How does fiber-arts contribute to the enhancement of cognitive comprehension skills in adolescents diagnosed with Autistic Spectrum Disorder in the United States?

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Abstract

The discussion of impairment for those with Autism Spectrum Disorder has been a topic of interest in research for a long time. Many people may think autistic people's abilities are limited in terms of communication, interpretation, and comprehension. This study analyzes how crocheting, an artistic outlet, can be a significant tool for those with autism, specifically adolescents. Additionally, this study questions misperceptions of those with autism and the ability to do artistic and social tasks. This study would be conducted through a meta-analysis. Its goal is to challenge the typical meaning of what it means to have ASD, and how it is supposed to be beneficial rather than disadvantageous in the United States. Learning more on the actual implications of ASD for adolescents will aid in more successful education for those with disabilities. For example, whereas children with ASD have trouble recognizing facial expressions in the classroom, children could use crocheting as a way to increase awareness and pay attention to details to understand communication styles. This literature review will go over the benefits of crocheting in aiding adolescents with ASD understand cognitive comprehension skills, facial recognition skills, problem solving, and enhancement of artistic skills. This study will further advance communication of those with ASD on the right way to communicate with them. In a culture where people assume those with ASD are disadvantaged, it's important to understand how they are negative with people, their settings, and different material.

Introduction

In today's world, Autism Spectrum Disorder (ASD) has been totally misrepresented by society on what it means to have this disorder and how one will function in their life, particularly adolescents. Specifically, there's been challenges in the realm of cognitive comprehension, such as spatial reasoning and finding rational reasonings behind the role of objects and people. There's also a difficulty within behavioral skills like lack of ability to explain one's own emotions and low level of social interaction. While traditional therapies exist, many studies support that autistic children don't necessarily need medicine to help them process the environment around them, but simply hands-on activities they feel a sense of comfort in. Charlotta Abernathy, research advocate for autism education rights from Western Washington university, adds an example to this theory, arguing "crochet can simplify shapes. Crochet often forces hard edges to become much softer and complex objects to become much simpler. This helps to soften the sense of both literal and figurative sharpness that causes many people to feel uncomfortable with medical devices and assistive technology" (Abernathy, 2021, pg. 13). These activities are suggested from neurocognitive research in supporting the development of skills necessary for autistic adolescents to successfully navigate through life. This review will challenge stereotypes in what it means to be autistic while analyzing fiber arts crafts on neurocognitive improvement.

Fiber Art Crafts Enhance Cognitive Comprehension.

The continuous pattern given from crocheting and knitting primarily aids cognitive comprehension. These crafts include having to follow constant patterns, predicting the outcome of the finished product, and finding patterns within stitches. Taylor Gotfrid emphasizes this idea

when mentioning “besides the functional value of knitting, the love that hand-knitted gifts convey, and the fact that it is relatively easy to customize a knitted object to fit a specific body size or shape, knitting is an enjoyable and relaxing craft that is easy to do while reading, talking, watching a show, or while hanging out with a group of friends who also knit” (Gotfrid et al., 2021, pg. 2). This routine boosts neurological functions in **working** memory, pairing certain visuals together, and increased problem-solving. Additionally, the **motor cortex** and **prefrontal cortex** will start to connect. Davide Rossi Sebastiano, neurological researcher analyzing the effect of crocheting on children’s attention span, discovered that “alertness and orienting networks (but not for executive control) was found for the CRO but not for the control group. As these scores usually remain constant after repeated sessions even in an older population (Ishigami & Klein, 2010), the improvements in alerting and orienting scores can be attributed to the crochet performance” (Sebastiano et al., 2022, pg. 9).This is insanely effective for autistic adolescents as they face cognitive overload, decision making, and aren’t fully aware of the role people and objects may have in their life. As these two cortexes together build, autistic adolescents would practice their decision making skills which leads to more control of their emotions and understanding of their environment. The fiber arts process helps with sensory feedback, positively reinforcing neural connections and strengthening the ability to follow multi-step instructions. As a result of this behavior, sensory sensitivities would decrease as the adolescents have more experience with predicting outcomes instead of having uncontrolled emotions to stressful stimulises. For example, Betty Houtman, anxiety management analyst, defined crocheting “is always nearby for when symptoms of anxiety and panic arise. Even visualizing the movements and feelings of knitting can help in most situations. Any easy (mindless) project is best for places with distractions; a new pattern or technique is best for

distracting the mind and growing new brain pathways" (Houtman, 2017). When autistic children manipulate yarn, needles, and hooks, more familiarity with **attentional focus** and **information processing** occurs. These are actual challenges of children with ASD as their mind can't focus on too many things at once or else they'll become sensory overwhelmed. However, using common repetitive actions with these hands-on rhythmic activates regular neural activity, increasing the natural flow of the brain to process new information. "There is no pressure to make eye contact with anyone while speaking. The rhythm of the knitting needles or crochet hook relaxing and concentrating on the stitches makes time go by quickly. I like to think of knitting and crochet as some of the original fidget activities. Even the texture of the yarn and the feel of the needles or hook in hand can be a part of the positive experience for autistic people" (Empowering Autism Community Through Knit and Crochet, 2023). Additionally, new neuropathways "can be created and strengthened by learning new skills and movements. As they become stronger with use, we "change our minds" to become quieter and more relaxed. "The feeling experienced as your mind flows into the movement of knitting can teach you what it feels like to be relaxed, and you can learn to recall this feeling even when you don't have knitting in hand" (Houtman, 2017). This engagement of different parts of the brain when performing these activities leads to more success for children navigating the world and becoming adaptable to different stimuli.

Fiber Art Crafts Improve Behavioral Skills and Emotional Regulation.

In addition to cognitive skills, fiber arts crafts also provide further development of **behavioral skills**, especially in controlling emotions and increasing relaxment when experiencing

overstimulation. Fiber-art crafts require a variety of repetitive motions. Whether in crocheting a pattern of single crochets or knitting a bunch of moss stitches, these activities promote a calming effect on the nervous system. This is shown in a crochet study by Pippa Burns, University of Wollonburg, concluding that "the texture of the yarn usually or definitely affected the mood of respondents (33.1%), whilst the colour of the yarn had less impact on mood (22.1%). The majority of respondents reported that the finished product was either fairly or very important to them (82.4%). Many respondents imagined others' reactions to their finished projects (42.0%), and just over half of respondents said that they planned their crochet projects in advance (54.2%)" (Burns et al., 2020, pg. 10). Specifically, adolescents with ASD will have an activated **parasympathetic nervous system (PNS)**. The PNS poses a constant challenge for those with ASD as it could be underactive during times when dealing with fight and flight reactions. Due to this reason, ASD children are most likely to have autonomic storms. The lack of PNS also impairs facial recognition as it plays a huge role in interpreting social cues when communicating to people. Consequently, this rhythmic activity adds sensory input to deal with overstimulation and anxiety. Danielle Le Lagadec, mental health advocate, addresses this concept when stating that "crocheting is as effective as meditation. Meditation has been shown to improve attention, which plays a pivotal role in advanced cognitive function (Kwak et al., 2019.) Knitting, as a daily creative activity, is often cited in the literature as a therapy to relieve symptoms of grief, loneliness and idleness (Kargól, 2022). Knitting has also been associated with reducing burnout and compassion fatigue in healthcare workers, temporarily allowing them to escape their profession's demands" (Lagadec et al., 2024, pg. 2). Furthermore, these crafts provide an increase of focused attention and promote psychological displacement. Where adolescents with ASD feel overstimulated, angry, or misunderstood, they could use crocheting as a way to redirect

their emotions into a calming recipient. This allows for a socially effective way in controlling sensory needs. The act of crocheting and knitting also creates self-efficacy and a sense of fulfillment that can make children with ASD feel confident in navigating issues in the real world. This is seen by Emily Nolan, who views crocheting as an art therapy, signaling crochet are "the developmental markers of secure attachment as a caregiver – making a connection, attuning, developing trust, expanding available resources, and being present – develops from the stitching practice of over and under looping that helps regulate the nervous system. Once everyone in the class successfully crochets the beginnings of a nest, we celebrate our new neural pathways forged by learning a new skill and acknowledge our sense of feeling grounded. Through this experiential learning, the studio is reinforced as a safe place" (Nolan, 2021, pg. 2). Not only is this effective in self-esteem, but creates a positive **reinforcement loop** as well as crafting encourages persistence and patience. These are all important factors important to have when facing challenges in the world. Lastly, the release of dopamine from crafting promotes grit and motivational behaviors in pursuing goals that are important when dealing with challenges.

Conclusion

Even though there hasn't been much research on the specific effects in fiber arts crafts, the cognitive and behavioral skills that develop from this form of art therapy, gives a rational foundation for these claims. The seeking of structure and pursuing of goals from these crafts provides a unique, but effective innovation for therapeutic intervention.

Limitations: The primary limitation when completing this study has been the lack of controlled trials. There were no actual experiments indicating the connection of fiber arts crafts with

cognitive behavioral improvement within those of ASD. Instead, the evidence gathered was anecdotal, based on case studies, or from broader neuropsychological principles. There were also some challenges in isolating the specific effects of the crafts from other environmental factors. Therefore, we can't ensure the improvement of cognition for ASD adolescents is truly due to these crafts.

Implications: There are many significant implications in this study. For one, with further research, fiber art crafts should be integrated into American school's curriculums. As if this form of art has as much benefit as said, it could be really beneficial for children to learn at a young age, so they could grow more into these skills and navigate the world better. There should also be community programs that pair up those with disabilities with artistic outlets, in order to have engaging interventions with similar people and understand their environment better. An increase of affordable craft programs could provide powerful tools of support from autistic adolescents in developing essential life skills.

Methodology for Future Research: If future research is performed, there should be a mixed-methods approach. Specifically, quantitative studies such as the Likert Scale (with informed consent from parents) should be used to determine how ASD children felt before and after doing fiber-art therapies to measure changes in cognitive behavioral skills. Qualitative studies, such as interviews and group therapies for those with ASD to feel more understood. This would allow for rich insights in the actual benefits and effects from these activities. These methodologies together would offer an in-depth review of the impact of fiber-art on ASD adolescents.

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