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Thesis title The influence of improv experience on uncertainty tolerance,  
social anxiety, and communication in adolescents on the  
autism spectrum

Intended date of commencement- May 6, 2022

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**The influence of improv experience on uncertainty tolerance, social anxiety, and  
communication in adolescents on the autism spectrum**

A Thesis

Presented to the Department of Communication Sciences and Disorders

College of Communication

and

The Honors Program

of

Butler University

In Partial Fulfillment

of the Requirements for Graduation Honors

Kathryn K. DesBiens

May 6, 2022

## **Abstract**

This study examined the influence of an improvisational theater experience on perceptions of social anxiety, intolerance of uncertainty (IU), and quality of communication life in autistic adolescents. Seven participants were recruited from Indiana University's *Camp Yes And*, a virtual day camp specializing in teaching improv strategies to autistic adolescents. Participants completed three scales measuring social anxiety, IU, and quality of communication life via surveys sent prior to and after attending the camp. It was hypothesized that levels of social anxiety and IU would decrease while quality of communication life would increase. Results indicated that pre- and post-test survey responses showed a statistically significant difference only for the IU measure. Additionally, while not statistically significant, trends indicated a slight decrease in social anxiety, particularly in response to new social situations, and a slight increase in quality of communication life. Given the results of the study, it is suggested that improv is a potentially beneficial intervention for targeting IU in some autistic adolescents and a larger study is warranted.

## **Introduction**

The autism spectrum is a range of neurodevelopmental conditions which influence an individual's social communication and behaviors (American Psychiatric Association [APA], 2013). The two core diagnostic features of the autism spectrum are differences in social communication and interactions, as well as restricted and repetitive behaviors (APA, 2013). People with autism often have difficulty understanding the rules of conventional, neurotypical communication (Boucher, 2017). For example, they may be unaware of the unspoken set of socially accepted norms that occur during social interactions, leading to communication breakdowns during class presentations, job interviews, or dates. Additionally, the diagnosis of autism includes restrictive and repetitive behaviors, with one subcategory of these behaviors being insistence on sameness (IS). IS typically presents in a person with autism as a need for the reduction of uncertainty or unpredictability within their environment (Boucher, 2017). For example, deviation from daily routines or rituals familiar to a person with autism could result in distress and anxiety.

In addition to the core features of autism, people on the spectrum experience higher rates of anxiety compared to the general population. It is estimated that about 40% of children and adolescents with autism have a comorbid anxiety disorder, including social anxiety (van Steensel, Bögels, & Perrin, 2011). It has been suggested that anxiety among adolescents with autism may be heightened due to self-perceived social differences from typically developing peers, leading to avoidance of social situations and exacerbating social delay (White et al., 2013).

This cycle of heightened social anxiety in adolescents with autism perpetuates the interaction between anxiety and the core social differences among people with autism (White et al., 2013).

A challenging trait that often presents with individuals experiencing anxiety disorders, including those with autism, is intolerance of uncertainty (IU; Jenkinson, Milne, & Thompson, 2020). Separate from the broader symptoms of anxiety, IU is a trait described as having significant difficulty in managing unexpected events or the unknown (Birrel, Meares, & Freeston, 2011; Boulter et al., 2014) and is reminiscent of symptoms of IS in autism. In fact, a strong correlation indicating concurrent increases in IU and anxiety has been observed in people with autism, with the strength of this correlation being comparable to neurotypical populations (Jenkinson, Milne, & Thompson, 2020; Boulter et al., 2014). The connection between IU and anxiety indicates that increased anxiety correlates with increased IU (Jenkinson, Milne, & Thompson, 2020). Therefore, in targeting IU in intervention, symptoms of anxiety may decrease in autistic individuals (Jenkinson, Milne, & Thompson, 2020). Like anxiety in autism, we propose that IU may interact with, intensify, and perpetuate the difficulties commonly experienced by people on the spectrum in social situations (Bellini, 2006; Jenkinson, Milne, & Thompson, 2020; White et al., 2013). Previous literature also suggests that targeting social communication and anxiety simultaneously is beneficial for adolescents with autism (White et al., 2013); therefore, interventions that also target IU in social scenarios may have an even greater impact on autistic people seeking treatment.

One therapeutic intervention that may be capable of targeting IU, anxiety, and social communication simultaneously is improvisational theater. Improv is a popular art form and is conventionally described as theater that is made up on the spot. For example, a common improv

game is to make up a group story one word at a time. Because no one knows what their peers may say for the next word, they will be unable to predict what word they will need to add to the story until it is their turn. They will also need to add a word that connects to the story the group is co-creating; thus, exercising topic maintenance skills. Research has shown improvement in uncertainty tolerance and social anxiety following participation in improv games and exercises in neurotypical people (Felsman et al., 2019; Felsman, Gunawardena, & Seifert, 2020). While effects of improv on IU have not yet been studied in autistic populations, Corbett et al. (2016) found that a peer-mediated theater and improv intervention approach improved social competence for children with autism. Thus, previous literature indicates that improv experience can help with uncertainty tolerance and anxiety in neurotypical populations, and with social skills in autistic populations. However, there are no existing studies examining the effects of improv on IU and anxiety alongside targeting social communication in youth with autism.

Based on the literature outlined here, it is reasonable to expect that the influence of improv on IU in neurotypical people could also benefit people with autism. Additionally, given our proposed link between IU, anxiety, and social communication in autistic populations (Jenkinson, Milne, & Thompson, 2020; White et al., 2013), improv games and exercises may reduce anxiety for autistic individuals and allow for improved social competence. While traditionally researchers have measured social competence in adolescents based on parents' or teachers' observations of their social skills, recent shifts in autism research emphasize targeting functional improvements in communication rather than measuring social competence as perceived by third-party members (Burgess & Turkstra, 2010). Including a self-reported social measure, such as rating the quality of communication life in the individual, provides valuable

insight into everyday functioning and centers an autistic person's own feelings regarding their communication abilities (Burgess & Turkstra, 2010). In addition to measuring how IU and social anxiety levels changed after receiving the intervention, including a measure of the quality of communication life in the participants may reveal novel information about how autistic adolescents personally feel about their communication post-intervention.

In summary, this study examined the influence of improv experience on autistic adolescents' IU, social anxiety, and quality of communication life.

### **Research Question**

How does participation in improvisational theater activities influence measures of uncertainty tolerance, social anxiety, and quality of communication life among adolescents with autism?

### **Hypothesis**

It is expected that intolerance of uncertainty and social anxiety symptoms will decrease while the overall quality of communication life improves among autistic adolescents experiencing improv training.

### **Methods**

#### Participants

The participants of the study included seven adolescents with autism between 13-18 years of age ( $M = 15.9$ ,  $SD = 2.1$ ). Three of the participants identified as female and the other four identified as male. Participants were recruited from the *Camp Yes And* program out of the

Indiana Institute on Disability and Community. Each participant participated in five days of programming.

Nine campers expressed interest in the study and underwent an initial screening to determine fitness for the study. Participants (and their parent/guardian) provided verbal confirmation of an autism diagnosis. One interested participant did not have a formal diagnosis of autism and was therefore excluded from the study. Per parent report, all participants had normal vision and hearing and no diagnoses of cognitive or reading disability. As the tasks of the study required age-appropriate word knowledge, participants were administered the Peabody Picture Vocabulary Test – 5<sup>th</sup> Edition to assess their receptive vocabulary (PPVT-5; Dunn, 2019). To continue participating in the study, participants needed to receive a standard score greater than or equal to 85 on the PPVT-5, which is indicative of average or above-average semantic knowledge. One interested participant did not meet this requirement and was eliminated from the study. After the screening procedures, seven participants were fully eligible to participate in the study. These participants then provided the researcher with additional demographic, medical, and developmental data (see Table 1).

<b>Participant</b>	<b>Sex</b>	<b>Age</b>	<b>Times Participated in <i>Camp Yes And Before Study</i></b>	<b>Additional Diagnoses</b>
1	F	16	1	Anxiety
2	M	17	0	Auditory Processing Disorder
3	M	14	0	ADHD
4	M	13	0	ADHD, Anxiety
5	F	15	1	Anxiety, Depression
6	F	18	0	Anxiety, Sensory Processing Disorder
7	M	18	Unknown	Unknown



## Intervention

*Camp Yes And* is a week-long summer improv program for teens on the autism spectrum. Due to the COVID-19 pandemic, this session of *Camp Yes And* was conducted using a virtual format. During *Camp Yes And*, teens on the autism spectrum receive approximately three hours of improv training per day (15 hours total). This training includes learning basic improv techniques and engaging in improv games and short skits. The activities of the day were done both as a whole group and in smaller “break-out” groups. The camp also includes a group of adult professionals, such as educators and speech-language pathologists, who also learn these techniques to facilitate communication with students on the autism spectrum. The professionals participated in the improv activities alongside the campers.

## Evaluative Measures

The study utilized three surveys to assess levels of social anxiety, intolerance of uncertainty, and quality of communication life in the participants. The surveys were administered via Qualtrics prior to and after participation in the camp to compare responses before and after intervention.

The first measure was an adapted version of the Quality of Communication Life Scale (QCL; Paul et al., 2004). Used as a social measure, this questionnaire determined the extent to which communication differences in social interactions affect the participant’s quality of daily life. The participants were asked to rate their level of agreement with a statement on a Likert scale with numerical values. For example, one item asks participants to rate their agreement with a statement, “It is easy for me to communicate,” on a sliding scale of one to five. A rating of one

means that the participant strongly disagrees with the statement, and a rating of five means they strongly agree. A total score was calculated for each participant by summing the numerical ratings on each item. A higher score indicates greater quality of communication life. Because the scale was originally developed for adults with communication disorders, not all of the items of the original QCL applied to teens (Paul et al., 2004). To account for this, the questionnaire was adapted to only include relevant questions to the study (e.g., Burgess & Turkstra, 2010).

Additionally, the Intolerance of Uncertainty Scale for Children (IUSC; Comer et al., 2009) was used as an uncertainty tolerance measure. This scale is designed to assess children's emotional, cognitive, and behavioral reactions when presented with a situation of uncertainty. Using a Likert scale of one to five, participants rate the extent to which they relate to a statement regarding uncertainty (e.g. "Things that are unclear stress me,"). A rating of one indicates no relation to the statement, whereas a five indicates significant agreement with the statement. Scores are calculated for each participant by totaling the numbers answered for each statement. A higher total score indicates a high level of IU.

Lastly, the study utilized the Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998). This scale was designed to measure adolescents' reports of social anxiety in the context of peer relationships. Like the previously mentioned measures, the SAS-A uses a Likert scale of one to five. Scores are calculated for each participant by totaling the answers for each statement. A higher score indicates greater levels of social anxiety. In addition to the total score, the SAS-A has three subscales: fear of negative evaluation from peers (FNE), social avoidance and distress that is specific to new situations or unfamiliar peers (SAD-New), and social

avoidance and distress that is experienced more generally when in the company of peers (SAD-General).

### Procedure

We collected pre-test and post-test and maintenance data. Before the first day of the training, participants completed a survey containing the three measurement scales (QCL, IUSC, & SAS-A). Each survey was re-administered at the end of the week-long camp and again two weeks after the end of the camp to assess potential carryover of effects. In total, the participants completed the survey and the included scales three times. The estimated time taken to complete one survey was 10 minutes, and a total of 30 minutes for completing all three surveys at each of the three time points across the study.

### Data Analysis

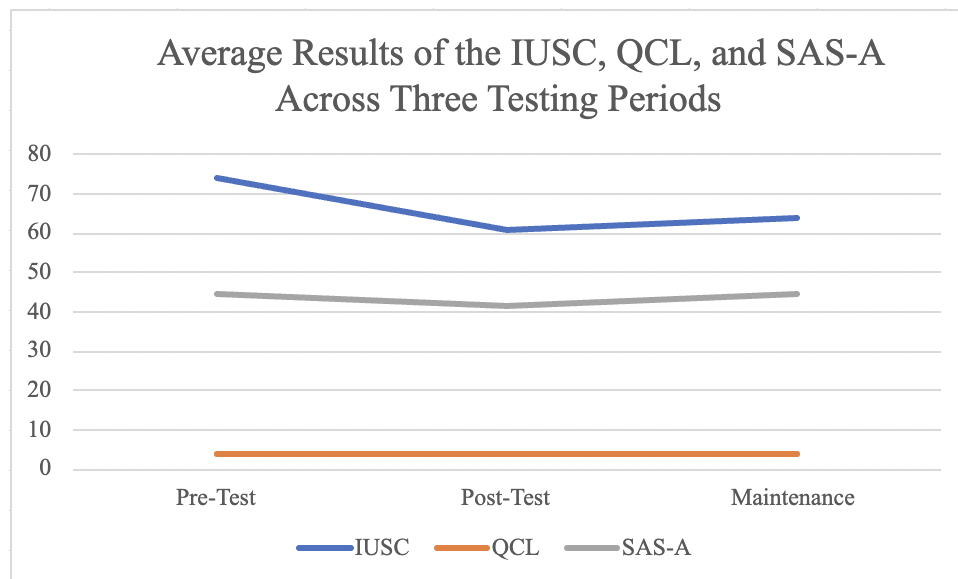
Statistical analyses were performed using SPSS software (Version 28) and an alpha level of 0.05 was used for significance testing. Dependent variables (i.e. total scores from each survey) were assessed for normality and homogeneity of variance to determine if they met the assumptions of parametric statistics. Due to the limited sample size ( $n = 7$ ), the data was also visually inspected for trends.

### **Results**

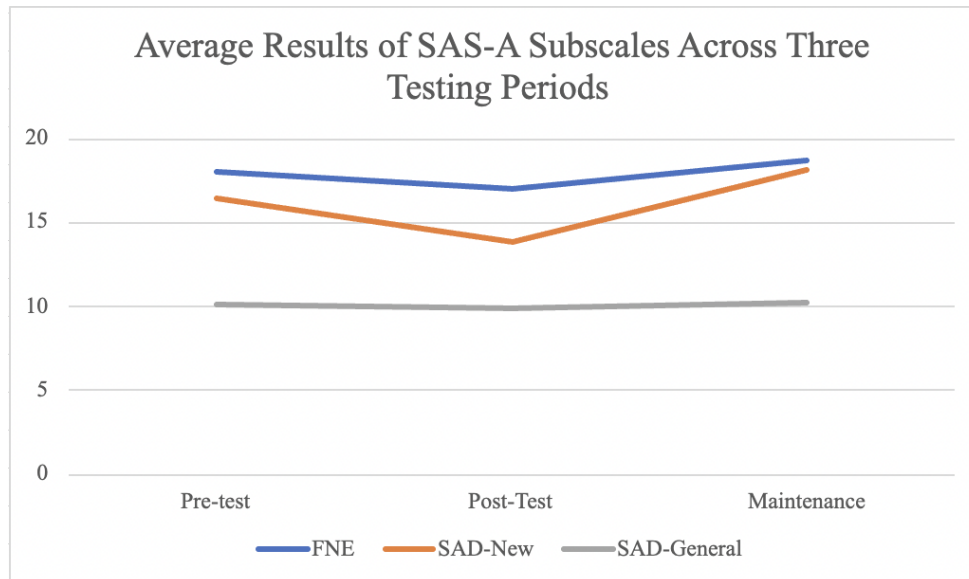
Due to violations of normality, non-parametric tests were used for statistical testing. A Wilcoxon signed-rank test showed that participation in 5-days of *Camp Yes And* elicited a statistically significant change in pre-post intervention for IU ( $Z = -2.371, p = .018$ ) but not in quality of communication life ( $Z = -1.604, p = .109$ ) or SAS-A ( $Z = -0.594, p = .553$ ). All seven

participants showed improvements in their IU scores (see Figure 1). For QCL, three out of the seven participants showed improvements while the remaining four participants had equivalent pre- and post- scores. For SAS-A, four participants showed improvements following intervention, while three participants showed elevated anxiety scores.

We further assessed whether the statistically significant change in IU was maintained two weeks post-intervention. Comparing pre-intervention scores to maintenance scores did not show a statistically significant change, ( $Z = -1.859, p = .063$ ), suggesting that the previous improvements in IU did not generalize outside of *Camp Yes And*. However, there was a trend in the hypothesized direction, with five out of seven participants maintaining some improvement in IU following *Camp Yes And*.



**Figure 1.** Mean scores of participants immediately pre- and post-intervention, and two weeks post-intervention (maintenance). Intolerance of Uncertainty Scale for Children (IUSC) and Social Anxiety Scale for Adolescents (SAS-A) results are averages of total scores calculated by summing the participants' ratings for individual items on the scales. A higher total score for IUSC and SAS-A indicates higher levels of IU and social anxiety. Quality of Communication Life Scale (QCL) results are the averages of total scores of participants, which are calculated by averaging participants' ratings for individual items. A higher score on the QCL indicates a greater level of quality of communication life.



**Figure 2.** Mean scores of SAS-A subscales: fear of negative evaluation from peers (FNE), social anxiety specific to new situations (SAD-New), and social anxiety experienced more generally in presence of peers (SAD-General). Results are averages of the totals of participants’ ratings on specific items in the SAS-A relating to the three subscale categories. A lower score indicates lower levels of the subcategory of social anxiety highlighted in each subscale.

## Discussion

### Interpretation of Results

The study yielded a statistically significant decrease in IU between pre- and post-testing. This indicates that participation in *Camp Yes And* for one week resulted in a decrease in self-reported levels of IU. A longer time frame of improv intervention could potentially yield more significant results. Previous research has suggested that improv intervention is beneficial in targeting IU in neurotypical populations (Felsman, Gunawardena, & Seifert, 2020). Given the results of the study, it is suggested that improv is a potentially beneficial intervention for targeting IU in autistic adolescents as well. These findings are clinically relevant because of the

suggested link between IU and social anxiety (Jenkinson, Milne, & Thompson, 2020) and the benefit of treating anxiety and social communication concurrently (White et al., 2013).

Additionally, while not statistically significant, examining the raw data revealed a slight decrease in self-reported levels of social anxiety (see Figure 1). Specific trends of decrease were observed in the subscales of the SAS-A. The SAD-New subscale of the SAS-A showed the greatest decrease in scores among the subscales (see Figure 2). This is interesting because of the inherent connections between social anxiety relating to new experiences, IU, and the basic principles of improv. Both IU and SAD-New entail anxiety related to unexpected situations. Working with the unexpected is a foundational aspect of improv. It makes sense that exposure to improv training would then decrease levels of IU and SAD-New.

Based on the results of the study, participants' quality of communication life did not seem to be significantly affected by the intervention. One possible explanation for this may be that the measure is not sensitive enough for shorter time frames. Another explanation could be that autistic adolescents are already relatively satisfied with the quality of their communication. In their study discussing the adaptation of the QCL for autistic adolescents, Burgess and Turkstra (2010) found that adolescents tend to rate themselves higher on the QCL than what a neurotypical observer may expect. Our findings indicate that the quality of communication life was already rated relatively positively by the adolescents, which adheres to the trend observed in the Burgess and Turkstra (2010) study. This finding has far-reaching implications for the purpose of social communication intervention for autistic individuals; however, that discussion is beyond the scope of this paper.

## Limitations

One limitation of this study was its sample size and subsequent lack of statistical power. Our sample also had a wide variance in age. The youngest participant in the study was 13 years old, while the oldest was 18 years old. This range may have limited the study because of the different social structures of middle-schoolers versus high-schoolers. For example, higher rates of anxiety tend to be reported as age increases (Van Steensel et al., 2011).

Another limitation of the study was the length of intervention. Participants spent a total of 15 hours with the intervention during the week-long camp. If participants spent more time with the intervention, more significant changes may have been observed. Additionally, due to the length of intervention, the scales used in the study may not have been sensitive enough for the short time frame. More sensitive scales to the length of intervention may have yielded more significant changes.

## Future Studies

To further confirm the findings of this study, the experiment could be repeated with a larger sample size. This would account for any outliers in the data and provide more reliable results. Repeating the study with a longer time frame may also reveal more significant changes. Our study saw one statistically significant change in IU after one week of intervention. Increasing the time the participants spend with intervention could correlate with greater statistical changes. Additionally, another study may provide more data regarding social anxiety. Although there is a known link between IU and social anxiety, the study only yielded a statistically significant change in IU. Future studies could further examine this relationship in

response to improv intervention with a larger sample size and focus on the subscales of social anxiety or individual differences among participants. For example, the researcher may analyze how autistic people with comorbid social anxiety or subclinical levels of social anxiety respond to improv intervention relative to autistic people without social anxiety.



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