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Treatment For Children With High Functioning Autism: A Comparison Of Social Stories To Musically Adapted Social Stories

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TREATMENT FOR CHILDREN WITH HIGH FUNCTIONING AUTISM: A COMPARISON
OF SOCIAL STORIES TO MUSICALLY ADAPTED SOCIAL STORIES

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TREATMENT FOR CHILDREN WITH HIGH FUNCTIONING AUTISM: A COMPARISON OF SOCIAL STORIES TO MUSICALLY ADAPTED SOCIAL STORIES

by

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THESIS

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Abstract

The incorporation of music and social stories has been seldom tested, thus a study which uses a single-subject, alternating treatment design assesses the effects of standard social stories versus musically adapted social stories on the pragmatic abilities of an individual with high-functioning autism is presented. The goal of this project was to determine whether read social stories versus musically adapted social stories would be more beneficial in reducing problem behaviors in a child with high-functioning autism. Both types of social stories were implemented with the participant and the data supported the effectiveness of both treatments. Though the musically adapted social story appeared to yield a more timely reduction in the target behaviors, the Mean Baseline Reduction (MBR) calculations determined an actual percentage of each social story being effective, however there is only about a 3% increase in the effectiveness of the musically adapted social story. Although a significant difference was not seen in the data, the participant and parent of the child participant favored the musically adapted social story over the standard social story. SLPs and other individuals who treat children with autism may find the implementation of musically adapted social stories beneficial to treat individuals with high functioning autism, to either decrease problematic social behaviors or increase positive social behaviors, allowing the individual to acquire and sustain general acceptable pragmatic behaviors. Further research is required to determine which treatment results in greater gains for children with high functioning autism, however in this particular case it must be noted that the musically adapted social story held greater acceptance by participant, caregivers, and parents.
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Chapter 1: Introduction

Autism is a spectrum disorder (ASD); which does not have a single diagnosis, rather various severity levels. Autism is a bio-neurological developmental disability which is typically diagnosed in individuals before the age of 3. A related condition is Asperger’s which is characterized by significant social impairment and restricted behaviors, however without severe deficits in communication and cognition. Asperger’s is known as a higher functioning type of Autism on the spectrum. Although some individuals with higher functioning types of Autism have less severe communication skills and cognitive aptitude these individuals typically still demonstrate severe social impairments. “Common to both autism and Asperger’s disorder is severe social impairment” (Sweeten & Posey 2001). Individuals with autism may display unique symptoms such as impairments in social interaction, communication, joint attention, and occasionally emotional tuning (Wan et al. 2010). Treatment for individuals with autism is individualized and dependant on the severity level as well as the symptoms displayed.

Recent research on the exact neural and structural aspects of the cortex that are affected by ASD indicate that the “temporal lobe structures, including the amygdala and hippocampus, have been implicated in the pathophysiology of autism following studies of either damage to these areas in humans or experimental lesions in animals” (Sweeten & Posey 2001). Furthermore research conducted by Cody and Pelphrey (2002) suggests that though further research is needed on autism and the specific areas of the cortex impacted by it, the non invasive MRI and fMRIs have been utilized in determining which areas have the most significant ties to autism. Furthermore, the investigation of neural pathways and motor interactions in the perception and production of music are of great value to the research question, in that music stimulates and integrates multiple areas of the cortex simultaneously.
Pragmatics

Pragmatic deficits and difficulties with social functioning among a variety of other inappropriate behaviors and problems may be displayed in individuals with autism. Dempsey and Foreman (2001) state that some of the main characteristics of autism can be deficits in language, the need to be self-stimulated, deficits in social interaction, constricted assortment of interests and maintenance of specific routines. Some pragmatic deficits typical in ASD are a lack or inability to follow directions, difficulty maintaining a topic in conversation, difficulty greeting, socially unacceptable non-verbal communication, difficulty with theory of mind development, impaired or delayed emotional language, and difficulty with eye contact (Russell & Grizzle, 2008).

Pragmatic behaviors though occasionally difficult to pin point and describe are reviewed by Gallagher and Prutting (1983). Acceptable pragmatic behaviors should be seen in a typically developing school age children as well as adults. Researchers discuss the process in which language and understanding of language is accomplished. Four steps have been discussed in the processes of accomplishment. The four stages are the Utterance act (the act of uttering words), Propositional act (the act of referring and predicating), Illocutionary (stating, questioning asserting etc.), and Perlocutionary acts (effects on the thoughts, actions, and beliefs etc. of the hearer).

Contained within the utterance act which has a verbal and paralinguistic modality are the categories of intelligibility, vocal intensity, voice quality, prosody, and fluency. The nonverbal modalities include: physical proximity, physical contacts, body posture, foot/leg movements, hand/arm movements, gestures, facial expression, and eye gaze. Contained within the propositional act within the verbal modalities are lexical section/use, specificity and accuracy,
specifying relationships between words such as word order, given and new information (pronominalization, ellipses, emphatic stress, indefinite/definite article, and initialization), stylistic variations which encompass verbal, paralinguistic and non verbal modalities which is the varying of communicative style. The illocutionary and perlocutionary acts that are verbal are speech act pair analysis and variety of speech acts including topic selection, introduction, maintenance, and change. Turn taking including initiation, response, repair/revision, pause time, interruption/overlap, feedback to the speaker, adjacency, contingency, and quantity and conciseness. When there is a breakdown at any level of these acts, the act with the majority of the breakdowns will become evident to whoever is evaluating the individual with pragmatic difficulties so the act can be targeted directly.

**Social stories**

These deficits are treated using a variety of interventions. One intervention type is social stories; these are often utilized for individuals with ASD to encourage a positive behavior, or to lessen an unacceptable behavior (Grey, 2012). Kokina and Kern (2010) state that social stories are aimed to aid individuals with ASD to be of assistance with their social difficulties. A social story is a story written with a specific goal in order to share important information related to how to behave or act in a specific situation they may encounter (Grey, 2012). Social stories describe a situation, skill or concept according to ten defining criteria. The criteria guide the story development to provide overall supportive qualities by having the individual create the story in conjunction with their caregiver or interventionist, in the process of creating a social story it is written and illustrated (Grey, 2010). They may be used in preparation for an event, or to target a specific behavior that may be a problem with that individual such as interactions with teachers, peers and family. Also addressed in social stories may be how to do certain skills, how to
participate in different events, how to learn specific concepts, or deal with different situations (Kokina et al. 2010). Complimenting the statement made by Gray (1998), Ozdemir (2010) states “a Social Story also helps ensure a child’s accurate understanding of social information for a given setting. A social story uses concrete, easy to understand text enhanced by visual supports”. Additionally Ozdemir states that by reducing the ambiguity of social settings, the child is more able to understand what is expected from him. Individuals with ASD may have difficulty adjusting to spontaneous activities that have not been encountered prior to the situation, or are uncomfortable with a specific situation. Thus, “Social Stories may provide an effective strategy to improve social competence” (Ozdemir, 2010).

To develop a social story one must follow the defining criteria proposed by Gray (2004). A Social Story must include several types of sentences: (a) descriptive—factual statements used to describe the situation and people involved in it; (b) perspective—descriptions of the reactions, feelings, and responses of others; (c) directive—statements that identify an appropriate response and guide child’s behavior; (d) cooperative—sentences to identify what others will do to assist; (e) affirmative— statements that enhance the meaning by expressing values or opinions common in a given culture; and (f) control— sentences written by the child to identify his/her personal strategies to recall and use information.

Due to the highly developed uniqueness of social stories they are typically implemented with individuals with high functioning autism. A higher functioning individual with autism may demonstrate minimized language deficits in comparison to an individual with a lower functioning autism; however they may present with difficulty in various social aspects. Each story is very specific to the individual using it; therefore the individual must take part in writing their own social story so that they may be able to apply it to the situation when it occurs.
In order to create high levels of evidence based practice in the effectiveness of social stories many researchers have probed at whether or not social stories are effective for individuals with ASD. Though some researchers have discussed that because there is a lack of methodological standards and that the use of social stories is consistently being implemented with other treatment types creates the dilemma of which source in the treatment is actually targeting the behavioral changes (Ozdemir 2010). However, research by Kokina & Kern (2010) states that “while Social Stories had low to questionable overall effectiveness; they were more effective when addressing inappropriate behaviors than when teaching social skills.” Grey puts emphasis on the fact that social stories are not to be used directly for fixing a problem, however social stories are written to encourage and provide individuals with social information which may yield a change in behavior or actions as the understanding of the targeted behavior increases (Grey, 2013).

Music

Another treatment intervention for autism is music therapy (MT). Simpson and Keen (2011) state in their review, that music can be beneficial to individuals with autism. In Music Therapy: An Introduction, Peters (2000) writes:

. . . music therapy may be defined as a planned, goal-directed process of interaction and intervention, based on assessment and evaluation of individual clients’ specific needs, strengths, weaknesses, in which music or music-based experiences (e.g., singing, playing musical instruments, moving or listening to music, creating or discussing songs and music) are specifically prescribed. . . to influence positive changes in an individual’s condition, skills, thoughts, feelings and behaviors (Peters, 2000).
Music therapy has multiple approaches to the way specific therapies are targeted. “Music therapists have utilized several different types of MT with their clients with autism including: adapted melodic intonation therapy, AIT, rhythmic entrainment, improvisational MT, musical synchronization, musical interaction therapy, activity MT, and receptive MT.” (Accordino, 2007) In addition researchers have found individuals with ASD prefer auditory stimulation over other types such as tactile or visual (Accordino, 2007). However, others have stated that some children with ASD have many problems with auditory processing (Gillberg & Coleman, 2000) and it may be easier to elicit information from a visual format as opposed to auditory input. Although some individuals with autism may be visual learners, Gillberg and Coleman (2000) also state that “research suggests that children with autism tend to … responds best when things are predictable in nature”.

Although this statement is valid one can counter by looking at music, which in most cases is predictable in nature. Music is created by using patterns which are typically repeated. This can be seen in the most simple of songs such as “Mary Had a Little Lamb” where the lines of music are predictable in that repetition of the music is present however there may be variations on the endings, or variations of the theme. However the music remains based on a central thematic pattern. Music is composed of pitch, rhythm, tempo, dynamics, melody, and phrasing, each to assist musical elements to stay the same or change in one song. According to Zatorre (2007) “rhythm is the local organization of musical time, it is the pattern of temporal intervals within a musical measure or phrase that in turn creates the perception of stronger and weaker beats.”

Music in general has been researched proving that music creates unique demands on the nervous system (Zatorre, 2007). It has been noted by researchers that the production of music
integrates three basic motor control functions: timing, sequencing, and spatial organization of movement.

As previously indicated in the section of pragmatics, individuals with autism occasionally have difficulty attending to tasks for increasing amounts of time. However, recent research indicates that while interacting with music these individuals were able to focus on the tasks at hand for greater amounts of time (Accordino, 2007). Active music making promotes interest and motivation to a degree that leads to joint attention and tolerance of shared engagement, as well as exploration of musical creativity involving subtle processes of “learning patterns within musical structures and frames that then spontaneously develop variability in dynamics, tempo, duration and accentuation. (Wigram & Gold 2006).

When children with ASD and typically developing children of the same chronological age were asked to improvise with musical instruments there was no difference between the two (Thaut 1988); both had the same rhythmic awareness, and originality. During a study by Wigram and Gold (2006) it was discovered that the incorporation of music therapy gave structure in improvisation that provided for the development of learning, and offered ways to encourage the children to become more adaptable. They also state that this type of therapy is recommended to effectively elicit communication because music is a “medium” which contains a vast range of qualities. Occasionally children with such pragmatic deficits become socially isolated, and at times become frustrated to the point of violence. Music may aid in relationship building by creating activities for interaction. For example when one person begins tapping on a drum another person may begin to tap their feet to the same tempo creating a different rhythm while interacting musically with the set tempo (Wigram & Gold, 2006). Musical activities have shown to enhance a child’s ability to interact appropriately with others as well as elicit a focus.
These advancements may increase the social and communication skills of children with autism. In studies done with music therapy and nonverbal children, researchers have gained much insight into how making music may offer a sort of stimulation which calms the child and has an impact on their behavior (Wigram & Gold, 2006). Elicitation of focus and intent from a nonverbal child with autism is a huge leap in an effective direction, due to intention being vital to the initiation of speech and the use of language. Therefore since music has had such great success on influencing children with very severe autism, I hypothesize that it will generalize and have an impact on children who are higher functioning.

Music therapy is frequently delivered to individuals as well as reported to be effective with children with autism (Accordino, 2007). However, there is still a lack of empirical research proving its benefit though many cases have been evaluated; the majority of the cases continue to lack evidence supporting MT as an efficient treatment. (Accordino, 2007)

Purpose

There are many benefits to incorporating social stories and music therapy together to create a hybrid treatment. Both music and social stories individually are beneficial treatments although there is little evidence that either of them is efficacious while combined. Though there has been minimal research on music and social stories in conjunction, there has yet to be evidence based research comparing the two treatments to reveal which treatment would be most efficacious for an individual with autism. Another reason one may care to incorporate the two are the various levels of similarity. The key aspect of music therapy being similar to how social stories are created is they are both individually tailored to the individual. Accordino (2007) states “many music therapists would argue that since MT is individually tailored to a client, the case study is the ideal way to measure success.” This outlook is very similar to single subject designs in that
one individual is monitored at a time in order to acquire specific and individualized data. Furthermore music therapists state a contributing factor to why case studies are beneficial is due to their individuality, and discuss that because the MT is so customized for the individual being treated it does not generalize well in group studies. In addition to the previous statements by Accordino the same researchers of musical intervention state that, musical intervention has limited empirical investigation thus requiring more investigation into intervention types that utilize music and music’s on autism. (Accordino, 2007)

Thus if music keeps children with autism more focused as previously stated by Wigram & Gold (2006) and in tune to the action at hand, it is logical to incorporate the two to keep a child with autism more focused on the story and begin to enlighten the individual of acceptable pragmatic behaviors in social settings of great variety. Generalization is the ultimate goal of treatments, no matter what the goal is addressing. Because children with autism may have difficulties with pragmatic behaviors, to begin with language and communicative acts that may be impaired may be a challenge. Thus by combining the two treatment types of music and social stories a hybrid model is created which encourages the individual to utilize a unique story they have created, as well as implementing music which targets a variety of areas of the cortex as well as initiating the nervous system. These aspects of the combination of the two treatments has the ability to aid in generalizing behaviors in aspects such as generalizing it into communication, social and behavioral targets. This may benefit the pragmatic deficits of children with high functioning autism in that the structure of both the music and the social story will have a greater opportunity to be absorbed by the child, as well as provide the individual with a fun opportunity. It has been noted that when an individual likes what they are doing they are more adept to utilize
and/or discuss it with others, creating increased opportunities for exposure to the interest at hand, which in turn is beneficial (Wigram & Gold, 2006).

*Research question*

What type of modified social story (standard social stories read out loud or musically adapted) shows a greater increase in the modification of the targeted behavior for children with high functioning autism?
Chapter 2: Methods

Participant- The single participant in this study is an 8 year old boy in the third grade whose primary language was English. He was diagnosed with having high functioning autism with no co-morbid diagnosis. He lives in a single family home with both parents and a younger sister. Further evaluation of the participant included several assessments, parent presentation of the participant and observation. The following is what was collected in order to evaluate and assess the child’s pragmatic behaviors. The Pragmatic Protocol guidelines (Prutting & Kittchner, 1987) were used to assess several parameters of pragmatics: Verbal aspects (speech act pair analysis, variety of speech acts) and Topic selection, introduction, and maintenance. The child demonstrated delayed, off topic responses and did not acknowledge statements by the speakers adjacent, or in direct interaction with him. Topic selections were not spontaneous, requiring probing from the researcher, the child’s introduction was straight forward with minimal change in intonation, however the greeting was appropriate. Turn taking was typically not demonstrated by the participant, when having a discussion with the researcher the child would interrupt continuously and had difficulty with topic maintenance, changing the topic to make a request approximately 60% of the time while being evaluated; the child went as far as chasing a pet into another room while engaged in conversation with the researcher. The participant required probing for topic initiation, however when he would recall or see something that spurred his interest he would initiate conversation or make a request to play with the toy that was the focus of his interest.

When being introduced to the clinician the child demonstrated multiple touches such as trying to hug, placing his hands on the researcher, and continued to do so while researchers was having a conversation with the parent. Responses to prompts by the researcher were minimal.
Repair/revision of conversation when a breakdown occurred or asking for repair when misunderstood did not occur spontaneously. Pause time between sentences was acceptable. Interruption/overlap was unacceptable and was displayed as a problematic behavior of the child. Feedback to the researcher was fair; as the participant would occasionally respond to the researcher.

The quality of his pragmatics were questionable as the participant chose topics related to bodily functions of humans and animals that one typically does not discuss with unfamiliar conversation partners such as flatulence, excrement etc. Pause time interruption/overlap was presented by the participant. Adjacencies of utterances were present meaning that the child would begin a sentence immediately following an utterance from the researcher. Contingency which is expansion of a communicative partner’s utterances were minimal. Quantity/conciseness of the child’s utterances was impaired in that there was little to no communicative structure, topic maintenance, eye contact, turn taking etc. The lexical selection covered cohesion which was impaired in the child due to the fact that topic maintenance was disjointed and no repairs were made.

In the context of paralinguistic aspects, the intelligibility of the child was impaired. Articulation problems were noted (/v/, /th/ as well as consonant clusters). The child’s prosody was typical. The vocal intensity was fairly loud, the child was fluent, however demonstrated minimal cluttering, however the child was very excited and was speaking rapidly. The child’s vocal quality was typical however presented with a strong cough, at the time he was recovering from a cold as stated by the child’s mother.

As for nonverbal aspects such as kinesis and proxemies, the child demonstrated severe breakdowns in this particular pragmatic section. The physical proximity was greatly impaired to
the point that the child stood between the researchers’ legs and while seated tried to sit on the researchers’ lap, give back massages, play with the researchers’ hair, and touch the researchers’ arms. The child’s body posture was typical. Foot/leg and hand/arm movements were all typical, however the child continued to make physical contact continuously. Gestures were noted to be utilized often by the child; in every instance that he was speaking he would gesture with his hands and arms. Facial expression and eye gaze were both typical for a child with autism. Many of the behaviors noted though pragmatically incorrect for a typically developing individual are related to the diagnosis obtained by the participant.

The Assessment of Pragmatic Skills (Shipley & McAfee (2009) aided in the evaluation of specific pragmatic behaviors such as responding to greetings which the participant did appropriately, however the child required a prompt from his mother for the question “How are you?” The participant did not make a request for a pen when prompted to draw a picture rather he took the pen from out of the researchers hand. He had difficulty with describing events and taking turns. He followed one step commands very well. Repetitions of phrases were acceptable. He attended to task with difficulty and multiple probes from his mother. Topic maintenance was impaired. The child demonstrated role-playing very well, demonstrated the ability to sequence actions accurately. When prompted to define words he preferred looking for the physical object rather than utilizing functional vocabulary to define the words. His categorization was very good, yet initiating activities or dialogue was moderately impaired.

In conjunction with the assessments delivered directly to the participant the child’s mother provided information such as the Review of Existing evaluation Data (REED) presented at his most recent ARD which is an admission, review and dismissal meeting from the school district the participant was attending. The REED indicated that the child was receiving services
at school for speech therapy and behavioral considerations. The participants’ behavior impeded his learning and that of others and was being addressed through intervention strategies. Positive behavior support strategies such as accommodations, frequent redirections, social stories, visual schedule/icons, teacher modeling role playing etc. was to be implemented by his school’s SLP. All of the participant’s paperwork indicated that he is high functioning and did not require in home training services, currently received speech therapy, and had not demonstrated any signs of regression in his academics. The precise behaviors that were impeding on his academics were not complying with the instructor’s directives for behaviors such as beginning class assignments immediately and not complying with less than three verbal prompts. The REED indicated the precise desired behaviors for the child were to listen and comply immediately, begin assignments directly following instruction, and complete assignments with minimal redirections (less than 5 times in a fifteen minute period).

At the time of the evaluation, he was to be placed in a general education setting encouraging exposure to the curriculum along with the social interaction with non-disabled peers. It also stated that his experience in the general educational experience is being met on a limited basis academically due to the behaviors in the setting, however was meeting success with additional pull out support. The child was being pulled out for assistance in reading and in math. It was also noted that the majority of the homework as indicated by the participants’ mother was in both of those subjects. Additionally the REED stated that he required constant redirection and prompting to complete assignments. He responded well to positive reinforcement and recognition of good work and behavior, he had difficulty staying focused for more than 5-7 minutes, even when someone was sitting next to him the difficulty persisted unless it was something he was interested in. Observations noted by the teacher and/or related service
providers stated that he responds best orally, however had a difficult time producing written work. Furthermore, his mathematics skills were stronger than reading skills. The parent notes that he tried hard to make friends, however was still learning how to relate to others, and demonstrated difficulty with change and routine as well as maintaining friendships. The above was supposed to be targeted in his behavior intervention plan. Direct assessments and scoring sheets were not obtained from the primary SLP due to time constraints.

Design

An alternating treatment single-subject design was employed. The experimental conditions were as follows: Baseline, Treatment 1- Standard social story (SSS), Treatment 2- Musical social story (MSS).

Dependent measures

Measurements of the occurrence of the behaviors of the child the first behavior which was time off task during a homework session-how many times the participant looked up away from his homework, began playing with something in his vicinity while attempting to do homework, and/or how many times he placed his head on the table not attending to his work. (treated with the standard social story), and the second behavior targeted touching of individuals when in arms reach of the child when a physical initiation was not made by an individual proceeding his physical touch (social space).

Effect size was calculated by using the Percentage of Non-overlapping Data (PND) score. This was calculated by identifying the highest baseline point and then counting the number of intervention points that are greater than the highest baseline point. Then the
proportion of non-overlapping data points to the total number of intervention data points was calculated. This occurred twice once by the primary researcher and by the trained rater to provide inter-rater reliability. Mean Baseline Reduction (MBR) was also calculated to determine an actual percentage.

**Instrumentation**

The instruments utilized in this study to determine what areas to focus on with the social stories were The Pragmatic Protocol (Prutting & Kittchner 1987), Assessment of Pragmatic Skills (Shipley & McAfee, 2008), a comprehensive case history specifically looking at goals indicated by school SLP, a parent/caregiver questionnaire created by the researchers to gain more information on the behaviors of the participant (see appendix A), as well as a follow up questionnaire for the parent and/or caregiver for feedback on the interventions received by the child (see appendix B). The two social stories were created by the child and clinician following the List Points for effective Social Stories (Brownell 2002) (see Appendix C), and the guidelines for a Social Story which must include several types of sentences: (a) descriptive—factual statements used to describe the situation and people involved in it; (b) perspective—descriptions of the reactions, feelings, and responses of others; (c) directive—statements that identify an appropriate response and guide child’s behavior; (d) cooperative—sentences to identify what others will do to assist; (e) affirmative—statements that enhance the meaning by expressing values or opinions common in a given culture; and (f) control—sentences written by the child to identify his/her personal strategies to recall and use information. Further detail is indicated in the literature cited (Grey, 2012). Both social stories were created on the same day.
with the child and parent present, each with their own book which was illustrated by the participant. The specific behaviors to be targeted by the standard social story and the musically adapted social story were determined by the parent of the child. Both problematic behaviors presented by the child were stated by the mother to be equally difficult to deal with and both were the most difficult of the behaviors presented by the child. The standard social story was:

**Standard social story**

Sometimes I may have homework from my classes at school.

I am not the only one from my class that has homework.

All of my friends have homework too.

Sometimes I sit to do my homework alone.

Doing my homework shows my parents and teachers how independent I can be.

It is very important for me to work hard. If I get stuck on a problem it is ok to ask for help.

I will try to do my homework on my own!

When my mom asks me to do my work I will try to be independent and finish on my own.

The musically adapted social story was created following the exact same procedures as the standard social story however the prompt (“Sing me the ABC’s) was implemented in the primary evaluation to determine if the child was familiar with the tune of the song. The melody for both the ABC’s and Twinkle Twinkle Little Star are the same. Once song familiarity was determined, the social story was created and manipulated to the familiar tune. The musically adapted social story was as follows:
Sung social story (to the tune of Twinkle Twinkle little star)

Rules are things that guide and help
I should keep my hands to myself.
It’s important not to touch or poke.
This rule is really not a joke.
If I touch people might get mad and then I would be very sad.
Hands and feet all to myself.
Respecting others space will help
This is a song that’s special for me. I’ll feel good and all will see.

A video recording device (Panasonic HC-V100M) was utilized to reevaluate the sessions as well as record the child and the problematic behaviors in the household setting due to the parents and children’s busy schedule. A personal laptop was utilized to make an audio recording of the musically adapted social story, which was burned onto a CD and delivered to the child and caregiver one day post creation of the musically adapted social story.

Procedure

The participants’ mother responded to a flyer at a local Applied Behavior Analysis (ABA) therapy clinic. Evaluation and baseline measurements were obtained using standard assessments and screeners from The Pragmatic Protocol (Prutting & Kittchner 1987), Assessment of Pragmatic Skills (Shipley & McAfee, 2008), a comprehensive case history specifically looking at goals indicated by school SLP, a parent/caregiver questionnaire created by the researcher to gain more information on the behaviors of the participant (see appendix A), and observation by the primary researchers.

Following evaluation and baseline collection of the behaviors, a standard social story and a musically adapted social story was created by the participant and researcher. The musically
adapted social story was recorded by the researcher and burned on to a CD. Instruction was given to the parent to implement both of the social stories three times a day (once at breakfast time, once when arriving home from school, and before bed time). The study took place in various locations of environments the child was familiar with (after school center, and at the participant’s home). When creating the social stories in the after school care center the participant, clinician and parent were in a separate room with lessened distractions in order for the child to maintain focus and fully participate in the creation of the social stories. The parent of the participant recorded the child weekly in his home environment to provide the most natural setting for the child and record the target inappropriate pragmatic behaviors. Data was collected from videos and reports from the participant’s mother over a period of 5 weeks. Each week the video camera was collected for data analysis.

To acquire inter-rater reliability another individual was trained to look at the specific behaviors, and was given the recorded video sessions. Following the intervention period the parent was interviewed by the investigators (see appendix B). Data was placed on a spread sheet and evaluated, a graph of the indicated behaviors was put together and the data was interpreted using The Percentage of Non-overlapping Data (PND) score to calculate the effect size as well as Mean Baseline Reduction was used to show express a percentage of difference between baseline and treatment.

*Inter-rater reliability*

Another researcher was trained to look at the specific behaviors to provide inter rater reliability. This occurred by presenting video clips not included in those used to calculate reliability. The second rater was given information regarding the dependent measures. The
following are the tables which document both the primary researchers’ data in comparison to the rater’s. Table 1 indicates the number of sessions; the first three sessions noted were the baseline collection. Following baseline the data points are all considered to be treatment which is following the implementation of the social story. Table 2 indicates the data collected for the musically adapted social story. The table contains only the sessions in which the child was in the room with another individual. The second rater rated 69% of the data (11 out of 16 videos).

Table 1. Standard Social Story – Homework

<table>
<thead>
<tr>
<th>Session #</th>
<th>Off-Task Behavior (Researcher)</th>
<th>Off-Task Behavior(Rater)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5029</td>
<td>0.4249</td>
</tr>
<tr>
<td>2</td>
<td>0.5071</td>
<td>0.3176</td>
</tr>
<tr>
<td>3</td>
<td>0.3304</td>
<td>0.339</td>
</tr>
<tr>
<td>4</td>
<td>0.4242</td>
<td>0.3512</td>
</tr>
<tr>
<td>5</td>
<td>0.3017</td>
<td>0.3128</td>
</tr>
<tr>
<td>6</td>
<td>0.4314</td>
<td>0.2605</td>
</tr>
<tr>
<td>7</td>
<td>0.2448</td>
<td>0.17105</td>
</tr>
<tr>
<td>8</td>
<td>0.2128</td>
<td>0.2045</td>
</tr>
<tr>
<td>9</td>
<td>0.2072</td>
<td>0.2595</td>
</tr>
<tr>
<td>10</td>
<td>0.0788</td>
<td>0.0626</td>
</tr>
<tr>
<td>11</td>
<td>0.0306</td>
<td>0.0350</td>
</tr>
</tbody>
</table>

Table 2. Musical Social Story – Hands and Feet All to Myself

<table>
<thead>
<tr>
<th>Session # following baseline collection</th>
<th>Touching video analysis( Researcher)</th>
<th>Touching video analysis(Rater)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Mothers recording</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>1 **</td>
<td>1 **</td>
</tr>
</tbody>
</table>

*the only sessions noted are the sessions that the child is in the presence of other individuals
**statement from the child
Inter-rater reliability for off-task behavior when using the arbitrary cutoff of 5%, the inter-rater reliability is 55%. If using a cutoff of 10%, the reliability is 73%. Inter-rater reliability for touching was 100%.
Chapter 3: Results

The data collected is indicative of both social stories being effective. As the data stands it does not demonstrate any significant differences in the treatments. The data collected (see Figure 1) in the standard social story section indicates that there was a decrease in off-task behavior to the child’s homework. On the graph each data point represents the proportion of time off task. Each point is the proportion of seconds on task throughout an entire recorded session. The baseline data is indicated in red, which was taken for three consecutive sessions. The first point shows that the child was off task for 50% of the entire session. The second session shows a slight increase in off task behavior however it is still within the 50% range. The third data point demonstrates a decrease in off task behavior at 33% however during this session the participants’ mother was seated with him and was giving him positive reinforcement for time spent on task. After implementation of the standard social story the he was off task 42% of the time of the recorded session. The second session after implementation of the story showed a decrease to 30%; however the third session was the highest following baseline. As the sessions proceeded a steady decline is recognized. From the first baseline taken to the last session recorded there was a difference of 76.38% thus indicating a significant decline in the behavior.
Results from the musically adapted social story targeting touching behaviors, also indicated that the musical story was effective in remediating the behaviors, however the data collected is presented in two separate tables due to two sources of data collection (parent report, and data collected from the recorded sessions.) The data collected for the musically adapted social story as documented from the video recorded data (see Figure 2) suggests that there was a significant decrease in the amount of touches the child produced. The first baseline point indicates 22 touches within one session. Following collection of baseline and implementation of the story with the child the amount of touches went down significantly to two touches, following recorded sessions yielded no more than four touches per session. As indicated on the graph one will notice the irregular numbering of sessions. This occurred because out of the total sessions the ones that are indicated on the graph were the only sessions in which other individuals were present, giving the participant the opportunity to be in physical contact.

![Standard Social Story](image-url)
The second graph of the musically adapted social stories (see Figure 3). This table represents a collection of data that was provided to the researcher by the mother via text messages or phone calls. The participant’s mother notified the researcher 11 times of the child’s touching behaviors after implementation of the adapted social story. The participants mother documented touches that occurred in the household environment as well as when she would receive phone calls from the child’s school saying that he had hit somebody.
The results from all three of the graphs and the collected data cohesively all show significant declines in the behaviors targeted. If one is simply looking at the data and not putting additional thought into the study and control factors one will notice that in the standard social story indicated is a steady decline however with the musically adapted social story there is an immediate decline. To determine the effect size the percentage of non overlapping data was used to assess the three forms of data both the rater and researcher showed that there was no overlap in the data in comparison to the baseline collection.

Analyzing the data collected using PND though effective does not give a definite quantitative number therefore implementation of Mean Baseline Reduction occurred, the data is as follows. For the standard social story there is a difference of 76.38% from the initial baseline points compared to the last data points collected from the videos, while for the music story (video session report) there is a 79.31% difference, and music social story (parent report) there is a 94.82% difference. The data indicated suggests there is a difference of 2.93% (not
significant) difference in the musically adapted social story (video session report) in comparison to the standard social story video reports.

Subjective data

Two questionnaires were given to the parent of the participant. The first was implemented to gain more information on the behaviors of the participant and control for any change in the opinions of the participants mother. The questions (see appendix A) presented were answered by the parent assisting in the determination of what behaviors would be targeted with the social stories. The mother stated that she and the child enjoyed music, so they would probably favor the musically adapted social story.

The secondary questionnaire (see appendix B) indicated the evaluation of the mother’s views on the contrasting social stories. The participants’ mother stated that she had noticed a continuous difference in both of the targeted behaviors. She stated that the child enjoyed the musically adapted social story more, because he could always hear it and it was fun to listen to at the house, at school and in the car. She also stated that they were able to incorporate the musically adapted social story into the typical school day, and the teacher would put it on for the class to listen to. She also stated that his little sister really enjoyed it and would begin singing it and he would follow along, in contrast though they reviewed the standard social story they had to take time out of their day and read it, though he was very proud of it because he had the understanding that he made that story for himself and produced all of the illustrations.

In addition following implementation of the stories the mother stated that she noticed she had to deliver a decreased amount of cues for attention to task, as well as a decrease in complaints or phone calls being received from the school telling her that he got in trouble for hitting or touching anybody. One of the final statements made by the mother was that they had,
had a situation occur in the house where the participants younger sister was punching the participant in the arm 3 times and then on the ear, rather than the child hitting his sister he got up from sitting beside his sister and walked over to his mother to tell her what happened, the mother was extremely proud of the participant and was eager to discuss the situation with the researcher.
Chapter 4: Discussion.

This study was completed to determine if a standard social story or a musically adapted social story would be more beneficial to a child with high functioning autism to promote and teach more favorable pragmatic behaviors. The participant in this single subject alternating treatment design was an English speaking 8 year old child with high functioning autism with no co-morbid diagnosis. Following suggestions by Brownell (2002) and guidelines by Grey (2012) two social stories were created by the researcher and the participant, one standard social story targeting staying on task behaviors (Homework) and a musically adapted social story targeting touching (keeping hands and feet to himself). Data was collected via parent report and recorded video sessions. The results indicate that both social stories were effective in encouraging positive behaviors and reducing the unfavorable actions the participant was displaying prior to the introduction of the stories. Though the data suggests both of the stories were effective there is not a significant difference in either the standard social story or the musically adapted social story. Using data analysis such as percentages of non overlapping data (PND) and mean baseline reduction (MBR) there is only a 3% difference between the two types of stories, however that number is derived strictly from the data that was collected from the video recorded sessions, the MBR for the difference between the standard social story and the mothers reported data is a difference 18.44%.

Limitations

There were several limitations to this particular study. An unexpected limitation was that the participants’ teachers had incorporated the musically adapted social story into their classroom. The child often requested the song to be played in the car while she drove. Though the story is greatly praised and requested this leads to a lack of control in the design.
Another factor which may influence the results is that the data for the musically adapted social story (touching behavior) is from mother report and video. The touching behavior was not as present in all video recordings of the child because he was isolated the majority of the time, thus “touching” data was difficult to measure because the measurements though noted from the videos was taken in conjunction with the mothers reports of the behavior. The video recordings collected, although the only sources for the data to have been collected other than parent report are too variable due to the fact that in many of the recordings the child is alone with no other individual interaction. Occasionally the child’s mother would enter the room and sit with him, however no other physical interaction was presented. Thus it is more attractive to look at the parent report of the child’s behaviors, however because this data is collected from a third party the validity is hindered. Since the data was taken from a third party the usage of the data in direct comparison to the standard social story required the researcher to only utilize the video recordings specifically the videos where any other individuals were present in the room with the child. Though several limitations were present, it was necessary to address such behaviors prior to the specific behavior becoming increasingly persistent and manifested recurrently particularly whilst the child was angry consequentially resulting in aggressive hitting.

The limitations of the other behavior (time off task) was that it remained difficult to measure the behaviors due to a weak operational definition not targeting the unsystematic behaviors the child presented that were deviations from the homework task (i.e. drawing on his desk, looking down the hall way, singing a song etc.). Additionally, there was a lack of control due to the inconsistency in his natural household environment (i.e. his mother would sometimes sit with him as he was doing his homework, and at times he would be alone without assistance).
During the intervention process he was also receiving services from a local behavioral analysis center, which was necessary for the child however creates instability for the study.

General limitations of a single-subject design are that withdrawal of the intervention is at times looked at to be unethical, they lack control of extraneous variables such as maturation and exposure, carryover effects meaning that generalization of one behavior carries over to the next thus a loss of control occurs. The difficulty mainly with a single subject alternating treatment design is a lack of control. Although a single subject design was implemented, for the research to become stronger it is suggested that more participants be present to increase the validity and replication of the study. Furthermore, ideally the data should be collected consistently in that 3 identical consecutive scores should be taken for baseline.

Direct assessments were not acquired from the participants SLP, and no direct communication was established with them. This would have been more beneficial to the observation and the qualitative data for this case, as the child was not only exhibiting poor pragmatic behaviors at home but in school as well. More data both qualitative and quantitative could have been collected if the individuals at the school were working in collaboration with the researcher.

**Future directions**

Suggested directions for future research are to have multiple participants as well as implement a concrete multiple dimensional scale to assess targeted behavior, however it is highly recommended that the study remain a single subject design. This suggestion is emphasized due to the ability to individualize the research and the treatment. It is vital to keep in mind that each individual with ASD is unique, and may display very different behaviors from participant to
participant. It is also recommended that a different single subject design be implemented. Future researchers may wish to implement an ABACA/ACABA (A=Baseline, B=standard social story or musically adapted, and C=the remaining social story that was not delivered in the B section) design. This design should be used in order to target each social story individually rather than in conjunction with each other, to receive a more cohesive amount of data on a single behavior at a time. Because two completely different behaviors were targeted, the design implemented remained cohesive, however if two behaviors were targeted that were similar in nature control may be compromised due to the possibility carry-over effects. It is also suggested to target behaviors that are more measurable and create a stronger operational definition for each target behavior prior to the implementation of either social story.

**Clinical implications**

SLP’s and clinicians alike may find the implementation of social stories beneficial. It helps to assist individuals with high functioning autism by providing them with a type of structure they may find encouraging and applicable to situations they may encounter.

The stories are typically used to either decrease problematic social behaviors or increase positive social behaviors. Thus, allowing the individual to acquire and sustain general acceptable pragmatic behaviors. Implications of the findings are that when one is contemplating administration of a standard social story, one may consider adapting it to music. A significant difference was not evident in this study however, musical adaptation of a standard social story aided in providing a pleasant, fun and convenient mode of delivery of the stimulus. Not only did the child enjoy interaction with the musically adapted social story but other individuals such as his mother, teachers, sibling and peers appreciated the story. The evidence in this study shows
that by utilizing musically adapted social stories the clinician may keep an individual with autism attending to a story, have them recall it more easily, and want to engage in the musical social story more often.
References


Appendix A

Parents and/or caregivers

1. What are the most difficult behaviors the child demonstrates?

2. Which treatment do you think your child will like better?

3. Which treatment do you think you will like better?
Appendix B

Parents and/or caregivers

1. Have you noticed a difference in [participant’s] behavior?

2. Which treatment did you think your child liked better?

3. Which treatment did you like better?

4. Have you noticed your child using the treatments, if so, when, where and how often?
Appendix C

List points for effective Social Stories:

1. Identify a target behavior or problem.
2. Identify target behaviors for data collection.
3. Collect baseline data on the target social behavior.
4. Write the social story using descriptive directive, perspective and controlled sentences.
5. Place each individual sentence on a separate page.
6. Draw out pictures or icons on each page corresponding to the sentence.
7. Read the story you have created with the patient and model the desired behavior.
8. The clinician may begin to collect intervention data. (Brownell, 2002).
Curriculum Vita

Veronica M. Torres the daughter of George and Norma Torres is graduated from Burges High School in 2005. She is currently a second year graduate student clinician at the University of Texas at El Paso (UTEP), pursuing a Masters of Science degree in Speech Language Pathology. This will be Veronica’s second degree, the first being a Bachelors of Fine Arts in Musical Theater/Theater. While obtaining her undergraduate degree Veronica worked for Gymboree music and play as a music and fundamental development teacher. Veronica joined the field of Speech Language Pathology after becoming inspired to assist individuals with aphasia due to her great grandmother having a massive stroke causing global aphasia, and her mother having a stroke and receiving speech and language services. Following admission into the masters program at UTEP and acquiring her very first patient containing autism, the parameter captured her heart. Dealing with such misunderstanding of a gradually blossoming parameter captured her heart. Veronica could not be happier than to incorporate her previous knowledge of music into the new found field of speech and language thus the reason why such a research project was created. With a foundation in music and theater she wanted to explore the actual research frontier and pioneer studies dealing with clinical rehabilitation with evidence based practice and the incorporation of music into the treatment for autism.

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