

An Analysis on the Impact of Peer-Mediated Theatre Interventions for Children with Autism on Typically Developing Peers

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BRIEF. The analysis of changes in model peers during behavioral interventions designed for children with Autism Spectral Disorder.

ABSTRACT. Autism spectrum disorder (ASD) affects 3.5 million Americans, and manifests itself in the form of several socio-cognitive impairments. Because there is no pharmaceutical treatment, ASD is often treated at an early age through the use of behavioral interventions. One such treatment is a novel theatrical intervention that partners participants with ASD with typically-developing peers. Previous studies have analyzed an ASD participant's stress level through salivary cortisol during the intervention process. Even though the peers are a core piece in the intervention process, there have not been investigations in order to assess how peers are affected by the intervention. Thus, changes in the peers that participated in an intervention were assessed through self-report questionnaires that evaluate self esteem and multifaceted empathy. In addition, salivary cortisol was also obtained from the peers at two timepoints in order to measure stress and anxiety while accounting for the diurnal fluctuation of cortisol levels. After the 10-day theatre intervention, the peers did not reflect a significant change in their hormonal cortisol levels; however, peers reported higher self esteem and greater overall empathy in comparison to the beginning of the intervention. Thus, there is indication that theatre interventions are not only beneficial to the participants with ASD, but also can have a positive impact on the mental state of peers that engage in them.

INTRODUCTION.

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that is often diagnosed during early childhood. ASD is characterized by social communicative impairments and restricted repetitive behavior [1]. Due to the detrimental social nature of the disorder, children with ASD experience difficulty in establishing interpersonal relationships with their peers [2]. As a result, behavioral interventions are used in order to address core social-communication symptoms of ASD. These interventions include sensory integration, cognitive behavior therapy, and speech-language therapy [3]. One novel approach is the use of theatre-based interventions, which incorporate acting and theatrical techniques to improve social awareness, cognition, communication, expression, and perception among children with ASD [2,4]. These children often rely on typically-developing peers to invoke and aid social interaction and growth. In previous SENSE Theatres, participants with ASD that were exposed to the intervention displayed improvement in social perception and reciprocal social interaction. In turn, the typically developing peers may also benefit from the interaction with children that have ASD. For example, peer-mediated studies have shown that peers in education inclusive programs report positive feelings toward children with disabilities and personal social-emotional growth [5]. Additionally, peers exposed to students with disabilities report positive attitudes toward other peers and children with disabilities [6].

Social-Emotional Neuroscience Endocrinology (SENSE) Theatre incorporates the use of trained typically developing (TD) peers as models for children with ASD. During the 10-day SENSE Theatre intervention, these peers model adaptive social skills and social interaction to children with ASD in a safe and supportive environment [4]. To examine factors that may influence the effectiveness of this intervention, previous studies have examined stress in SENSE Theatre participants with ASD.

Children with ASD show heightened stress (cortisol) during social interaction with typically-developing peers. However, the SENSE Theatre intervention may result in decreased overall stress during these situations, thus this calls for a need for the analysis of stress. Changes in physiological stress may be moni-

tored by analyzing the activity of the hypothalamic pituitary adrenal (HPA) axis. The HPA axis is both responsible for maintaining homeostatic levels via diurnal rhythm and for activating in response to a threat. HPA activation results in the release of cortisol, the primary stress hormone in humans. Diurnal cortisol levels follow a circadian rhythm, with higher levels in the morning that lower as the day proceeds. Typically, when cortisol levels increase from the individual's baseline, it is indicative of enhanced physiological arousal and stress. However, changes in peer stress during the SENSE Theatre intervention have not been investigated.

Thus, a peer study was conducted during SENSE Theatre in order to measure changes in stress through salivary cortisol sampling. In addition, self-reported measures of self-esteem and multifaceted empathy were examined in peers. These variables were examined through the utilization of questionnaires such as the Rosenberg Self Esteem Scale and the Interpersonal Reactivity Index, and they buttressed this particular study in that they provided a well-rounded evaluation of peer growth and divided the growth in various categories. We found evidence that the SENSE Theatre has a positive impact on the peers decreasing average stress levels and increasing overall empathy. Overall, these results show that the SENSE Theatre has the ability to not only significantly impact the participants with ASD, but also the peers, who share an active role in improving on the social impairments found in children with ASD.

METHODS.

SENSE Theatre Study.

The current study included peers (n=10) that ranged from ages 14-28, with the study containing 2 males and 8 females. Out of the ten participants, eight were reported to being of Caucasian descent, while the other two were Asian females. Each peer in the study had a participant with ASD to work with during the intervention. The peers and participants actively partook in activities based around mirroring and spontaneous acting towards the initial days of the intervention. This eventually progressed to creating an entire new character and assuming their role in the play. Peers were given two self-report questionnaires prior to and following the theatre intervention.

Interpersonal Reactivity Index.

The Interpersonal Reactivity Index (IRI) is a measurement tool for the multidimensional assessment of empathy. This self-report questionnaire contains 28-items on a 5-point Likert scale, and consists of four distinct subscales. The subscales include perspective taking (the tendency to spontaneously adopt the psychological point of view of others), fantasy (taps respondents' tendencies to transpose themselves imaginatively into the feelings and actions of fictitious characters in books, movies, and plays), empathic concern (assesses "other-oriented" feelings of sympathy and concern for unfortunate others), and personal distress (measures "self-oriented" feelings of personal anxiety and unease in tense interpersonal settings).

Rosenberg Self Esteem Scale.

The Rosenberg self esteem scale is a ten-item Likert-type scale. Each item is answered on a four point scale that ranges from strongly agree to strongly disagree. Five items are worded with positive statements, and five are worded with negative statements, and participants are to evaluate how they feel about each statement. The scale measures state self-esteem by asking the respondents to reflect on their current feelings. Lower scores are indicative of higher self esteem.

Cortisol Sampling.

Salivary cortisol samples were taken on five separate days. On each day, testing consisted of two samples, roughly around 1 P.M. and 5 P.M., in order to establish a diurnal baseline that compensates for the daily fluctuation of cortisol levels [7]. The salivary samples were then sent to the Hormone Assay & Analytical Services Core located in Vanderbilt University where the cortisol assay was quantified by the use of a radioactive tracer.

RESULTS.

SENSE Theatre Study

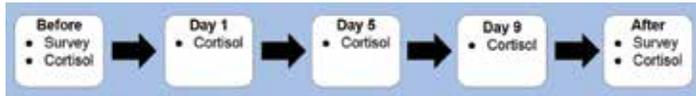


Figure 1. Timeline of the testing during the 10 day intervention process. The before and after represent the distribution of the questionnaire and sampling of the cortisol prior to and following the intervention. Days 1, 5, and 9 are all days during the intervention in which salivary cortisol was sampled.

Interpersonal Reactivity Index.

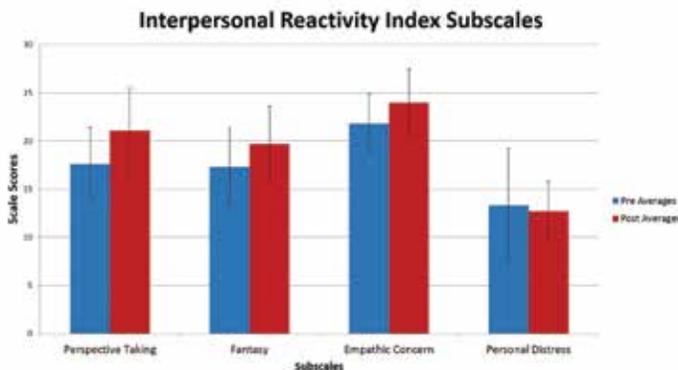


Figure 2. Overall Averages for each subscale on the Interpersonal Reactivity Index, prior to and following SENSE Theatre. Blue bars represent averages on Interpersonal Reactivity Index prior to participation in the intervention. Red bars are associated with the average subscale scores for the post tests, with each average having error bars measuring standard deviation.

There was an increase in the average score for perspective taking, fantasy, and empathic concern, while there was an average score decrease for personal distress between the pre-assessment and post-assessment. Through the use of a two-tailed t-test at a 95% confidence interval a statistically significant difference was found between empathic concern ($p=0.037$) and perspective taking ($p=0.005$) between the initial Interpersonal Reactivity Index and the one that followed the intervention process.

Rosenberg Self-Esteem Scale.

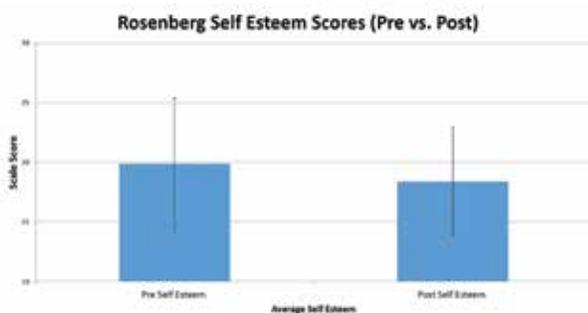


Figure 3. Comparative graph juxtaposing Pre and Post Self Esteem scale results for each peer. The bars represent a collective average of all the scores from each participant, and the error bars evaluate each average's standard deviation.

On average, the self esteem scale scores decreased, and there was a statistically significant change ($p=0.022$) between the pretest and posttest, as indicated after using a two-tailed t-test.

Salivary Cortisol.

Initially, a pairwise two-tailed t-test was conducted on each day's noon salivary sample values and the respective early evening sample values. The test compared the noon sample to the evening sample in order to demonstrate the expected diurnal decline of cortisol throughout the day. Each day's sample had a statistically significant difference ($p < 0.05$) between both the samples that were taken on that day except for Day 5 ($p=0.17$). After establishing that the cortisol levels declined as the day progressed (as is the norm), a pairwise two-tailed t-test was conducted comparing each day's noon sample and each day's evening sample. For example, the evening sample from before the intervention and the evening sample from after the intervention were both compared, however, there was not a statistically significant difference ($p=0.15$). This was true for all the other samples as well. No statistically significant difference was found among the various noon samples between each day or the various evening sample between each day. A one-way ANOVA indicated no significant difference in daytime cortisol levels in peers throughout the SENSE Theatre intervention ($F = 1.286, p = 0.29$). This same ANOVA also indicated no significant difference in evening cortisol levels either ($F = 1.348, p = 0.27$).

DISCUSSION.

SENSE Theatre.

The study has had a seemingly positive impact on the TD peers as well as the participating children with ASD. An analysis of the Rosenberg Self-Esteem scale shows the TD peers reported higher self esteem following the theatre process, and a lower "personal distress" subscale average correlates with the peers self-assessing less personal anxiety under uncomfortable and stressful situations. The increase in the "fantasy" subscale of the Interpersonal Reactivity Index suggests that the peers have a greater tendency to emotionally and mentally connect with fictitious characters, which translates to being able to have emotions for any being, regardless of whether they exist or not. In conjunction with this, there was an increase in both the "empathic concern" and "perspective taking" subscales of the Interpersonal Reactivity Index which reveals that the peers not only report a greater understanding and concern for the feelings of others, but also an increase in the ability to grasp the viewpoint of another and understanding a situation from their point of view.

Limitation.

A limitation in the study is that the questionnaires were self-reported by the peers; therefore, the self esteem and empathy of each peer may be subject to change based on any daily event that could have transpired. In order to control for this, questionnaires were sent out with "personal journals" in which each peer was asked to document any major stressor on any given day that could impact their cortisol results or influence how they respond to the questionnaires. The peers did not report any such circumstances.

Salivary Cortisol Study.

There was not a statistically significant change between the values of cortisol samples from the TD peers from day to day. The sample size of the study was fairly small ($n=10$), but some t-tests indicated a declining trend in cortisol values, so it is possible that given a larger sample size, there could have been an observed statistically significant change in the cortisol levels of the TD peer population.

CONCLUSIONS.

Not only was there a favorable change in each questionnaire that was given out, the change in overall empathy of the Interpersonal Reactivity Index was assessed, and the result showed that the change in overall empathy was also statistically significant. Therefore, the results reveal that SENSE Theatre is not only beneficial to the participants with Autism Spectrum Disorder, but also to the

mental state of the typically developing peers (however, there is no indication that the theatre lessens the amount of stress or anxiety a typically-developing peer faces).

Further Investigations.

In addition to the peer study analyzing TD peers in the theatre intervention, a future study could also examine the drastic changes in self esteem, empathy, stress, and anxiety between male and female peers. Another potential study that could occur is a peer-participant joint study in which self-esteem, empathy, and cortisol factors are measured in both peers and their respective participants in order to see how they are able to impact one another (does a younger pair have a more drastic change vs. an older pair, etc.). Finally, the peer's stress level can be monitored in relation to the changes that occur in the participant with ASD, in order to observe whether peer stress levels have a positive or negative impact on participants with ASD.

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