3's settings were the following: 1. Highchair in the kitchen for mealtime, and 2. On the sofa in mother's lap and 3. In their walker.

Baby 4's settings were the following: 1. Floor in their living area and 2. On the couch

Baby 5's setting was at the kitchen table sitting down with mom and sibling present.

Materials

Materials that were provided for the parent were questionnaire of milestones, consent to participate in research, and signs the participant wanted to learn (See Appendix A-C). The following are the word choices of each participant:

Baby 1: Mom, dad, eat, bath, and up

Baby 2: Did not choose words

Baby 3: Mom, dad, eat, all done, up, and diaper

Baby 4: Mom, dad, eat, milk, and all done

Baby 5: Mom, dad, eat, milk, and diaper

A pre-recoded video was created by the researcher and provided to the parent for reference following the individual training. The video included each sign the parent requested. The order of the presentation of signs in the video were based on the preference of the parent regarding the most important or most often used concept. The video included the researcher verbally producing the word and the sign, while also having the word appear on the screen. American Sign Language (ASL) signs were used for all signs.

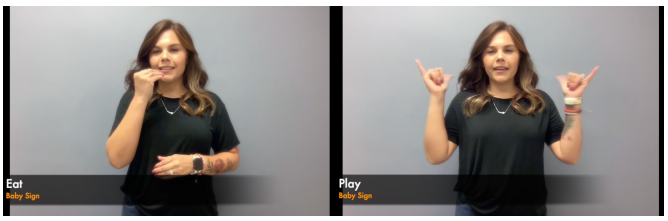


Figure 2.1: Screen shot of the Baby Sign Training Video

Finally, a hard copy handout was also provided to the parent participants that included a still image and narrative description of how to produce each sign (see appendix D for an example). Contact information for the researcher and the research assistant was provided, in the case of any questions or clarifications were needed.

Procedure

After participants contacted the researcher, a meeting was scheduled either face-to-face or online to explain in detail the study procedure, provide consent documents, and administer the questionnaires about milestones and signs wanted. Parent participants were informed to choose words that they often use in their daily life, such as mom, dad, and eat. Following the initial intake, baseline data was collected across three to four videos without any training provided. Once a stable baseline was obtained, the researcher then contacted the parent participant to schedule a second meeting for training. Treatment videos were requested to be 3-5 minutes long and 3-5 times per week.

The videos were viewed, analyzed, and rated utilizing the Maternal Rating Scales and Infant Rating Scales in all categories. If needed, feedback was provided to parent participant regarding the production of signs and usage, as well as follow up for any questions. Data collection lasted approximately ten weeks.

Baseline

Baseline was attained by observing and rating behaviors between infant and caregiver. The parent participants set up their phone to record their interactions with their infant in settings and activities that were chosen by them for comfort. The videos sent were between three to five minutes long via email or text message to the researcher or researcher assistant.

When communicating, parent participants utilized spoken language with key word Baby Sign use. The signs that were used were those the parents indicated were most important prior to initiation of the study.

Treatment

The treatment phase was initiated when the researcher obtained a stable baseline on the rating scales. A stable baseline included a consistent rating score for each category for both parent and baby across three consecutive videos.

Training was provided via face-to-face or online, with a detailed explanation on how to and when to produce the chosen signs. Participants were trained on the correct production of their chosen signs and to use the sign each time they said the corresponding word simultaneously. For instance, during mealtime, every time the word eat is said, the sign EAT should be produced.

Information on how to video the interaction such as where to place the phone and how to send the videos to the researcher was included in the training. The researcher contacted the

parents throughout the study to ensure all questions were answered and to provide feedback on baby sign use.

Interrater Reliability

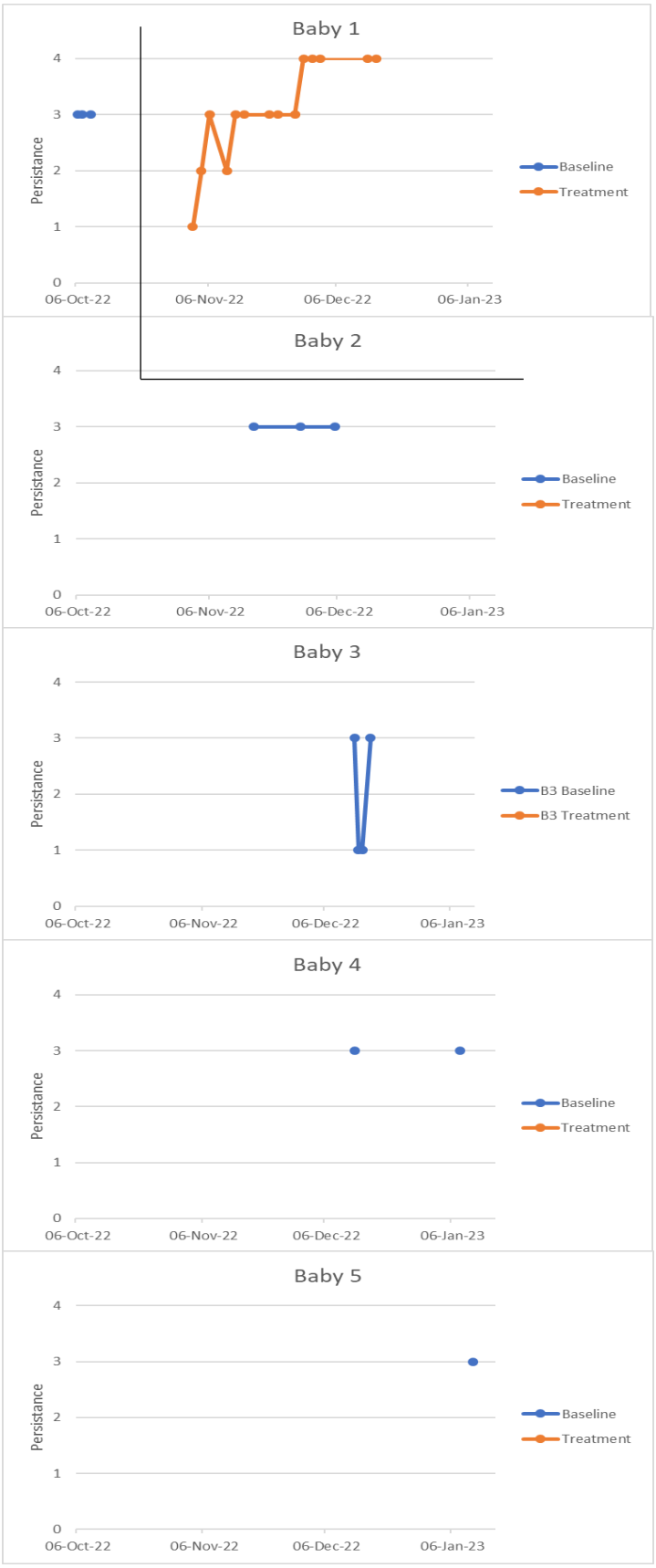
A graduate student in the UTEP Speech-Language Pathology Program was the second rater for this study. Training consisted of giving them the Maternal and Infant Rating Scales to review and ask questions in anticipation of reviewing videos. Examples of what to identify in the video to a corresponding rating were explained and any questions were answered.

Chapter 3: Results

The results for Baby 1 are relatively consistent from the beginning of the training and throughout the entirety of time, starting with the baseline and improving by 2 rating scores in each category of the Maternal Rating Scores and the Infant Rating Scores. Baby 2, Baby 3, Baby 4, and Baby 5 did not undergo the baby sign training, only baseline scores were taken.

Rating scales for Baby 1 and Mom 1 will be reviewed, no data was collected for other participants. In the Baby Rating Scale of Persistence, it remained the same, however in the final five days of participation, the rating increased and remained consistent. In Attention to Activity, Baby 1 made progress, the decreased once, then continued to make progress, remaining at a consistent rating of 4. For the Involvement ratings, Baby 1's ratings consistently increased throughout the study until the end of the study where there was a slight decrease. The Compliance ratings were inconsistent for Baby 1. In Initiation to Activity, the ratings steadily increased and remained consistent for the entirety of the study. For the Affect ratings, Baby 1 decreased once in the first data points collected, following that, increased consistently, smiling, and showing enjoyment.

Mom 1 demonstrated Sensitivity to baby's interest consistently, with only one decrease. Responsivity ratings also demonstrated one decrease, however Mom 1 consistently progressed and responded with encouragement and to baby's evolving demands. Effectiveness (reciprocity) had one decrease, Mom 1 progressed consistently following the decrease and demonstrated engagement willingly and communication throughout the majority of the interactions. Acceptance made progresses consistently, Mom 1 showed positive affect in response to baby's actions, only having one decrease. Enjoyment was demonstrated consistently throughout the research, displaying joy, and had one decrease. Expressiveness was observed with Mom 1, showed communication consistently during the interactions, only having one decrease. Achievement was observed to make consistent progress, having only one decrease, Mom 1 demonstrated encouragement towards Baby 1. For the Praise (verbal) ratings, the data collected showed inconsistent results with multiple decreases. Directiveness is also unclear, it remained the same for several data points and decreased multiple times as well.


Baby 1
Persistance
4
3
2
1
0
06-Oct-22
06-Nov-22
06-Dec-22
06-Jan-23
Baseline
Treatment
Baby 2
Persistance
4
3
2
1
0
06-Oct-22
06-Nov-22
06-Dec-22
06-Jan-23
Baseline
Treatment
Baby 3
Persistance
4
3
2
1
0
06-Oct-22
06-Nov-22
06-Dec-22
06-Jan-23
B3 Baseline
B3 Treatment
Baby 4
Persistance
4
3
2
1
0
06-Oct-22
06-Nov-22
06-Dec-22
06-Jan-23
Baseline
Treatment
Baby 5
Persistance
4
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2
1
0
06-Oct-22
06-Nov-22
06-Dec-22
06-Jan-23
Baseline
Treatment

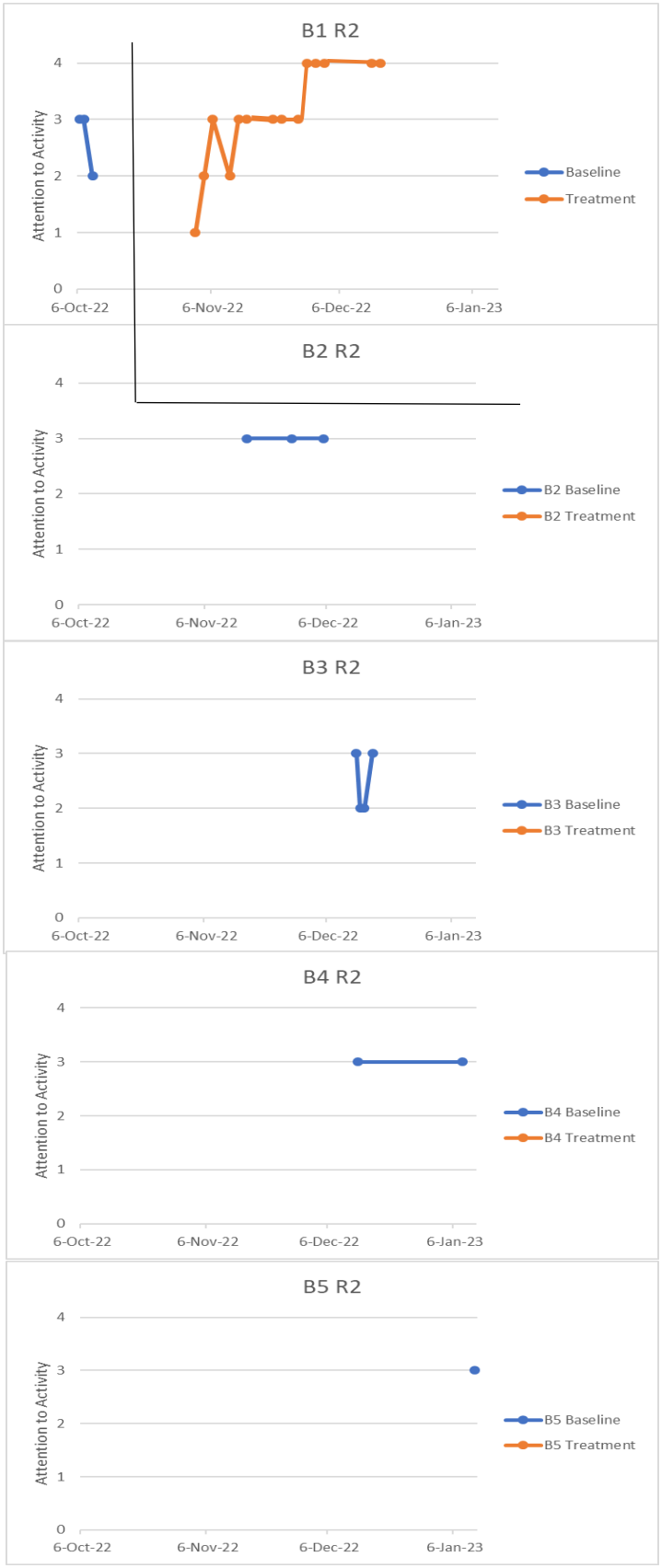

Figure 3.2: Infant Rating – Attention to Activity

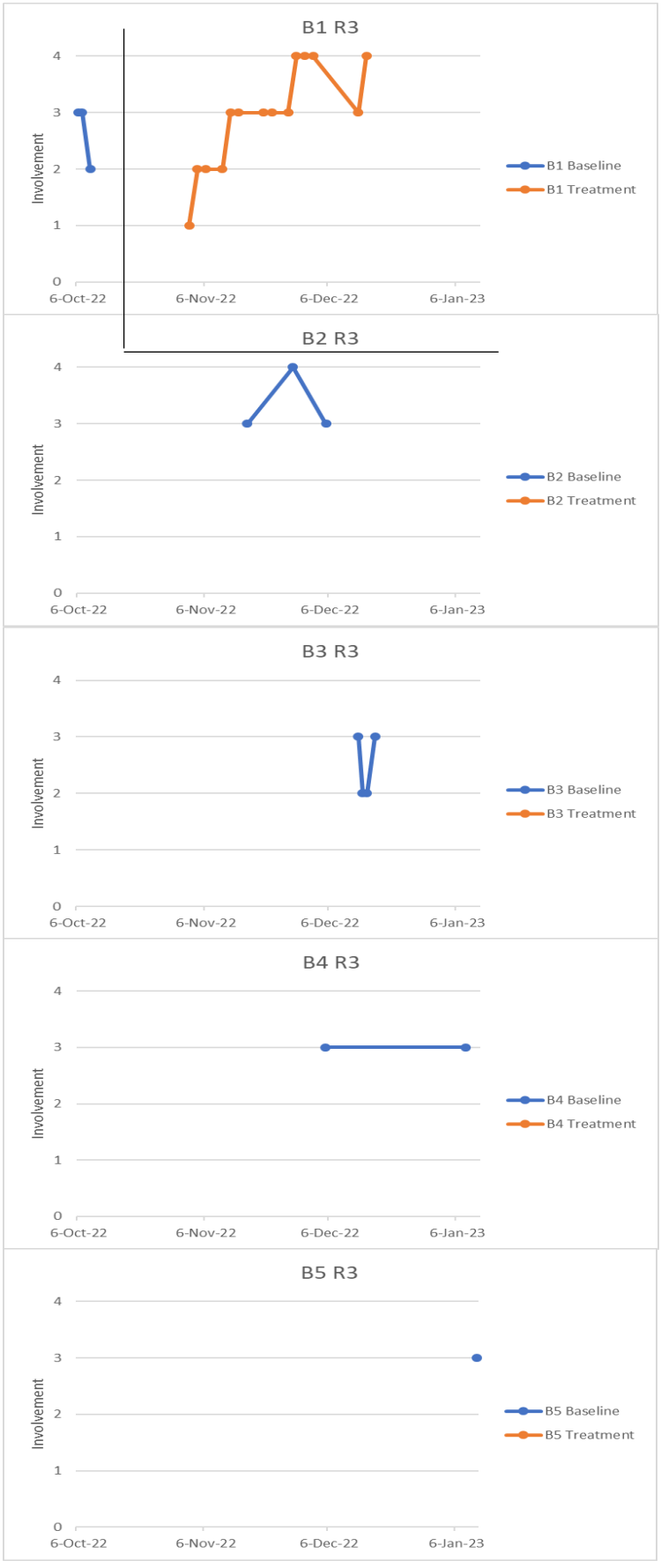

Figure 3.3: Infant Rating – Involvement

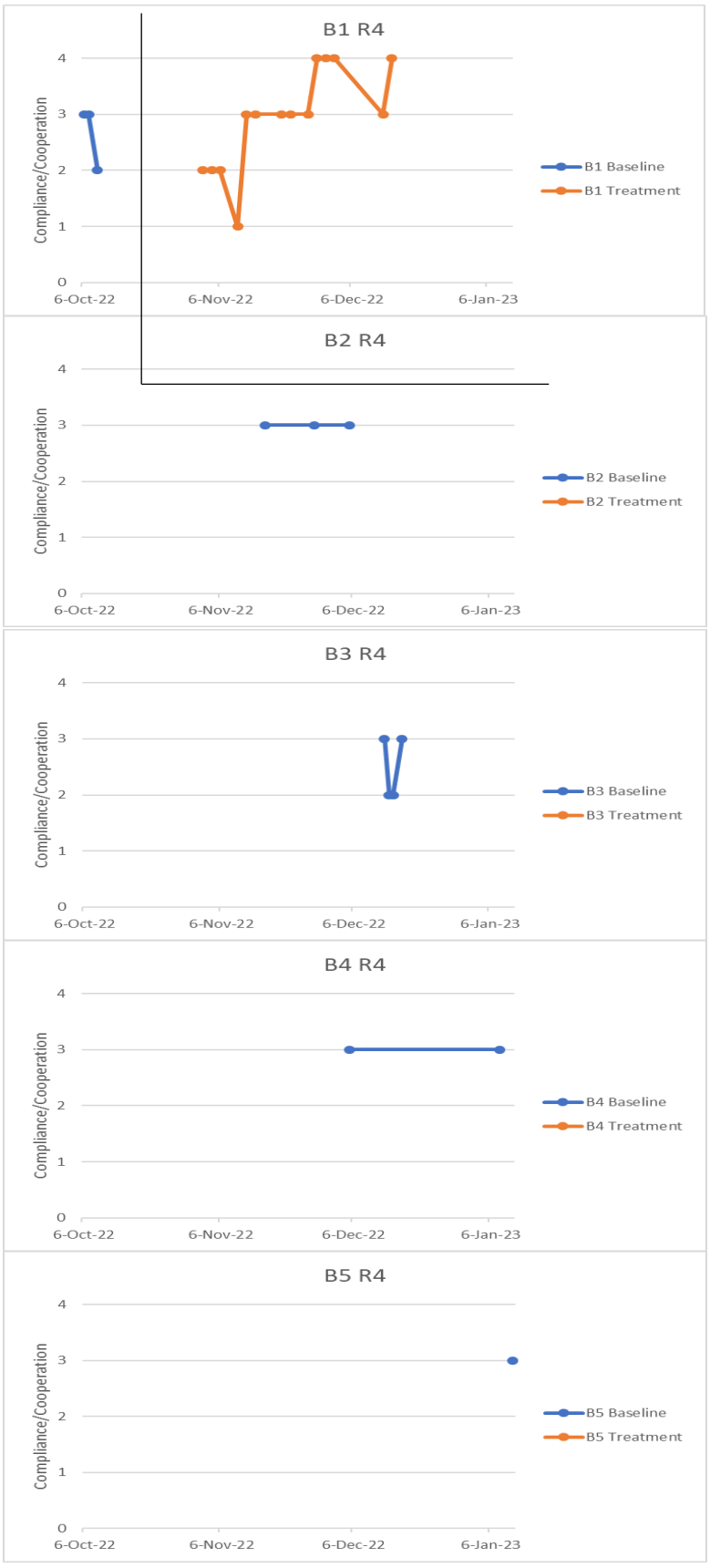

Figure 3.4: Infant Rating – Compliance/Cooperation

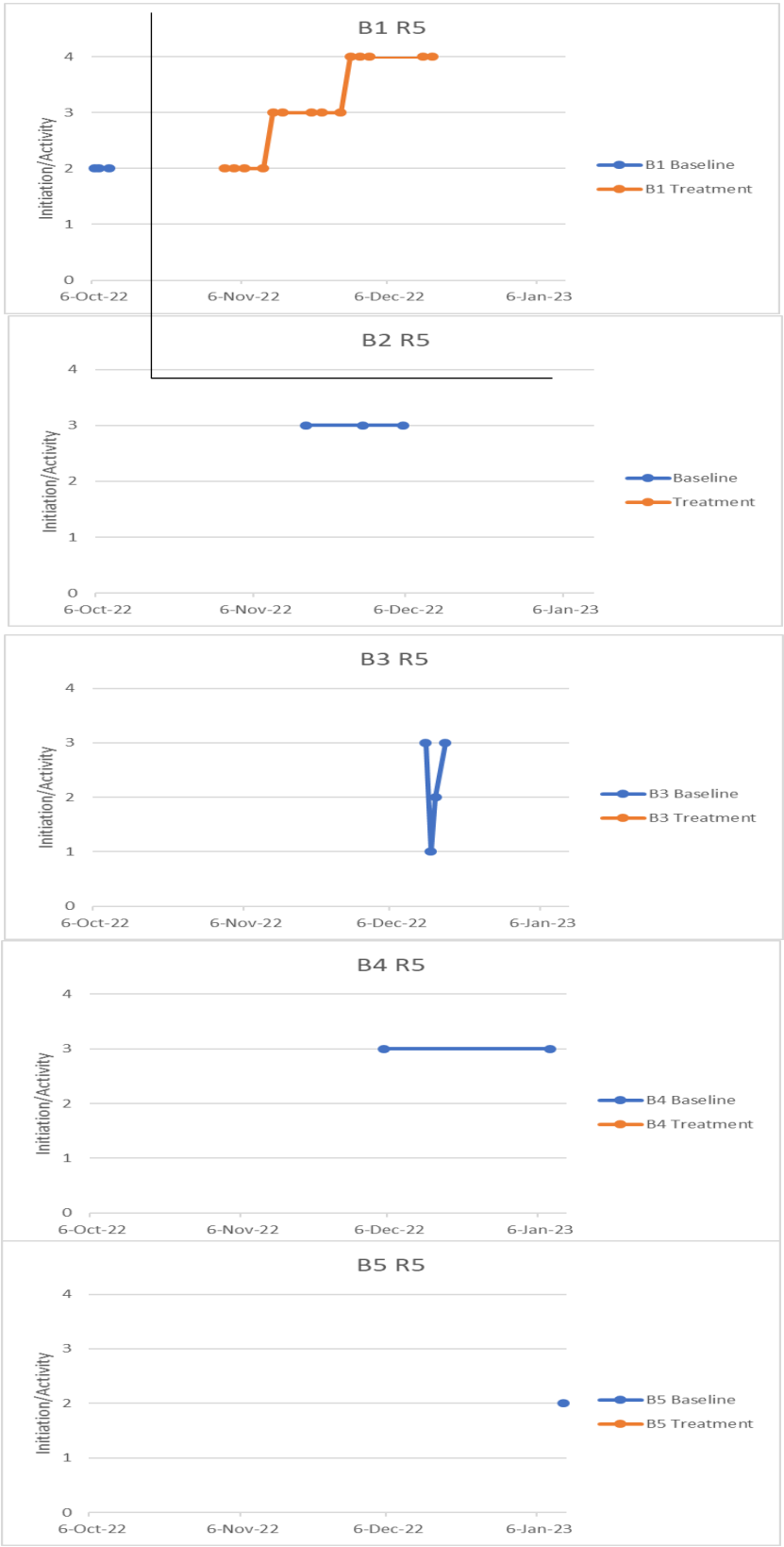

Figure 3.5: Infant Rating – Initiation/Activity

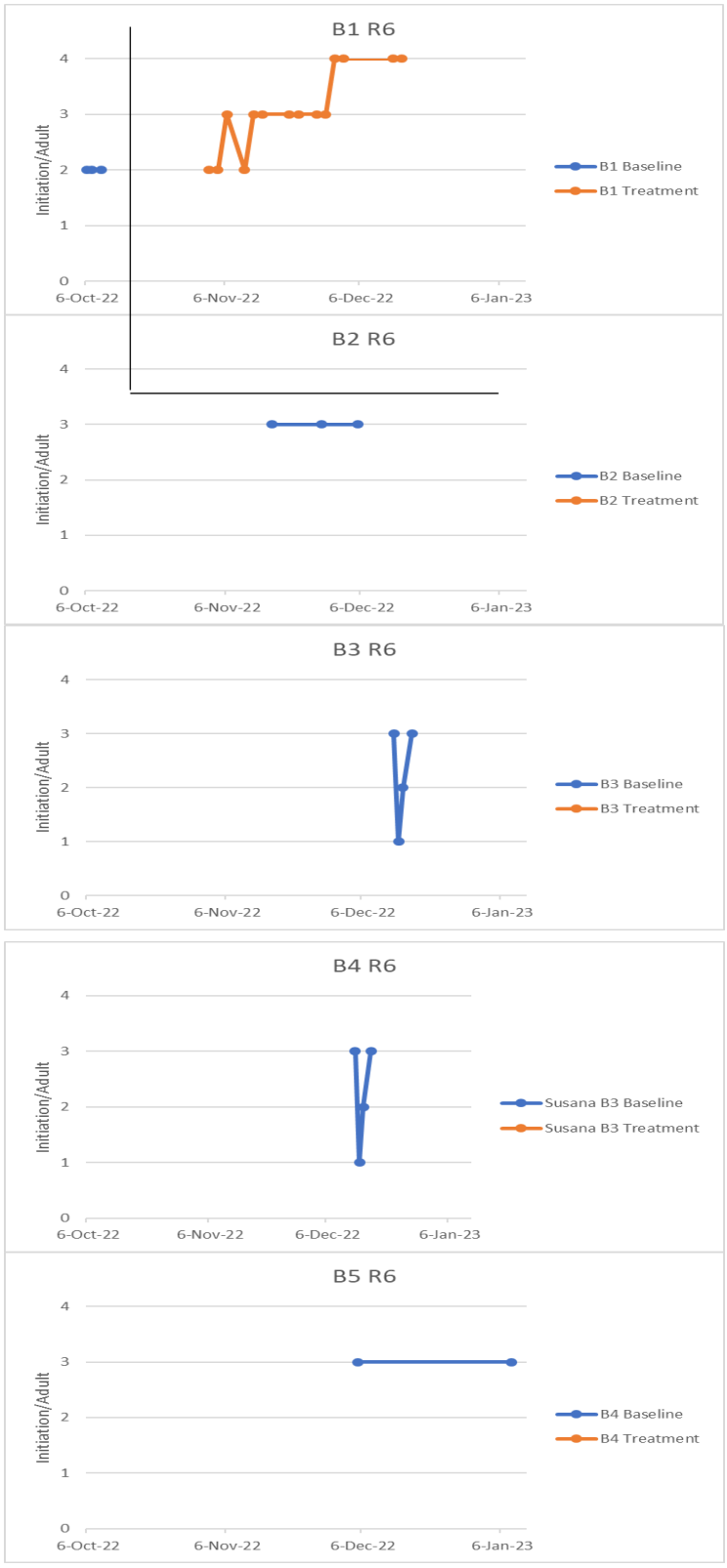

Figure 3.6: Infant Rating – Initiation/Adult

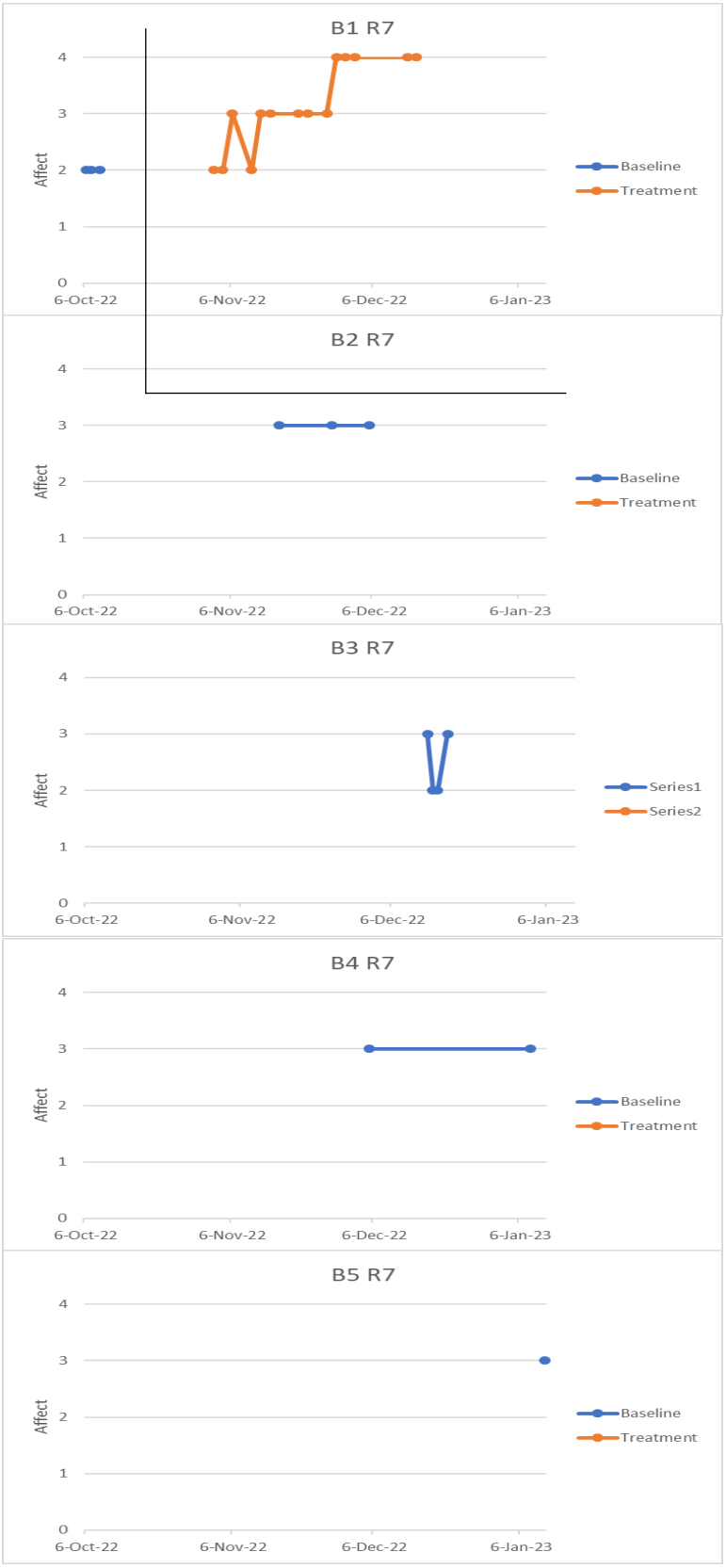

Figure 3.7: Infant Rating – Affect

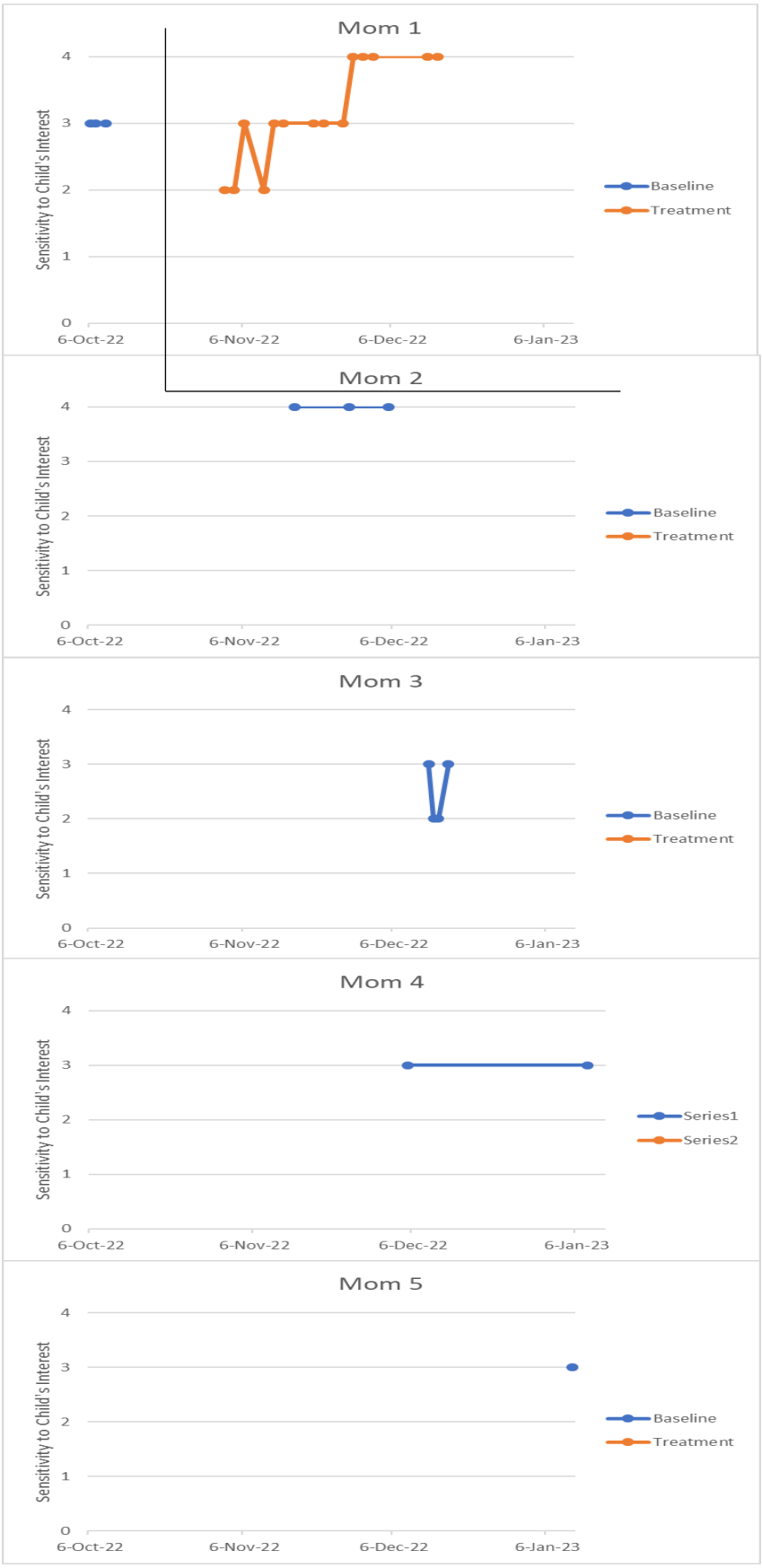

Figure 3.8: Mother Rating – Sensitivity to Child's Interest

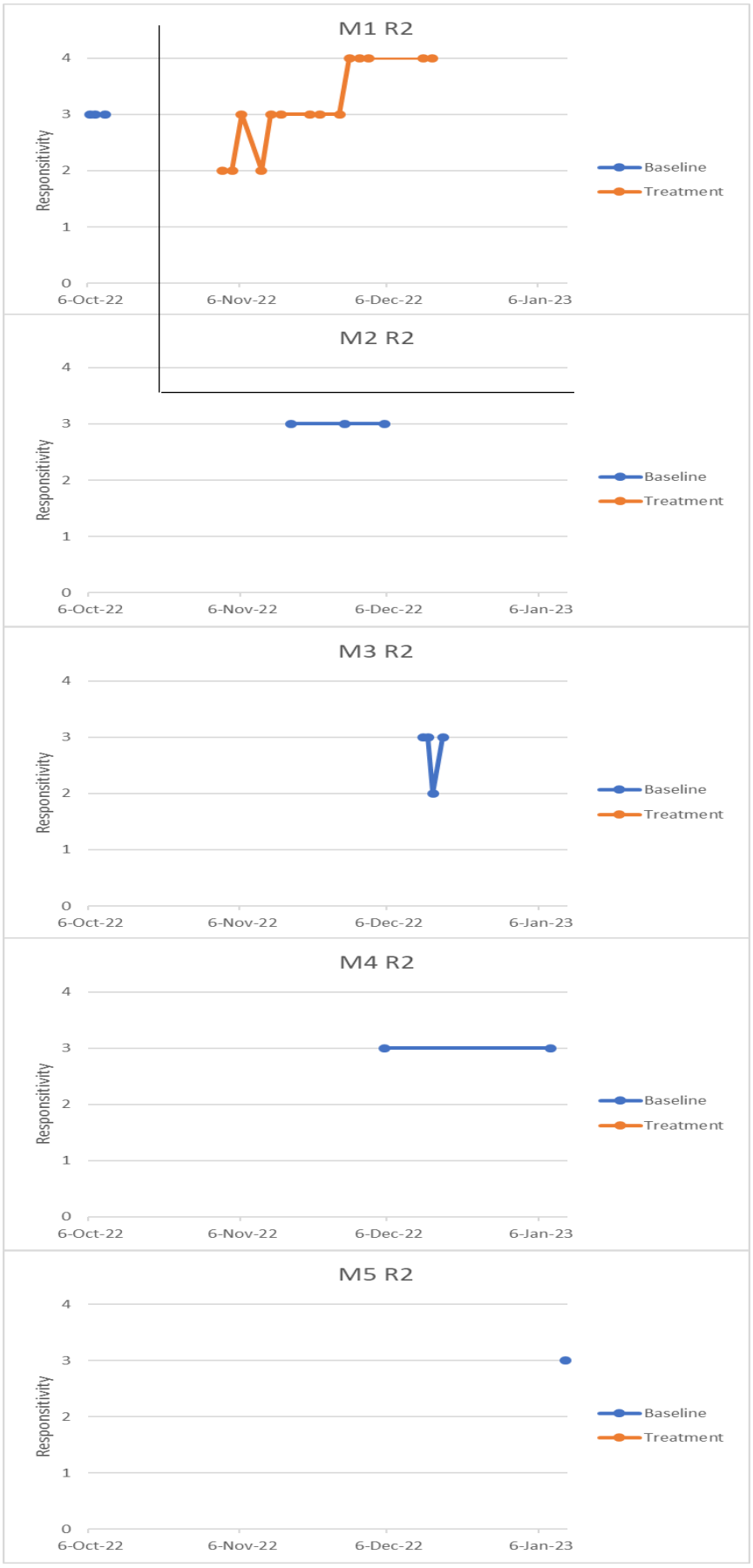

Figure 3.9: Mother Rating – Responsivity

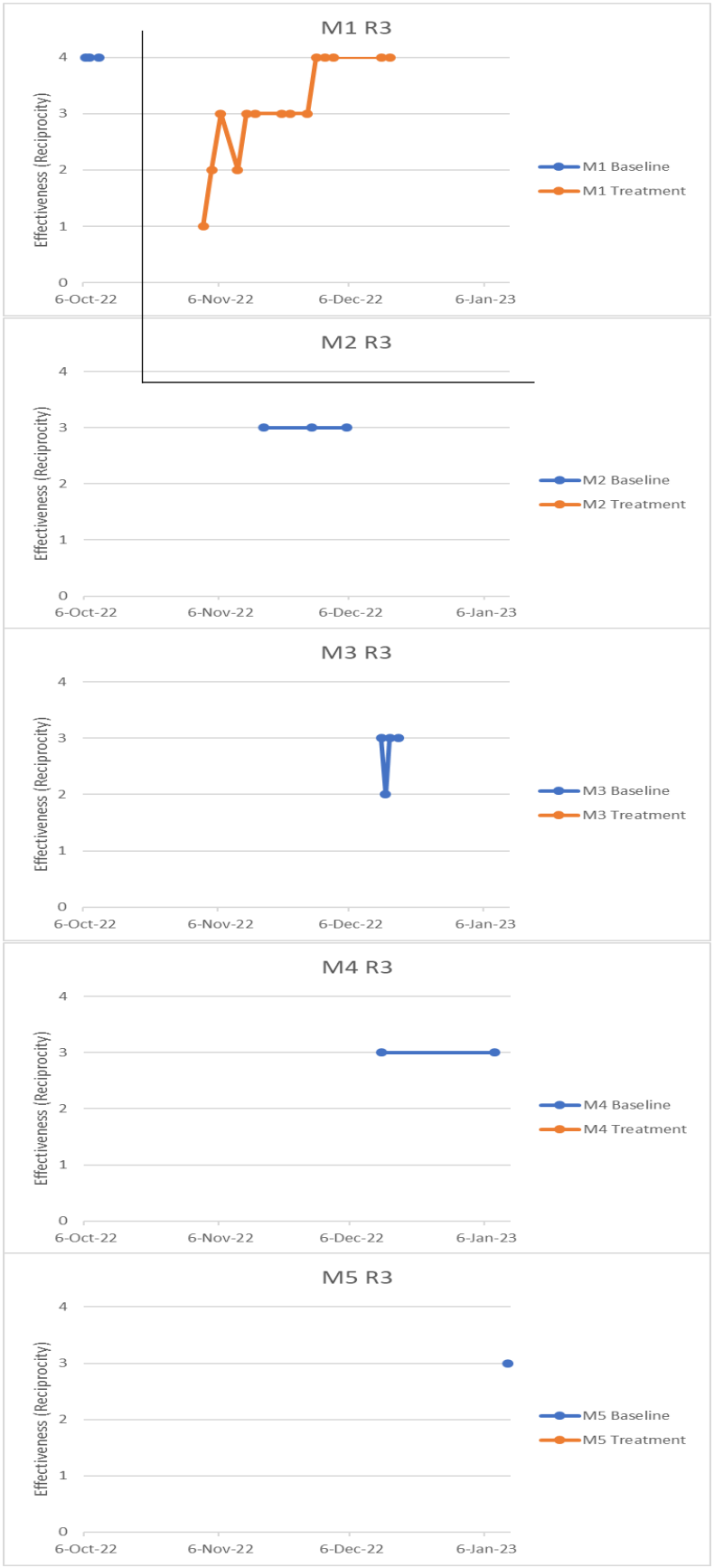

Figure 3.10: Mother Rating – Effectiveness (Reciprocity)

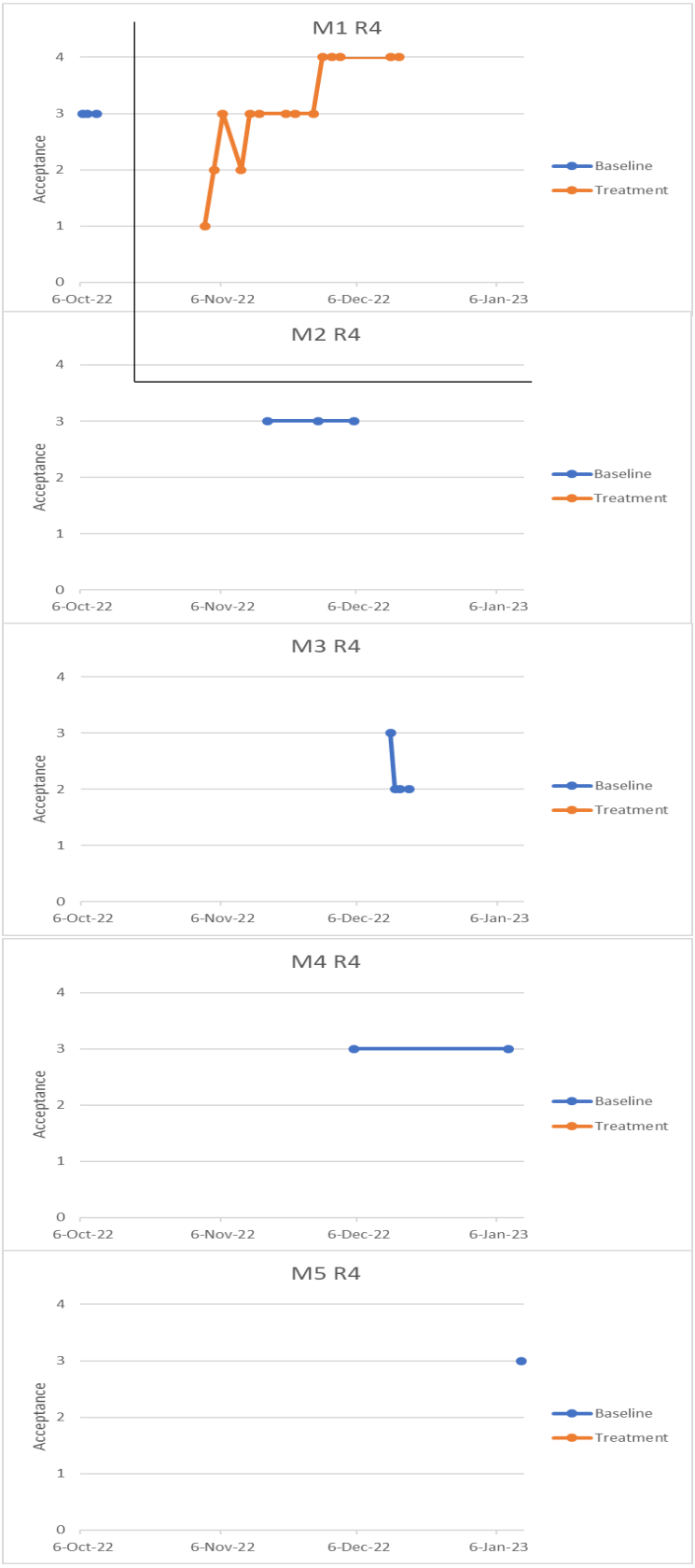

Figure 3.11: Mother Rating – Acceptance

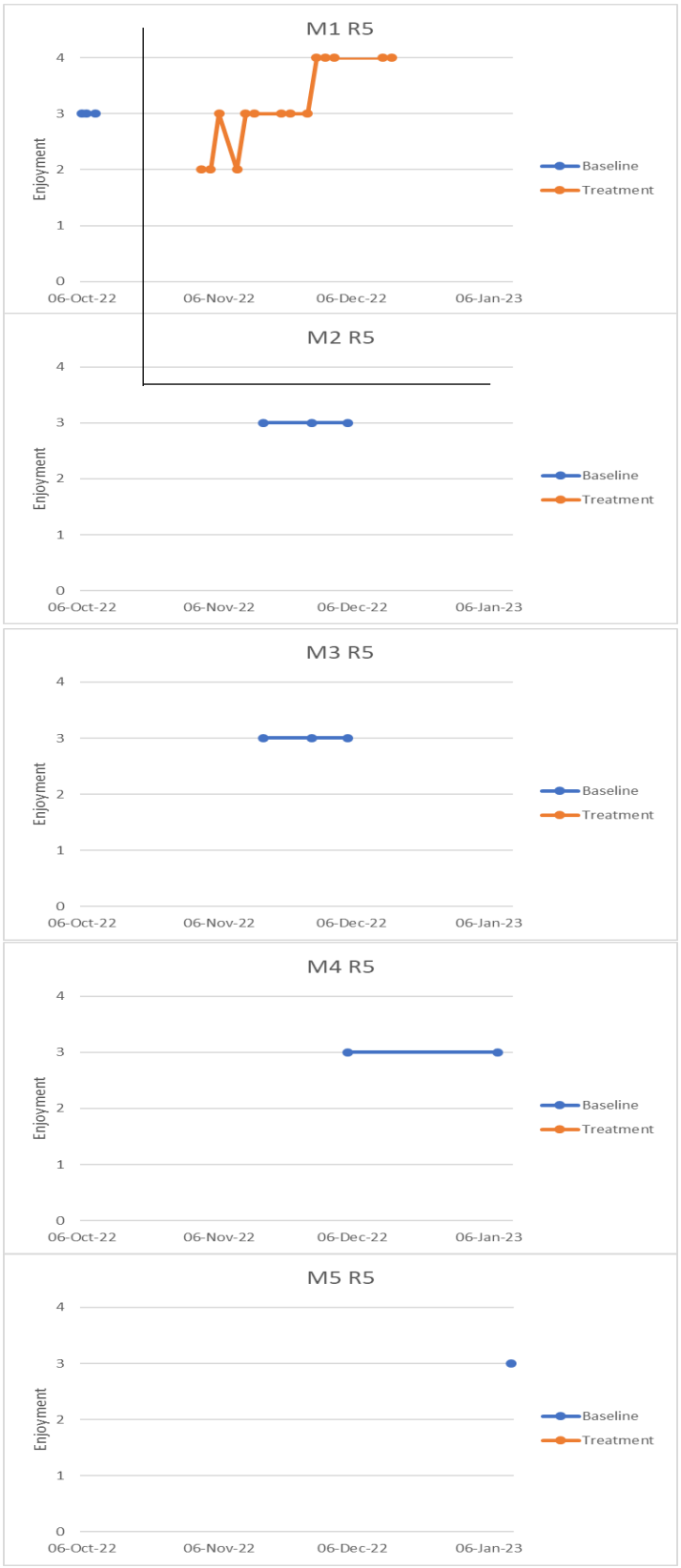

Figure 3.12: Mother Rating – Enjoyment

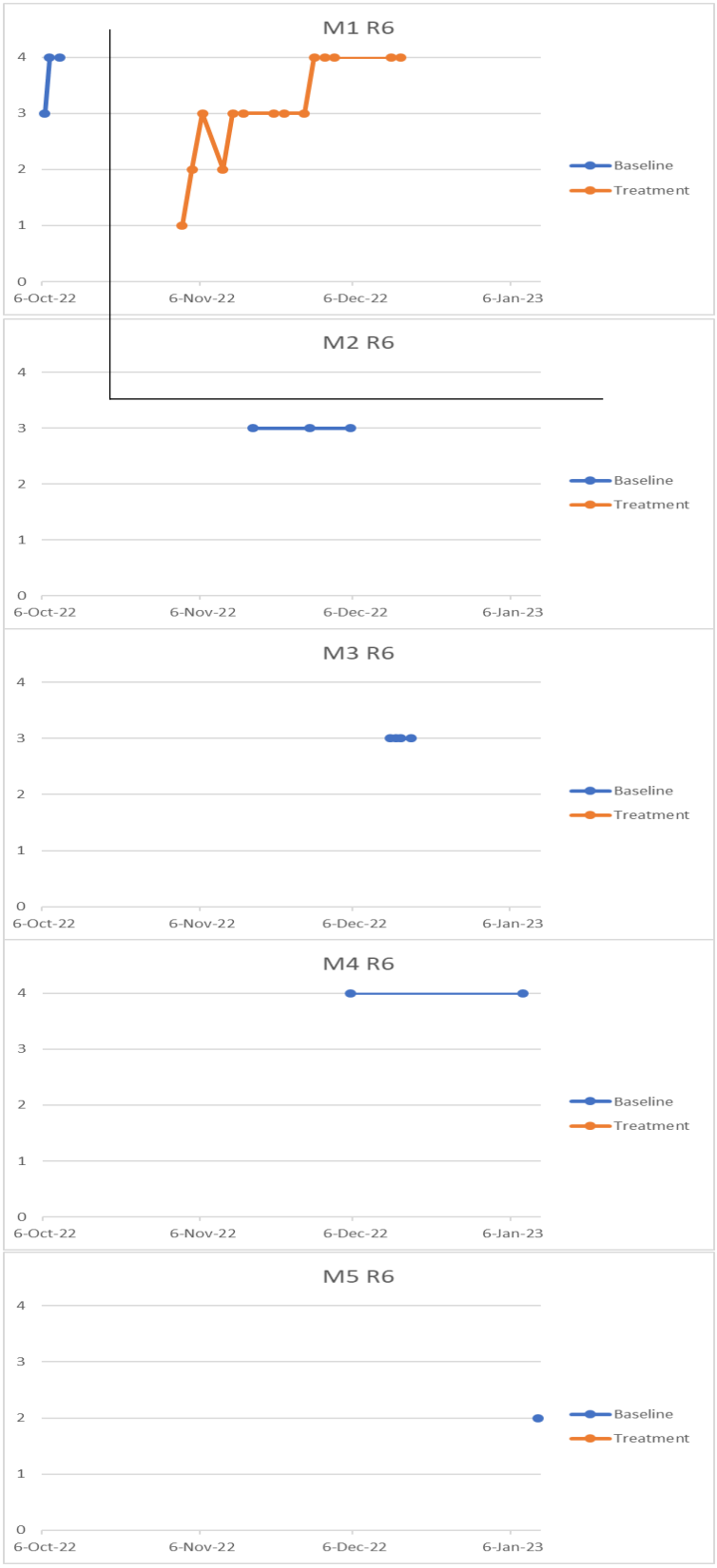

Figure 3.13: Mother Rating - Expressiveness

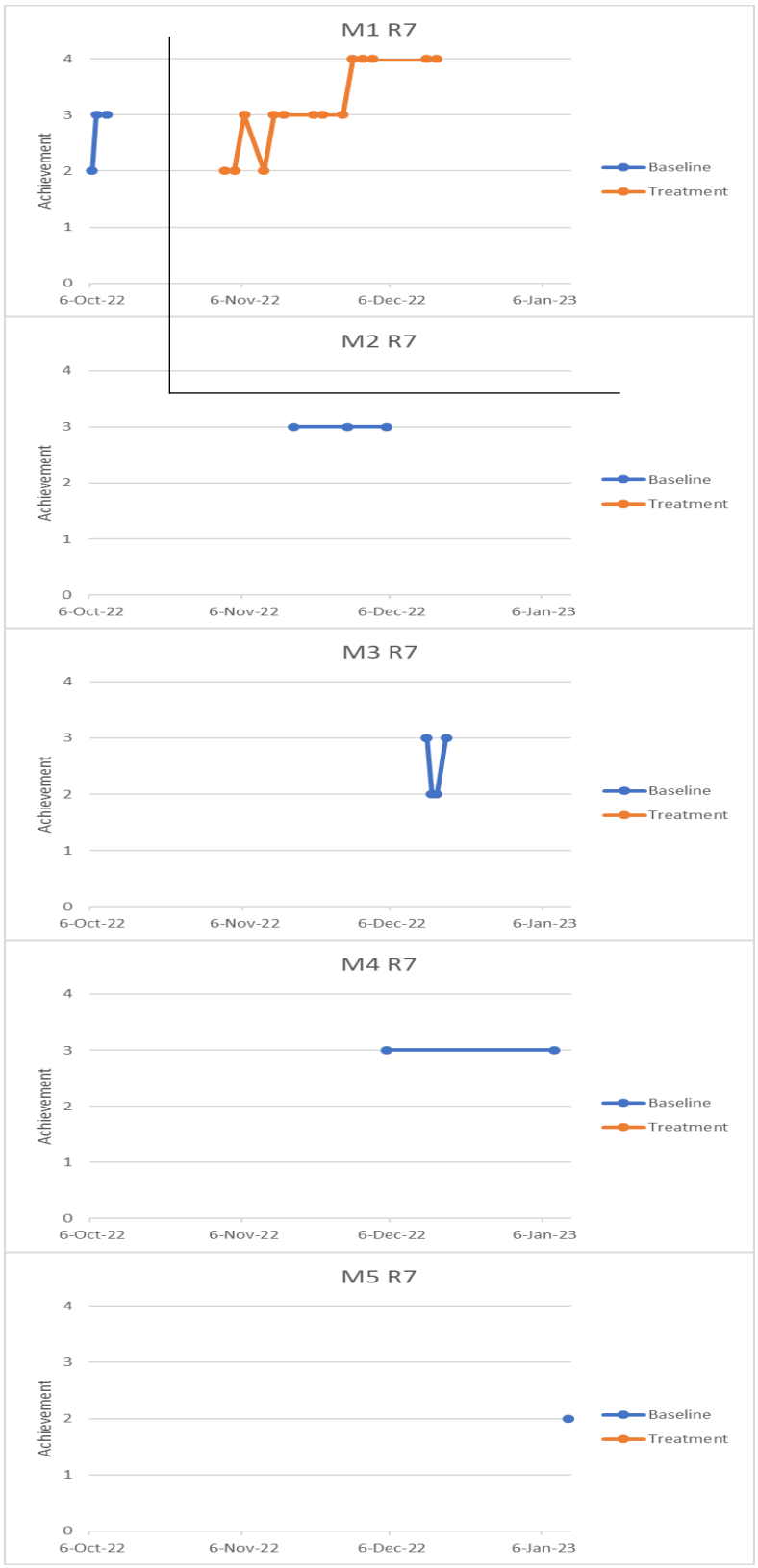

Figure 3.14: Mother Rating – Achievement

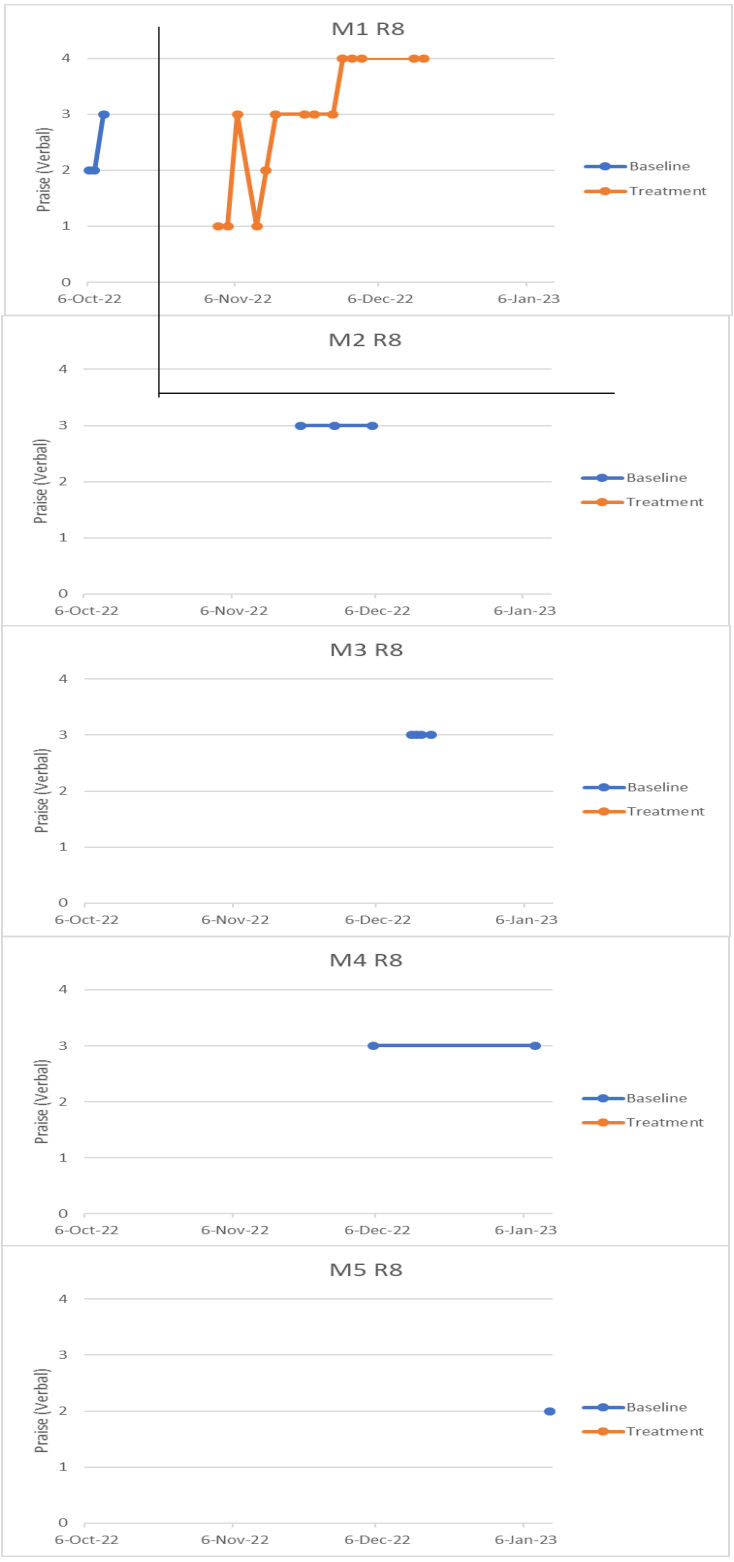

Figure 3.14: Mother Rating – Praise (Verbal)

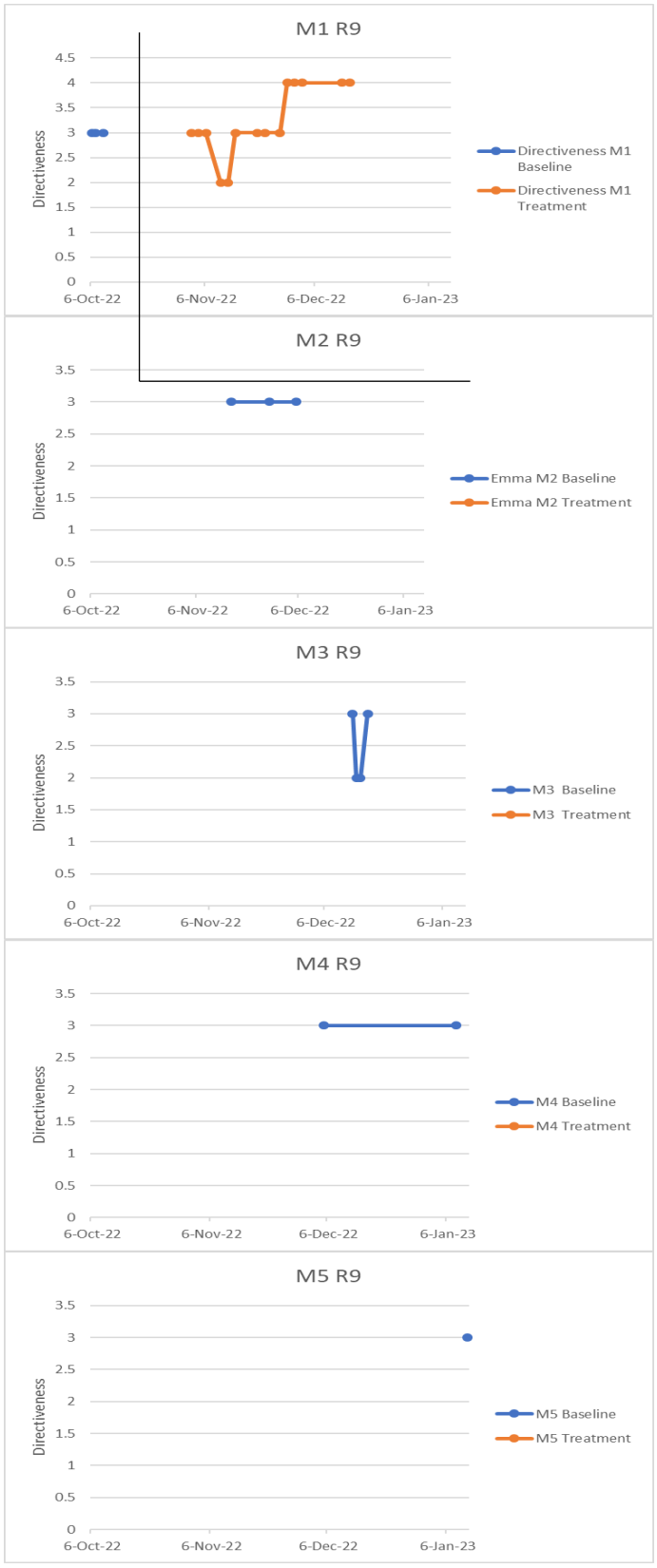

Figure 3.16: Mother Rating – Directiveness

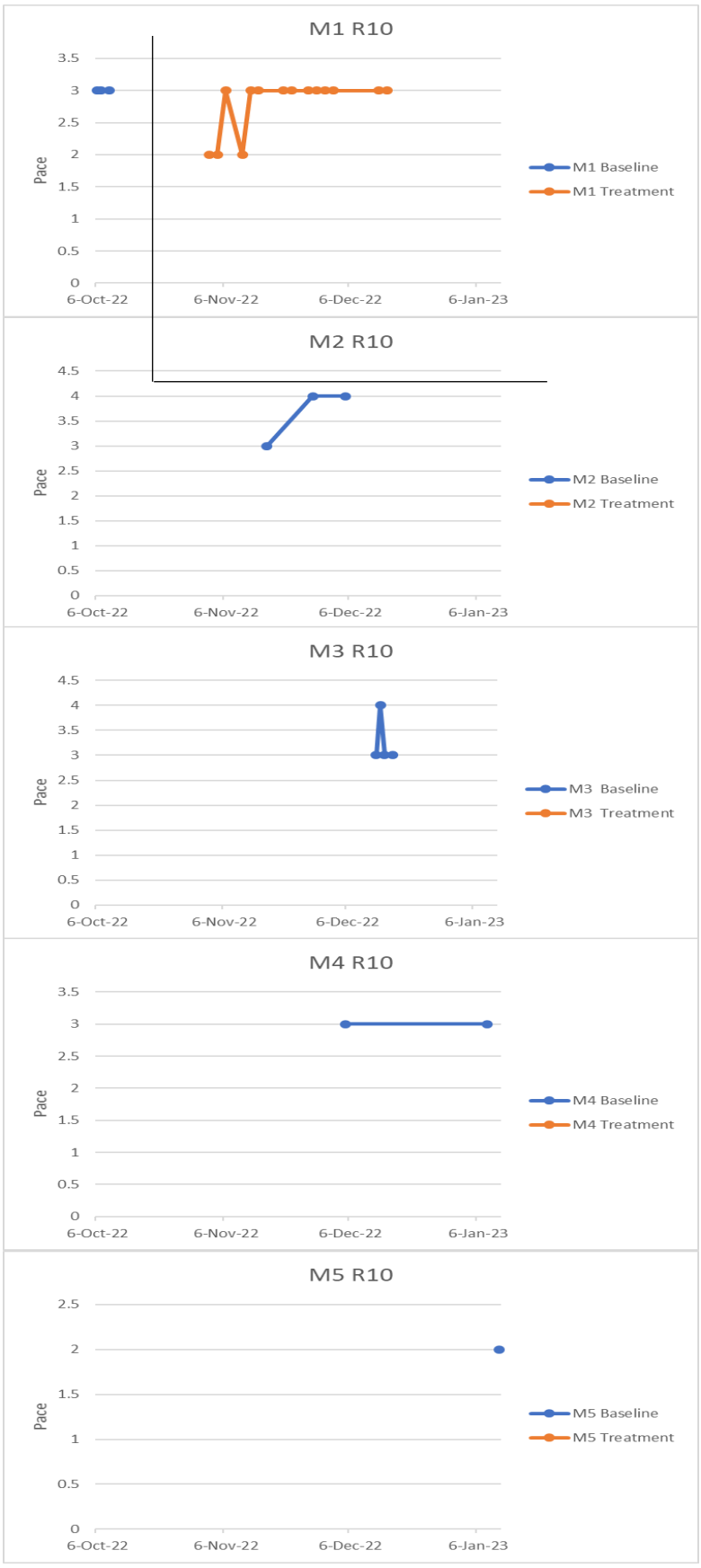

Figure 3.17: Mother Rating - Pace

Chapter 4: Discussion

The purpose of the study was to determine whether baby sign training affected the interactions between mothers and infants. The research question asked was, "What are the effects of using baby sign training on the interactions between mothers and infants?" It was hypothesized by the researcher that the baby sign training would have a positive effect on the relationship between mothers and infants, reducing tantrums by communicating their wants and needs. Given the results of one infant and mother, the data demonstrated improvement in several areas of the interactions.

The researcher-initiated baby sign training with Mother 1 and Baby 1 participants while Mother 2 and Baby 2 participants begin the study. As Mother 2 and Baby 2 participants could no longer participate due to family medical problems, Mother 3 and Baby 3 participants were identified. Mother 3 and Baby 3 only provided baseline videos needing to discontinue the study for personal medical issues. Mother 4 and Baby 4 began the study, sent two videos for baseline, but then needed to discontinue due to the technical problems of not being able to upload videos. Mothers 4 and Baby 4 were located in another city, were provided with multiple options for participating. After many attempts, videos could not be uploaded. Mother 5 and Baby 5 began the study and sent one video for baseline. However, after multiple attempts to help the participant send videos, they were not sent. It was deemed by researcher and committee to end research, changing from single subject design to a case study.

Multiple data points for both Mom 1 and Baby 1 correlate with the same date when having a single decrease across all rating scales. External factors can be considered for this decrease, tiredness, hunger, upset, etc. Results demonstrate progress on the rating scales, indicating the interactions have improved when incorporating baby sign. Initially the infant

engaged with the parent by looking at their hands during the production of signs. The baby would continue looking past the parent or at their surroundings as their parent attempted to obtain their attention and execute the request, for instance *EAT*. If the parent participant was engaging during playtime at night, the baby would act tired and cry, wanting to initiate their bedtime routine. Parent participant would gather toys to pick up, while baby was still fussing.

Based on the data collected, baby sign was observed to facilitate not only auditory words but visual as well. Baby 1 often looked at Mom 1's hand when she implemented the baby sign. Where there were no significant changes in the data was particularly with Mom 1 scales. During the recordings, it was observed that Mom 1 has a quiet demeanor, not often talking, may indicate that is Mom 1's persona, therefore generating these results.

Limitations

Several limitations were encountered during the research. The principle limitation was obtaining the videos from the participants. The participants often encountered difficulty when attempting to upload the video for the researcher to receive. Some possible solutions could have been going to the participants' homes perhaps weekly to get the videos, providing a video recorder and picking up the tapes, or conducting in-person observations. Another limitation was only having one in-person training. Providing more one-on-one personalized interventions may have led to more consistent findings. The baby sign intervention could have been improved by demonstrating the training with baby so the parent participant could observe how the training could be applied.

Future Direction

Future researchers may want to consider modifying the baby sign training to differentially affect the interaction characteristics of the rating scales. For example, it may be that within the context of a baby sign training, parental pace could be improved. Finally, more research should be conducted to determine the amount, intensity, and duration of baby sign trainings for parents, including the most beneficial signs to train initially for the participants.

Clinical Implications

Speech language pathologist who are considering using baby sign with their populations should consider the time required to train parents and follow up with them on baby sign use. Additionally, it is important to ensure that the professional works closely with the family regarding when and where the implementation occurs and providing them with adequate resources. Professionals should not be intimidated by using and training baby sign if they are not familiar or know American Sign Language. Online resources can easily be found for individual sign, which include detailed written instructions and videos that demonstrate how to produce the sign. Finally, it is important for clinicians to acknowledge the busy lifestyles of families with infants and should not be discouraged, specifically when families experience difficulty complying with the treatment.

Chapter 5: Conclusion

Overall data gathered suggest that Baby 1's interactions improved when baby sign was implemented. Inconsistencies that may be typical for infants were noted. For Mom 1, data gathered suggested inconsistent improvement in the interactions when baby sign was implemented. Specifically in rating scales of praise (verbal) and directiveness, significant change was not demonstrated, and decreases were shown.

Future research is necessary to continue to assess the interactions of parents and babies using baby sign. More evidence should be gathered related to how the interactions are affected and whether long-term baby sign use is beneficial. Research in this area is necessary in order to translate this to at risk populations. Enhancing the parent child interactions for infants at risk for language disorder has the potential to positively affect their overall development.

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Appendix

Appendix A – Infant Developmental Checklist

Hearing and Understanding	Yes/No	Talking	Yes/No
7 months – 1 year		**7 months – 1 year**	
Turns and looks in the directions of sounds		Babbles long strings of sounds, like mimi upup babababa.	
Looks when you point.		Uses sounds and gestures to get and keep attention.	
Turns when you call her name.		Points to objects and shows them to others. Uses gestures like waving bye, reaching for “up,” and shaking his head no.	
Understands words for common items and people—words like cup, truck, juice, and daddy.		Imitates different speech sounds.	
Starts to respond to simple words and phrases, like “No,” “Come here,” and “Want more?”		Says 1 or 2 words, like hi, dog, dada, mama, or uh-oh. This will happen around his first birthday, but sounds may not be clear.	
Plays games with you, like peek-a-boo and pat-a-cake.			
Listens to songs and stories for a short time.			

1 year – 2 years		**1 year – 2 years**	
Points to a few body parts when you ask		Uses a lot of new words.	
Follows 1-part directions, like "Roll the ball" or "Kiss the baby."		Uses p, b, m, h, and w in words.	
Responds to simple questions, like “Who’s that?” or “Where’s your shoe?”		Starts to name pictures in books.	
Listens to simple stories, songs, and rhymes.		Asks questions, like “What's that?”, “Who’s that?”, and “Where’s kitty?”	
Points to pictures in a book when you name them.		Puts 2 words together, like "more apple," "no bed," and "mommy book."	

Appendix B – Milestones

6 Months Checklist

Social/Emotional Milestones	**Yes/No**
Likes to look at himself in a mirror	
Laughs	
Knows familiar people	
Language/Communication Milestones	
Takes turns making sounds with you	
Blows “raspberries” (sticks tongue out and blows)	
Makes squealing noises	
Cognitive Milestones (learning, thinking, problem-solving)	
Puts things in her mouth to explore them	
Reaches to grab a toy he wants	
Closes lips to show she doesn’t want more food	
Movement/Physical Development Milestones	
Rolls from tummy to back	
Pushes up with straight arms when on tummy	
Leans on hands to support himself when sitting	

9 Month Checklist

Social/Emotional Milestones	**Yes/No**
Is shy, clingy, or fearful around strangers	
Shows several facial expressions, like happy, sad, angry, and surprised	
Looks when you call her name	
Reacts when you leave (looks, reaches for you, or cries)	
Smiles or laughs when you play peek-a-boo	
Language/Communication Milestones	
Makes different sounds like “mamamama” and “babababa”	
Lifts arms up to be picked up	
Cognitive Milestones (learning, thinking, problem-solving)	
Looks for objects when dropped out of sight (like his spoon or toy)	
Bangs two things together	
Movement/Physical Development Milestones	
Gets to a sitting position by herself	
Moves things from one hand to her other hand	
Uses fingers to “rake” food towards himself	
Sits without support	

12 Month Checklist

Social/Emotional Milestones	**Yes/No**
Plays games with you, like pat-a-cake	
Language/Communication Milestones	
Waves “bye-bye”	
Calls a parent “mama” or “dada” or another special name	
Understands “no” (pauses briefly or stops when you say it)	
Cognitive Milestones(learning, thinking, problem-solving)	
Puts something in a container, like a block in a cup	
Looks for things he sees you hide, like a toy under a blanket	
Movement/Physical Development Milestones	
Pulls up to stand	
Walks, holding on to furniture	
Drinks from a cup without a lid, as you hold it	
Picks things up between thumb and pointer finger, like small bits of food	

15 Month Checklist

Social/Emotional Milestones	**Yes/No**
Copies other children while playing, like taking toys out of a container when another child does	
Shows you an object she likes	
Claps when excited	
Hugs stuffed doll or other toy	
Shows you affection (hugs, cuddles, or kisses you)	
Language/Communication Milestones	
Tries to say one or two words besides “mama” or “dada,” like “ba” for ball or “da” for dog	
Looks at a familiar object when you name it	
Follows directions given with both a gesture and words. For example, he gives you a toy when you hold out your hand and say, “Give me the toy.”	
Points to ask for something or to get help	
Cognitive Milestones (learning, thinking, problem-solving)	
Tries to use things the right way, like a phone, cup, or book	
Stacks at least two small objects, like blocks	
Movement/Physical Development Milestones	
Takes a few steps on his own	
Uses fingers to feed herself some food	

Appendix C – Word Choices

Participant ID:_____

Word Choices

Please write 5-10 words you would like to learn in baby sign on the line below. The best words to choose are those that are used most often in your home with your baby.

Here are some suggestions to help you get started.

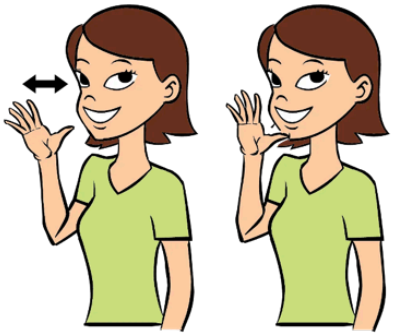
Mom	Dad	Milk	Eat	All done	Full
Stop	Dog	Cat	Bath	Pick me up	
Diaper		Play	Love		

Words chosen: _____

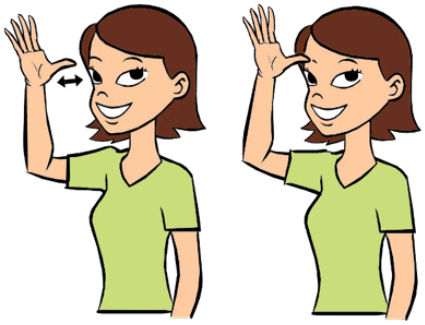
_____

_____

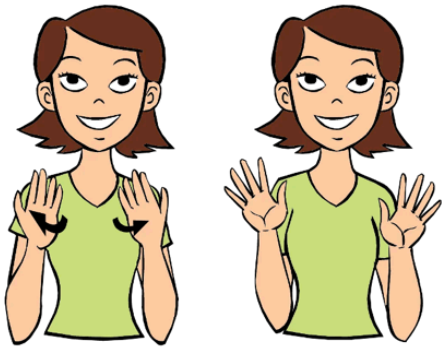
Appendix D – Still Image and Narrative Description



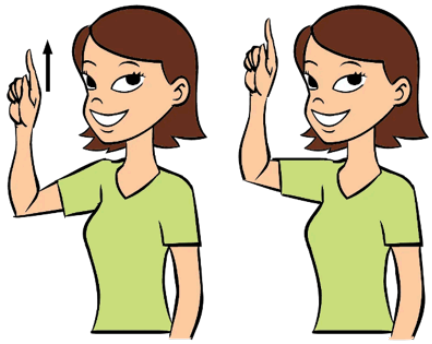
Mom
Extend and spread your fingers apart on your dominant hand



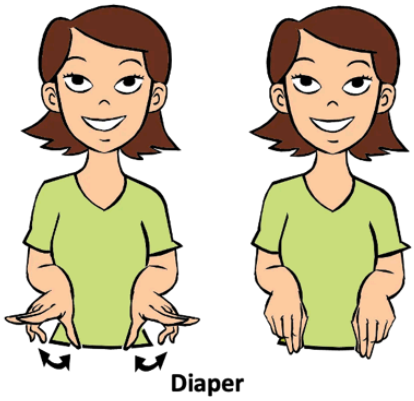
Dad
make the number '5', extending and spreading out the five fingers on your dominant hand. Then tap the thumb end of your '5' hand on your forehead.



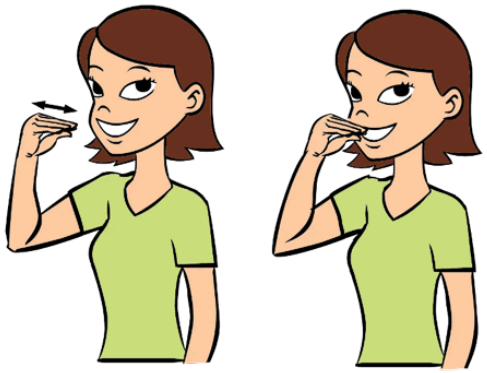
All Done
start with palms facing in, then turn the hands so that they are facing out



Up
taking your index finger and aiming it skyward. Raise and lower your arm so it is like you are pointing up at the sky.



Diaper
Taking your hands and place them down around your waist. Take your index fingers and middle finger together from each hand and tap them on your thumbs. It is like you are playing mini castanets at waist-height



Eat
taking your dominant hand, forming a flat and tapping your fingers to your mouth once

Appendix E – Maternal Rating Scale

Sensitivity to Child's Interest

1	2	3	4	5
Highly Intensive	Low sensitivity	Moderate Sensitivity	High Sensitivity	Very High Sensitivity

Rating of [1]: Highly insensitive. Parent appears to ignore child's show of interest. Parent rarely watches or comments on child's behavior and does not engage in child's choice of activity (e.g. ignoring comments about pictures, pointing to pictures).

Rating of [2]: Low sensitivity. Parent occasionally shows interest in the child's behavior or activity. Parent may suddenly notice where child is looking or what child is touching but does not continue to monitor child's behavior or engage in activity.

Rating of [3]: Moderate sensitivity. Parent seems to be aware of the child's interests; consistently monitors child's behavior but ignores more subtle and hard-to-detect communications from the child (e.g. child shifting focus of attention, looking away, getting distracted, etc).

Rating of [4]: High sensitivity. Parent seems to be aware of the child's interests; consistently monitors the child's behavior but is inconsistent in detecting more subtle and hard-to-detect communications from the child (e.g. child shifting focus of attention, looking away, getting distracted, etc).

Rating of [5]: Very high sensitivity. Parent seems to be aware of the child's interests; The parent positions herself so that both the child and her are able to look at the e-book and signs made by either of them. The parent consistently monitors the child's behavior and follows interest

indicated by subtle and hard-to-detect communications from the child (e.g. child shifting focus of attention, looking away, getting distracted, etc).

Responsivity

1	2	3	4	5
Highly Unresponsive	Unresponsive	Consistently Responsive	Responsive	Highly Responsive

Rating of [1]: Highly unresponsive. Parent responds infrequently to the child and usually only to behaviors that demand a response. Less than 10% of the time the parent reacts to the child's activities, facial expressions, vocalizations, gestures, body language, and intentions that do not demand a response (e.g. child making spontaneous comments, labeling pictures or producing signs).

Rating of [2]: Unresponsive. Parents respond to most of the child's demand behaviors but to less than one fourth of the child's non-demand behaviors and intentions. The parents' responses may be non-supportive in insofar as they stop the child's activity or redirect the child to do something different than what they were intending to do. They may also be mismatched to the child's behavior such as when parents label or comment on the child's activity but do physically react to the what the child is doing

Rating of [3]: Consistently responsive. Parents respond to almost all of the child's demand behaviors and to at least one fourth of the child's non-demand behaviors and intentions. Most of the parent's responses are supportive in insofar as they encourage the child's activity. At least one half of the parent's responses match the child's behavior such that the parent's responses are directly related to what the child is doing. For example, if the child is pointing to a picture, the

parent responds with actions to the child's focus of interest; if the child is vocalizing or communicating the parent responds by vocalizing or communicating.

Rating of [4]: Responsive. Parents respond to almost all of the child's demand behaviors and to about one half of the child's non-demand behaviors and intentions. Most of the parent's responses are supportive in insofar as they encourage the child's activity. Most of the parent's responses match the child's behavior such that the parent's responses are directly related to what the child is doing. For example, if he points to a picture, the parent responds with actions to the child's activity; if the child is vocalizing or communicating the parent responds by vocalizing or communicating.

Rating of [5]: Highly responsive. Parents respond to almost all of the child's demand behaviors and to most of the child's non-demand behaviors and intentions including subtle and hard to detect gestures, vocalizations and other behaviors. The parent's responses are almost always supportive in insofar as they encourage the child's activity. The majority of the parent's responses match the child's behavior such that the parent's responses are directly related to what the child is doing. For example, if the child points to a picture the parent responds with actions to the child's activity; if the child is vocalizing or communicating the parent responds by vocalizing or communicating.

Effectiveness (Reciprocity)

1	2	3	4	5
Very Ineffective	Ineffective	Moderately Effective	Highly Effective	Extremely Effective

Rating of [1]: Very ineffective. Parent is seldom engaged in any kind of joint or cooperative activity or communication with the child. The child may be actively engaged and may even be in close proximity to the parent, but the parent is usually not joining in what the child is doing. The parent my attempt to elicit the child's cooperation, but the child either does not respond, or responds briefly and quickly disengages. Parent may give the appearance of helplessness where the child is concerned.

Rating of [2]: Ineffective. Parent is mostly ineffective in keeping the child engaged in joint or cooperative activity or communication. The child may be actively engaged and may even be in close proximity to the parent, but the parent is only occasionally successful at cooperating or participating with what the child is doing. In the few instances when the parent gains the child's cooperation, the interaction tends to last one or two turns before the child disengages. In such instances, the child may continue the activity without noticing or responding to the parent

Rating of [3]: Moderately effective. At least one third of the time parent is successful in engaging the child in book sharing or communication. Interactive sequences seldom last more than 3 to 4 turns before the child disengages, but such interactive sequences occur frequently during the observation. Interactive sequences may be dominated by either the parent or the child and are generally not characterized by a balanced reciprocal exchange of turns.

Rating of [4]: Highly effective. More than one half of the time parent is successful in engaging the child in shared reading or conversation. Interactive sequences generally last 5 or more turns at a time. With little prompting the parent is successful at encouraging the child to transition into this pattern of interaction. The majority of interactive sequences are characterized by a balanced, reciprocal exchange of interactive turns.

Rating of [5]: Extremely effective. Parent is able to keep the child willingly engaged in joint activity or communication throughout the majority of the interaction. Interactive sequences generally last a few minutes at a time before the parent or child disengages. Interactive sequences are almost always characterized by a balanced, reciprocal exchange of turns.

Acceptance

1	2	3	4	5
Rejecting	Low Acceptance	Accepting	Very Accepting	High Acceptance

Rating of [1]: Rejecting. Parent primarily interacts with the child by trying to get the child say or do things that the child does not appear capable of doing at the moment. Parent may express dissatisfaction with what the child is doing, and almost never takes delight in or encourages the child to communicate or follow along the way the child is able to do.

Rating of [2]: Low acceptance. Parent puts little pressure on the child to say or do things he is not yet able to do. However, parent shows little positive affect toward the child. Parent mostly remains neutral and almost never takes delight in or encourages the child to communicate or follow along the way the child is able to do.

Rating of [3]: Accepting. Parent expresses a general positive affect toward the child and occasionally expresses delight in child's actions or communications. While the parent affirms the child by frequently responding in a way that supports the child's actions or intentions, the parent also requests or prompts the child to do or say things that the child is unable to do.

Rating of [4]: Very accepting. Parent expresses enthusiasm and delight for the child's actions and communications. More than one half of the time, the parent's interacts in a way that affirms

the child's actions and communications as legitimate and worthwhile. The parent may make a few suggestions or requests, but these are generally made to help the child communicate or do what they want more effectively.

Rating of [5]: High acceptance. Parent is effusive with delight and admiration of the child. Parent expresses intense positive affect in response to the child's actions and communications in a way that continually affirms the child as legitimate and worthwhile. The parent's suggestions or requests almost always support the child's actions and communications.

Enjoyment

1	2	3	4	5
Enjoyment is absent	Enjoyment is seldom manifested	Pervasive enjoyment but low-intensity	Enjoyment is the highlight of the interaction	High Enjoyment

Rating of [1]: Enjoyment is absent. Parent may appear rejecting of the child as a person (e.g. parent yells at the child, is annoyed by child).

Rating of [2]: Enjoyment is seldom manifested. Parent may be characterized by a certain woodenness. Parent does not seem to enjoy the child per se. This might be evident by parent not smiling or laughing at child's actions or comments that would normally elicit these types of behaviors.

Rating of [3]: Pervasive enjoyment but low-intensity. Occasionally manifests delight in child being himself, as evident by smiling and/or laughing at child's actions or comments.

Rating of [4]: Enjoyment is the highlight of the interaction. Enjoyment occurs in the context of a

warm relaxed atmosphere. Parent manifests delight fairly frequently by smiling and/or laughing at child's actions or comments.

Rating of [5]: High enjoyment. Parent is noted for the display of joy, pleasure, delighted surprise at the child's unexpected mastery.

Expressiveness

1	2	3	4	5
Highly Inexpressive	Low overt expressiveness	Moderate overt expressiveness	Overly expressive	Highly expressive

Rating of [1]: Highly inexpressive. Parent may be characterized as quiet and uncommunicative during the interaction. When the parent speaks, affect is flat; voice quality is dull and facial expressions vary little.

Rating of [2]: Low overt expressiveness. Parent communicates occasionally during the interaction. Parent's body language, affect, voice quality and facial expression may be characterized as dull to neutral

Rating of [3]: Moderate overt expressiveness. Parent communicates consistently during the interaction. Parent's body language, affect, voice quality and facial expression may be characterized as ranging from neutral to mildly positive.

Rating of [4]: Overtly expressive. Parent communicates consistently during the interaction. Parent uses body language, voice quality and facial expression in an animated manner to express emotion toward the child. Parent is generally enthusiastic but not extreme in expressiveness.

Rating of [5]: Highly expressive. Parent communicates consistently during the interaction. Parent is extreme in expression of all emotions using body language, facial expression and voice quality. Appears very animated, these parents are "gushers" (effusive).

Achievement

1	2	3	4	5
Very little encouragement	Little encouragement	Moderate encouragement	Considerable encouragement	Very high encouragement

Rating of [1]: Very little encouragement. Parent makes no attempt or effort to get child to learn.

Rating of [2]: Little encouragement. Parent makes a few mild attempts at fostering sensorimotor development in the child by making vocabulary words somewhat salient, but the interaction is more oriented to reading for the sake of reading rather than teaching (e.g. parent reads the text but does not prompt child to produce sign or does not ask questions about the reading).

Rating of [3]: Moderate encouragement. Parent continually encourages sensorimotor development of the child either through play or training (by means of one of the following: modeling signs, prompting child to produce signs, or asking questions about the story) but does not pressure the child to achieve.

Rating of [4]: Considerable encouragement. Parent exerts some pressure on the child toward sensorimotor achievement, whether as unilateral pressure or in a pleasurable interactional way and whether wittingly or unwittingly (by means of two of the following: modeling signs, prompting child to produce signs, providing hand over hand assistance and/or asking questions about the story).

Rating of [5]: Very high encouragement. Parent exerts much pressure on the child to achieve. Parent constantly stimulates him toward sensorimotor development, whether through play or obvious training (by means of three or more of the following: modeling signs, prompting child to produce signs, providing hand over hand assistance and/or asking questions – especially ones that go beyond the story's plot/text). It is obvious to the observer that it is very important to the parent that the child achieve certain sign vocabulary and/or literacy skills.

Praise (Verbal)

1	2	3	4	5
Very low praise.	Low praise	Moderate praise	Praises frequently	Very high praise

Rating of [1]: Very low praise. Verbal praise is not used by the parents in the interaction even in situations which would normally elicit praise from the parent.

Rating of [2]: Low praise. Parent uses verbal praise infrequently throughout the interaction.

Rating of [3]: Moderate praise. Parent uses an average amount of verbal praise during the interaction. Parent praises about half of the situations which would normally elicit praise (e.g. answering a question correctly, producing a sign after prompting, responding to parental command/redirection).

Rating of [4]: Praises frequently. Parent verbally praises the child frequently for most situations that would normally elicit praise (e.g. answering a question correctly, producing a sign after prompting, responding to parental command/redirection).

Rating of [5]: Very high praise. Very high frequency of verbal praise from the parent even for behavior which would not normally elicit praise (e.g. subtle/spontaneous comments about the story, asking good questions).

Directiveness

1	2	3	4	5
Very low directive.	Low directive	Moderately directive	Very directive	Extremely directive

Rating of [1]: Very low directive. Parent allows child to initiate or continue activities of his own choosing without interfering (e.g. clicking on pictures, changing the page). Parent consistently avoids volunteering suggestions and tends to withhold them when they are requested or when they are the obvious reaction to the immediate situation. Parent's attitude may be "do it your own way."

Rating of 2: Low directive. Parent occasionally makes suggestions. This parent rarely tells the child what to do. He/she may respond with advice and criticism when help is requested but in general refrains from initiating such interaction. On the whole, this parent is cooperative and non-interfering.

Rating of [3]: Moderately directive. The parent's tendency to make suggestions and direct the child is about equal to the tendency to allow the child self-direction. The parent may try to influence the child's choice of activity but allow him independence in the execution of his reading, or he may let the child make his own choice but be ready with suggestions for effective implementation.

Rating of [4]: Very directive. Parent occasionally withholds suggestions but more often indicates what to do next or how to do it. Parent produces a steady stream of suggestive remarks and may initiate a new activity when there has been no previous sign of inertia and/or resistance shown by the child.

Rating of [5]: Extremely directive. Parent continually attempts to direct the minute details of the shared reading interaction. This parent is conspicuous for the extreme frequency of interruption of the child's activity-in-progress, so that the parent seems "at" the child most of the time -- instructing, training, eliciting, directing, controlling. Parent is inflexible and does not allow child to have a say in the shared reading interaction.

Pace

1	2	3	4	5
Very slow	Slow	Average pace	Fast	Very fast

Rating of [1]: Very slow. Parent is almost inactive. Pace is very slow with long periods of inactivity.

Rating of [2]: Slow. Parent's overall tempo is slower than average. There may be inconsistency in the parents' tempo in which periods of inactivity (where parent allows child to explore e-book and respond) are followed by occasions of active participation.

Rating of [3]: Average pace. This parent is neither strikingly slow nor fast. Tempo appears average compared to other parents.

Rating of [4]: Fast. Parent's overall tempo is faster than average. There may be few brief periods of inactivity (where parent allows child to explore e-book and respond) that are followed by

quick paced activity (e.g. moving from page to page, asking one question followed by another,) that provides child with little time to react.

Rating of [5]: Very fast. Parent's interactive tempo could be characterized as rapid-fire behavior. The pace of the parent's interactive tempo may not allow the child time to react.

Appendix F – Infant Rating Scale

Measures for Attention

Persistence

The degree to which the infant makes an effort to participate in engaging in activity. In addition, persistence reflects the extent to which the child produces signs and vocalizations.

1	2	3	4	5
Very low Persistence	Low persistence	Moderate persistence	Very persistent	Extremely persistent

Attention to activity

Assesses the extent to which the infant attends to activity. The child may or may not be actively involved in baby sign but must remain in the activity for an extended duration.

1	2	3	4	5
Very low attention	Low attention	Moderate attention	Very attentive	Extremely attentive

Involvement

This measure reflects the intensity to which the child is involved in activity. Involvement can be demonstrated by the child being highly motivated to engage in baby sign regardless of who initiated the interaction.

1	2	3	4	5
Very low involvement	Low involvement	Moderate involvement	Very involved	Extremely involved

Compliance/Cooperation

The degree to which the child attempts to cooperate with the requests or suggestions of the adult.

1	2	3	4	5
Very low compliance	Low compliance	Moderate compliance	Very compliant	Extremely compliant

Measures of initiation

Initiation Activity

Measures the extent to which the child initiates an activity. A child who receives a high rating frequently attempts to initiate interaction with baby sign.

1	2	3	4	5
Very low initiation	Low initiation	Moderate initiation	Frequent initiation	Very high initiation

Initiation/Adult

This measures the child's intent to initiate interactions with the adult. High rating in this item might show frequent and lengthy periods of eye-contact and other sharing behaviors such as vocalizations, taking turns, requesting, gestures, or facial expressions to involve the adult in the interaction.

1	2	3	4	5
Very low initiation	Low initiation	Moderate initiation	Frequent initiation	Very high initiation

Affect

Demonstrates positive *affect* and *enjoyment* whether it be directed toward the adult or the activity. The child may show affect by frequently smiling, laughing, demonstrate enthusiasm or vocalizing either to the adult or during the activity.

1	2	3	4	5
Very low affect	Low affect	Moderate affect	Very affective	Extremely affective

Vita

Ayzzar Gurrola graduated from the University of New Mexico in Albuquerque, NM with a Bachelor of Arts with Speech and Hearing Sciences and Spanish, with a minor in Psychology. Ayzzar graduated from UNM in May of 2021, preceding acceptance into the graduate program of Speech Language Pathology at the University of Texas at El Paso in August of 2021. Graduation is anticipated for May of 2023. Ayzzar Gurrola can be contacted via email: agurrola10@miners.utep.edu