Systematic Review Article

Flashbacks and Friendships: How Autobiographical Memory Can Be Used to Foster Social Learning

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ABSTRACT

There is a rising prevalence of children with Autism Spectrum Disorder in the current status quo. Autism Spectrum Disorder is known for causing issues in social functioning for children who are affected by the disorder, so it is necessary to identify best practices when it comes to social learning for said children. Differences in the use of memory have often been identified when looking at children with Autism Spectrum Disorder in comparison to their typically developing peers, as their autobiographical memory seems to be diminished. The present study involves a meta analysis of 14 autobiographical memory recall methods as well as social learning methods that have been proven to work for children with Autism Spectrum Disorder. Through the use of an Ex-Post Facto research method, 14 methods were narrowed down to just two: the most compatible and highly effective autobiographical memory recall method and social learning method. The findings suggest that the use of images from the perspective of the child showing the child being placed in social situations will be an effective method to facilitate social learning through autobiographical memory recall. This method should increase detail and quantity of memories by 93% while increasing social behavior by over 7.5%, as taken from previously completed studies. This provides a way for children to build social connections in a way that is not otherwise possible.

Keywords: Autism Spectrum Disorder; Memory; Social Learning; Autobiographical Memory; Episodic Memory; Children

INTRODUCTION

The rate of Autism in children has risen from "one in 150 in 2000 to one in thirty-six in 2020" (1). Autism, also known as Autism Spectrum Disorder (ASD) in its more formal term, is a complex neurological disorder that often appears in the first three years of a child's life. It can greatly affect their development of communication and peer interaction skills (2).

Further, studies have identified that spontaneous social learning and interaction required more neural effort and was overall more difficult when a child had ASD (3, 4). A reason for this could be seen rooted in autobiographical memory. It was seen that children with ASD had a harder time sharing past experiences since their Autobiographical Episodic Memory was diminishe (5, 6). Autobiographical memory (AM) is memory about oneself that we rely on to comprehend the world around us. The issue of the impairment of this in ASD means that it creates difficulty when children with ASD try to comprehend the world around them.

Although the issue of diminished social interaction

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and diminished AM have often been studied separately, connecting the two and understanding the ways in which AM and social learning can support each other has been lacking, and is thereby what my focus will be. I will be identifying what the most effective methods for social learning are through using AM by integrating memory and social skill intervention. By employing an ex-post facto research method, I will be looking at various methods involving images to understand which one would be best to facilitate social learning in children with ASD.

LITERATURE REVIEW

Autobiographical Memory Relating to Autism Spectrum Disorder

While social deficits are the most common symptom seen in children with Autism Spectrum Disorder (ASD), memory deficits are the second most common and have been seen since research on the disorder first started years ago (6, 7). Autobiographical Memory (AM) is made up of two main parts: semantic memory, which is enhanced in people with ASD, and episodic memory, which is diminished (5). According to Lorna Goddard, a psychiatrist; behavioral therapist; and researcher with the University of London, in comparison to children who are typically developing (TD), it was seen that children with ASD exhibit about equivalent recall when it comes to memories in the recent past, but distant past memories were harder to and less frequently accessed (8). This is backed up by the idea that it is more difficult for the ASD population to recall items seen earlier on a list along with this harder recall of memories made earlier in time (9). As seen above, current research indicates that there are significant gaps in AM between children who are TD and children with ASD, creating rifts in overall social functioning.

Autism Spectrum Disorder in Young Children

ASD is typically seen and diagnosed in early childhood, a vital stage in any child's development (10). A primary symptom of ASD is a child showing impaired social behavior, as well as repetitive behaviors and/or interests (10). For social functioning, it is often seen that young children typically show more difficulty in reciprocating conversations and showing joint attention in social interactions (11). Another significant aspect to consider involves connecting memory and neurological functioning. For example, children with ASD are often seen to show reduced meaning-making, which refers to the amount of understanding they gain from their memory and self awareness and lowers their self-concept clarity or self awareness in social situations (12). Along with this, when children with ASD talk about themselves, they often recall and use less details than TD children of their same demographics since it is neurologically more difficult for children who have ASD to recall these details (8). This is a complex disorder, so it is important to analyze these common trends.

Socioemotional Learning in ASD

Within ASD, many children often approach socioemotional learning differently, due to their individual preferences and needs. However, a commonality that is often seen is that the process of sharing past experiences was quite difficult for kids with ASD (6). This contributes to children with ASD frequently experiencing conversations that are less elaborate and less narrative than those experienced by their TD peers, which may impact them negatively, since it provides little to no outlet for these children to properly express their feelings (11). In addition, when people with ASD are placed into a social situation, they process and experience things quite differently from the typically developing population. During social situations, the TD population often takes cues from the other party's face to properly respond. However, it is seen that in people with ASD, understanding social cues from a person's face requires more neural effort than it would for their TD counterpart (3). Along with this, people with ASD often have a harder time learning from social situations spontaneously, meaning that it's difficult for them to understand the reasoning behind theirs and others' social decisions (4). However, according to Ashley Brien, a researcher who has designed materials to help support the social learning of those with neurological disorders, if social learning is looking to be altered for the benefit of a child, there can be methods that are beneficial to enhancement of learning (5).

Learning Methods for Children with ASD

To first identify the areas where more learning is necessary, we have to look at a few key aspects. For instance, there is often a lack of social problem solving in people with ASD, meaning there is a disconnect between their current and past life experiences (13). There are some techniques that can be used to facilitate learning through AM. For one, using open-ended questions facilitates greater memory recall for

children with ASD over more closed questions (14). According to Anna M. Agron, Alex Martin, and Adrian W. Gilmore, researchers of Cognitive Neuropsychology in the National Institute of Mental Health, stimulus based memories are often easier to understand, recall, and comprehend for people with ASD[7]. Along with this, elaborative reminiscing, which refers to a conversational technique using detailed and open-ended questions to elicit memory recall, is the primary method used to reverse or treat episodic memory (EM) impairment, and can be applied in this context as well (5). All of these learning methods can have a positive impact on spontaneous social learning and socioemotional learning in children with ASD.

Where Does this Research Fit

When looking at the impact of learning through autobiographical memory in children with ASD, it is important to understand where research has or hasn't been done. For example, an area that has been highly researched is the specific differences between the TD and ASD population when it comes to AM. Multiple studies that have occurred in this field. However, there are some aspects of this topic that have been under-studied.

This paper focuses on one of these under-studied aspects, the implications of social learning through Autobiographical Memory in children with ASD. This is done by using existing research and finding ways to correlate it to look at methods to help increase recall in AM and use that to facilitate social learning in these children. Filling this gap will allow for a way to help young children understand social situations to a greater degree. This provides an intrinsic look at something that could be very beneficial for children in this community, especially at this important time in their life. Increased social learning will allow young children with ASD to have a better understanding of themselves and others in a social context. This will provide them with more honest and fulfilling relationships in the long run. Therefore, the research question of this study is, what methods are most effective to facilitate social-emotional learning through autobiographical memory recall in American children ages ten to twelve with high functioning ASD?

METHODS AND MATERIALS

The data collection process used follows the Ex Post Facto model, which allowed the use of secondary data to complete the study. This method was the most effective way to establish an association between two previously unrelated variables. This method was primarily rooted in the study done by Simpson, Eskandaripour, and Levine in 2023, titled "Effects of Healthy and Neuropathological Aging on Autobiographical Memory: A Meta-Analysis of Studies Using the Autobiographical Interview" (15). Similar to this, the present study involves a set of primary databases, search terms, and specific criteria for chosen articles. However, unlike the study done, which was only researching "psychological therapeutic or educating methods" in neurotypical participants, this study involved two different categories of methods in children with Autism Spectrum Disorder (15). The two different categories caused the repetition of certain steps. This is similar to the study "Narrative-based autobiographical memory interventions for PTSD: a meta-analysis of randomized controlled trials" done in 2023 (16). This study involved coding data according to five categories, while this study involved coding data into two categories. This is where the present research on the relationship between multiple methods was rooted, although the lower number of categories pushed for a more simple analysis of the similarities.

Literature Search

In order to begin the search, databases used included ScienceDirect, Proquest, Gale, PubMed, EBSCO, Wiley Online Library, and JMIR publications. These databases provided a holistic view of the current scholarly body of knowledge in my field. The search terms used included: "autobiographical memory recall autism," "autobiographical memory recall," "social learning methods autism," and "social learning methods autism children." These terms were both specific enough to eliminate information unrelated to the research question, but also broad enough to elicit a large number of results, as seen in Table 1. In total, 14 articles were clicked on and viewed.

This search was conducted in 2025 with a ten year time limitation on any data used, meaning no data could be collected prior to 2015 if it is to be considered valid for the study. This ensured that all data collected was reliable and current. All articles collected were then separated into two categories: "Autobiographical Memory (AM) Recall" and "Social Learning" within a spreadsheet, representing each of the topics this study focused on. This labeling system allowed all potential data sets to stay organized. By the end of the study, these categories needed to be brought together, so it was

essential to separate each category in the preliminary search. Studies considered in this section needed to be full text and had to be peer reviewed. Specific criteria was limited, due to this search being only initial; however, each study chosen had to include a viable AM Recall or Social Learning method tested in pediatric Autism Spectrum Disorder (ASD) cases. The primary piece of data collected in this stage of the study was simply what method was tested. This process allowed for an overview of the various methods that have been previously tested within the field.

Data Extraction

Initially, around seven studies were collected for each category, for a total of fourteen. These were labeled "Initial Search." This "Initial Search" phase consisted of primarily viewing the abstract and results section of each study considered. The amount of studies

Table 1. An overview of search terms used and results that were identified in the Initial Search phase

Search Term	Results (Assigned Title)
autobiographical memory recall autism	"Reminiscing and Autobiographical Memory in ASD: Mother-Child Conversations About Emotional Events and How Preschool-Aged Children Recall the Past." (Mother-Child Conversations)
	"Scene construction and autobiographical memory retrieval in autism spectrum disorder" (Identifying parts of the brain that overlap scene construction and social processing)
	"Episodic Autobiographical Memory in Adults With Autism Spectrum Disorder: An Exploration With the Autobiographical Interview" (Episodic Questions to Elicit Recall)
	"Exploring the development of past and future episodic memory in adolescents with autism spectrum disorder: A preliminary longitudinal study" (LONG TERM - Increased recall over time/as the child ages)
autobiographical memory recall	"Emotion-Focused Therapy for Autism Spectrum Disorder: A Case Conceptualization Model for Trauma-Related Experiences" (Emotion-Focused Therapy)
	"Neural Correlates of Reflection on Present and Past Selves in Autism Spectrum Disorder" (Images as Stimuli - Analyzed through fMRI)
	"Positive Effect of Visual Cuing in Episodic Memory and Episodic Future Thinking in Adolescents With Autism Spectrum Disorder" (Visual Timelines and Questioning)
social learning methods autism children	"Feasibility Testing of a Wearable Behavioral Aid for Social Learning in Children with Autism" (Physical, Wearable Device)
	"A robot or a dumper truck? Facilitating play-based social learning across neurotypes" (Adult Facilitation of Communication)
	"Implementation of evidence-based practices for early childhood social learning: a viewpoint on the role of teacher attitudes" (Teachers as Facilitators)
social learning methods autism	"We don't play that way, we play this way: Functional Play Behaviours of Children with Autism and Severe Learning Difficulties" (Structure of Playtime)
	"Design of a Digital Comic Creator (It's Me) to Facilitate Social Skills Training for Children With Autism Spectrum Disorder: Design Research Approach" (Comics to facilitate mutual understanding)
	"The Development of an Escape Room–Based Serious Game to Trigger Social Interaction and Communication Between High-Functioning Children With Autism and Their Peers: Iterative Design Approach" (Escape room type game to facilitate communication)

chosen for this phase provided about double the amount of data needed. This allowed high quality and well fit data to be chosen.

Once the preliminary search was completed, the initial fourteen studies were narrowed down to only three per category, for a total of six. This part of the search, labeled "Specific Results" involved more information being collected for each article chosen. This allowed for a more in-depth understanding of each method. To be included in this phase of the search, studies needed to fit the following criteria: (a) methods involved a physical product or outline, (b) participants included pediatric autism patients diagnosed by a psychiatrist, (c) studies included a baseline measure or control group, and (d) included quantitative measures of effectiveness. This criteria was generated in accordance with the research question. Any studies that did not meet even one of criteria a, b, c, or d were excluded from the analysis process in this phase. This excluded eight studies from future consideration. Such criteria ensured that all articles were included or excluded in the study for a concrete reason.

During this phase of the literature search, a title was assigned to every method investigated. Titles of said methods chosen for this phase of research include "Mother-Child Conversations," "Image Stimuli - Recorded through fMRI," "Visual Stimuli + Questioning," "Wearable Social Learning Device," "Structure of Playtime," and "Comics as Social Facilitation." These titles are seen in Table 1. Each of the titles identified the physical product or outline used to facilitate learning or recall. Additionally, these titles provided a concise, yet effectively descriptive label that allowed for a quick reference. Further, more information was collected during this section including the author(s), research question, date published, age group, and quantitative effectiveness. This data was collected to ensure that the study was valid and fit the parameters of my research question.

After the studies were narrowed down to just three per category, each one was then analyzed more thoroughly. The studies were checked for effectiveness and compatibility with other AM Recall or Social Learning methods. The studies chosen showed the highest compatibility with the other method, as they involved physical products that could be easily altered to adapt to both AM Recall and Social Learning goals. The reason for this stems from the goal of the study, which is to identify a way that social learning could be facilitated through AM Recall. Anything that proved to be incompatible with other methods was excluded for this reason. This ensured that the final method created would be viable for use through easily adaptable methods that have been previously proven.

Data Analysis

Following this, the "Final Methods" were researched, consisting of the methods titled "Visual Stimuli + Questioning" and "Comics as Social Facilitation," both chosen because of their similarities in age groups and high effectiveness, further proving their compatibility. Figure 1 shows the exact inclusion and exclusion process. From these studies, qualitative similarities and differences were collected to establish a relationship between AM recall and Social Learning through their impact on the behavior of a child with ASD. The data collected showed that the two most promising methods had great qualitative similarities, as they both included use of personalized images for visual recall, art by a professional illustrator, and research on children with ASD aged ten to twelve. This showed how well the methods overlap, establishing a foundation for analyzing the data as two methods that could be potentially correlated. However, differences were also identified, primarily including the purposes of the images in each respective method. This showed a limitation, as the studies were very similar, but not completely the same, so they will not show a causational relationship in this study.

Following this, the data analysis process involved running two different simple regression tests on both studies by hand. For the first study, regression was completed on the recall type (Free vs. Cued) and the Episodic Score in children with Autism, which is defined as the quality and number of episodic memories recalled. This was done to see the exact amount by which the use of images (cued recall) increased the quality and number of episodic memories in children with ASD. Then, a percent increase in episodic score was calculated by hand to establish a concrete increase. Along with this, a test was run to find the correlation between the amount of time after viewing an image (ten vs. fifteen minutes) and change in the amount of helpful or approaching behavior exhibited by children, showing how well the images hold up as a long-term solution. A percent change was taken in social behaviors over time to support that the images did indicate a net increase in helpful behavior. Effect sizes were compared, in percentages of each of these categories in a graph, giving me a visual representation of the similarities

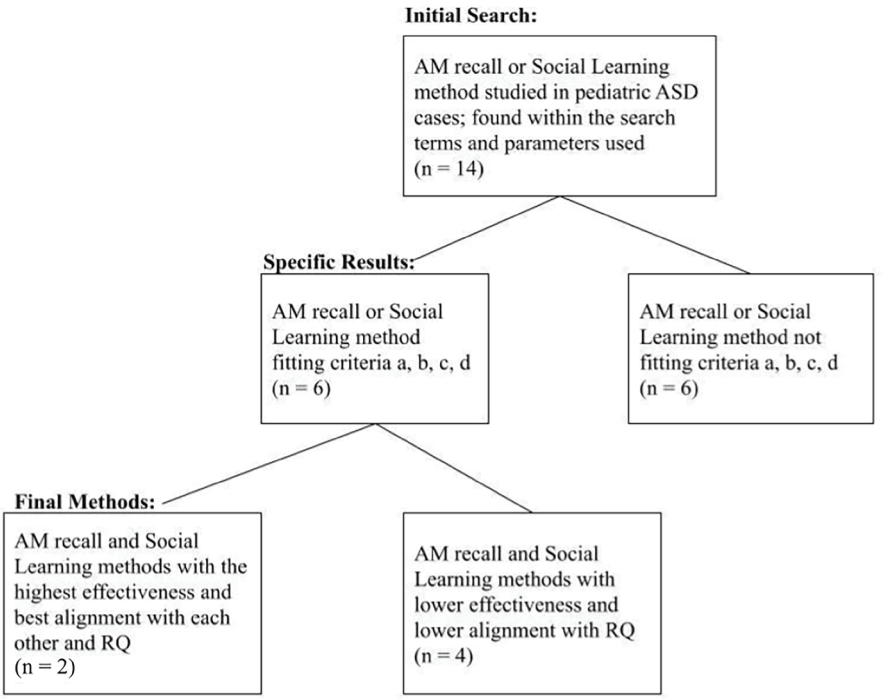

Figure 1. Data inclusion and exclusion process of all results clicked on during the analysis.

between the effects of the AM recall and social learning methods.

Limitations of Data Collection

Finally, the limitations of this study were rooted in the process in which the two final studies to compare were chosen in a qualitative manner. Because of the limit on data for children, especially neurodivergent children, criteria in choosing the final two studies shifted away from just choosing the most effective method and towards choosing methods that aligned the best. Mainly, it was necessary to find age groups that aligned the best with each other. The closest two age groups found fell within the range of children aged ten to twelve. While this factor was important to consider, the way in which data was narrowed down from six to seven studies per category to just three still ensured that highly effective methods in both AM recall and Social Learning were chosen. Along with this, another limitation was that since the studies were conducted on different groups of children, there was not a direct correlation established. Despite this, it was still possible to identify a relationship between episodic score and increasing helpful behavior over time. Therefore, despite the limitations of my data collection, a new understanding still resulted from the methods analyzed.

RESULTS

Qualitative Relation Between Methods

In finding a relationship between Autobiographical Memory (AM) Recall and Social Learning Methods, qualitative similarities and differences had to be identified. This determined the extent to which the two methods could be used simultaneously. As seen in Table 2, three primary similarities were identified, while there were two primary differences seen between each method.

The similarities between these two methods shown in Table 2 indicate that there was significant evidence that they could be used simultaneously. These methods were both founded on a similar theory, as they both share the idea that future behavior can be influenced by images. Further, they both rely on past experiences to guide future behavior. Meanwhile, the differences seen were primarily due to the purpose and the nature of

Table 2. A comparison of five primary characteristics from each study to identify their compatibility and possibility of use together (17, 18)

	AM Recall Method (Visual Stimuli + Questioning)	Social Learning Method (Comics as Social Facilitation)
Similarities	• Use of personalized Images for future directives • Art by a professional illustrator • Age Group 10-12	
Differences	• Images were used to recall memories • Data was separated for ASD and TD	• Images used to facilitate social conversatin after viewing theimage • Combination of data for TD and ASD children (Test Session 3)

each original study. This makes the methods compatible for use together.

Effectiveness Per Method

Since these methods were determined to be similar enough to use together, a method was proposed to combine the methods in a memory-driven social learning method. This consists of the use of images from the perspective of the child being placed in social situations that are authentic to the person. This can elicit memories that can facilitate social conversation with peers, leading to increased social learning. This method harnesses the similarities from the original two methods while avoiding conflict from the differences. To test the viability of this new method, statistical tests were run on the effectiveness of each individual method, then combined.

First, to determine the level of effectiveness for the AM recall method, a percent increase in episodic score was calculated, showing a percent change in the measurement of how well a person can store and recall episodic memories, through a simple regression analysis, from the study done by Anger *et al*. in 2019 (17). The results are outlined in Figure 2. This shows the differences seen in free recall (episodic memory recall without any stimuli) or cued recall (episodic memory recall with visual images as stimuli).

Figure 2 shows the drastic increase that was seen in episodic score when it comes to cued recall. This data was derived from the study, "Positive Effect of Visual Cuing in Episodic Memory and Episodic Future Thinking in Adolescents With Autism Spectrum Disorder" by Anger *et al*. in 2019 (17). The metric of episodic memory was used because autobiographical memory is a subset of episodic memory. Episodic recall, by that logic, is an umbrella that includes AM recall. This justifies the use of episodic recall as a measurement for the AM recall method. When referring to the method itself, it will be referred to as the AM recall method. However, when responding to the metric, more exact language like episodic cued recall may be used.

For the remote past, represented in blue, there was a 96% increase in episodic score for children aged ten to twelve with Autism Spectrum Disorder (ASD) (17). When it comes to the recent past, represented in green, there was a 90% increase in episodic score for children aged ten to twelve with ASD (17). There was a total average increase in episodic score of 93% (17). This value was taken from the previously completed study, then placed into a visual representation of the effect sizes in Figure 4. The drastic increase proves that cued recall is a highly effective recall method for children with ASD. Along with this, the level of effectiveness for the social learning method was measured by determining how well it held up over time. In the study done by Terlouw *et al*. in 2020, data was given for specific behaviors exhibited by the children at both 10

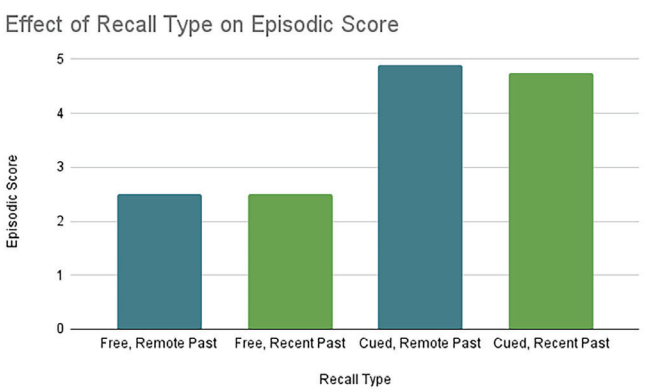

Figure 2. Measure of Episodic Score Increase with Cued Recall extracted from the study, "Positive Effect of Visual Cuing in Episodic Memory and Episodic Future Thinking in Adolescents With Autism Spectrum Disorder" (17).

and 15 minutes (18). Using this data, it was determined how well the method instilled behaviors in the children so that they continued to exhibit said behaviors long-term after the comic was shown. These results are outlined in Figure 3.

The results in Figure 3 showed that the long-term effects of the comic were more significant for helpful behavior than approaching a peer. When it came to helpful behavior, or children helping a peer, there was a 7.5% increase in the amount of children that exhibited it at 10 vs. 15 minutes after viewing the comic, as seen in the study, "Design of a Digital Comic Creator (It's Me) to Facilitate Social Skills Training for Children With Autism Spectrum Disorder: Design Research Approach" done by Terlouw *et al*. in 2020 (18). This shows that there was a relationship between the comic and long-term helpful behavior, which is often a behavior that is hard to come by in children with ASD. However, when it came to approaching behavior, or initiating conversation with a peer, there was a 45% decrease. Despite this, the approaching behavior did not decrease to 0, in fact, it still stayed at 29% (18). While the behavior did decrease, the fact that it was apparent at all is significant to the study, as this behavior is often not at all prevalent in children with ASD.

Understanding the Relationship

After identifying the effectiveness of each aspect of the study, based on each specified metric, all results were placed into a graph to show a visual representation of the effect sizes across studies, as seen in Figure 4. All effect sizes were taken from previously completed studies by Anger *et al*. and Terlouw *et al*. and placed into an original visual representation (17, 18). The effect size seen in Figure 4 for episodic memory cued recall was largest, at 93%, meaning that the combined method would have the highest impact on AM Recall. Meanwhile, the effect size for helpful behavior was at 7.5%, a smaller, yet significant impact that shows that this method will be helpful for altering behavior long-term (17, 18). Finally, the effect size for approaching behavior was -45%, indicating that this behavior may not be highly affected by the method long term (18). Despite this, because of the similar effects in both cued recall and helpful behavior, there is a relationship between the two methods. This once again shows that the use of images from the perspective of the child being placed in social situations that are authentic to the person can potentially facilitate social learning.

DISCUSSION

In the present study, the topic investigated involved which methods are most effective in eliciting autobiographical memory (AM) recall and social learning in children with Autism Spectrum Disorder (ASD). This was done to answer the question: what methods are most effective to facilitate social-emotional learning through autobiographical memory recall in American children ages ten to twelve with high functioning ASD? The methods identified as being highly effective were the use of visual stimuli (AM

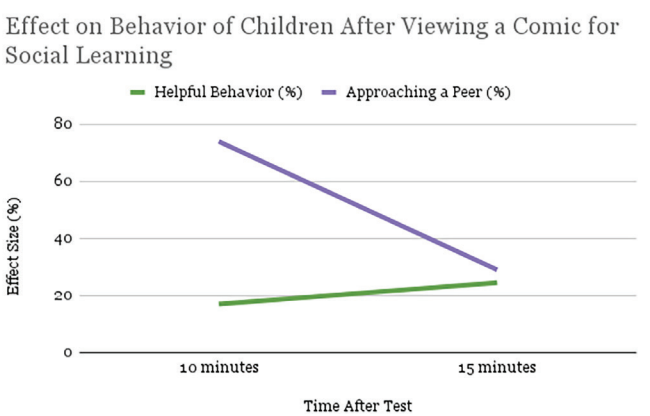

Figure 3. Effect of comic on social behavior in children with Autism over time extracted from "Design of a Digital Comic Creator (It's Me) to Facilitate Social Skills Training for Children With Autism Spectrum Disorder: Design Research Approach" (18).

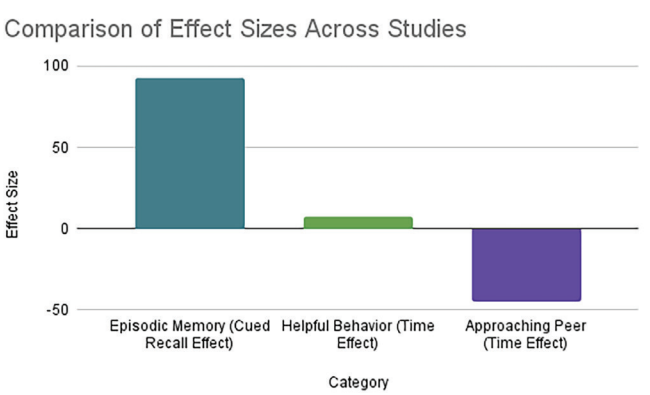

Figure 4. Comparison of Effectiveness from both chosen methods in a visual representation to identify overlap (17, 18).

recall) and the use of personalized comics (Social Learning). The way these methods best worked together to allow for social learning through AM was explored.

In doing this, it was especially important to identify the effectiveness of each method through the specified metrics. For AM recall, the metric used was episodic score, a measure of how many memories a child recalled and how detailed they were. For social learning, the metric used was skills retained over time at ten versus fifteen minutes after the image was shown to the children. To properly discuss and analyze these findings, it will be broken up into three main aspects starting with the implications of the AM recall method. Then, the implications of the Social Learning method will be determined. Finally, the importance of these methods coming together and the best method to do so will be explained.

Specific Implications

First, when it comes to the AM recall method that was analyzed, there was a total average increase in episodic score of 93% when using cued recall rather than free recall (17). This means that the use of images to elicit autobiographical memories nearly doubles the specificity and ease of recall for episodic memories. This is important because it provides a concrete method for young children with neurodevelopmental disorders to recall and understand their own experiences in a social context. A concrete method is important because it can potentially be used and transferred over to many children across different age groups and backgrounds, though the present study only involves the use of this method in children aged ten to twelve. To be transferred to more age groups or used in official sites, more clinical testing would be needed.

Next, when it comes to the implications of the social learning method, it was seen that the use of images allowed for long term increase of helpful behavior in children with ASD and short-term increase of approaching behavior in children with ASD (18). Both of these factors indicate social learning in these children because these behaviors are often virtually non-existent prior to the use of this method. Therefore, the appearance of these behaviors indicates the increased recognition of social roles and responsibilities when compared to what was apparent prior to the image being shown. This is important because the recognition of social responsibilities is often lacking in children with ASD. Now, through the use of this method, this effect is reversed and children will be able to better understand and carry themselves in a social situation.

Finally, to talk about the combined method, by the results of the study, the new proposed method is the involvement of images from the perspective of the child being placed in social situations that are authentic to the person. This can elicit memories that can facilitate social conversation with peers, leading to increased social learning. This method works to use the similarities found in the methods while ensuring that the differences do not get in the way to a significant degree. This method is viable, in theory, because the two previously explained methods are over 50% similar and were founded on a similar theory. This was determined by looking at the primary characteristics of each method, for which five were found. Three of these five characteristics were shared between the two methods, making them more than 50% similar when it comes to the metrics chosen. The theory that these methods were both found on involve the idea that images can be used to alter future behavior in children. These factors both allowed for the methods to be used together effectively.

Along with this, there were similarities between effect sizes in both of these methods. The AM recall method showed a positive percent increase in episodic score, similar to the percent change seen in helpful behavior. This ensured that these methods were similar enough not only at the surface level but also helped me determine that they can be used together.

Limitations

Moreover, limitations of my research include a lack of generalizability due to the age groups used. While one study out of the two used indicated an age range of children ten to eighteen, the other only included children aged ten to twelve, it became necessary to limit the extent of my results to just children ten to twelve. Because the study was done through the use of previous research, it is not possible to generalize results past the age groups that the initial studies used. The narrowest age band in the prior studies used was ten to twelve years old, so this generalization had to be limited to that as well. The new method also cannot be generalized out to any other neurodevelopmental disorders past ASD. However, because the new method was derived from a study done on two different groups of children, each with a significant sample size of over thirty children, the method may potentially show positive effects on American children aged ten to twelve diagnosed with Autism Spectrum Disorder by a psychiatrist, though my generalizability ends there. To understand the

effects on other children, either those outside of that age range or with a different disorder, it is important to make sure that this method undergoes clinical testing, as said previously. The results should not be used or generalized prior to clinical testing being done.

Significance and Future Directions

The importance of my proposed method primarily affects the community that is affected directly (diagnosed) or indirectly (family members or friends) by ASD. The use of images from the child's perspective ensures that each implementation of this method is personalized and allows for a highly promising way to learn socially, proven in the social learning study drawn from. This can be further situated in the ideas represented by researchers of Cognitive Neuropsychology in the National Institute of Mental Health, who explained that stimulus based memories are often easier to understand, recall, and comprehend for people with ASD (7). This method was determined as the one with the highest compatibility and effectiveness from my specific search rather than just an option. As for the fact that the images are from the child's perspective, this is a highly effective way to ensure that social learning occurs at the best degree. In this light, my research takes a step further on the study done by Lorna Goddard, a psychiatrist and behavioral therapist, stating that distant past memories were difficult to and less frequently accessed by the children with ASD (8). The proposed method will ensure that children get an easy and enjoyable process to learn proper social roles and have more detailed recall through the use of visual stimuli.

In the future, researchers should be looking into clinical testing to ensure that this method is fully effective and works for a wide variety of children. This should be done through testing the proposed method in a wide variety of age ranges and children. While my method is based on a relationship seen, it does not guarantee viability for general use in children with ASD so it must be tested. Future researchers may also be inclined to study this method and prove its use for other neurological disorders and the implications it may have on them. Since the method proposed is specific to those with ASD, it could be beneficial to understand its impact elsewhere.

CONCLUSION

Children who are diagnosed with ASD require extra attention when it comes to learning social skills. Thus, it is important to identify what the most streamlined methods to do so are. By identifying these highly promising AM recall and Social Learning methods, it was found that the use of images has the highest success rate in both categories. After identifying this, the aspects of each method that made it so effective were analysed along with what made them similar or different. This led to identifying that the use of images of real-world scenarios (essential for AM recall) placed in the child's perspective (essential for Social Learning) would be essential to facilitating peer-to-peer social learning through the use of Autobiographical memory.

The use of stored AMs allows for children to draw on their past social experiences to then take proper social skills into action. Further, this eliminates the issue of having to learn social skills from scratch, which is often extremely difficult for children with ASD to do since there is no foundation to build upon. This will most likely streamline the process overall and create an easier way for children to learn social skills with ASD. In the future, clinical testing of this method would be extremely valuable because it is essential to ensure the effectiveness of this method. One in thirty-six children are diagnosed with ASD, which often comes with social learning difficulties as well. Finding a process this easy, using a person's own memories will help children affected by ASD substantially.

CONFLICT OF INTERESTS

The author declares that there are no conflicts of interest regarding the publication of this article.

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