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The Effect of Motion in AAC Displays on Literacy Skills of Individuals with Down Syndrome

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ABSTRACT

Individuals with Down Syndrome, and other developmental disabilities, benefit from augmentative and alternative communication (AAC) technology to support their participation in communication. Unfortunately, many individuals in this population are susceptible to distraction, which can negatively impact their learning and communication. Research is needed to resolve this issue. Motion has been found to be a very powerful attractor of visual attention. The goal of this study was to investigate the effect of targeted motion and of symbols (written words) in AAC displays on the visual attention and, thus, learning by a single participant with Down syndrome. Due to COVID-19, this study was conducted remotely via Zoom web conferencing software. The individual participated in two different conditions (i.e., static and motion). Upon selection of a target symbol in the static condition, the image and the target written word remained on the screen for 5.5 seconds and the name was spoken aloud. Upon selection in the motion condition, the written word smoothly moved from the corner of the screen where the selection occurred to the middle of the screen and enlarged 400%. The participant's exposure to the static and motion AAC displays was video recorded over four sessions as well as performance on the learning task. The participant's eye gaze during the exposure to the display was later analyzed and coded. Results demonstrated that the participant attended visually to the target AAC symbols for a longer time in the motion condition (mean = 2.84s) compared to the static display condition (mean = 1.28s). The participant was also consistently more accurate learning the novel AAC symbols within the targeted motion display compared to the static display. These results suggest that motion may be a powerful mechanism to attract visual attention to AAC displays and other materials to maximize learning. Further research is required

to replicate the results of this pilot study and to extend the findings to other age and disability groups.

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Chapter 1

Introduction

Problem Statement

Prior research shows us that small changes to the display of Augmentative and Alternative Communication (AAC) systems can lead to significant improvements in the successful learning and use of these devices (Light, McNaughton, & Caron, 2019). While many facets of these systems have been studied (e.g., color, size, shape, layout), targeted motion in an AAC display is a concept for which little research has been done. Furthermore, because AAC systems are commonly viewed solely as a communication modality, their capacity to be used as a literacy learning tool is often overlooked. By recognizing the effect of motion as a potential attractor of visual attention and AAC systems as potential literacy learning tools, we can investigate these topics in conjunction to discover the effect of targeted motion in AAC displays on the visual attention and literacy learning skills of individuals with Down syndrome.

Overview of AAC

Communication is an essential part of everyday life. For many, the process of communication seems very simple; however, for people with complex communication needs (CCN), it can be difficult to communicate effectively. This can cause detriment to these individuals in many different areas of their lives due to their inability to fulfill the purposes of communication. There are four main purposes of communication: 1) expressing wants and needs,

2) transferring information, 3) social closeness, and 4) social etiquette (Light, 1988). The purpose of expressing wants and needs refers to an individual's ability to relay necessities and desires to a communication partner. Transferring information allows one to share details, facts, and opinions with someone else. To develop relationships with others, the purpose of social closeness must be fulfilled. Lastly, social etiquette refers to one's ability to express manners and conventions of one's culture. AAC allows people with CCN to perform these functions.

According to the American Speech-Language-Hearing Association (ASHA; n.d.), AAC is, "an area of clinical practice that addresses the needs of individuals with significant and complex communication disorders characterized by impairments in speech-language production and/or comprehension, including spoken and written modes of communication." To address these needs, individuals are often provided with AAC devices that aid them in performing communicative functions. AAC systems can be unaided or aided. Unaided AAC systems include modalities of communication that do not require any external equipment (e.g., gestures and vocalizations). Aided AAC devices require an external component (Beukelman & Light, 2020). Furthermore, aided AAC systems can be broken into low-technology and high-technology devices. Low technology devices include simpler versions of AAC systems such as communication boards. High-technology AAC devices include computer-based technology such as tablets with AAC applications (Beukelman & Light, 2020). This study utilizes an aided high-technology grid display AAC system. In a grid display, concepts are represented by symbols that are arranged in a grid-layout in which the individual who uses AAC can select symbols to express them through the AAC system.

Individuals with Down Syndrome

A common population of individuals that benefit from AAC are people with developmental disabilities (Beukelman & Light, 2020). A prevalent developmental disorder is Down syndrome. Down syndrome is a genetic condition in which an individual has an extra copy of chromosome 21 (Center for Disease Control, 2020). In addition to common physical characteristics (e.g., flat facial features, poor muscle tone, small ears, etc.), individuals with Down syndrome also experience cognitive deficits and language delays. Due to their facial abnormalities and cognitive abilities, language difficulties may persist into adulthood. Furthermore, individuals with Down syndrome have an increased risk for developing Alzheimer’s disease in their later years (Beukelman & Light, 2020). Alzheimer’s is a degenerative disease that leads to memory loss and decreases in other cognitive abilities (Alzheimer’s Association, 2021). The loss of language abilities coincides with the individual’s memory decline and therefore, makes people with Alzheimer’s candidates for AAC supports. Because of these factors, AAC systems can provide multiple benefits to people with Down syndrome across the lifespan.

Literacy Learning and AAC

While AAC is commonly used to improve the communication of individuals with CCN, it can also be used to improve literacy skills. Literacy skills, while important for all human communication, are especially vital in allowing individuals with CCN to communicate across modalities (Caron, Light, Holyfield, & McNaughton, 2018). Often, for individuals with disabilities, sight word learning is the first step to developing literacy skills (Browder & Xin, 1998). This process involves associating a word with a symbol and teaching that association to an individual through memorization processes (Caron, Light, Holyfield, & McNaughton, 2018). AAC devices can be pivotal in aiding vocabulary development of people with CCN; however, there are many characteristics of an AAC display that can impact the user's learning (Light, McNaughton, & Caron, 2019). In order for the individual who uses AAC to learn new symbols, they must first attend to them (Wilkinson & Mitchell, 2014). Different variables in AAC systems can influence the amount of time an individual attends to the target. Because of this, it is important that we maximize factors that will increase attention to a given symbol or written word.

Motion as an Attractor of Attention

In most cases AAC displays, the appearance of the word and corresponding symbol is a static occurrence; typically, the AAC picture symbol is presented with the written word above it. This can lead to the learner focusing on other known symbols within the display and failing to attend to the written word (Fosset & Mirenda, 2006). As stated before, it is crucial that one attends to an association in order for them to eventually learn it. Motion is an extremely powerful attractor of visual attention, that emerges early in development, and has limited susceptibility to disruption (Jagaroo & Wilkinson, 2008). While dynamic display options are available in AAC systems, little research has been done on the effects motion could have (Jagaroo & Wilkinson, 2008). While past studies have reflected that targeted motion in AAC displays seems to improve individuals word learning (Caron, Light, Holyfield, & McNaughton, 2018), the research on the effect of motion in AAC displays on literacy skills is limited and more research is required to understand the full implications of this factor.

This preliminary study examined the effect of dynamic text in a simulated aided, high-technology, grid-based AAC display on the visual attention and learning of written words by an individual with Down syndrome. My hypothesis is that individuals with Down syndrome will attend to the symbols (written words) in the motion condition longer than symbols in the static display condition. I also hypothesize that individuals with Down syndrome will be more accurate identifying novel written words in the motion condition of the AAC display than the static condition of the same display.

Chapter 2

Methods

Research Design

This preliminary pilot study used a single case design with one participant with repeated measures (multiple sessions) across two different display conditions (a static display representing the current state of practice and a display with motion of the target symbol). Case studies are an appropriate method to provide initial explorations of factors that have not been investigated previously. The study investigated the participant's performance under two conditions: the control display condition included a static grid display with unknown written words (Pokémon names) remaining in place upon the selection of a symbol (image of the Pokémon); the experimental display included a grid display which incorporated targeted motion of the unknown written words (Pokémon names) upon the selection of a symbol (Pokémon).

Due to COVID-19, this study was conducted virtually. Zoom (a video conferencing software) was used to administer the participant trials. The "screen-sharing" option and remote-control capabilities of Zoom were used to allow participants to interact with the displays. Furthermore, video was captured of the participant while they performed the exposure task. The video was then analyzed through coding software which allowed the eyes of the participant to be zoomed in on and the playback to be slowed down. The participants gaze was then determined to be looking in one of five places: upper right corner, lower right corner, upper left corner, lower left corner, and center. An additional code was added for "target to center" which tracked the participants gaze moving from one of the corners of the screen to the center. This allowed for increased accuracy of coding in the motion condition.

Participant

The participant in this single-case pilot study that investigated the effects of motion with a participant with Down Syndrome was a White 18-year-old male. He wore glasses and his corrected vision was functional to read written words in 20-point font. The participant also had strabismus, a condition which results in misalignment of the eyes that can result in the eyes pointing in different directions (Boyd, 2020). The participant's hearing was within normal limits and his motor skills were functional for this study (he used his pointer finger to select symbols on the screen). His PPVT-4 standard score was 66, suggesting a significant language delay (conducted within the last 2 years).

Materials

This study utilized three laptops: one laptop was controlled by the researcher administering the trial; one was used by a second researcher to record the trial; and the third laptop was provided to the participant to participate within the study. This laptop was a Dell model with a touch screen and allowed the participant to fold the laptop so that the keyboard was underneath the screen and facing backwards (the actual keyboard was resting against the surface of the table that the participant was using). This allowed the laptop to mimic the design of common AAC systems and ensured the participant would not get distracted by the keyboard.

The study involved two simulated AAC displays: a static display (representing the current state of practice) and a display with targeted motion of the selected written word. See Table 1.

Each of the displays included four different Pokémon characters, one located in each of the four corners of the display: upper right, upper left, lower right, lower left. The Pokémon characters were selected according to the following criteria: (1) they were not commonly used and were therefore unfamiliar to the participant; (2) they were distinct in their shapes and colors so that they could be easily discriminated. Since prior research suggests that internal symbol color may affect accuracy and efficiency of selection (e.g., Light, Wilkinson, Thiessen, Beukelman, & Fager, 2019), the Pokémon were selected in pairs with each pair a different color. Members of each pair were randomly assigned each of the display conditions. Locations for each of the Pokémon characters were randomly determined in the two display conditions. The name for each Pokémon character was presented in written text above the character in 20-point font. These names were modified as required so that they were between 5 and 7 letters in length. The coordinating static/motion same color pairs also started with the same letter. Upon selection of the Pokemon character in the static condition, the image and the target written word remained on the screen for 5.5 seconds and the name was spoken aloud. Upon selection in the motion condition, the written word smoothly moved from the corner of the screen where the selection occurred to the middle of the screen and enlarged 400%.

In addition to the static and motion displays, the study also included probes to test the participant's accuracy identifying written words. Each probe included a 4x2 grid containing each of the written words (i.e., names of the Pokémon characters) in the static and motion displays. Underneath the grid, a single image of one of the eight Pokémon was included. The participant had to identify the written name for the Pokémon image. The order of the written words in the grid was randomly determined for each probe trial.

The independent variable of this study was the type of AAC display: either the static display (representing the current standard of practice) or the motion display (with smooth animation of the target written word upon selection). The dependent variables focused on the participant's visual attention and accuracy of his performance identifying the written words. The participant's visual attention was hand coded and his ability to learn the novel symbol names was measured through the probe task.

Several additional technologies were used in this study. As mentioned before, the video conferencing software, Zoom, was used to conduct the trials virtually. Microsoft PowerPoint was used to create the simulated displays (i.e., the display with targeted motion of the selected written word; and the static display) and probe task. In order to code the participant's eye-gaze, BORIS (Behavioral Observation Research Interactive Software), an eye-tracking coding application, was used after the participant's trial was recorded. To record the participant trials, a screen-recording software, Active Presenter, was used. Microsoft Excel was also used to create several of the figures presented in this thesis and to track inter-rater reliability.

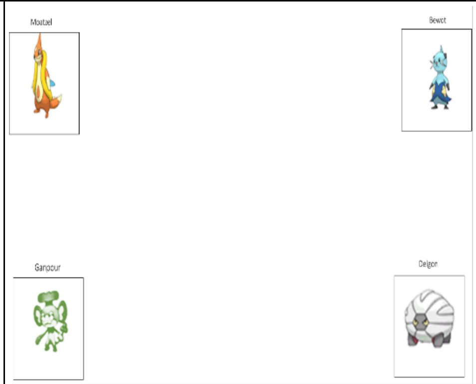
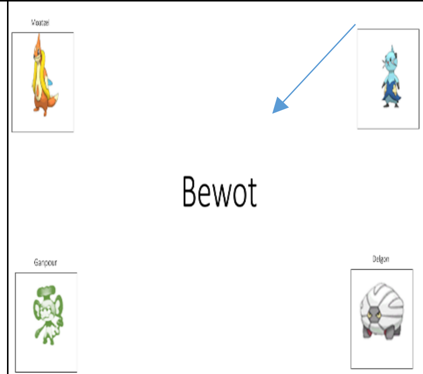
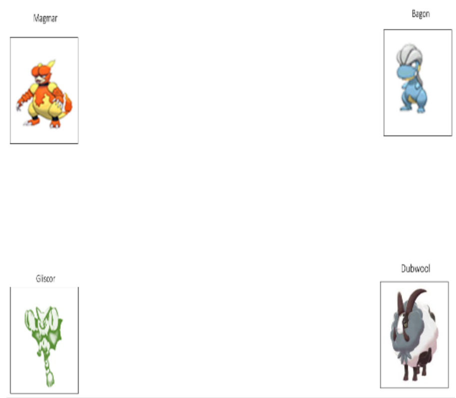
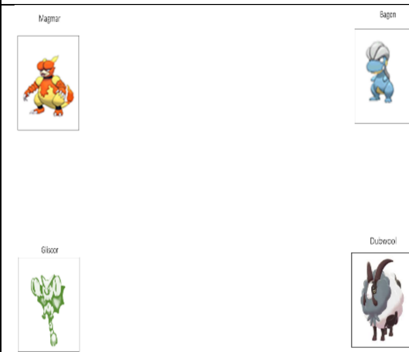
	1	2	3
Motion			 Participant hears “Bewot”
Static			 Participant hears “Bagon”

Table 1: Exposure Task in Static and Motion Conditions

Procedures

The participant completed four different intervention sessions for this study. The sessions included a session of exposure trials to the static and motion displays followed by a probe session which was used to test learning. Before each session of exposure trials, the participant was presented with a calibration slide to orient the researcher to their eye-gaze.

The sessions began with the researcher informing the participant that the session would be recorded and then reading the instructions for the exposure tasks. Three practice trials were administered prior to the exposure trials, in the first session, to familiarize the participant with the task. The participant was given the following instructions before beginning the practice trials:

> “We are going to look at some pictures. Each picture will first appear once in the middle of a slide. Once you feel that you have a good sense of what the picture looks like you may touch the picture to advance to the next slide. On this slide, you will see four pictures, including the one that was on the previous slide. Please select the picture you saw on the previous slide. After you select the picture do not touch anything but pay attention to the screen. The slide will advance automatically after a short period of time. After the slide has advanced, a new screen will appear with a black square in the middle. You may touch this black box once you are ready to move on to the next trial. Then you will repeat the process, until you reach a slide that says, “End of Session One.” Once you reach this slide, I will take control back of the screen. If you wish to pause at any point during the session, you may do so on the slides with the black box in the middle.” The first few trials are practice trials to get you acquainted with the task. After you have completed them, we will pause briefly then begin the test trials.”

After the researcher read the instructions to the participant, he started the exposure task. The task continued until the participant has been exposed to all eight Pokemon and their written names: four in the static display condition and four in the motion display condition. The sequence of the exposure to these eight Pokemon was randomly determined for each session. The participant’s visual attention to the written words associated with each of the target Pokemon was measured during the exposure tasks.

Upon completing the exposure task, the researcher took control back of the screen and switched to the probe display to complete the probes to assess the participant's learning of the written words for the eight Pokemon characters. After the probe task was displayed on the screen, remote control was given back to the participant. Before beginning the probe task, the participant was given the following instructions:

> "For this task you will see a picture on the bottom of the screen and eight names in boxes above the picture. Please select the name that you believe identifies the picture below the grid. Once you touch the name that you believe is correct, you will see a green outline appear around the box that the name is in. This green box does not signify either a correct or incorrect answer and will appear after each selection is made. After you have made your selection, do not touch the screen again. I will advance the slide from my computer after I have recorded your answer."

After the researcher read the instructions, she directed the participant to begin the task. The researcher recorded each of the participant's selections, without informing him whether he was correct. The sequence of trials in the probe task was randomly determined for each of the sessions. Upon completion of this task, the session was concluded.

Data Collection and Analysis

There were two dependent variables in this study: 1) the amount of time spent visually attending to the target written words during each trial of the exposure task; and (2) the accuracy of identification of the written names.

Visual attention was measured during the exposure task with the simulated static and motion displays. Each session was recorded, given the participant's consent, for data collection of the participant's face and eye gaze. Each exposure trial to the written name for each of the target Pokemon was 5.5s long; the start of each trial was marked by the participant's selection of the target symbol. After completion of the session, the researchers uploaded the video recording to BORIS. BORIS was used to record the participant's eye-gaze during the trials. A total of nine trials were coded, the calibration trial and each of the eight exposure trials (i.e., four in the static display condition and four in the motion display condition).

At least two researchers coded the trials; these coders were blind to the display conditions (i.e., static or motion). The coders reviewed the video and marked the time of onset of each of the participant's visual fixations, its location (e.g., participant looks top right, participant looks center, etc.), and time of offset. Total time of visual attention to each location during each trial was then calculated. Once all fixations had been calculated, the coding was compared across coders to determine inter-rater reliability, via Microsoft Excel, based on the number of events the researchers agreed on. Any disagreements were resolved through discussion to reach consensus. The coding of fixations was then mapped on to the actual displays for each trial and the amount of time spent visually attending to the target written word for each trial in the static and motion display conditions was calculated as well as the amount of time spent viewing non-targets (i.e., any area other than the target). Since this was a preliminary pilot study, the data were summarized, graphed, and analyzed visually. The purpose of this analysis was to decipher whether the participant attended to the motion condition names more than the static condition names.

Data were also collected on the participant's accuracy identifying the names of the Pokemon during the probe trials. During the probes, the researcher recorded the participant's answers for each of the trials. The answers were monitored for correctness (i.e., the written name selected by the participant in the probe matched the name associated with the Pokemon on the simulated AAC display). The percent of trials answered correctly was calculated separately for the static and motion display conditions for each of the four sessions. These data were graphed and analyzed visually. The purpose of these analyses was to determine whether the participant was learning the novel words in both conditions and to test whether there were any discrepancies between learning the novel words in the motion and static conditions.

Chapter 3

Results

This study was centered around two main hypotheses: 1.) the effect of targeted motion of new symbols in AAC displays on visual attention to target symbols and 2.) the effect of motion on the learning of novel written words.

The results of this study support the first hypothesis. The individual with Down Syndrome attended longer to the novel symbols presented in the study when their selection incorporated motion (a smooth animation of the written word to the center of the screen) than when the written word remained static in the AAC display. These findings are illustrated in Figure 1, which shows the average time spent visually attending to the target in both conditions during the participant's fourth session. The participant attended visually to the target symbol for a mean of 2.84s out of 5.50 total seconds in the motion display condition. The participant attended to the target symbol for only 1.28s out of 5.50 total seconds in the static display condition. Out of the total time viewing the display with motion, the participant attended visually to the target symbol 57% of the time. When viewing the static condition, the participant only attended to the target symbol 29% of the total time viewing the display.

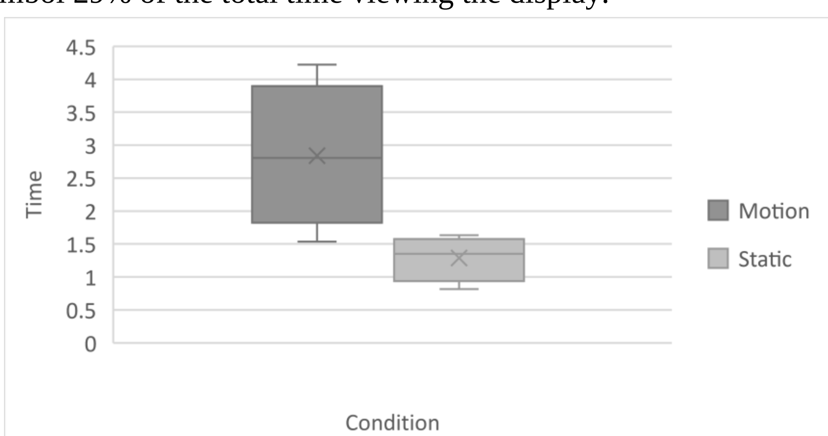


Figure 1: Attention to Targeted Symbols in Motion and Static Conditions

Furthermore, the data from the time the participant spent looking elsewhere reflected that the participant was less distracted in the motion condition than in the static condition. The participant attended elsewhere (any place other than the target symbol) for an average of 2.103s out of 5.50 total seconds in the motion condition. The participant attended elsewhere for an average of 3.146s out of 5.50s in the static condition. Out of the total time viewing the display, the participant spent 43% of their time looking elsewhere in the motion condition. While viewing the static condition, participants spent 71% of their time looking elsewhere when viewing the display.

The results of this study also support the second hypothesis. The individual with Down syndrome demonstrated more accurate learning of novel symbols when their selection incorporated motion (smooth animation of the written word to the center of the screen) than when the written word remained static in the AAC display. These findings are illustrated in Figure 2, which shows the number of targeted symbols the participant got correct during each

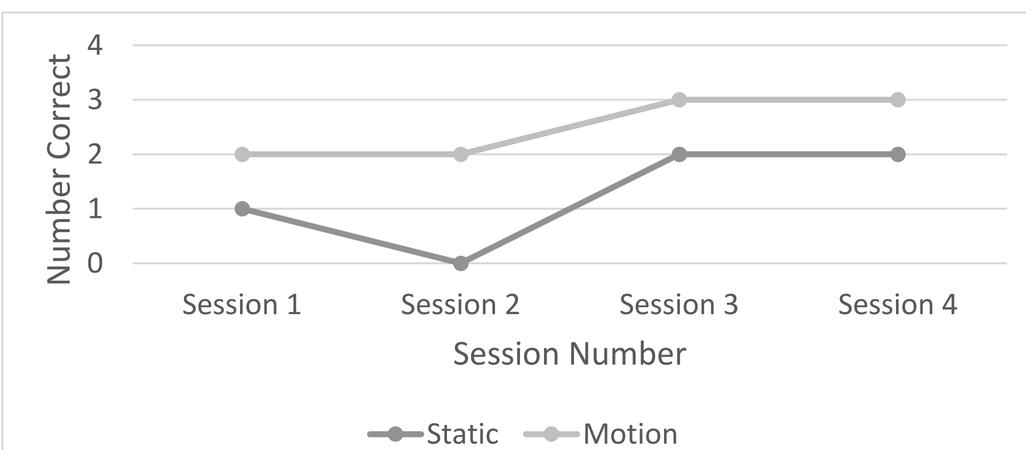


Figure 2: Number of Times the Targeted Symbol was Correctly Identified in The Motion and Static Conditions

session, in both the static and motion conditions. The participant consistently chose the correct answer in the motion condition more than in the static condition during each session.

Chapter 4

Discussion

This study focused on the effect of motion in AAC displays on the visual attention, and resulting learning, of written words by an individual with Down syndrome. The results supported both the hypothesis that the participant would attend more to target symbols, and less to distractors (non-target symbols), when motion was incorporated into the symbol than when the symbol remained static and the hypothesis that motion would increase the learning of target symbols. This section discusses these results in relation to the research on the effect of motion on visual cognitive processing and learning, the implications this study has on clinical practice, the limitations of this study, and directions for future research.

Effect of Motion on Visual Cognitive Processing and Learning

This study is the first to investigate the effects of targeted motion within AAC displays. Motion is an extremely powerful attractor of visual attention (Jagaroo & Wilkinson, 2008). This is especially true when motion is focused on one target symbol, while all else remains static, in an AAC display. For example, in their study, Caron, Light, Holyfield, and McNaughton (2018) found that, when inserting a transition to literacy feature (T2L) that provided motion of the written text used in an AAC display, individuals with developmental disabilities acquired sight words with more accuracy than when using typical AAC technology (where the written word remained static). The results of this study reflected the same pattern, which is that motion allows individuals to focus visual attention on key elements of an AAC display and reduces their attention to distractions.

Furthermore, the results also indicate that the effect of motion persists beyond initial exposure since the data on the effects of motion on visual attention was collected during the participant's fourth session of the study. Even by the fourth session, motion still had a powerful effect on the participant's visual attention. All of the prior research that has investigated the effects of display variables on visual attention has collected data on a single occasion with novel AAC displays. This study is the first to investigate the effects of AAC display variables (in this case, motion) over time with repeated exposure.

These findings are especially applicable to those with developmental disabilities, as they tend to attend less to AAC displays than their typically developing peers (Wilkinson & Light, 2014; O'Neill, Wilkinson, & Light, 2018). Targeted motion seems to be a powerful tool to increase visual attention to AAC displays.

This study is also the first to investigate the specific relationship between visual attention to target AAC symbols and learning of these symbols. It was hypothesized that the relationship between visual attention and learning is robust. According to Wilkinson and Mitchell (2014, p. 111), "Vision science indicates that an item (object) cannot be identified or further processed until the point of gaze comes fairly close to that item." Thus, in order for a symbol to be learned by an individual, they must first attend to the symbol. When target symbols are being attended to, learning of these symbols will increase; however, when distractor symbols are being attended to, they can interfere with learning of the target symbol. In AAC, and communication in general, learning of symbols is extremely important in order to fulfill the four purposes of communication (Light, 1988). Results of this study suggest that targeted motion in AAC displays has a powerful effect on visual attention and facilitates learning of novel AAC symbols (in this case written words).

Implications for Clinical Practice

The results of this study offer several potential implications for clinical practice. They suggest that targeted motion may be a powerful strategy to capture the visual attention of individuals with developmental disorders to targets and decrease attention to distractors, thus facilitating learning. This means that clinicians may be able to utilize the effect of motion in different ways. In low-technology methods, clinicians may use motion to capture visual attention to materials. For example, a clinician may use movement to introduce a written word when teaching literacy skills instead of just keeping it in a static position on the table. Furthermore, in high-technology AAC systems, motion has been used to promote learning in both visual scene displays (VSDs) and grid-based systems (see the discussion above of the effects of the T2L feature on single word reading skills). While there is not yet research on the effect of motion on picture symbols in AAC systems, motion could potentially cause a similar effect as when used with written words.

Limitations

There were several limitations to this study which should be considered when interpreting the results. First, there was only one participant. This limits the experimental control of the study and prevents us from being able to generalize these results to others (e.g., other individuals with Down syndrome, other age groups, and other disabilities). Second, due to COVID-19, this study was conducted remotely which presented several complications. Internet connection differences and technological challenges were present during every session of the study. One technological challenge prevented us from collection of the visual attention data in the participant’s first three sessions. Since the study was conducted virtually, the participant remained at home during data collection, which allowed him to become distracted at some point by different occurrences in his home environment. In addition, instead of using a traditional AAC device, we had to create simulated AAC displays on PowerPoint and limit the number of symbols to four, which is not representative of typical AAC displays. Third, instead of using a high-technology eye-tracking system, such as Tobii eye tracking research technology, hand coding was used to track eye gaze behaviors. Hand coding was made difficult by a number of factors: the glare from the participant's glasses and his condition of strabismus, internet lag causing some time frames to be uncodable, and quality of the video used for coding. Fourth, this study only involved four sessions of data collection, which makes it impossible to predict the effects of long-term exposure to motion in AAC displays and impossible to rule out the possibility that this effect may fade over time. Lastly, the task may have been too difficult, as a score of 5/8 was the participant's highest score. These limitations suggest that the results should be interpreted with caution; however, they clearly suggest important directions for future research to further investigate the effects of targeted motion in AAC displays.

Directions for Future Research

Future research should consider the following modifications. Studies should include more participants to increase experimental control and to ensure the generalizability of results. Studies should investigate the effects of motion across varied age and disability groups. Next, typical versions of AAC displays should be used and the effect of motion should be measured on both written words and picture symbols. Furthermore, high-technology eye-tracking research systems should be used to collect more precise visual attention data. Also, the number of exposures the participant receives to the task should be increased so that long term effects can be measured. Lastly, the effects of motion should be measured not only on visual attention and learning, but also on actual performance during communication tasks (a more typical context in which AAC systems are used).

Conclusion

This study made three important contributions to the field of AAC. It was the first study to investigate the effects of targeted motion in AAC displays, which is potentially a powerful feature to enhance visual attention, reduce distractions, and enhance learning. It was also the first study to consider the effects of display factors (such as motion) on visual cognitive processing over time with repeated exposure (four sessions). Finally, it was the first study to investigate the relationship between visual attention and learning.

The results of this study suggest that targeted motion may function as a powerful attractor of visual attention to symbols in AAC displays and therefore improve learning outcomes and communication performance. These findings are especially important for those with developmental disorders and other populations that are susceptible to distraction. Future research is necessary to replicate these results and to further investigate the effects of this potentially powerful AAC display factor.

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Wilkinson K., Mitchell T. (2014). Eye Tracking Research to Answer Questions about Augmentative and Alternative Communication Assessment and Intervention. *Augmentative and Alternative Communication*, 30(2), 106-119. https://doi.org/10.3109/07434618.2014.904435

ACADEMIC VITA

Academic Vita of Shelby Kayga

Education

Pennsylvania State University (*Anticipated Graduation: May 2021*) Fall 2017 – Present
Schreyer Honors College
Bachelor of Science in Communication Sciences and Disorders
Minor in Psychology
Dean's List – earned all semesters

Academic Involvement

Research Lab Assistant Fall 2019 – Present
Effects of Motion on Alternative and Augmentative Communication Displays
Lab Advisor: Janice Light, Ph.D.

- Collaborate with a team of five on a weekly basis
- Construct two AAC displays that incorporate elements of motion and audio
- Transfer research to a virtual method to compensate for COVID-19
- Author a lab protocol script to be presented to participants
- Conduct virtual sessions with participants
- Operate coding software to analyze data
- Utilize eye-tracking software to collect data
- Consistently meet weekly deadlines
- Present AAC displays and analysis of data at meetings

Schreyer Honors Scholar Fall 2019 – Present
Schreyer Honors College
Honors Advisor: Carol Miller, Ph.D.

- Enroll in advanced honors-level courses
- Complete additional honors-level requirements
- Research and develop an individual thesis prior to graduation
- Network with faculty and alumni in the CSD field

- Craft literature review separate from thesis for Honors option class

Vice President, HHD Student Council Spring 2018 – Present
The College of Health and Human Development Student Council
Faculty Supervisor: Dennis G. Shea, Ph.D
- Coordinate with fellow board members and faculty to create a meeting schedule for each semester
- Assist the President with various tasks and performed presidential duties when she was unable to
- Correspond with multiple guest speakers and scheduled for them to attend various meetings
- Gather materials necessary for certain meetings

NSSLHA Member Spring 2018 – Fall 2020
National Student Speech Language and Hearing Association
- Provide help for multiple community service projects related to the organization
- Attend meetings regularly and communicated with peers of the same major
- Surpass requirements needed to maintain membership status

MSLC Volunteer Tutor Fall 2018 – May 2019
Mid—State Literacy Council
Advisor: Tracy Roth
- Instructed a class of English Language Learners for two hours per week
- Constructed weekly lesson plans that catered to the students’ learning
- Underwent informational training course on working with English Language Learners
- Kept record of class attendance and became acquainted with each of the students

Other Involvement

HEAL Thon Organization Member Fall 2018 – Present
Atlas Thon Organization Member Fall 2017 – Spring 2018
Rules and Regulations Thon Committee Member Fall 2017 – Spring 2018

Relevant Coursework

Completed:
- Introduction to Communication Sciences and Disorders
- Deaf Culture
- Clinical Phonetics

- Introduction to Psychology
- Abnormal Psychology
- Introduction to Human Development and Family Studies
- Human Body: Form and Function
- Words: Classical Sources of English Vocabulary
- Elementary Statistics
- Developmental Considerations in the Assessment and Treatment of Language Disorders
- Introduction to Audiology
- Anatomy and Physiology for Speech and Hearing
- Introduction to the Psychology of Learning
- Molecular Science
- Introduction to Alternative and Augmentative Communication
- Acoustic Principles in Communication Sciences and Disorders
- Advanced Abnormal Psychology
- American Sign Language I
- Disorders of Articulation and Phonation
- Organic Speech and Language Disorders
- Psychology of Adolescence

Currently Enrolled:

- Aural Rehabilitation
- Principles of Clinical Management
- Linguistics I: Study of Language

Thesis

The Effect of Motion in AAC Displays on Literacy Skills of Individuals with Down Syndrome (in progress)

- Study the power of motion as an attractor of attention in an AAC display
- Create both static and motion versions of grid-display AAC systems
- Control for confounding variables throughout the study
- Craft undergraduate thesis under the supervision of a faculty member
- Create and incorporate relevant graphics into thesis
- Gather references throughout the research process

Employment Experience

Fringe Hair Salon, Greencastle, PA June 2018 – August 2018

Receptionist
B. Street 104 Restaurant, Greencastle, PA June 2018 – August 2018
Hostess/Waitress
FORD Models, New York City, NY June 2014 – April 2017 Model