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Autism Spectrum Disorders, Empathy, and Communication: Research Outline

In the simplest terms to ensure all requirements are met:

Abstract overview

This research will explore multi-sensory and movement-based interventions as a tool for promoting communication and empathy between neurotypical populations and those on the Autism spectrum. As technology increases our understanding of sensory processing and augments communication across neuro-diverse populations, exciting possibilities for improving the quality of life of people on the spectrum are emerging. By investigating the neurological differences observed in ASD populations, the reader will begin to understand how someone with ASD or SPD experiences reality differently from a neurotypical person as guided by perception through sensory modalities. Using anecdotal evidence from blogs, case studies, employment guides, and biographical accounts, we will examine how sensory processing issues impact quality of life via social appropriateness of behavior, ability to communicate, ability to assess needs of self and others, and ability to exercise self-control and make positive choices to manage anxiety and sensory needs. We will use occupational therapy practices, ASD employment guides, and social emotional learning resources to explore typical tools for handling sensory processing issues in traditionally neurotypical settings using both long-term practices and short-term crisis-management techniques. By understanding existing adaptive strategies and therapies, we provide a point of entry for artists, who create sensory experiences that affect audiences at an intellectual and emotional level, to design assistive technologies that improve quality of life of high-functioning adults on the spectrum through enhanced communication and empathy.

Make this shorter- 200 words, don't need lists of this stuff, higher level, more focused, more crisp sentences

Keywords

Autism Spectrum Disorder
Neurotypical
Occupational Therapy
Sensory Processing Disorder- Kristie Koenig Lectures
Sensory Modulation Disorder
- Sensory hyper-responsiveness
- Sensory hypo-responsiveness
- Sensory seeking

Sensory Discrimination Disorder
Sensory Based Motor Disorder
    Postural Disorders
    Dyspraxia- Praxis is the ability to have an **idea** of what we want to do, plan and sequence the action and execute the action. In turn, we learn through this process from the sensory and environmental feedback of our efforts.
Proprioception
Equilibrioception
Somatosensation
Sensory Integration Theory - http://ajot.aota.org/article.aspx?articleid=1853012
Special Interest –Kristie Koenig interview
Strength Based Approach- Kristie Koenig interview

Significance of the topic (cultural, historical)

History of occupational therapy as a more human treatment for mental illness
Shift in our understanding of ASD as neurological/developmental disorder/difference rather than mental illness
History of sensory integration theory and therapy

Topic Description context + questions + problems

Technology is improving our understanding of the brain, sensory processing, and Autism, as well as providing new avenues for communication that give a voice to nonverbal people.
As we discover more about sensory processing, movement-based and sensory integration therapies are gaining traction and evidence suggests efficacy.
Simultaneously, we observe increasing numbers of ASD cases. Is this because we can identify it more easily? Are we over diagnosing? Is it increasing? Where does the spectrum begin?
How can we use technology and art to provide tools for managing anxiety, augmenting adaptive strategies, and improving empathy and communication across the bridge between neuro-typical people and people on the spectrum to improve the quality of life of those on the spectrum?

AudienceCommunity, and Socio-Political Impact

Ability Community
Occupational therapists
Education: Standard and Special Needs
Policy: Disabilities and Education
Management and HR
Neural Science of Autism and sensory processing

Arguments and Claims- Come up with two claims for and one claim against your topic to show how informed you are on the topic.

Claim: Reality and the means by which it is perceived and constructed in the brain is different between ASD and neurotypical populations.

Claim: Communication and empathy are limited across neurotypical people and people on the spectrum because reality is different, sensitivities to channels of communication are different, and limited control of motor planning and execution prohibit many people on the spectrum from engaging effectively in spoken language, written language, and stereotypical movement-based forms of expression.

Claim: People with ASD and SPD can lead fulfilling, independent, "successful" lives with appropriate therapies, adaptive tech, and awareness. Care and treatment should be given from a strength-based approach, creating ideal environments for individuals to excel in areas of strength and manage and improve weaknesses.

Claim: Technology can open new avenues for therapy, communication, and empathy.

Counter-claim: BUT ASD is not curable and SI therapies are not proven to improve neurological functioning. You are just training the person to fake what neurotypical people do naturally. This is true, but they are faking it successfully; they feel empowered, happier, more fulfilled. The improvement in quality of life is real.

Research Findings- what interesting extractions from your research (up until now) can be brought up here?

Child development

- Autism is detectable at 5 years. When are treatments most effective? Ami Klin
- Baby starts with only changing state of body as a tool for understanding reality
- Interactions with mother help to build cause/effect relationships
- Communication and cooperation between mother help to decode sensory inputs to accomplish goals
- Imitation is a valuable teaching tool for motor planning, cause and effect, social skills, but harder for ASD

Sensory Processing Differences on Spectrum

- Sound Processing:
  - measurable differences in early auditory pathways, especially with increasingly complex stimuli-> ability to acquire and parse a variety of incoming sounds is the foundation for language and communication
- Touch:
  - High functioning adults with autism appear to have a disrupted cortical representation of their face and hand
- Facial expression processing:

children with autism respond more robustly than controls to neutral and detailed, high-spatial frequency information and less robustly to rapid low-frequency processing that is critical to our fast-paced social world

- Visual Movement/emotional processing:
  - Cannot name emotions from point light displays->disconnection from "emotion" neural networks that inform primary sensory processing inefficient motion processing
  - increased local cortical activity with impaired long-range
- Low-level Multi-Sensory Integration (MSI)
  - "'flash-beep' illusion- disparity between the auditory and visual stimulus onset times will impact the effect of the illusion, until they appear uncoupled at a certain threshold"
  - "...These investigations indicate that both magnitude and latency of activity in brain may contribute to multisensory processing deficits in ASD."
- Higher-order Multisensory Integration
  - "When audio and visual speech stimuli are staggered and presented to individuals with autism, performance drops to a chance level and indicates deficits in speech comprehension"
  - "An inability to "fall back" on certain sets of sensory stimuli in the presence of challenging environmental stimuli may contribute to the communication deficits that are well-characterized in this disorder."
  - "Given the observable deficits in imitation and empathy known to be a core feature of the autism spectrum, it has been proposed that communication deficits arise from an inability of multisensory "mirror neurons" to concatenate information to facilitate higher order cognitive function"
  - "However, others propose that as sensory integration is dependent on the rapid exchange of information between distinct cortical and sub-cortical regions, disruptions in connectivity plays the causative role"
- Attention impacts every stage of sensory processing
  - ability to shift focus from stimuli of one type to another
  - ability to select what information needs to be attended to and what needs to be ignored
- Movement processing and sensory fusion
  - "In normal circumstances vestibular, visual and proprioceptive cues provide congruent information on locomotor trajectory; however, in cases of sensory discord there must be a recalibration of sensory signals to provide a unitary representation."

Sensory Integration Therapy and Movement Efficacy

- Yoga Study with Koenig and Buckley
  - Routine implemented for 16 weeks against a control group without yoga
  - Significantly less meltdowns and maladaptive behaviors
- SI therapies study

Regular SI therapy against control of desktop occupational therapy
Just-right challenges
Significantly less meltdowns and maladaptive behaviors
No strong evidence of increased/improved neurological processing
Auditory rhythmic cueing for motor functioning

Social Emotional Learning
5 social emotional competencies from CASEL
recognize and manage emotions
develop caring and concern for others
establish positive relationships
make responsible decisions
handle challenging situations effectively
5 point scales- Dunn Buron- help individual on spectrum calibrate emotions to manage responses
Anxiety curves- help teachers and care providers understand process of meltdown and how to best help the person recover
IEPs- plans to quantify and motivate progress with tangible discrete treatments
Guides for employers and employees

Case Study Projects Similar Projects or Inspiration Projects that relate to your topic

Kinect games for social emotional learning- facial expressions
Kinect games for team work- raft game
Kinect games for sensory processing- use body to accomplish a goal
Robot that teaches facial expressions and imitation
Dance in school system to promote and develop empathy
Snoezelen rooms
Sensory gyms
Brain gym
Paul Kotler's blog
Kristie Koenig's Yoga Study
Opera Therapy
Vibrating attention watch

Data and Numbers to support (quant and qual data). Find numbers and data to support your topic. This can be qualitative and quantitative data.

Statistics on increasing ASD and SPD diagnoses
Scientific evidence for differences in sensory processing in ASD population
Anecdotal and scientific evidence of inhibited communication and empathy
Scientific evidence for reduction of maladaptive behaviors with yoga and SI
Anecdotal evidence of usefulness of adaptive/assistive/therapeutic tech

Conclusion identify the big takeaways. What will leave the reader with something to think about?

How do we empathize with someone whose perception of reality is at the most basic level in contrast with our own? How do we understand and respect that person as an equal in society?
Diversity in brain structure is the same as diversity in gender or race. Why should this minority be marginalized when most of us agree that it is unacceptable to continue to undermine the rights of minorities based on skin-color or sexual orientation?
Increasing violence, political and civil unrest
Globalization and technologization of communication
Need for building empathy across diversity

Let's organize the body. How does the evidence support the claims?

Claim: Reality and the means by which it is perceived and constructed in the brain is different between ASD and neurotypical populations.

Statistics on increasing ASD and SPD diagnoses
Scientific evidence for differences in sensory processing in ASD population
Child development
Sensory Processing Differences on Spectrum
Sensory illusions

Claim: Communication and empathy are limited across neurotypical people and people on the spectrum because reality is different, sensitivities to channels of communication are different, and limited control of motor planning and execution prohibit many people on the spectrum from engaging effectively in spoken language, written language, and stereotypical movement-based forms of expression.

Anecdotal and scientific evidence of inhibited communication and empathy
Sensory differences and how they inhibit communication and empathy:
- Language processing- integration, auditory processing
- Facial expression processing- visual, attention
- Movement processing- attention, balance, planning/execution for language and grace, gesture imitation/recognition
- Touch- hypo/hyper-responsiveness, emotional communication, attention
- Emotional processing- sensory integration, evidence of low level processing issues, parts of brain that affect this

Social emotional learning inhibited by sensory processing issues, difficulty managing reactions to sensory stimuli, and imitation difficulties
Paul Kotler's blog

Claim: People with ASD and SPD can lead fulfilling, independent, “successful” lives with appropriate therapies, adaptive tech, and awareness. Care and treatment should be given from a strength-based approach, creating ideal environments for individuals to excel in areas of strength and manage and improve weaknesses.

Scientific evidence for reduction of maladaptive behaviors with yoga and SI
Anecdotal evidence of usefulness of adaptive/assistive/therapeutic tech
Yoga Study
Sensory Integration therapy study
Opera therapy program
Dance therapy in school system
Creative genius on the spectrum

Claim: Technology can open new avenues for therapy, communication, and empathy.

Vibrating attention watch
Snoezelen rooms
Kinect games
Robot
Typing
Brain impulse guided movement assistance
Linear resonance actuators use asymmetric vibration to simulate movement

Counter-claim: BUT ASD is not curable and SI therapies are not proven to improve neurological functioning. You are just training the person to fake what neurotypical people do naturally. This is true, but they are faking it successfully; they feel empowered, happier, more fulfilled. The improvement in quality of life is real.

Helping Autistic people live in the world?
Adaptive tech?

Or helping people understand Autism?
Raising awareness?

TKU
Social Emotional Training
Movement incorporated

VR game?
Chair?
Wearable device?
VR Installation?
System/app for social-emotional learning?
Experience movement that they can't do?
Tech system for social emotional tracking

Why the hell do I care?
Empathy
Communication
Ultimate obstacle for empathy because reality is totally different

UDL universal design for learning