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The Potential Effects of an Improvisational-Based Intervention on Social Cognitive Skills in Autistic Youth: A Discussion of Existing Literature and Considerations for Further Development

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By

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ABSTRACT

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This thesis proposes to evaluate the viability of an improvisational theater-based intervention in a population of youths with Autism Spectrum Disorder (ASD). It first discusses the nature of existing neuroscience literature surrounding ASD, indicating a neurological basis for many of the behaviorally and cognitively observable struggles faced by those with ASD (and, therefore, the potential for a critical period for skill development which may be aided by intervention). Skill correlations between improvisational theater and social cognitive difficulties observed in youth with ASD are also discussed. Following this, an experimental design is proposed for an intervention utilizing a 12-week program focused on improvisational theater. Further discussion utilizing interviews with professionals in both theater and cognitive and behavioral development fields is then conducted regarding necessary considerations for this intervention to be effective, as well as potential applicability on a broad scale.

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Introduction and Literature Review

First identified in 1943 by Dr. Leo Kanner, Autism Spectrum Disorder is a broadly defined neurodevelopmental disorder which indicates cognitive and behavioral dysfunction in humans on three primary axes: social interaction, communication deficits, and behavioral challenges such as restricted or repetitive behaviors (Garber, 2007). No direct medical evaluation, such as blood tests or neuroimaging, exists as a diagnostic aid - rather, the diagnostic focus is the individual's developmental history, behavior, and performance on certain self-reporting (or parent/guarding or teacher-reported) measures (Center for Disease Control and Prevention, 2020). Generally, a professional can reliably diagnose Autism Spectrum Disorder, or ASD abbreviated, around the age of two (although it is possible to begin to have reasonable certainty at 18 months of age or younger, (Center for Disease Control and Prevention, 2020), or even begin to suspect something by the end of the first year of life (Hao & Layton, 2016)). Presentation is highly individual - some individuals with ASD may demonstrate severe intellectual disability, while others may demonstrate behavioral deficits but supreme intellectual capability, and others still may experience some areas of intellectual expertise while struggling significantly with others (Garber, 2007). In Autism, a significant language delay (no words before the age of two) is frequently observed, but in Asperger's Syndrome, a condition on the Autism Spectrum, this language delay is not observed (Baron-Cohen, 2004). This uniquity of presentation makes it difficult for neuroscientific evaluation to pinpoint specific influences which may neurologically be responsible for the broad umbrella of symptoms and presentations which Autism Spectrum Disorder encompasses.

Cognitive evaluation, currently, is the primary means of objective assessment for Autism Spectrum Disorder. The age of diagnosis (as early as age two, as late as adulthood) influences the intervention options available for a given individual (Hao & Layton, 2016), and may influence what assessments are feasible. Self-assessment on a written evaluation, for example, cannot be asked of a

non-verbal two year old (or likely any two year old, even with an age-appropriate level of language development, unless the assessment has specifically been designed for completion by this age group). Earlier identification, however, can lead to earlier intervention - which, in many cases, can play a significant role in mediating symptoms later in life (Center for Disease Control and Prevention, 2020). Developmental monitoring and screening (ensuring a child meets all appropriate developmental milestones) may be useful at 9 months, 18 months, 24 months, and 30 months old, per the advice of the American Pediatric Association (Hao & Layton, 2016). In the case of concern, this may lead to a comprehensive developmental evaluation by the child's doctor to further indicate whether a screening for ASD may be relevant to the case (Center for Disease Control and Prevention, 2020). Medical evaluations can be helpful in determining next steps evaluatively - whether other developmental disorders may be suspected, for example, and whether or not further medical assessment (blood tests, neuroimaging, etc) would be required alongside cognitive evaluation to rule out other potential causes. A medical evaluation, however, does not provide sufficient information to inform the interventions which may be most appropriate for a given case (Hao & Layton, 2016), and further screening per the age and ability level of the child may ensue. As a child reaches school age, an academic (educational) assessment becomes necessary to help the child's educational team determine what supplemental education or accommodations may be necessary (Hao & Layton, 2016).

Although a given presentation is rarely consistent across every case, certain neuroanatomical patterns have been noted as frequently occurring in Autism Spectrum Disorder patients, most frequently observed in the cerebellum, brain stem, frontal lobes, parietal lobes, hippocampus, and amygdala (Baron-Cohen, 2004). Primarily, these observed differences are found in the density of neurons in these areas. A frequently observed low density of Purkinje cells in the cerebellar cortex, for example, is suggestive of resultant "disinhibition of the cerebellar deep nuclei and consequent overexcitement of the thalamus and cerebral cortex" (Baron-Cohen, 2004). This observation indicates dysfunction in sensorimotor cerebellar output and overall temporal acuity regulation

(Baumel et. al., 2009). Abnormalities in neuron packing density have also been observed in the hippocampus, amygdala, and limbic system as a whole (Baron-Cohen, 2004). Reports have also noted "a reduction in the size of cortical minicolumns and an increase in cell dispersion within these minicolumns," which may "indicate an increase in the number of and connectivity between minicolumns" (Baron-Cohen, 2004). Minicolumns, playing a role in cortical organization and regulation that is still under some investigation, have been noted as being anatomically unique to the area of the brain in which they are located and distinctly un-clone like (Buxhoeveden & Casanova, 2002). These abnormalities in minicolumn size and connectivity have been particularly noted in the frontal and temporal lobes (Casanova et. al., 2002), indicating uniquity in executive function, memory processing, and sensory processing that is further supported by cognitive investigations into the relationships of these topics in conjunction with Autism.

Genetic associations have also been noted as a potential site of biological influence on the development of Autism, and remains an evolving investigation. Autism Spectrum Disorder is just that - a spectrum of disorders. Consequently, there will never be a single gene implicated in every case (Garber, 2007), and since the early 2000s, hundred of genes have been highlighted as potential contributors "to the serious deficits in communication, social cognition, and behaviors that patients often experience" (Rylaarsdam & Gumez-Gamboa, 2019). Of particular note has been the neurexen-1 gene, which binds with neuroligens (also implicated in prior research) and plays a prominent role in aligning and activating synapses (Garber, 2007). Further investigations of *in vivo* data indicate and "support the implication of synapse pathology and abnormal neural network formation in ASD" (Rylaarsdam & Guemez-Gamboa, 2019). Major leaps have been made in this area, and although it is not yet totally understood how, synapse-activating proteins like neuroligens, neurexins, and cadherins, as well as synapse-activating risk genes like synaptic vesicle cycling proteins such as SYN1, ion transport proteins such as SCN2A, and calcium voltage-gated channel subunits (among

others) play a definitive role in the observable symptoms associated with Autism Spectrum Disorder (Rylaarsdam & Guemez-Gamboa, 2019).

Investigations via neuroimaging (both functional and structural) have, while still maintaining the disclaimer that no one indicator is demonstrated in every individual diagnosed with ASD, revealed results which highlight a few interesting consistencies, particularly with information established via alternate research targets (such as genetics). Frequently, volume deficits are observed via MRI in the cerebellum, brainstem, and posterior corpus callosum, with some limited reporting of increased cerebellar volume and volume deficits in the parietal lobe in other cases - indicative of a "narrowed spatial focus of attention" following from neuropsychological perspectives (Baron-Cohen, 2004). Cerebellar abnormalities, be it increased or decreased volume or in studies of cell density as discussed above, appear to be one of the more consistent physiologically observable indicators of ASD. As children with ASD age, transient postnatal microcephaly has also been observed, and by 2-4 years of age, a substantial subset of those diagnosed with ASD "have MRI based brain volumes larger than average," reflective particularly of "enlargement of cerebellar and cerebral white matter, and cerebral gray matter" (Baron-Cohen, 2004). The overgrowth observed is noted to be anterior to posterior (with frontal lobes the largest) in the cerebral cortex, but cerebellar white matter volumes and vermis size "can distinguish 95% of toddlers with autism from normal controls," as well as predict their functional abilities later in life (Baron-Cohen, 2004).

Structural observations pair with functional neuroimaging to paint a fuller picture, as well. EEG and EFT has demonstrated "increased activity in sensory areas of the brain normally associated with stimulus driven processing, and decreased activity in areas normally associated with higher cognitive processing," as well as "unusually high activation in ventral occipital areas and abnormally low activation in prefrontal and parietal areas" on the EFT specifically (Baron-Cohen, 2004). Stimuli responses have also been shown to consistently demonstrate similar abnormalities. Heightened N2

responses to irrelevant stimuli and novel stimuli, a generalized P3 response to auditory stimuli within occipital sites in the visual cortex, and an abnormally heightened P1 in response to attentionally targeted stimuli but abnormally generalized P1 in response to untargeted stimuli all indicate significant abnormalities in stimuli recognition and attending abilities (Baron-Cohen, 2004). This is further supported by observations indicating indiscriminate but abnormal bilateral hemispheric activation during attentional shifts - paired as well with observed difficulty with rapid attentional shifts between modalities, spatial locations, and object features (Baron-Cohen, 2004). All of these findings are ultimately indicative of difficulty with shifting, attention, and sensory processing - deeply consistent with the most frequently observed symptoms in individuals with ASD.

Imaging studies are incredibly informative, and offer important insights into the physiological basis of some of the elements of Autism Spectrum Disorder. That being said, however, this is a complex spectrum of disorders. Current neuroimaging capabilities, while informative, are not endlessly so - and a movement towards combining neuroimaging data with cellular, anatomical, and cognitive studies in order to determine clinically relevant biomarkers is growing steadily (Ecker & Murphy, 2014). Many of these imaging studies, however, are conducted in isolation - making their low specificity difficult to directly marry with existing research across experimental disciplines (Ecker & Murphy, 2014). Interestingly, this disparity of discovery and applicability of that discovery has caught the attention of sociologists, who have noted a unique relationship between hope, uncertainty, and the trained ambivalence of a researcher towards their results in neuroscientists whose research is specific to neuroimaging in Autism Spectrum Disorder (Fitzgerald, 2014). Neuroscientists particularly comment on ongoing research with a “structured ambivalence” which engenders uncertainty, deflation, and low expectation of significant success - even as their research directions indicate a hope to create and discover clinically relevant biomarkers (Fitzgerald, 2014). This pairs interestingly alongside the encouragements of Ecker & Murphy (2014), who suggest that a movement in neuroscience research which works to fold neuroimaging into research alongside other disciplines,

as well as work towards increasing the specificity of neuroimaging to better pair with these disciplines (such as genetics research) would go a long way to increasing the relevance of imaging findings in the clinical sphere, and further encourage the development of clinically relevant biomarkers in both diagnostic and interventional scopes. After all, ASD investigations have historically focused on atypical anatomy, connectivity, and functionality - none of which develop in isolation, but rather critically interact with each other during development (Ecker & Murphy, 2014). These relationships are the basis of the large-scale systems that ultimately play the most substantial roles in clinically relevant symptoms of ASD behaviorally and neuropsychologically (Ecker & Murphy, 2014).

Beyond the anatomical and physiological basis of investigation into Autism Spectrum Disorder, cognitive investigations form an axis of equal importance, with perhaps slightly more immediacy in clinical relevance in their findings. Importantly, however, while cognitive perspectives hold more clinical relevance, they do not investigate the biological root of the symptoms, but rather how to approach interventions to assist with symptom management and mitigation. Two cognitive triads exist within evaluations of ASD: the triad of deficits (primarily under the umbrella of empathy-based skills; including social cognition, communication, and imagination of others' minds) and the triad of strengths (primarily under the umbrella of systemising; including islets of ability, obsession with systems, and repetitive behavior; Baron-Cohen, 2004). (Of note, terminology regarding the idea of "islets of ability" has undergone challenge which criticizes the implication that individuals with ASD only contain ability within "a sea of ignorance," (Mottron, 2019), and thus is considered less in modern theory as compared with the other two elements of systemising.) Executive dysfunction has been hypothesized to be a primarily root of the systemising drives experienced by those with ASD, but a solely frontal lobe-indicated pathology is not demonstrated by any physiological research at this point in time (Baron-Cohen, 2004). Many elements of executive dysfunction, however, are present in many individuals with ASD, although their precise manifestation can differ significantly on an

individual basis. Difficulty shifting attention and difficulty with sensory processing have been discussed above (Baron-Cohen, 2004), and both hold relevance in a discussion of executive dysfunction.

Another executive cognitive deficit of note in individuals with Autism Spectrum Disorder is inhibitory control. Those with ASD have been previously observed to demonstrate significant deficits with tasks that require them to stop a given behavior as compared to a control, particularly with strategic delay tasks (Schmitt et. al., 2018). This observation is suggestive of "reduced preparatory behavioral control may underpin inhibitory control deficits as well as repetitive behaviors in ASD," (Schmitt et. al., 2018). However, inhibitory control is not solely an executive function-based task, and difficulty with this skill cannot be definitively assigned to one source. For those individuals with ASD who present with significant systemising, executive dysfunction may be more relevant - but it cannot, as with many of the other biological indicators discussed above, be indicated as the sole force behind the symptom presentation. It may, however, help to inform intervention - Schmitt et. al. (2018) observed that expected age-related improvements in inhibitory control were not observed as consistently in the ASD group as compared to the control, which may be important in directing a critical period for intervention regarding inhibition development.

One topic of significant, substantial note in conversations of cognitive impairment in Autism Spectrum Disorder is that of social cognition. As defined by the American Psychological Association (APA), social cognition is "cognition in which people perceive, think about, interpret, categorize, and judge their own social behaviors and those of others" (American Psychological Association, 2020). Individuals with ASD experience "impairment in interpersonal behavior" which "can manifest in many ways and often includes fundamental impairments in social perception" (Corbett et. al., 2013). Frequently, this prevents children and pre-teens with ASD "from achieving appropriate developmental milestones and establishing interpersonal relationships, especially with peers" (Corbett

et. al., 2013). These difficulties establishing interpersonal relationships often stem from difficulty on the part of the individual as they attempt to relate to their peers. Reduced left medial frontal cortex activity has been observed in individuals with ASD during theory of the mind empathy tasks (Baron-Cohen, 2004). Individuals with ASD have also been observed as having physiological abnormalities in the amygdala (with a symptom profile similar to patients with amygdala lesions), as well as the orbito and medial frontal cortices - which, in combination, play significant roles in empathy and social cognition, alongside the superior temporal sulcus and gyrus (Baron-Cohen, 2004).

Social cognition is defined via three sub-domains: "perceptual processing of social information such as faces and emotional expressions (social perception), [...] grasping others' cognitive or affective states (social understanding), and [...] planning behaviors taking into consideration others' in addition to one's own, goals (social decision-making)" (Arioli et. al., 2018). Notably, this three-pronged definition is incredibly aligned with multiple noted areas of social impairment in individuals diagnosed with Autism Spectrum Disorder. Individuals with ASD are hypothesized to have difficult with a particular element of social understanding attributed to what's known as the "Theory of the Mind," defined as "the awareness that people have mental states, information, and motivations that may differ from one's own" (Arioli et. al., 2018). Social perception in particular, however, also influences the other categories significantly - in evaluating others' emotional states and opinions towards us through a confluence of facial expression, body language, vocal tone, and gaze direction, we ourselves gain the ability to understand their current emotional state, and adjust our goals (and/or our expectations of their social goals) accordingly (Arioli et. al., 2018). Individuals with ASD often not only experience difficulties with eye contact and body language themselves (as well as aforementioned difficulty with Theory of the Mind), but also considerable difficulty understanding emotional and physical expression in others. Interestingly, social perception in particular has been heavily linked to functionality associated with (amongst other areas, such as the posterior portion of the superior temporal sulcus) the function of the Fusiform Face

Area, or FFA - an area that multiple studies have noted observable hypoactivity as compared to neurotypical norms in patients with ASD (Baron-Cohen, 2004).

First described by Kanwisher et. al. (1997), the FFA is an area in the fusiform gyrus which demonstrates significant preference for the visual stimulus of faces as compared with other common objects of similar definition (houses used as the control in the initial experiment). This experiment allowed for the rejection of facial recognition as attributable to general visual recognition patterns - the specificity of the site indicating that it is selectively involved in the visual recognition and processing of faces. A debate exists about the domain generality or specificity of the FFA's capabilities. One argument claims the FFA is not solely capable of identifying faces - it is instead engaged in areas of visual expertise, particularly with faces and artificial objects which share similar visual constraints. This is best demonstrated in the "Greeble" experiment by Tarr & Gauthier (2000), demonstrating that when individuals were trained to attain visual expertise with an artificially created object given similar constraints as faces (the aforementioned Greeble), activation was noted in the FFA during neuroimaging capturing activity during Greeble recognition tasks. Resultantly, it may be concluded that FFA processing is in fact domain-general rather than specific solely to the recognition of faces and facial geometry (Tarr & Gauthier, 2000). Of note, however, is the fact that faces generally elicit the maximum response from the FFA - notable, particularly, because it indicates a significant intensity of visual expertise particularly associated with faces in the average human (Tarr & Gauthier, 2000). Further investigation of Greeble training also indicated some activity in the FFA prior to receiving training - and indicated that during manipulation of interpretation tasks, participants indicated Greebles as "face-like stimuli" (Brants et. al., 2011). This further is supported by Brants et. al.'s (2011) findings of a "large inversion effect for Greebles in the FFA in the first scan session," prior to any of their participants receiving any training (although the effect did not increase after training) and indicating that the previously observed neural inversion effect for Greebles observed by

Tarr & Gauthier (2000) is potentially due to the interpretation of Greebles as faces - which would be more consistent with a domain-specific hypothesis.

Regardless of domain specificity or generality, one major component of the FFA becomes clear - it plays an incredibly important role in the recognition not just of faces, but in our ability to effectively engage in social cognition (Arioli et. al., 2018). In individuals with ASD, however, the FFA is not the only region implicated in facial processing. In contrast to the hypoactivity observed in the FFA during facial processing, hyperactivation in multiple occipital and temporal regions, such as the broader fuisform gyrus, has been consistently observed (O'Connor & Kirk, 2008). This hyperactivation extends beyond facial processing and into voices and mentalizing tasks as well as non-social tasks, such as visual spatial attention tasks and visual-motor tasks (O'Connor & Kirk, 2008). The fusiform gyrus, however, has also been hypothesized to be a part of a system which leads to the observable dysfunction in ASD - rather than being causal in isolation, the observed irregularities in activation may be indicative of dysfunction within a social processing collective system (Schultz et. al., 2003). Observed correlations between fusiform gyrus and amygdala activation, for example, indicate the fusiform gyrus in isolation may not result in social cognitive dysfunction, but rather impact the collective result of a distributed system (Schultz et. al., 2003). This offers an interesting perspective to the variety of observable areas of unique function observed in ASD patients that, although frequently found, are not necessarily guaranteed to be observed in every individual with ASD. Rather, dysfunction, particularly in social cognition, may be a result of one or more potential disruptions to a social network which engages the FFA, fusiform gyrus, occipital and temporal areas, and even abnormal hemispheric communication.

Combining these findings with the neuroscience of social cognition paints a fuller picture than any one component of these findings in isolation. Hyperactivity in occipital and temporal regions, but hypoactivity in the FFA (which, if not definitively domain-specific, is at least implicated

in higher-order processing), is suggestive of a dependence on increased attention and processing dedicated to low-level perceptual information in individuals with ASD for both social and non-social information, making discrimination (and therefore, effective interpretation) more difficult as a whole (O'Connor & Kirk, 2008). The hypoactivation of the FFA serves as a relevant biomarker, but cannot be confidently established as a "cause" of social cognitive deficits (Schultz et. al., 2003). It may, however, inform our understanding of social impairment. After all, regardless of origin, FFA hypoactivity, especially alongside the above mentioned biomarkers, indicates a disparity in higher-order social cognitive processing as compared to lower level social cognition in individuals with ASD.

The hypoactivation of the FFA, though well documented, is difficult to parse in its own right regarding causality. After all, is the deficit observed in emotional recognition attributable (at least in part) to this hypoactivation? Is the deficit the result of decreased social motivation, engagement, or interest? Experiments conducted into Basic Emotion Recognition Tasks, Complex Emotion Recognition Tasks, and Trustworthy Perception Tasks, and Identification Tasks with adults with ASD (as well as a non-ASD norm population) by Walsh et. al. (2016) investigated this exact question. Identity recognition and social interpretation are distinctly different - one is based on qualities which are largely unchanging, while the latter requires an evolving and constant recognition and interpretation of facial information (Walsh et. al., 2016). Although it was expected that adults with ASD would diverge from the control group as emotion perception and social complexity demands increased, and unlike the results of prior studies of children with ASD, divergence was only noted as emotion perception demands increased - not within the domain of social complexity (measured particularly via the Trustworthy Perception Task and Identification Task; Walsh et. al., 2016). This is suggestive of the latter theory: that hypoactivity observed in the FFA is resultant of deficits in emotion perception, rather than difficulty with the social complexity of the stimuli (Walsh et. al., 2016).

Of particular interest of the Walsh et. al. (2016) study is the difference in this result from those of studies done with similar tests using children as the experimental group. The increased social processing abilities in the adult population indicate that this performance in this area may be altered by interaction with these concepts over time. This is also relevant to a theory regarding their findings - while the non-ASD control group relies on intuition to make the judgement calls about emotion and social understanding asked of them in these tasks, the adults with ASD often relied on a more deliberate, rules-based strategy to do so (Walsh et. al., 2016). This may suggest that some experimental designs are better or less effectively suited for success on the part of the participants with ASD, but it may also suggest that this is a skill that can be trained. The development of an experience base from which an individual may develop rules draws attention to a particularly unique suggestion of intervention style, as compared to existing interventions for teaching social cognition in ASD.

Designing interventions, however, is highly individualized in Autism Spectrum Disorder. Every person is different - some struggle with verbal language while others demonstrate little to no deficit, others struggle with motor skills while others yet are talented athletes. In particular, in an educational setting, each child with ASD is going to have unique educational needs, and accommodation is vital (Burns, 2012). Early intervention is particularly ideal - the potential for developing literacy is greatly influenced by progress made before the age of five, and early intervention in children with ASD can greatly promote this (though again, each child has individual needs and early intervention will still take this into heavy account; Center for Disease Control and Prevention, 2020). Leaning particularly into the potential neuroplasticity of children provides extra incentive for early intervention, as repeated exposure early in life creates an environment which fosters skill development (Burns, 2012).

Despite the need for intervention, and the potential benefit it may bring, many interventions frequently underestimate or outright disregard the ability level or desire to participate in individuals with Autism Spectrum Disorder. Furthermore, many interventions are heavily geared towards developing normative behaviors in a way that caters to normocentric ideals of ASD (Mottron, 2019). There exists a fixation on encouraging teaching behavior which appears normative - not necessarily teaching social cognition in a way that appropriately acknowledges the intelligence, desire, and existing perspective of the individual (Mottron, 2019). Too frequently, research conducted in a bubble which excludes autistic perspectives and relies heavily on laboratory findings draws conclusive evidence which exists contrary to accounts by those with ASD - a lack of desire for social interaction is popularly assumed to be present in those with ASD, but that is not necessarily the case (Jaswal & Akhtar, 2018). As is evident in the biological research dedicated to ASD, every case is highly individualized. The practice of assuming a lack of desire or motivation for social interaction in every individual with ASD would be fallacious. Importantly, this is true of the normal population as well - some individuals are more highly socially motivated than others, and the same has been found to be true in interviews with individuals with ASD (Jaswal & Akhtar, 2018). Furthermore, focusing on the testimony of those with lesser social motivation creates a culture which disregards the potential desire for an intervention to encourage social cognition but caters to the unique talents and approaches of those with ASD (Jaswal & Akhtar, 2018). There also exists a culture in cognitive neuroscience research regarding ASD that fails to trust the testimony of those with ASD, due to the potential that they struggle to convey their perspective appropriately to the interviewer (Jaswal & Akhtar, 2018). It's important, however, to remember how important it is to design interventions while keeping in mind the perspectives, abilities, and desires of those who will most benefit from it. After all, in order for engagement with an intervention to be successful, the participant critically must *want* to participate.

The testimony gathered in the research of Jaswal & Akhtar (2018) primarily consulted adults with Autism Spectrum Disorder, but this does not mean that elements of their findings do not apply to children. It may be even more important to consider, in fact, due to the significant lack of recorded testimony of children with ASD. As research currently stands, assumptions of a lack of social motivation underlay much of the social cognition research which exists for children with ASD (Jaswal & Akhtar, 2018). This is discussed in Walsh et. al. (2016) regarding the salience of their findings in adults with ASD and emotion/social recognition tasks in conjunction with prior beliefs about children with ASD, as mentioned above. This is even influential in intervention design. Many interventions are designed to eliminate behaviors such as motor tics to make individuals fit more closely into the social expectations of those without ASD (Jaswal & Akhtar, 2018). Rather than focus on how to make individuals with ASD "blend in" with the non-ASD population norm, it's prudent to consider *who* an intervention benefits when considering whether it is relevant to a given individual. Findings suggestive of social cognition as a trainable skill in youth, in combination with testimony which indicates a desire for social engagement in individuals with ASD, further suggest the desire and need for an intervention which engages these skills in a manner which appropriately appeals to children with ASD, setting them up for social success as adults while still regarding them as individuals worthy of respect and regard.

More attention has been directed towards intervention design in recent years, particularly regarding social cognitive abilities in Autism Spectrum Disorder. Particularly of note has been increasing evidence which supports group-based interventions as being overall more effective in developing and attaining applied skill which can be transferred to social contexts outside that of the explicit intervention or assessment (Wyman & Claro, 2020). Many programs that are successful in clinical contexts, however, struggle to see these skills transfer to broader social contexts (Wyman & Claro, 2020). The program evaluated by Wyman & Claro (2020; The UCLA PEERS program, a group-therapy approach designed to teach and demonstrate social cognitive skills in the classroom

context) was designed for teenagers, but was assessed for efficacy in young adults. The researchers suggest that it's possible this is the reason they saw an unexpected lack of out-of-assessment application - in studies with teenagers of this same program, more success in contexts beyond the assessment has been observed (Wyman & Claro, 2020). This is suggestive of a critical period in which certain interventions may be more effective (as discussed earlier via Walsh et. al. (2016) and Schmitt et. al. (2018)).

Social skills training in group settings is an increasingly studied intervention style, particularly in Autism Spectrum Disorder populations. Explicit (top-down) models which rely around a thematic base for each session are favored in some circles for their thematic coherence and more teachable and controllable content (Guivarch et. al., 2017). Implicit (bottom-up) models, however, which rely on the nature of the situation to allow teachable moments to be derived from organic context, have received increasing attention and study in recent years (Guivarch et. al., 2017). Through weekly half hour sessions which involved engaging children with ASD without demonstrated intellectual disability in a series of board game, strategy game, and individual games adapted for group play, Guivarch et. al. (2017) engaged conversation skills, theory of the mind, cognitive flexibility, and exchange and management of emotions in the patient population organically in order to teach and encourage adaptive skill in the population. In review of post-intervention via WISC scores, improvement was primarily observed in the cognitive flexibility and empathy of the participants, with notably large effect sizes (greater than or equal to 0.9 on the SEP, CARS, and EQ scores as compared to the pre-intervention assessment baseline; Guivarch et. al., 2017). These findings encourage the idea that implicit intervention, especially in the context of social skills training in youth populations with ASD, may be better suited for generalization of learned skills as compared to their explicit intervention counterparts (Guivarch et. al., 2017).

One intervention style which highlights implicit techniques and has come to recent attention in conversations surrounding Autism Spectrum Disorder has been that of a drama-based therapy. One of the most vocal advocates for this methodology has been Blythe A. Corbett, of the Vanderbilt University Kennedy Center and Center for Cognitive Medicine and director there of the Social Emotional Neuroscience Endocrinology (SENSE) lab, which specializes in research of "reciprocal social functioning and stress responsivity of children with autism spectrum disorder" (Corbett, 2021). In 2011, this lab first approached the idea of utilizing the SENSE approach of integrating intervention into natural settings (such as during play) in conjunction with theater (Corbett et. al., 2011). Initially, the modeling (video and in-person), environmental, and mentor/trainer techniques of the SENSE lab were piloted in a musical production of Disney's The Jungle Book, where participants in the production with autism spectrum disorder engaged primarily with video modeling as well as the other elements in order to rehearse their roles. The biological (cortisol and oxytocin) and neuropsychological (NESPY, SRS, and others) evaluations of the participants during and following the intervention demonstrated some level of impact as a result of the participants' engagement with the program (Corbett et. al., 2011), although no one component could be solely identified as the major influencing factor responsible for these results. What the results did demonstrate, however, was a space rife with potential for further investigation - something Corbett's SENSE lab, along with many others, have begun to explore. These explorations have gained increasing specificity and diversity in kind, even within Corbett's SENSE lab.

Of particular interest was the finding that the SENSE Theater technique, particularly when integrated with both a performance-based theatrical approach and an improvisation theatrical approach over a two-week summer camp model, resulted in a significant difference between the participants' performance pre- and post-intervention on facial memory tasks (Corbett et. al., 2013). This result was present even with no direct face training, and notably did not extend to emotion recognition, something which Corbett et. al. (2013) speculate may require direct training in order to

see an impact within. Significant results were also demonstrated in this model in the broader framing of social cognition, as measured by the Social Responsiveness Scale (SRS), and in adaptive living skills (as measured by parents, along with a significant decrease in parental stress), while no difference was observed in playground cooperational play (Corbett et. al., 2013). This intervention's success is primarily attributed to the peer interaction focus of the technique - ultimately, the areas of impact all may be returned to peer reciprocity in social interaction, and while much of this was in a theatrical context, that reciprocity translated to non-intervention presentation (Corbett et. al., 2013). Cortisol levels were also noted to be increased at the beginning of the intervention, but by the end of the program had normalized once more - indicating an adjustment period that should be noted and accommodated for, but would be entirely expected in the process of introducing individuals with ASD to a new peer environment and social engagement (Corbett et. al., 2013). The peer interaction and heavier focus on improvisational theater rather than a solely product-based approach (improvisational theater emphasizes a more process-based approach to theater) indicate promising results for the potential impact of a program which more heavily relies on improvisational theatrical techniques in order to encourage similar results.

These findings have also been, via further research, increasingly demonstrated to be effective within larger cohorts (and therefore gain increasing validity as a more generalizable intervention style). The SENSE Theater techniques of rehearsal towards a final product via games, role-play exercises, improvisation, character building exercises, and modeling rehearsals demonstrated efficacy in a cohort of 77 children with ASD aged 8-16 years old in positively influencing social cognition, specifically with relation to the theory of the mind, as had been previously hypothesized and observed in smaller cohorts (Corbett et. al., 2019). Findings in the 2019 study by Corbett et. al. indicate significant positive influence on verbal theory of the mind skills in children with ASD. The potential for influence in facial memory was observed (more observable in other variations of this program (Corbett et. al., 2013), although not found to be statistically significant in this study) in an observable

increase in ERP activity upon recognition of faces, although this was not a statistically significant difference from the pre-intervention assessments which had been conducted. The inclusion criteria of Corbett's studies, however, should be discussed in conversation with the generalizability of the SENSE Theater program's intervention potential. Within the umbrella of children with ASD, the SENSE Theater tends to be most effective in youths aged 8-16 (Corbett et. al., 2019). Furthermore, individuals that demonstrate significant intellectual disability (IQ < 70 as measured by the Wechsler Abbreviated Intelligence Scale) or behavioral concerns (significant aggressive behavior, defined as verbal or physical threats to harm other people or themselves, within the last six months) were excluded from the program (Corbett et. al., 2019). This comes back to two major principles. For one, an individual who is not able to participate in a program which requires a child to verbally and largely independently engage with the facilitator and peers will not be a good fit for this intervention. Secondly, and importantly, an individual that does not want to participate in the program will ultimately not thrive in a program of this sort - not because the program has failed them, necessarily, but because they may actively engage in behaviors which prevent them from succeeding. Furthermore, they may engage in these behaviors in a manner which prevents others around them from engaging in the program or thriving within it. Interventions of a similar nature to Corbett's SENSE Theater program, then, likely must fall within similar inclusion criteria in order to see success, particularly in the areas of interest (such as social cognition, theory of mind, and facial memory) noted here.

Investigations have been conducted into how to make the experience of theater (not just the creation process but the environment of attending theater overall) more accessible to individuals with Autism Spectrum Disorder. Attention deficits, needs for both increased and decreased sensory stimulus alike, and visualization of broad concepts (the balance of each unique to every attendee with ASD, and no two needs identical) make this a more complex task than it may appear on the surface, but a worthwhile endeavour in order to create more accessible enrichment opportunities both in and

outside of an educational context (Giserman-Kiss et. al., 2020). This often makes it difficult for parents and educators to find appropriate and engaging enrichment activities for children with ASD - however, when techniques specifically geared towards making theater more accessible on the axes mentioned above, research by Giserman-Kiss et. al. (2020) has revealed significantly increased satisfaction with the experience (measured in parents, educators, and children) as compared to their pre-show expectations. Some of the accommodations investigated by Giserman-Kiss et. al. (2020) may be applicable in the context of creating theater as enrichment as well, not solely in the context of observing or participating in immersive theater. Taking into consideration the frequently comorbid attention deficits observed in individuals with ASD, for example, the inclusion of visual schedules (in order to indicate transition periods) and the integration of brief attention breaks into the program may both be important in retaining focus and interest in a creation setting as much as in an observation-based setting (Giserman-Kiss et. al., 2020). Also notably, sensory engagement may be a benefit to some children, but a deterrent to others - providing opportunities for sensory engagement (such as using sounds throughout the experience or having textured and/or easily manipulated props for interaction) may be valuable, but should always be optional, and engagement with these opportunities should be entirely participant-determined (Giserman-Kiss et. al., 2020).

Limited investigations have begun into improvisational theater, specifically, as a potential scaffolding style for a theater-based social cognition intervention. Primarily, this has been observed in older teen populations, such as in the study by Wendler (2018) which saw participants with a mean age of 15 years. Via 90-minute long sessions of improvisational training and games via a partnership with an existing improv training program, which were held for 12 consecutive weeks, Wendler (2018) observed an impact on some anxiety reduction (nervousness, but not worry) and a decreased sense of feeling left out (although an increased sense of loneliness, potentially attributable to increased social awareness) following the intervention. True conclusions regarding social cognitive impact, however, were difficult to draw due to a failure of completion of the pre- and/or post-intervention assessment

(via the Social Responsiveness Scale-2). No control group existed within the study, as well, making a point of comparison of the efficacy of this program difficult as compared to studies in this field by individuals such as Corbett. Many, including Wendler and Corbett, seem to believe that improvisational theater's emphasis on divergent thinking and unscripted nature (resembling a general social interaction) make it a good match as a potential intervention for social cognition training (Wendler, 2018) - but limited research has been attempted, let alone completed, in this specific discipline. As such, a demand within the literature exists for evaluation of such an intervention style, with a complete screening process and robust experimental design which incorporates the observed successful elements of the previous work in this field.

The experimental design of Wendler's (2018) study also highlights another topic mentioned in a different context in conversations about the findings of Giserman-Kiss et. al. (2020): accessibility. The participants in Wendler's (2018) program did not attend a site-specific intervention administered by a psychiatrist, cognitive neuroscientist, or clinical psychologist, but rather attended an existing 12 week program at an existing improvisational community program. In recent years, non-specialist mediated interventions for individuals with ASD have been increasingly evaluated as a cost-effective means of helping individuals to achieve developmental milestones and make social cognitive and activities of daily living (ADL) training more accessible overall (financially, spatially conveniently, and otherwise) to those who may require or desire such interventions (Naveed et. al., 2019). In a meta-analysis of studies into peer, teacher, aid, parent, and general non-specialist mediated intervention styles (a total of 33 studies), the majority of which were conducted between 2010 and 2019 (31 of 33), a plethora of statistically significant effects were found across a wide variety of social cognitive and motor skills trainable via non-specialist mediated intervention (Naveed et. al., 2019). Of particular note, a significant positive influence was noted in the domains of measured child distress, communication, expressive language, joint engagement, motor skills, parental distress, parent self-efficacy, parent-child relationship, repetitive behaviors, self regulation,

social skills, symptom severity, and visual reception (Naveed et al., 2019). No significant improvement was observed across the studies in categories of adaptive behaviors, receptive language, or joint attention (Naveed et. al., 2019). Of interest in the context of the proposed improvisation training-based intervention are the domains of communication, expressive language, joint engagement, self regulation, social skills, and general symptom severity - all of which were noted to be significantly and positively influenced by non-specialist mediated intervention. This is most promising in the secondary goal of this intervention as proposed - making such an intervention more accessible to those who may have interest in or a need for it. Although Naveed et. al. (2019) highlight that peer and teacher-mediated interventions are certainly less frequently studied as compared to parent and aid-mediated interventions, and long-term follow up of any study was rare, they demonstrate potential for further investigation and pursuit. It is important to note that they must be considered as a potential beyond initially specialist mediated research, and should be considered as a potential further direction following initial research.

The neurological process implicated in social cognition and facial memory, in conjunction with the social behaviors and desires of youths with Autism Spectrum Disorder and the qualities of theatrical enrichment (particularly improvisational theater), highlight the potential to develop an intervention which utilizes improvisational theater as a means of developing social cognitive skills in Autistic youth. This intervention style holds potency not just as a clinically relevant intervention, but an accessible one as well, with the potential for a clinically-informed but community-based setting for the intervention's process making it highly accessible to those interested - potentially more so than many existing interventions for children with ASD.

Methods

Participants

Inspiration was derived from the aforementioned studies (particularly those of Corbett et. al. (2011, 2013, 2019)), as well as Gutman et. al. (2010), who observed two adolescents with High Functioning Autism in a single-subjects design, instituting a motor-based social skills intervention in the context of a 7-week after school program. I would seek to recruit 26-30 total participants with an existing diagnosis of Autism Spectrum Disorder between the ages of eight and twelve, from the surrounding community of where this study is being conducted. Ten of these participants would remain as the control group, and would be assessed at the same intervals as the intervention group without participating in the program. Assignment to the intervention or control group would be via random assignment. Of the remaining 16-20 children, these participants would be split into two groups of 8-10 for the administration of the intervention. The groups would be entirely separate from each other (different days of participation) in order to keep numbers small within the setting (and therefore guarantee plenty of space for every participant to engage in the program). Having multiple groups, however, would increase the data collected by the study overall, and help to demonstrate that any results are not indicative solely of the interactions of one particular group. Assignment to each experimental group will be random as well, contingent upon the ability of the participant to attend the assigned day. Accommodations must be accounted for in the event that a given participant is only able to attend one of two potential "class" days, but ideally both groups will be totally randomly assigned.

Sites of recruitment may include public school systems, advertising via community resources (such as a local newspaper or community recreation center/activities board, or other community resources designed for Autistic youth, such as a group therapy or social work office). No prior experience with theater would be required, nor would prior experience with theater serve as exclusion criteria - any and all experience levels would be sought for this study (it would be relevant, however, to collect any relevant information about prior theatrical experience and the duration/intensity of that experience for comparison during data evaluation). Consent would be required of both the participant

and their parent or guardian, and regular contact would be kept with each parent/guardian before, during, and after the research period to keep them updated on what to expect from this project. No compensation will be offered to participants, but unlike many typical community recreation activities, no registration fee will be requested in order to encourage participation regardless of socio-economic status.

Materials

The study would involve pre-assessment of the participants to establish a baseline, using a battery of assessments to observe and record social cognition skills prior to the program. The Gilliam Autism Rating Scale, Third Edition (GARS-3) and Social Responsiveness Scale, Second Edition (SRS-2) will serve as both pre- and post-intervention evaluation. Both scales will be administered by an individual qualified to do so, in compliance with the requirements for administration of each assessment (Pearson Assessments, 2021; Constantio, 2012). The GARS-3 scale, which assesses symptom severity in Autistic youth aged 3-22, evaluates symptom profiles along six subcategory axes: restrictive/repetitive behaviors, social interaction, social communication, emotional responses, cognitive style, and maladaptive speech (Pearson Assessments, 2021). Due to this assessment variety, the GARS-3 will be used as a general evaluation of symptom severity, and to confirm the existing diagnosis (and therefore, qualification to participate in the study). A secondary focus for this assessment, however, will be placed on the social interaction, social communication, and cognitive style categories, as these are the areas of most note in conjunction with the study's hypothesis. The SRS-2, which assesses social impairment in Autistic youth aged 2.5-18, will be used for more socially-specific assessment and evaluation. This scale measures social impairment on five subscale axes: social awareness, social communication, social cognition, restricted interests and repetitive behavior, and social motivation (Hao & Layton, 2016). This assessment will be most useful in

pinpointing which specific areas of social performance, if any, are most impacted by the experimental intervention.

If possible, per Corbett et. al. (2013) and aforementioned research into the hypoactivity of the FFA in individuals with ASD, the NEPSY-II would also be an ideal inclusion in order to assess facial memory and recognition. This assessment, however, would necessitate a significant amount of extra time dedicated to each individual for assessment, as administration of the full evaluation generally takes 45 minutes to an hour to complete (Korkman et. al., 2007). As a consequence of this, this would only be feasible to administer if a separate session was dedicated to administration of this assessment - unlikely to be possible, taking into consideration previously existing accounts of difficulty in pursuing completed assessments for full comparison (Wendler, 2018).

Materials necessary for the theatrical portion of the intervention are fairly minimal. Ideal engagement would see participants in a theatrical setting rather than a clinical one, although any open space removed from the idea of a clinical setting will suffice - a stage is not necessary, but an open space with plenty of room for movement absolutely is. Participants should not feel as though they are taking part in a study, but rather should feel as though they are engaging with a fun activity in order to create an environment most reminiscent of a community program. A local theater, either in a local school, community theater, or university department, would be an ideal setting for the improvisational theater aspect. Barring this, any large space, such as a community center's general purpose room or a large classroom with all desks pushed to the edges of the room would be appropriate as well. Pre- and post-intervention assessments (as discussed above) will occur in a more formal setting, such as a clinical office or classroom environment.

Some props may be required for the completion of some improvisational theater games. Examples may include a hat and "emotion" cards (pieces of cardstock with emotions named and represented with an emoticon) for a modified "Scenes from a Hat" game (Balonon-Rosen, 2017),

instrumental music for a freeze dance warmup, or "silly" items such as a fake flower, a shoe, or a wooden spoon for an "alternate uses" prop grab-bag game. A full index of warm-ups, improvisational games, and cool-down activities to be selected from is included (Appendix A), and all necessary props are listed in accordance with the relevant game.

Procedure

Both the GARS-3 and SRS-2 will be administered prior to beginning participation in the intervention, as well as following completion of the program, to both the control and experimental groups. Pre-assessment will occur a week prior to beginning the program (on the same day as experimental participants will attend their program in the weeks to come, ideally). Scoring should be completed prior to the beginning of the program, particularly the scoring of the GARS-3 assessment, to confirm the existing diagnosis of Autism for the purposes of this study and ensure all participants fit the necessary criteria to continue on to the intervention portion of the experiment.

The improvisational theater intervention as a whole will consist of twelve one-hour sessions, held once a week for three months (not including the assessment days; this is solely the sessions dedicated to engaging participants in the program itself). The consistency of this structure mimics a community program, as in the research of Wendler (2018). This is ideal, as this study is not only assessing whether such an intervention is effective in improving social cognitive skills in Autistic youth, but whether or not such training can be made accessible on a community scale, beyond a clinical or explicitly therapeutic setting. This structure and duration of intervention administration also takes into account the attention span and potentially demanding schedules of the age group of participants. Finally, to have the intervention spread out over a three-month period (repeated gradual exposure to these exercises and concepts) will hopefully encourage long-term retention of skills more so than a weekend retreat or longer sessions over a shorter period of time might.

The first two sessions will consist primarily of trust building exercises, as well as exercises designed to integrate participants with the concept, expectations, and rhythm of improvisational theater. This is primarily to build trust and comfort between the participants, as well as between the participants and the group leader. A beginning introduction to some of the more traditional or involved games and activities will occur here, but in order to develop an atmosphere which encourages participation, especially with an Autistic youth population, the first few sessions will be more geared towards comfort and easing into the idea of "performing" alongside the other participants. At the end of all sessions, cool-down exercises will be completed before the participants are dismissed to return home with their families.

Following these establishing sessions, the balance of these sessions will shift in favor of the games and activities more traditionally associated with improv theater. Warm-up exercises will still play an important role in the sessions, but will dominate far less of the schedule as they will have in the two establishing sessions. The majority of sessions will be dedicated to a few games, chosen from a list (Appendix A) which includes descriptions of the games and exercises, what will be asked of participants, necessary props (if any), and the intent of the game or exercise. One example is a modified "Scenes From A Hat" game a la the television show *Whose Line Is It, Anyways?* In which students will draw a card depicting an emotion from a hat at random, and will be asked to act this emotion out in front of the other participants, who will in turn attempt to guess what the emotion the participant drew (Balonon-Rosen, 2017). Another example of a different type of activity would be a modified version of the "Gibberish" game, in which one participant speaks in emotive gibberish and another participant "translates" their speech to the audience (the other participants and group leader) accordingly (Maas, 2019).

Ideally, sessions will be pre-planned in such a way as to select exercises which flow into one another based on common themes. After each game, exercise, or activity, a brief period of discussion

will occur to encourage participants to reflect on their experience, as well as, over time, to encourage some self-awareness in a manner conducive to encouraging lasting social cognitive skill development. This will be easiest to facilitate if each game holds relevance to a similar theme, such as using the modified "Scenes from a Hat," the Gibberish game, and an emotion-themed run of the "Sculpting" game (Appendix A) in order to further conversations about physical cues for emotions. Questions in this example case may include elements such as, "What made it easier to guess what your friend was trying to pretend to be? What made it harder?" or "What are some other ways you might have approached this challenge?" Cool-down exercises will still play a prominent role as well, serving as a transition from the session to returning home, as well as serving as a buffer between activities if the energy level in the room becomes too intense to effectively continue on to the next activity, or complete the current one. Cool-down questions may also be applied at this point in time. Questions such as "What was fun about what we did today?" or "What was your least favorite part of today?" can help the group leader to adjust plans for the following week accordingly and keep the experience exciting, fun, and ultimately engaging for the participants.

In order to better understand retention potentials, post-assessment will occur at two separate intervals as opposed to one singular testing session. The first, in order to mirror the pre-assessment and control for any influence testing too close to an active session may have on results, will occur in the week following the final session of the program (on the same day and in the same time slot as the participants completed their pre-intervention assessments, ideally), using the same assessments as were completed three months prior at the beginning of the experiment. During this testing period, it would also be prudent to solicit an "exit survey" from the program participants while the material and experience is still fresh in their mind. This would be a more formal recognition of questions similar to those asked during the cool-down period at the end of each session - inquiries into what participants enjoyed, what they did not like, what they felt they learned, where they had the most fun, and so on. For the second interval, testing will occur three months following the previous

assessment. Retention for this session is the most likely to "drop off" due to the months of removal from the intervention, so reminders and plentiful contact in the lead up to the final assessment period will be of great importance. After completion of this final assessment period, participants and their parent/guardian will be thanked for their time, debriefed, and dismissed. Assessment of the control group will occur in these same periods, but will exclude the exit survey and other subjective measures of the program itself.

Results

There are two types of data being collected as a part of this project - observational, subjective data, and quantitative, objective data. Both of these collections will be tantamount to discovering not just the potential impact of such an intervention, but the best approach for the enjoyment of the participants. It is important, however, to take note of how each set of data collected may be applied for maximum efficacy in refining this program for community use.

The first category of data collection (the subjective data) will be that which was collected throughout the program during the cool-down question period, as well as during the exit survey collected during the second assessment period. This will be solely available in the experimental pool. If participants do not enjoy the experience enough to actively want to participate, then no matter what the results of the data demonstrate, the experiment is a moot point. In order for the intervention to be effective, participants will need to want to actively engage with it. Collecting subjective data about the likes and dislikes of participants will be effective in providing examples of how to adjust the program accordingly. It will not, of course, apply to every future use of this intervention, as every group of participants will differ in their likes and dislikes. It will, however, provide a baseline for how this objective information may be best processed and applied to the program before, during, and after the engagement period.

The second type of data collected (the objective portion) will allow us to analyze how effective this program actually is at reinforcing and teaching social cognitive skills to the participants. This data will be available for comparison from both the experimental and control groups. Having multiple periods of post-intervention assessment will reinforce the investigation of this influence even further. While the first post-intervention assessment will allow us to compare results of the intervention immediately following participants' experience and engagement with it, the second post-intervention assessment at the three month mark will help to highlight what, if any, long-term impact such training may have on social cognition. The results may indicate no relationship between the intervention and an improvement in social cognition within the experimental population, indicate a need for semi-consistent engagement with this program in order to maintain the positive impact on social cognition within the population, or may indicate a long-term impact of the intervention on social cognitive skills. Comparative analysis of the correlation between pre- and post-intervention assessment results, as well as between the short and long term post-intervention assessment results, will indicate what, if any, significant relationship exists between the social cognitive skills of participants before and after their participation in the program.

Discussion

Improv theater, by its nature, makes it an incredible field of potential to develop the social cognitive skills often struggled with by individuals with Autism Spectrum Disorder, making it not only a clinically viable intervention but one which is viable along an axis of accessibility as well. In terms of both accessibility and clinical viability, conversations with experts in the theatrical, clinical, and applied improvisational theater fields have confirmed this suspicion as one which holds merit and worth in its investigation. Unsurprisingly, these perspectives frequently are aligned in not only where the value may be found in an intervention of this style, but also in what needs to be prioritized in order for clinical goals to succeed.

Due to the ongoing COVID-19 Global Pandemic (ongoing throughout the duration of this project) as well as a few other contributing factors, a pilot program was not realistic to pursue and evaluate at this time. Resultantly, interviews with experts in the fields of theater, applied improvisation for skill development, and social work with a clinical focus on Autism Spectrum Disorder were consulted as a supplement to the more conclusive data lost to circumstance. Each expert agreed to recording their perspectives on this project's methods, designs, and overall theory behind the intervention. Their perspectives were invaluable, particularly in understanding the necessity of an orientation-based structure, especially in determining how to balance pushing boundaries with creating an environment in which children can truly enjoy themselves and be themselves. Ultimately, their most valued insights were provided in the refining of the project's "mission statement" - how it seeks to help, and most importantly, how it seeks to work *with* (not for) the participants.

In developing a "mission statement" of sorts for this intervention, Randy Wyatt (a professor and director of theater based in Schenectady, NY) and Steve Szalowski (a licensed social worker who specializes in working with individuals with Autism Spectrum Disorder based in Colonie, NY) are largely in agreement: generalizability and accessibility are key. "The idea of 'get the result before you have the experience' is pretty deadly, I think," Wyatt, the professor (personal correspondence, May 28, 2021) shared in discussion of where valuable skills may be found in an improv setting. "When somebody demonstrates that they can truthfully play, I think there's so much in that as a starting point. That I can - I can't make somebody funny in eight weeks, but I might be able to get them to trust their truthful instincts maybe over eight weeks, or at least once and let them know what that feels like, you know? Because there's a crazy amount of energy that's released right when somebody goes, 'here's an idea I had off the top of my head that somebody else has supported me on, and we made something from it.' And maybe it's not even comedic, but I had the guts to be able to do it, and I am not going through the 'oh, I should have said that' or 'well, my idea's better, but I

didn't say it,' or all that kind of after thought, you know? It's so rare when people go, 'I said the right thing at the moment it was necessary. So I think those are the things I think are particularly rewarding to watch people do" (R. Wyatt, personal correspondence, May 28, 2021).

This is ultimately incredibly similar to Szalowski's insights. "If you're working out for a sport, you're working out for the entire sport," the clinician offered. "Everything is a social muscle. How do I get my sense of humor to be controlled? Because I could be funny, but I also have to be tempered in the idea of reading the room, and understanding that not everybody wants to laugh all the time and not everything I think is funny is what they'll think is funny. Understanding that there is that piece that is a joining piece of me being funny has to have some level of bridge. If I feel comfortable when I'm doing something I enjoy, how do I feel comfortable in something that I don't enjoy? How do I get through it? How do I not make people feel miserable?" (S. Szalowski, personal correspondence, June 1, 2021). To this social worker, an expert on designing interventions for this population, that generalizability is key - as is the experience itself. "'How do we educate people on generalization?' That should be the goal. What skills do you want to generalize? Is improv a way to get there? Yeah, absolutely," (S. Szalowski, personal correspondence, June 1, 2021). Tantamount to the success of that generalizability, though, is how improv may be applied outside of the context of the exercise itself.

Speaking on improv's viability, Szalowski shared similar insights with Mr. Dan Sytsma of Improv Effects (an applied improvisational company based in Kalamazoo, MI). From the clinician's perspective, "What improv does is it kind of gives you the idea about, ok, set, domain, context. All the pieces of "you can do anything you want" and not make it a roleplay? You make it improv. A roleplay has therapeutic implications that I think more often than not are useless. We roleplay a crisis intervention, I guarantee you that you're gonna have some adrenaline going, but you're not going to be able to feel the same way as if I put you in that situation. Whereas, if I put you in an improv

situation, you're gonna feel totally different" (S. Szalowski, personal correspondence, June 1, 2021). Ultimately, however, the participant has to *want* the skills learned in that improv setting to be generalizable. "When we're talking about generalizing skills, you've gotta be looking to generalize skills," Szalowski highlights. "And when – that's universal, that's how we generalize. […] So you have to look at in terms of your research – how do we get kids to be motivated to generalize the skills? They've gotta be motivated to do it" (S. Szalowski, personal correspondence, June 1, 2021). Interventions are ineffective in two populations - populations where participants actively work to prevent the intervention from working or do not want to participate outright, and populations where no conversation is allotted to the intervention itself, and the activity is completed essentially out of the context of its most teachable qualities.

Sytsma agrees with this premise. His usual population is a bit different from the one discussed in this thesis (corporate workshops as opposed to therapeutic intervention), but the struggle to engage a population and motivate them to want to learn the generalizable skills underlying the exercises is still one he faces regularly. Preemptively getting groups on board, the improv specialist shares, and being up front and honest with them about what will be expected of them and what they will not be asked to do, goes a long way in ensuring a more enjoyable experience for everyone involved. "Some of our preconceived notions of it are completely valid. I mean, there certainly are lots of applied improvisation coaches that, you know, maybe aren't a good match for a particular group. [...] But a few [...] tools that are very useful are being very honest and being as genuine as humanly possible, while still having that positive energy. [...] While still having a level of energy that is going to be forward moving, a lot of times, pointing out the negative of something or pointing out something that is not great or challenging or scary can purely be just a negative moment. I know you're not going to want to do this, but you know there's a way to enter that moment, recognizing this is challenging, and this is the one that gets you to a really cool place, you know - finding more and more of those ways, and it's just different for every group. So I think that's a big one - being honest

and genuine up front with that note of, 'here's what we're going to be doing and here's what we're not going to be doing.'" (D. Sytsma, personal correspondence, May 27, 2021).

That clarity of approach and base setting of expectations sets up a "safe" social situation, according to Szalowski (personal correspondence, June 1, 2021), which can inhibit the generalizability of the skill - unless careful detail and attention is paid to encouraging the conversations about what makes the practice generalizable. Therefore, the therapeutic element of this practice is not the improv itself - it's the conversations that happen in the heat of the moment, and the discussions that occur following the conclusion of a game or activity. Getting people to enjoy engaging with the process requires more care, as Wyatt's experience in the classroom has taught him. In engaging students with an improv setting, the professor notes how "what I have to accommodate my pedagogy now is if somebody says 'I'm actually not comfortable doing that.' Rather than be like, 'Well, we're all doing this and we need to do this, because this is part of it,' it's being able to say 'yep, there's room for us to sit this out,' which I realize now creates a feeling of, 'all right, you're doing what you need to do, but you're still part of the class. So we have to do it, but you can observe and you'll still be alert, and you shouldn't feel ostracized for telling me what you need' - so that's a new way of shaping pedagogy" (R. Wyatt, personal correspondence, May 28, 2021).

From all three professionals, in all corners of the domain intersections vital to the success of a project like this, one message is clear: the generalizability of skills is key, but if participants do not want to engage with a project, it doesn't matter what skills one is trying to develop, because the will never truly take hold. The environment needs to encourage participation, but as with any population (but especially with a population of youths with ASD), clear communication of expectations is key. Some of those expectations, of course, may be environment-specific. This creates that safe social environment (S. Szalowski, personal correspondence, June 1, 2021), however, and so the discussion becomes key to encouraging the pushing of boundaries and reflection on the generalizability of the

skills being used in the moment. The first two sessions being set up to primarily consist of warm-up exercises helps to set those expectations for what this class will be. This develops the rules and expectations which keep people safe, but firmly establishes participation expectations in equal measure. Participants both have a space to understand what will be expected of them, and from this point, conversations can begin. This is where the transfer of skills best occurs - in the moments which challenge the boundaries of the "safe" social situation and ask participants to, even theoretically, apply what they have organically engaged with in the context of the improv class to the world beyond the doors of the room they're currently in. Demonstrations and facilitator participation, to Wyatt and Sytsma as experts in theatrical (improvisational) practices, are key to establishing expectations, boundaries, and how to be honest with each other.

The goal of utilizing improvisational theater as an intervention to develop social cognitive skills in adolescents with Autism Spectrum Disorder is not to "fix" a problem that does not exist, or to approach the experience with the same expectations one would approach a room full of adults without ASD. Rather, it is to create a space which encourages not only the use and active engagement of social cognitive skills that are often observably deficient in individuals with ASD (and which negatively impacts their quality of life), but also the conversations which make these skills generalizable beyond the intervention itself. The behavioral and cognitive features unique to individuals with ASD are supported heavily by existing neuroscience literature, indicating that critical periods of training are still viable. An individual child with ASD will always be an individual child, and no part of this intervention is intended to disrupt their personality - instead, the goal becomes to help them understand how to express themselves and interact with others around them in such a way that they can share their personality, interests, and fantastic selves with others with less anxiety, uncertainty, frustration, or any other struggles they may encounter. In increasing the strength of participants' theory of mind and practiced behaviors in an unscripted but mediated setting, the goal is to set them up for success on multiple social axes in multiple capacities. Every participant is unique,

but with an approach that can be individualized, participants are set up for success according to their personal desires and struggles.

Appendix A: Improvisational Games, Activities, and Tasks to be Used in the Development and Execution of a Community-Based Social Cognition Skill-Building Intervention

1. **Warm-up exercises**
    a. **Circle Dash (derived and modified from Rohd (1998))**
        i. Time: 5-10 minutes
        ii. Instructions: One person is the "middle" player, with all the other participants forming a circle around them. From their positions within the circle, two participants must silently signal to each other, and agree to switch positions. They will then attempt to do so before the "middle" player can steal one of their spots on the outside. If the "middle" player is successful, the participant who did not make it to their new spaces becomes the new "middle" player.
        iii. Skills highlighted: Nonverbal communication
        iv. Notes: The program group leader may opt to participate in this game, either by starting as the "middle" player to help to teach expectations for the special role or as a fellow participant. The latter option also allows the group leader to "rescue" a participant from being stuck as the "middle" player by attempting a too-difficult switch or by being too slow semi-intentionally, and keep the game moving.
    b. **Minefield (derived and modified from Rohd (1998))**
        i. Time: 10-20 minutes
        ii. Instructions: All participants, using non-breakable and non-sharp objects (such as jackets, backpacks, or shoes) create a "minefield" in the center of the room (enough space must be left to reasonably navigate between the objects from one end of the room to another, but not with excessive ease). One volunteer participant will then close their eyes and navigate from one end of the minefield to the other, with the group guiding them verbally and the supervision of the group leader to ensure safety. The rest of the participants cannot designate a leader or one speaker - they must work together to instruct the volunteer on where to step.
        iii. Skills highlighted: Verbal communication, teamwork
        iv. Notes: Variations on this game can include not using participants' names or navigating silently with a physical guide indicating via taps to the volunteer's shoulders where to step (this latter variation is much more difficult, and may be ideal for late in the project once participants are comfortable with the game's initial presentation and variation).
    c. **Zip Zap Zop (derived and modified from Rohd (1998))**
        i. Time: 5-10 minutes
        ii. Instructions: All participants stand in a circle and repeat the words "Zip, Zap, Zop" three times together. Then, one person begins the game by pointing with their whole arm/pushing their hands out/using some other large and

directed gesture towards another participant, zaying "Zip" and making eye contact with them as they do so (you must achieve eye contact for this game to be successful). The "receiver" then uses a similar motion to "pass" the turn in kind to a participant of their choosing, this time saying "Zap." The third participant will pass the turn with the "Zop," sound, and the game continues in this manner until a fumble occurs and the game is reset. Minimal pauses should occur between participants - the goal is to transfer between participants as quickly and with as much energy as possible.

iii. Skills highlighted: Nonverbal communication, group concentration/focus, expressive body language

iv. Notes: Getting the words right at first can be difficult - this is a game to be practiced, and may be a good warmup to begin every session with as it can be quickly played and moved on from, but will allow for participants to gain practice and experience (and therefore, comfort) with it.

d. Machine (derived and modified from Rohd (1998) and, per his citation, Spolin)

i. Time: 5-15 minutes

ii. Instructions: Participants stand in a circle, with one volunteer in the middle to "start the machine." Their task is to adopt a motion that may be repeated for a long time at a rhythm (such as swinging their arms back and forth, jumping, clapping, or tapping). Once the rhythm is established, the other participants join one by one to add their "motion" to the machine - they do not have to touch the other participants, but their motion should connect to the rhythm of what the first volunteer establishes, and they can stand behind, next to, or in front of the participant to join the machine prior to them.

iii. Skills highlighted: Nonverbal communication, group concentration/focus expressive body language

iv. Notes: This is best taught when the group leader is the first one to start the machine to set clear goals for the participants. Variations on this game may include focusing on sounds rather than motions, or establishing a theme for the machine (such as caring for a pet, building a house, or playing on a playground). Within the latter variation, even further variation can be established by splitting the group and having them develop smaller machines within their groups, then comparing how each group adapted the challenge differently.

e. Tour of a Place (derived and modified from Rohd (1998))

i. Time: 20-30 minutes (good for one of the first few sessions, where warmup games are the priority)

ii. Instructions: Participants pair up, and are instructed to close their eyes and think of a special place very important to them in as much detail as possible. This could be their bedroom, a spot outside they love to play, their classroom at school, or any other space they value. Then, once they've thought about the place in great detail, they take their partner on a 5-10 minute (group leader monitored/decided for timing) tour of their place. Participants are

encouraged to show their partner around the room they're currently in, but describe it as if it is the space they're picturing, in as much detail as possible. The participant going on the tour is encouraged to ask questions, and the participant giving the tour is encouraged to answer with stories.

iii. Skills highlighted: teamwork, listening/questioning, social sharing

iv. Notes: If participants finish early, the group leader should encourage the tour guide to see what else they can remember about the space, even if the detail is small, to share with the participant - the tour should fill the whole time provided. Encourage participants to move around the space they're currently in as if it's the space they're describing. Encourage participants to connect with the emotions they associate with the space, not just what it looks like or how it feels, and share the stories of why the space makes them feel that way.

2. Examples of Major Games, Activities, and Tasks

a. Note: This is not an exhaustive list, but rather a base to be built from. All elements of the below descriptions should be easily answered for any game which is added to this list, and their relevance to the intervention should be carefully considered before doing so.

b. Scenes from a Hat (Modified; derived from modifications described in Balonon-Rosen (2017))

i. Time: 10-15 minutes

ii. Instructions: The group leader, before the game, will prepare pieces of cardstock with different emotions written and represented via emoji on them. These will be placed into a hat for participants to draw out of later. During game play, a participant will draw a card from the hat, then act out/represent the emotion called for on the card. The "audience" of remaining participants will attempt to guess what emotion is being represented.

1. Mid-game discussion: If the audience guesses quickly, give them a chance to recognize the work of the participant by asking them to discuss what the actor did well. If they struggle to guess what's being represented, ask them to discuss, "What might have helped [participant] pretend to be feeling [emotion] in a way you would have recognized? What do people who are feeling [emotion] do when they feel that way?"

iii. Skills highlighted: Nonverbal communication, emotion recognition, expressive body language (participant)

iv. Notes: This works well as an introduction to this game, but may become "old hat" by the end of the sessions. Except in the case of much younger groups (primarily eight year olds, as opposed to a good mix, or primarily twelve year olds), this is a good fit for the first few attempts at this game, but may be exchanged for the more traditional version once comfort has been established.

v. Post-game discussion: Ask participants to reflect on what made it easy to guess what emotion was being represented, and what made it more difficult.

This can be more general than any mid-game conversation, but should be more thorough if no mid-game conversation occurs.

c. Scenes from a Hat (traditional; derived from Styles, R., Mulville, J., & O'Donoghue, D. (1998-2007))

i. Time: 10-20 minutes

ii. Instructions: The group leader, before the game, will prepare pieces of paper with different prompts written on them (examples listed below). These will be placed into a hat for participants to draw out of later. During game play, the group leader will draw a prompt from the hat and read it out loud. Participants will take turns making jokes about the prompt given, or acting out scenes surrounding it.

1. Example prompts: "The nicest bank robber in the world," "bad ice cream flavors," "bad superheroes," "worst wishes to ask a genie for," "what birds would say if they could talk," etc.

iii. Skills highlighted: Traditional improv (quick thinking, relating humor to others in the room)

iv. Notes: This is a fun game, but not necessarily as intervention-geared as others on this list. May be useful to bring in if a game doesn't go the way you expected to bring energy back to the room, and may be more readily framed to be geared towards social cognition with more directed prompts (i.e. "things you would never see at the playground," or more situation-geared prompts)

v. Post-game discussion: Could potentially take some of the prompts and reverse them or look into what makes them funny (i.e. "*Why* would Lazy Man be a bad superhero?")

d. Sculpting (derived and modified from Boal (2002) and Rohd (1998))

i. Time: 15-30 minutes

ii. Instructions: Participants pair off in teams of two. The group leader gives a prompt (category examples listed below), and assigns one participant as the "clay" and one participant as the "sculptor." The sculptor then creates a statue out of their partner (either by helping them move into position or, in the case of discomfort with physical contact or areas of particular sensitivity like the face, asking them to assume a specific position) which represents the given prompt, and once finished, a discussion can occur within the "statue garden."

1. Mid-game discussion: Ask participants to consider why the sculptor might have chosen to represent the prompt in this way - what cues are present to indicate what the prompt was?
2. Prompt ideas: Emotions (fear, anger, joy, confusion, etc), activities (going shopping, playing sports, building a house, doing homework, etc), or vaguer themes (home, school, playground, internet, etc).

iii. Skills highlighted: Non-verbal communication and verbal teamwork/communication, body language, in some prompt cases emotion

recognition

iv. Variations: A group version of this game may be played to highlight teamwork, wherein one sculptor works with multiple "clays" to create a more complex sculpture (or, alternatively, multiple sculptors work together with one clay participant for a different teamwork experience). Used in combination with mid-game discussion, the question "how would you respond to what's been sculpted here?" can prompt another variation on this game, where the previous clay players sculpt their partners into a response to the previous prompt (ex: given "anger," a participant might respond with "fear,") and discuss why/what this looks like?

v. Notes: This can be an excellent match, especially if used creatively, for the intervention portion of this experience. It asks participants not only to identify non-verbal cues of emotion or situation, but to understand the best way to represent them through looking at/working with someone else. A must-have for multiple sessions, although variation on the general game is necessary to keep things fresh for participants week to week.

vi. Post-game discussion: Most of the discussion will actually occur during the process of the activity, but some discussion may be relevant towards the end of the session, especially in some variations (such as, "how did you decide what your answer would be to the sculpture your partner made?"). Primary questions might include elements such as, "What was the easiest prompt to represent today? What was the hardest?" and "When you were the clay, what was different about how your partner sculpted you from how you would have represented the prompt?"

e. "Yes, and" or "Yes, let's" (derived and modified from Drama Notebook (2021))

i. Time: 5-10 minutes

ii. Instructions:

1. For "Yes, let's-": This can also serve as a warmup, or an energy burner if levels get too high during another game. The group leader begins with a statement (ex: "Let's all run in place!") and all participants respond together (ex: "Yes, let's all run in place!") before doing so all together. Each participant takes a turn deciding what the group will do.
2. For "Yes, and-": The group leader sets the prompt for a scene (ex: eating at a restaurant, going to a sports game). One participant begins the scene with a request (ex: "I would like to go to lunch"). From there, everyone takes turns suggesting something which begins with either "Yes, and-" or "No, but-" (ex: "Yes, and I would like to go to Olive Garden! Would you?" "No, but I would be alright with going to Chili's!"). All participants take turns playing the scene out.

iii. Skills highlighted: For "Yes, let's-": teamwork, listening, awareness. For "Yes, and-": listening and offering an appropriate response, adapting rapidly to accommodate each other's ideas, situational context awareness, teamwork.

iv. Notes: This is a versatile game that can be adapted to specific situations for teaching purposes. It can also, in the simpler version, be used as a warm-up or even as a cool down to burn energy via lots of movement. May want to establish basic improv principles briefly before this game (i.e. "Yes, and-") but this may also be an excellent teaching tool to reinforce these ideas.

v. Post-game discussion: More post-game discussion should ensue following the "Yes, and-" game. Topics of conversation may include, "What was the silliest part of the story we just told?" and "How did you feel when someone said "Yes, and-" or "No, but-?" How were they different from each other?"

f. Alien, Cow, Tiger (derived and modified from BBB Press (2014))

i. Time: 5-10 minutes

ii. Instructions: Participants are taught a motion specific to each of the three creatures named in the title of this game (i.e. using index fingers as antenna for an alien, using your hand for udders and mooing as a cow, or making claws for a tiger). On the group leader's cue, everyone becomes one of these three creatures. Without talking about it, the goal is for everyone to eventually become the same creature on the cue.

iii. Skills highlighted: Nonverbal communication, awareness of context and of others

iv. Notes: If this game is not successful in a reasonable period of time, adjust for mid-game discussion. Ask why the participants feel frustrated, what they think would help them to understand what others are going to do (try to steer them away from verbally agreeing to become the same animal and have them get creative), then allow them to use whatever solution they derive in the next round.

v. Post-game discussion: Discussion should center around how participants came to the conclusion they did. What cues did they look for in other players? Did they stick with their animal, or did they change it every round? How did they work together? How could they have worked together better?

g. The "Gibberish" game (derived and modified from BBB Press (2013))

i. Time: 10-30 minutes

ii. Instructions: Participants are paired together, then assigned roles within their pairs - one as the "gibberish" speaker, and one as the "translator." The gibberish player will speak in gibberish one sentence at a time, attaching an emotion to what they are saying (i.e. if they are "talking" about something that makes them happy, their gibberish and body language should sound and look like they are happy). The translator then, to the audience, translates the gibberish into English, using the same body language and tone as the gibberish speaker.

iii. Skills highlighted: Nonverbal communication, emotion recognition, expressive body language, listening and responding appropriately

iv. Variations:

1. Gibberish to Gibberish mirror: Both participants speak to each other,

mirroring the other participant's emotions (i.e. one participant speaks happily in gibberish, the other participant replies happily in gibberish as well). When the group leader calls "Switch," the other participant (not the one who picked the starting emotion) switches to a new emotion, and the other player must respond in kind once again.

2. Gibberish Story: One player begins telling a story. At the group leader's cue, they'll switch to speaking gibberish, but maintain the emotion and body language they were using to tell their story (or change it as the story changes). At the next cue, the next participant "picks up" the story in English from where the last player "left off" in their gibberish telling, and continues in accordance with the emotion they'd worked with, spinning their own story. This is a more complex activity, and will not work with every group - use group leader judgement to determine if this is a good fit for your group.
3. Gibberish Scene (adapted from Boal (2002)): All participants establish a scenario (ex: playing on the playground, going camping, eating at a restaurant) and act as though they are all in that scene. At the group leader's signal, everyone in the scene switches from speaking in English to speaking in gibberish, and attempts to keep the scene making sense.

v. Notes: This is another game that, like sculpture, can be an excellent and easily customizable fit throughout the weeks of sessions. Be sure to keep things fresh for participants, but adapt to fit the theme you wish to highlight in a given week and leave plenty of room for discussion.

vi. Post-game discussion: Discussion will center heavily around the variation utilized in a given session. That being said, questions that investigate what cues participants looked for in their partner's gibberish, how it felt to be speaking gibberish and having to rely on someone else to translate their meaning, and what it felt like to respond to their partner's gibberish will all be relevant in some capacity.

h. Props (derived and modified from Styles, R., Mulville, J., & O'Donoghue, D. (1998-2007))

i. Time: 5-15 minutes

ii. Instructions: The group leader will provide a series of random objects (these may be as abstract as pieces of styrofoam in random shapes, or as specific as a unique object, such as a fake flower or water bottle). The participants will take turns selecting a prop and coming up with a new use for it - it cannot be the conventional answer. It can be as silly as the participant wants, but it should make at least some sense (ex: a water bottle can't become an airplane, but it can become a baseball bat).

iii. Skills highlighted: Contextual awareness, flexibility/adaptability

iv. Notes: This game can be altered at a given difficulty level by adjusting the

available props. Abstract shapes may be more difficult to work with than objects the participants are already familiar with. Introduce the game with familiar objects, then as the course progresses, substitute these objects with more abstract shapes and see what the group comes up with.

v. Post-game discussion: Ask participants how they created their new uses for their objects, and what qualities of the object were important to them when they were making that decision. You may also find value in asking them what would not have worked, and why it would not have worked/what qualities of the item would make that idea impossible.

3. Cool-down activities

a. Group Freeze (derived and modified from traditional game "Freeze Dance")

i. Time: 4-7 minutes

ii. Instructions: Music may be used, but is not necessary. All participants begin dancing or moving, and at the cue of the group leader, freeze in place.

iii. Skills highlighted: Contextual awareness, listening/focus

iv. Variations: No music is used. All participants begin to dance until one participant, of their own decision (no cue from group leader) stops dancing. All other participants must stop dancing as soon as they notice one person has frozen.

v. Post-game discussion: Ask participants how they focused on what they were supposed to be doing, and in the case of variation, how they noticed when the first person had frozen.

b. Gesture match game (created by this paper's author)

i. Time: 5-10 minutes

ii. Instructions: One person (the group leader or a participant volunteer) creates a repetitive motion. The rest of the group tries to mirror that motion as closely as possible. Eventually, another person is selected for the "creator" role, and the gesture changes.

iii. Skills highlighted: Attention/focus

iv. Post-game discussion: Not necessarily in this case - this is primarily a cool down activity to re-focus the group, either in the case of high energy or at the end of a session before dismissal. Any discussion is likely to be a general summation of what led to high energy situations, or what was worked on that day.

c. Energy output activities (created by this paper's author)

i. Time: 3-5 minutes

ii. Instructions: The group leader picks a high energy, full body exercise for everyone to do together (running in place, jumping jacks, or similar exercises) and the group does this together. The group leader should participate to serve as a role model.

iii. Skills highlighted: Bodily awareness, attention/focus

iv. Post-game discussion: Not necessarily in this case - this is primarily a cool down activity to re-focus the group, particularly when the room becomes too

intensely energetic to continue a game. Any discussion is likely to be a general summation of what led to high energy situations and how that can be avoided in the future.

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