Final Assessment/Evaluation Report

2010-2011 School Year

Final Assessment/Evaluation Report
Table of Contents

Introduction

Methods

Developed in rigorous clinical trials, Allegro Foundation compiled a comprehensive in-class assessment, the PF Scale (copyright 2010) with a multivariate track to analyze the cognitive, physical, and social development of more than 500 enrolled students with disabilities annually.

Administered by highly trained instructors three times per year: once at the beginning, once at mid-point, and finally, during the last class, the standardized PF Scale measures receptive and expressive language growth, phonological awareness, sequencing/pattern skills, executive functioning, attention span, gross motor skills, posture, range of motion, dexterity, bilateral coordination, and social development. The initial round of assessments was conducted between September 20 and October 8, 2010, and mid-point testing occurred on average 18 weeks later due to the construction of the current public school year calendar. Final assessments were administered approximately 26 weeks into the session, so results are predicted to be skewed with greatest gains made between initial and mid-point testing.

Upon completion of the entire assessment battery, student forms were scored and entered into Allegro's database for review and analysis. Circle composition was scored based on criteria published in the Buktenica Developmental Test of Visual-Motor Integration, 6th Edition (BEERY VMI), while other measures were rated in an original scoring procedure with rubric available by request only. Allegro instructors were then notified of areas of improvement and weakness for individual students with disabilities, while curriculum and/or program elements were modified to ensure that all participants continue to excel in Allegro's movement education programs.

Instrument

A multi-dimensional, interactive assessment, the PF Scale captures a series of distinct subscores to maximize the validity of the instrument across the cognitive, communicative, physical and social domains. Triangulation of data from several measures, which creates substantial overlap between measures of communication and cognition for example, is key for instructors to distinguish variability in skills for specific subsets of children with disabilities. Precautions must be made when interpreting results from various groups of children with disabilities, as complications experienced by those who live with autism, visual, or hearing impairments may render distinctions between communicative and cognitive growth unclear.

It is important to note that the development of skills measured by the PF Scale represents a continuous and cumulative process, emphasizing the importance for repeated monitoring throughout the school year. Allegro's instruction builds on previously acquired knowledge and skills, while also evoking concrete structural changes in learning and cognition.

Following the initial assessment construction, multiple item analyses were completed to identify those crucial subdomain components that form three internally consistent scales

for comprehensive evaluation. An initial assessment draft was administered to a sample of 124 Allegro Foundation students with disabilities, and resulting items which did not statistically “hang together” were categorically purged and/or replaced. Failure to intercorrelate indicated that previously selected items did not represent a common underlying construct. These measures of internal consistency, as produced by coefficient alpha (Cronbach), operated as a direct function of both the number of items per subdomain as well as their magnitude of intercorrelation.

Item analysis revealed solid internal consistency for the **Cognitive Development Subscale** (measuring receptive/expressive language, anatomy, letters, phonological awareness, sequencing/patterns, executive functioning, attention span, and spatial relations) with a **Cronbach alpha coefficient of .864** after a single, flawed item had been removed.

While the **Physical Development Scale indicated lower consistency due to the diverse disabilities of Allegro’s students, a modest .703 alpha coefficient was reported** with the beanbag toss task (detailed later in this report) demonstrating a strong .765 Cronbach alpha coefficient.

The **Social Domain of Allegro’s PF Scale**, measuring eye contact, positive interactions, socially unacceptable behaviors (reverse scored), boundaries, and respect for other’s space, also **reported strong internal consistency with a resulting .825 alpha coefficient.**

As all PF Scale testing was conducted by Allegro instructors, interrater reliability analysis, as measured by Cohen’s kappa, was imperative to ensure that testers acquired the same results within a predetermined margin of error. **Allegro’s instructors received intensive training prior to administering the assessment, and the resulting interrater reliability for instructors was found to be quite high at Kappa = .978 (p <.001), 95% CI (.954, 1.00).** Allegro also instituted numerous controls to prevent bias of the data, including requiring instructors to submit assessments immediately upon completion and the maintenance of restricted access to data to prevent inflation of student scores.

Confirmatory Factor Analysis of the PF Scale construct indicated that predicted items load on the appropriate subdomains (Cognitive, Physical, Social), validating Allegro’s newest assessment measure as an effective means for quantifying improvement in 500+ children with disabilities.

Results

Final results as measured by Allegro’s PF Scale are reported within this report. Each of Allegro’s more than 500+ students with disabilities evidenced significant improvements in all three domains over 26 weeks of free movement education instruction. Detailed case studies of Allegro students with disabilities have been included in addition to commentary regarding research implications of our findings.

PF Scale: Final Report
PART I: COGNITIVE DEVELOPMENT

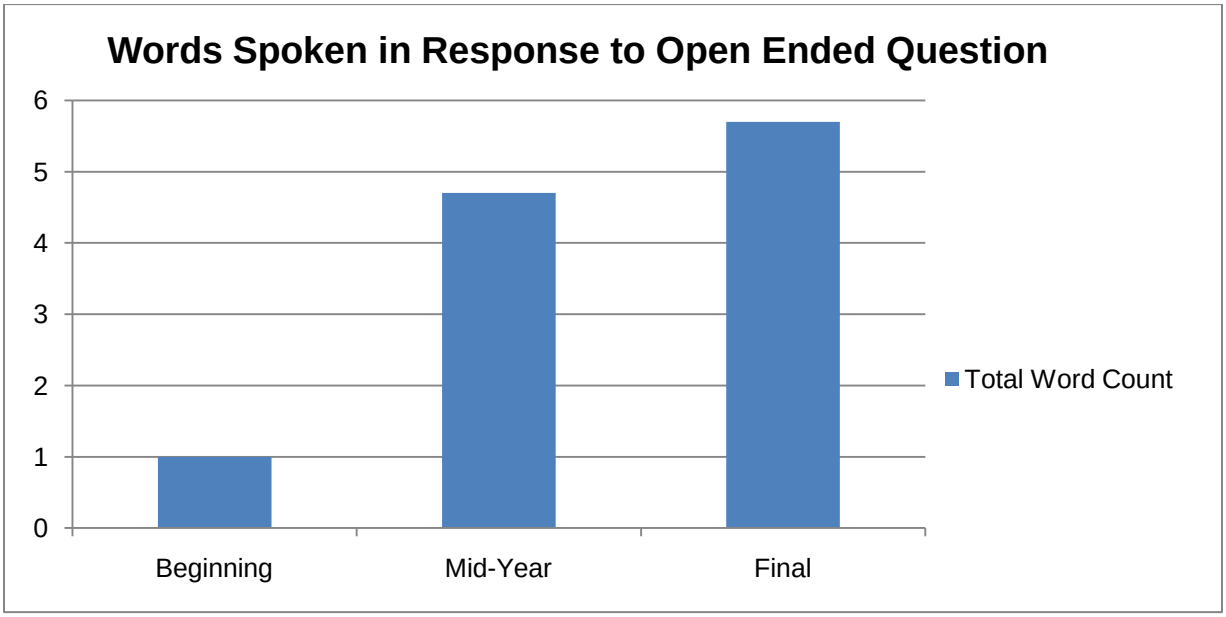
Receptive/Expressive Language Development

Receptive and expressive language skills are absolutely essential in the day-to-day functioning of ALL children. Without meaningful language (whether it be through gesture, vocalization, or complex sentences), children will struggle to communicate their basic needs in school and experience many obstacles in future educational learning.

Allegro's movement education techniques target all aspects of language development. In fact, recent fMRI research credits **Broca's area (right)**, a region in the cerebral cortex of the human brain responsible for both language comprehension and production, as playing a crucial role in encoding bodily movements. By performing Allegro's movement techniques, our students with disabilities are activating their Broca's areas and providing increased neural stimulation directly onto the language centers of their brains.

Over the course of 26 weeks, Allegro's free classes produced significant gains in both receptive and expressive language for enrolled students with disabilities. To quantify expressive language, students with disabilities were asked an open ended question: "What did you do today?" Responses were recorded by Allegro instructors and total words spoken by each student were tallied.

Excluding non-verbal children from this measure, overall student word production **increased from an average of 1.0 words to a total of 5.7 words**, indicating amazing gains in functional vocabulary and vastly improved social skills.



PF Scale: Final Report
PART I: COGNITIVE DEVELOPMENT

Communicative Gesture

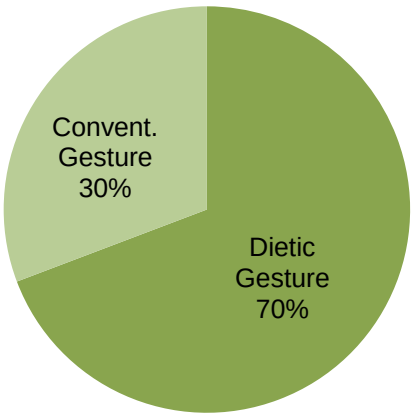
While verbal children were evaluated based on total word production, children who have yet to produce spontaneous spoken language were assessed through a variant measure: communicative gesture.

In human development, gesture production predates all major linguistic milestones. As you may know, gesturing plays a vital role in memory and "paves" the neural pathway for later spoken language.

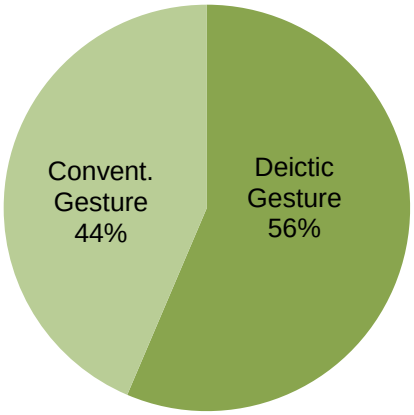
In current disabilities research, children with Down syndrome are characterized as adequate gesturers in spite of their deficits in expressive language. Strong gesturing skills may compensate for the physiological constraints, including mouth shape and tongue size, that delay expressive language mastery in children with Down syndrome.

Allegro's final assessments revealed major progress on this measure with 39 out of 46 total non-verbal children with disabilities producing spontaneous gesture, many for the very first time. Prior to this, 33 out of the 46 total non-verbal students had begun to gesture by mid-year assessments, 8 weeks prior to their final evaluation.

Gesture Production Type
Mid-Year Assessment



Gesture Production Type
Final Assessment



Conventional Gesture: communicative body movements that have established meanings. (Examples: nodding head for "yes", waving goodbye, raising hand to answer question).

Deictic Gesture: a gesture used to "show" an object such that it is brought to the attention of others. (Example: pointing, holding up to show).

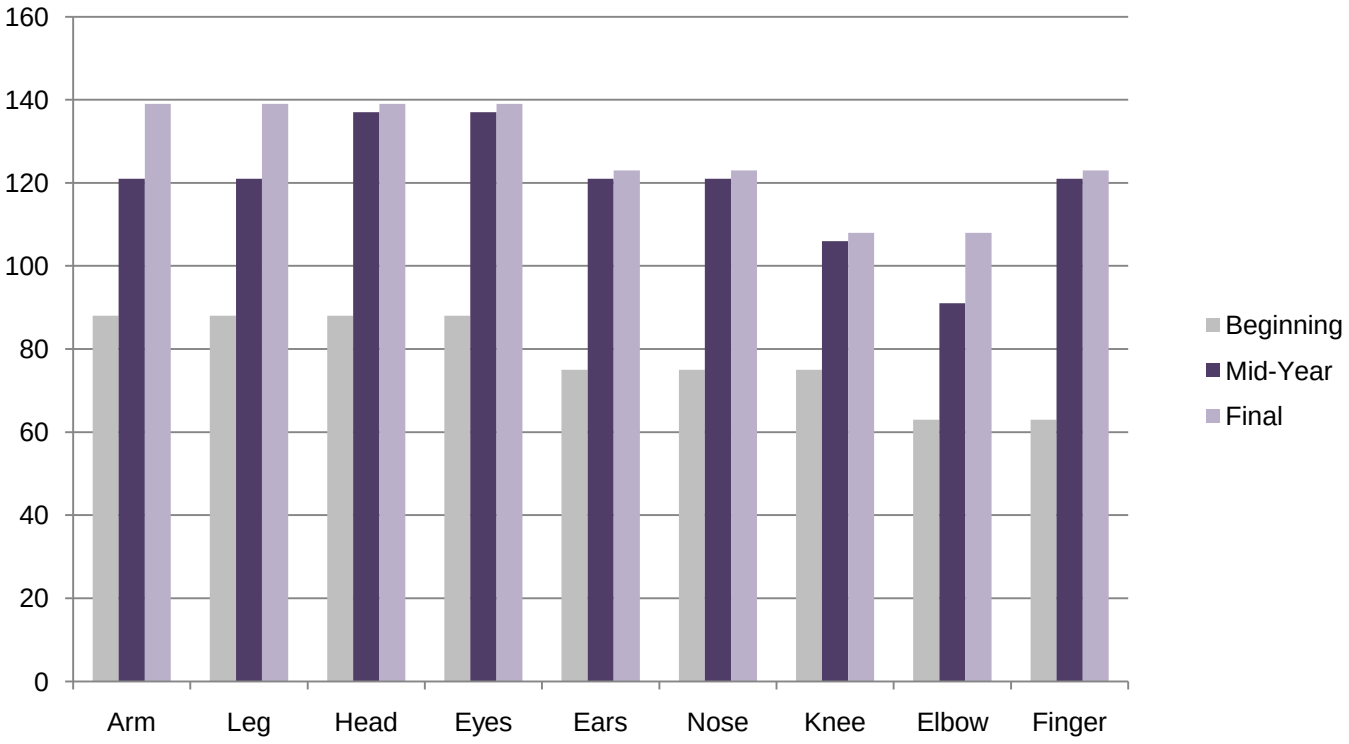
Deictic gestures are typically learned first in our population, with conventional gestures indicating additional communicative growth. For many of Allegro's students without anatomical or other physiological impairments, spoken language (verbalizations) may be their next step after becoming proficient with conventional gestures.

PF Scale: Final Report
PART I: COGNITIVE DEVELOPMENT

Anatomy Identification

Being able to identify various parts of the human body is an important skill for all children in terms of self-awareness, success in movement education instruction, and as a measure of receptive vocabulary.

Students with disabilities were asked to identify the following body parts on a poster presented by Allegro instructors, and responses have been recorded below. For example, only 88 students could identify their arms in the beginning, by mid-year, 121 were consistently identifying their arms, and during the final administration of the PF Scale, 139 of Allegro's verbal students were successful in identifying their arms! While this could be interpreted as a very minor achievement, important adaptive life skills like understanding body part locations serves as a foundation for even greater academic learning for children with disabilities!



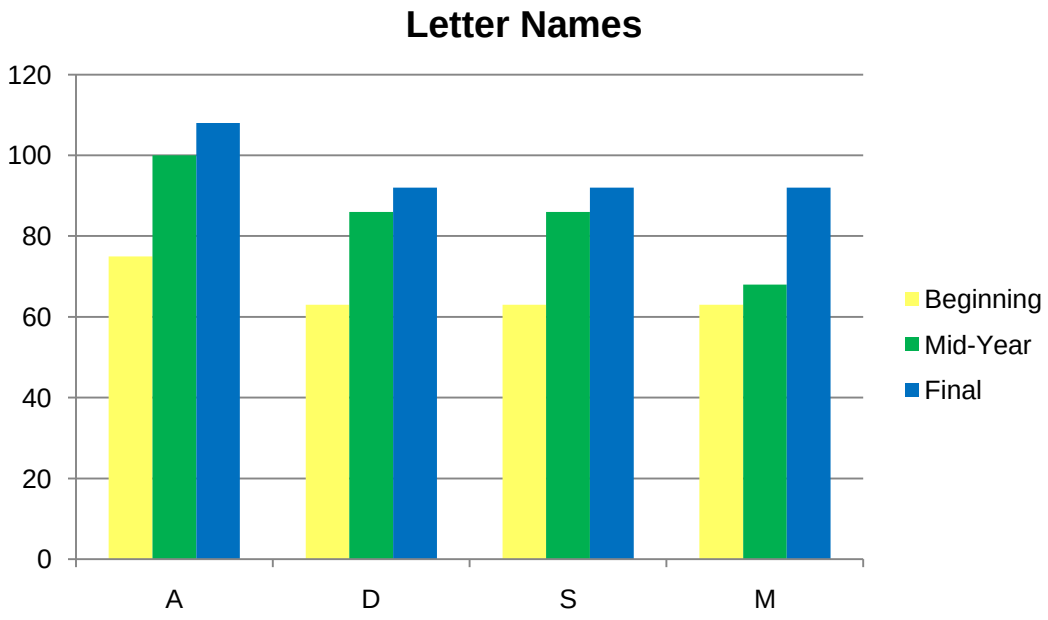
Overall Composite Scores increased from 77.9 (Beginning) to 126.8 (Final).

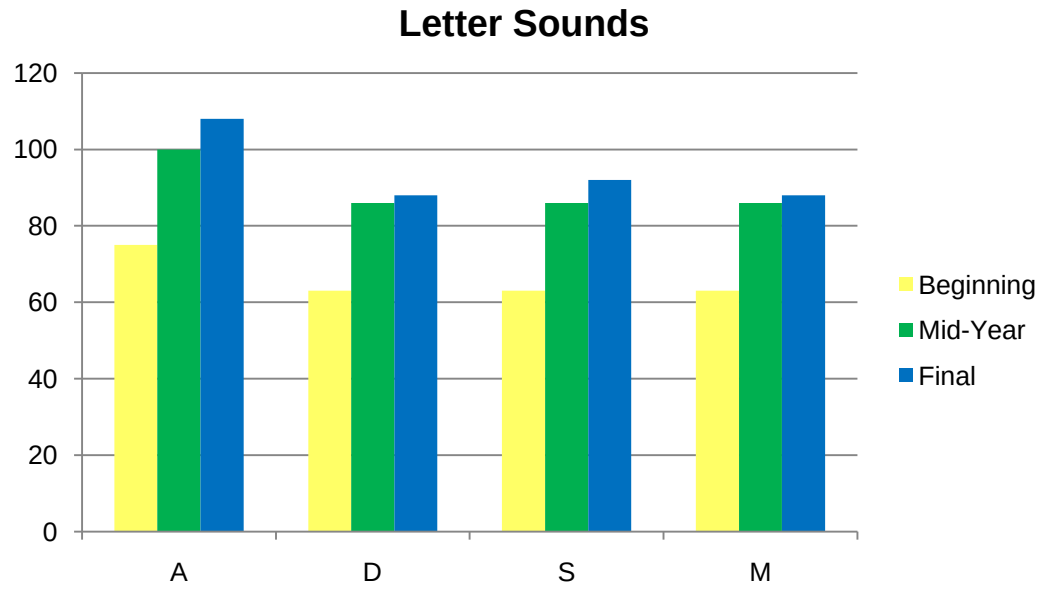
PF Scale: Final Report
PART I: COGNITIVE DEVELOPMENT

Identifying Letters

Recognition and identification of letters in the alphabet are vital pre-literacy skills that children with disabilities must master prior to learning to read. Through Allegro's innovative movement education techniques, children with disabilities are taught to use their bodies to form letter shapes, while also learning to manipulate alphabet props as educational tools.

Over the course of 26 weeks, Allegro's students with disabilities demonstrated remarkable improvements in letter-learning as evidenced below.



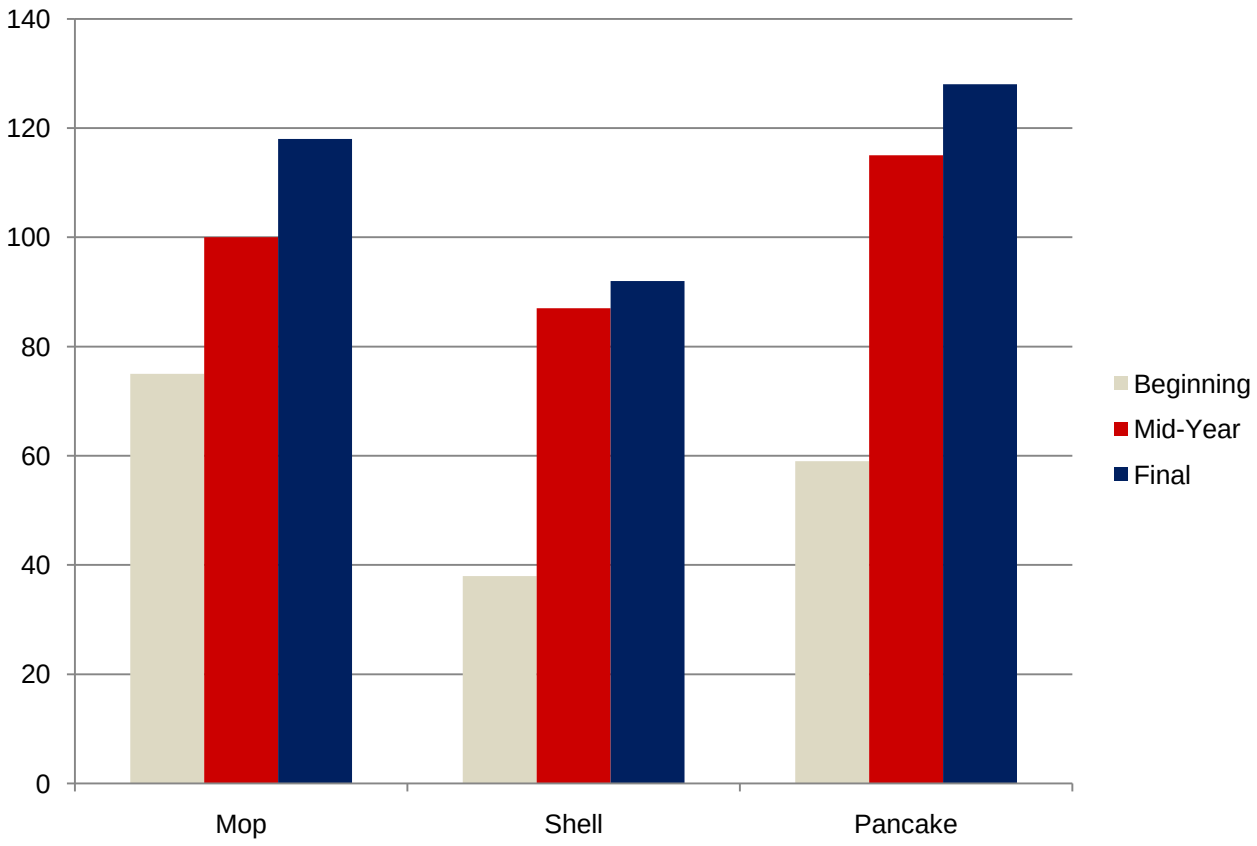


PF Scale: Final Report
PART I: COGNITIVE DEVELOPMENT

Phonological Processing

Phonological processing is another important measure of both receptive and expressive language, in addition to functioning as a strong indicator for literacy readiness. Children with mental retardation are traditionally taught exclusively through sight-words, but the scientific community is slowly proving the value of phonics instruction for children of all abilities.

To assess phonological awareness, Allegro instructors slowly pronounced three words originally identified by the Wechsler Individual Achievement Test (WIAT-II) for their utility in this evaluation. The words “mop”, “shell”, and “pancake” were broken down by syllable with 1-second interval spacing, and subsequent student performance was rated between 0-3 with 3 indicating complete mastery.



PF Scale: Final Report
PART I: COGNITIVE DEVELOPMENT

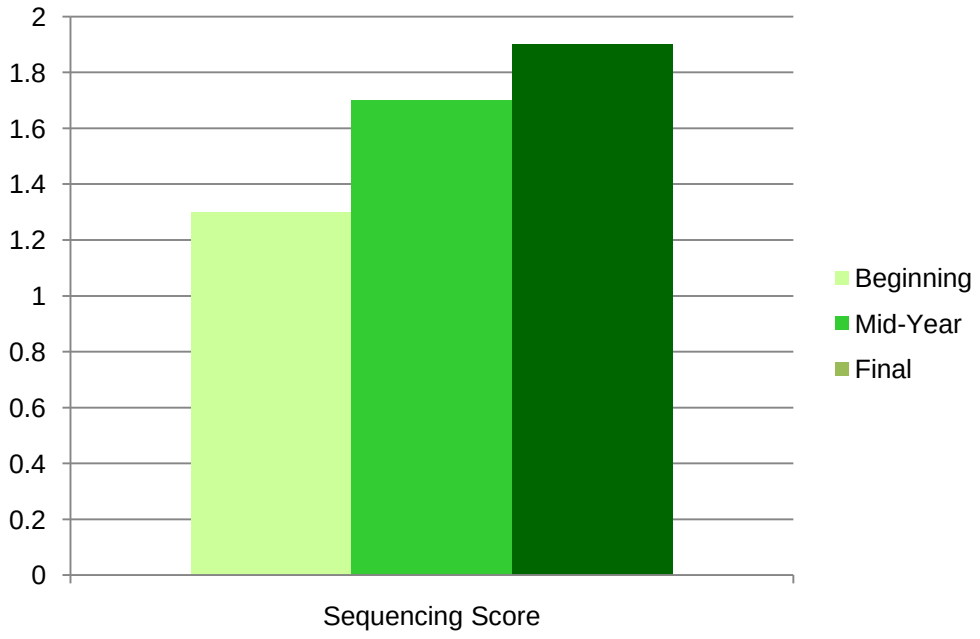
Literacy Building Blocks

Sequencing/Patterns: Child's ability to follow a sequence demonstrated by instructors.

Sequencing skills, an important measure of working memory, operate as a strong indicator of future executive functioning skills. Executive functioning, defined as the cognitive construct that controls, maintains, and regulates planning, strategizing, decision-making, and impulse control, is vital to the future independence for children of all abilities, particularly those who may struggle with other academic skills.

Recently published research has demonstrated that impairments in executive functioning during the preschool years correlates with lower mathematics achievement many years later. For this reason, Allegro emphasizes sequencing and other executive functioning skills in all free weekly classes for preschool children at risk with unidentified disabilities. What a remarkable gift that Allegro provides to hundreds of preschool children at risk: Allegro's early intervention can actually mean the difference between struggling and shining in their future math classes!

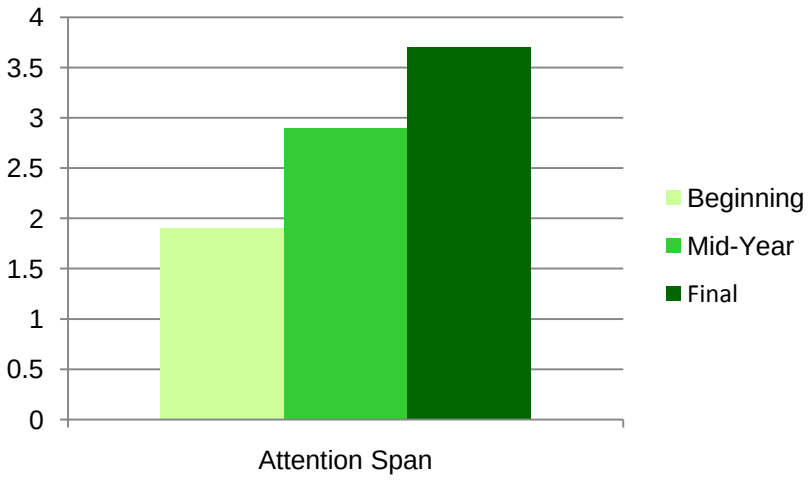
The diagnostic criteria of most disabilities indicates some level of deficiency in executive functioning, particularly for those living with moderate to severe mental retardation. As this cognitive construct governs processing, working memory, and other important abilities, it is absolutely crucial that Allegro's movement education instruction targets these skills, something that is often overlooked in the traditional Individualized Education Plan (IEP). **As demonstrated in the below graph, Allegro's instruction resulted in substantial gains in sequencing skills for all children with disabilities and at risk.**



PF Scale: Final Report
PART I: COGNITIVE DEVELOPMENT

Literacy Building Blocks

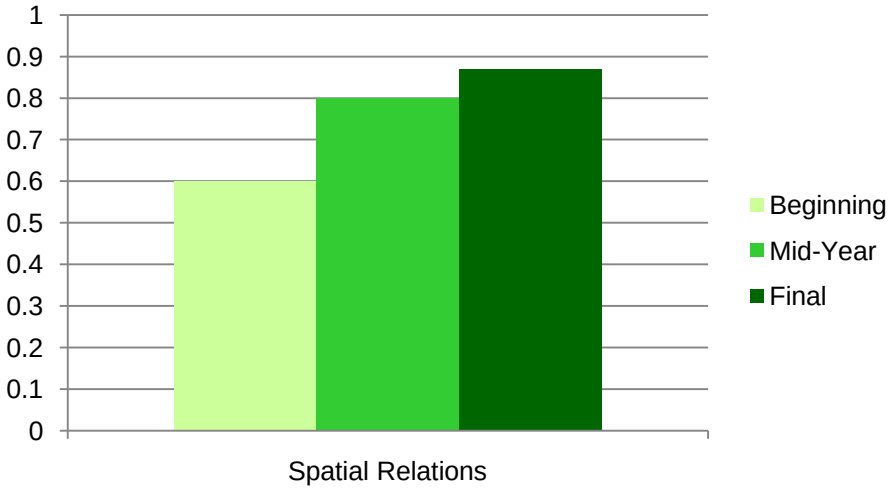
Attention Span: Child's ability to stay on task in comparison to other enrolled students with disabilities



Attention operationally defined as "eyes focused, head in correct direction, no verbal or other communicative interruption".

Attention Span Scoring Procedure:
1 = much less than expected (as compared to others in the class)
2 = minimally less than expected
3 = expected
4 = minimally more than expected
5 = much more than expected

Spatial Relations: Child's ability to navigate independently within the circle without an indicator prop



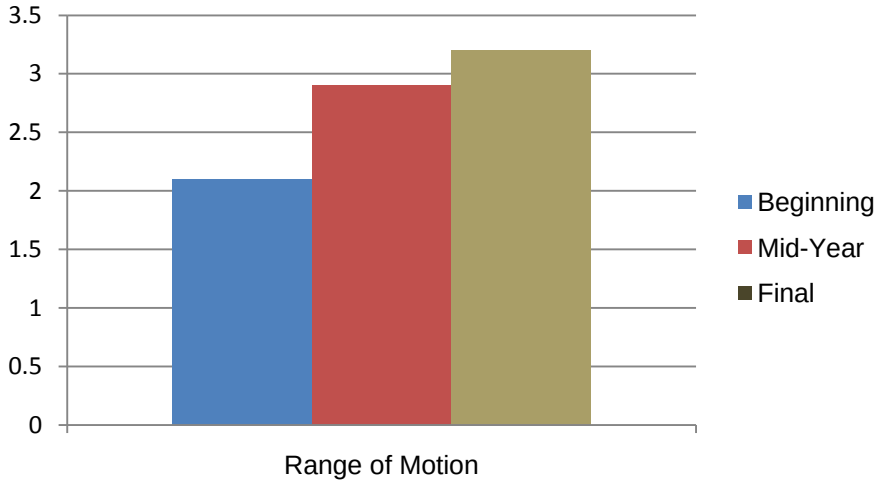
PF Scale: Final Report
PART II: PHYSICAL DEVELOPMENT

Gross Motor Skills

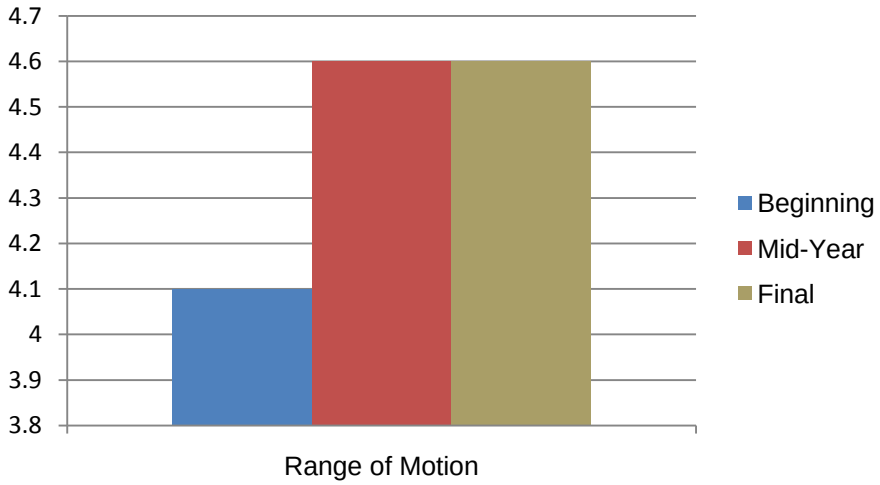
Measures of gross motor skills indicate growing flexibility and muscle strength gained through Allegro's movement education techniques. Well-developed fine and gross motor skills are necessary when all children learn to write by holding their pencils correctly, read lines of text, and solve math problems.

Improvements in gross motor skills are especially important for children with disabilities living in wheelchairs, as they build the core body strength necessary to assist their caregivers with transfers in and out of their wheelchairs for increased independence.

Range of Motion: Leg-to-Floor Angle



Range of Motion: Forward Bend



PF Scale: Final Report

PART II: PHYSICAL DEVELOPMENT

Posture: Children with Down syndrome

Current research published in various scientific journals (e.g. *Disability and Rehabilitation*, *Research in Developmental Disabilities*, *Developmental Psychology*), evidences significant impairments in posture and balance stability for children with Down syndrome. The motor development of children with Down syndrome is frequently delayed due to generalized muscle hypotonia (low muscle tone) and ligament laxity ("loose" ligaments) but can also be attributed to cerebellar dysfunction, in particular, a delay in myelination of neurons. These differences in development may be responsible for the postural weakness of children with Down syndrome.

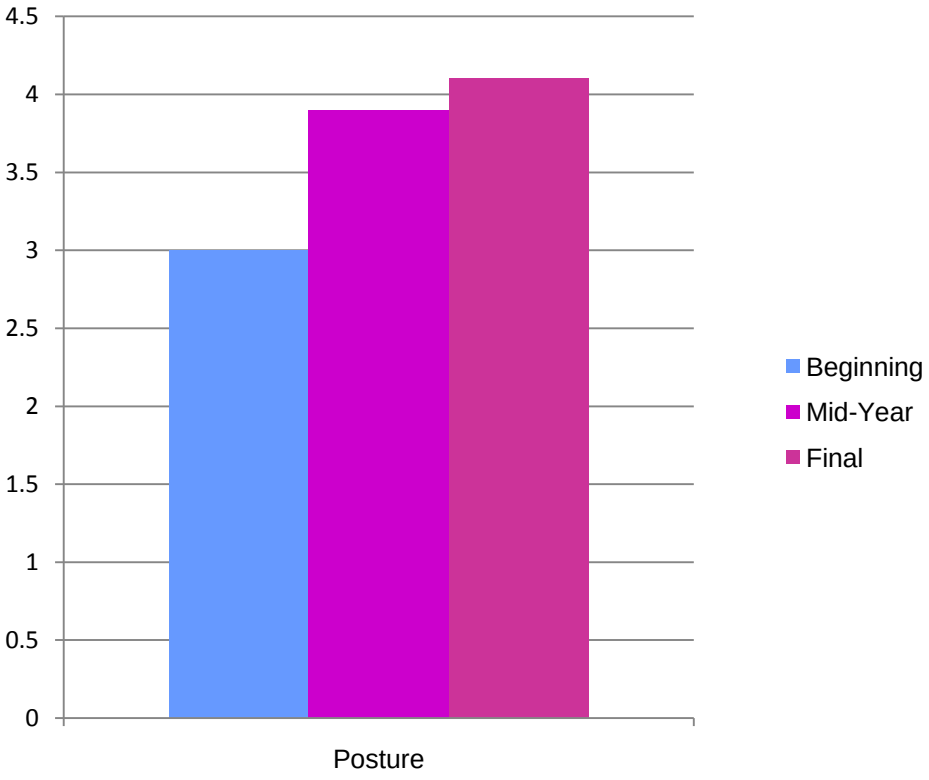
Various interventions have been tested with mixed results, but Allegro Foundation's movement education instruction produced significant improvements in demonstrated posture for all identified students with Down syndrome, *t*(10) = -9.587, p < .001! Additional research will be conducted in Allegro's programs in the upcoming school year to determine the exact mechanism of these improvements made possible by movement education!

Postural Control

All students with disabilities made amazing improvements in their posture, indicating enhanced core muscle strength and flexibility as reflected in the below graph.

Example

Before After



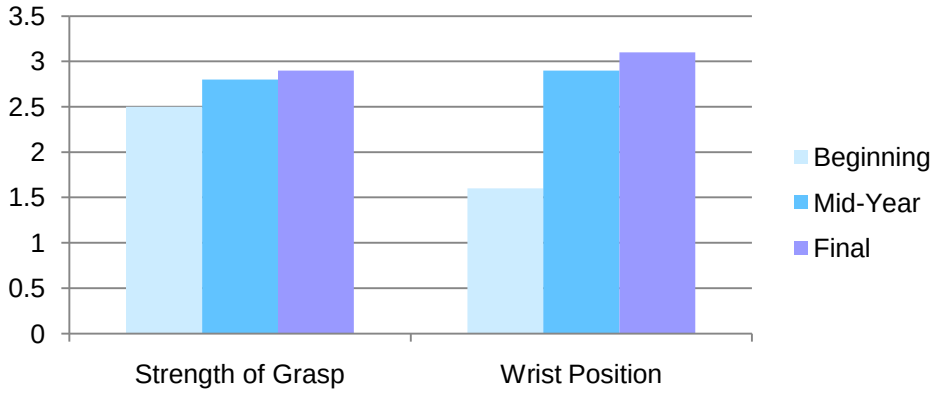
PF Scale: Final Report
PART II: PHYSICAL DEVELOPMENT

Fine Motor Skills / Dexterity

Certain genetic disorders result in dermatological differences (skin structures, connective tissue, elastin, etc.) that may affect how sensation is perceived by children with disabilities. As a result, Allegro's students have more difficulty in grading movement of muscles and experience greater challenges in manipulating an object properly.

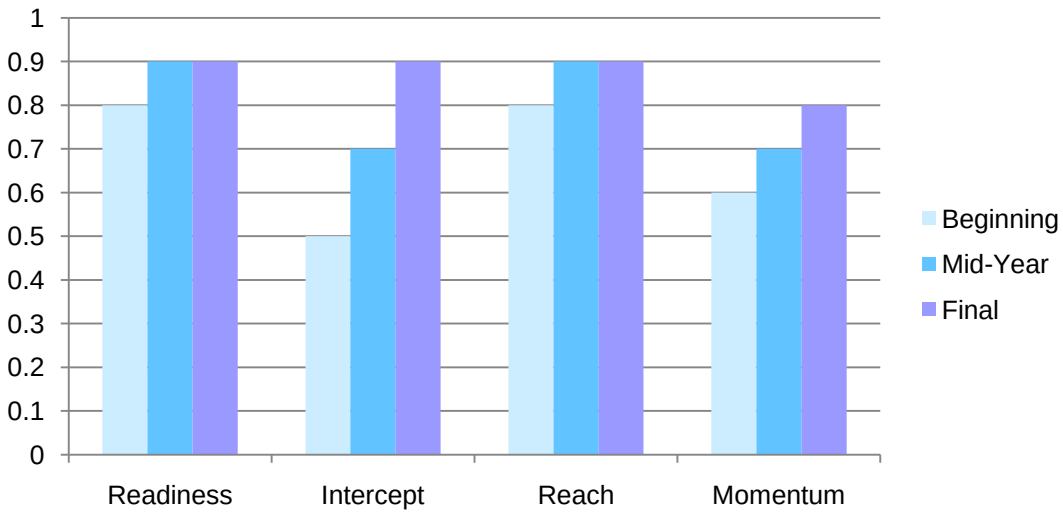
Using the PF Scale, instructors examined how each child is able to maintain muscular contractions around a joint to hold his or her beanbag in a certain position, while also looking at wrist movement. Some children with disabilities do not automatically progress into using an extended wrist position for fine motor activities and must be taught through Allegro's movement education techniques.

Physiological Characteristics: Beanbag Toss Task



Readiness and Interception: Beanbag Toss Task

Both a cognitive and physical measure, Allegro's PF Scale Beanbag Toss Task requires students to plan their movements (executive functioning), anticipate the velocity and direction of the toss, and compensate for its forward motion by absorbing the beanbag's momentum.

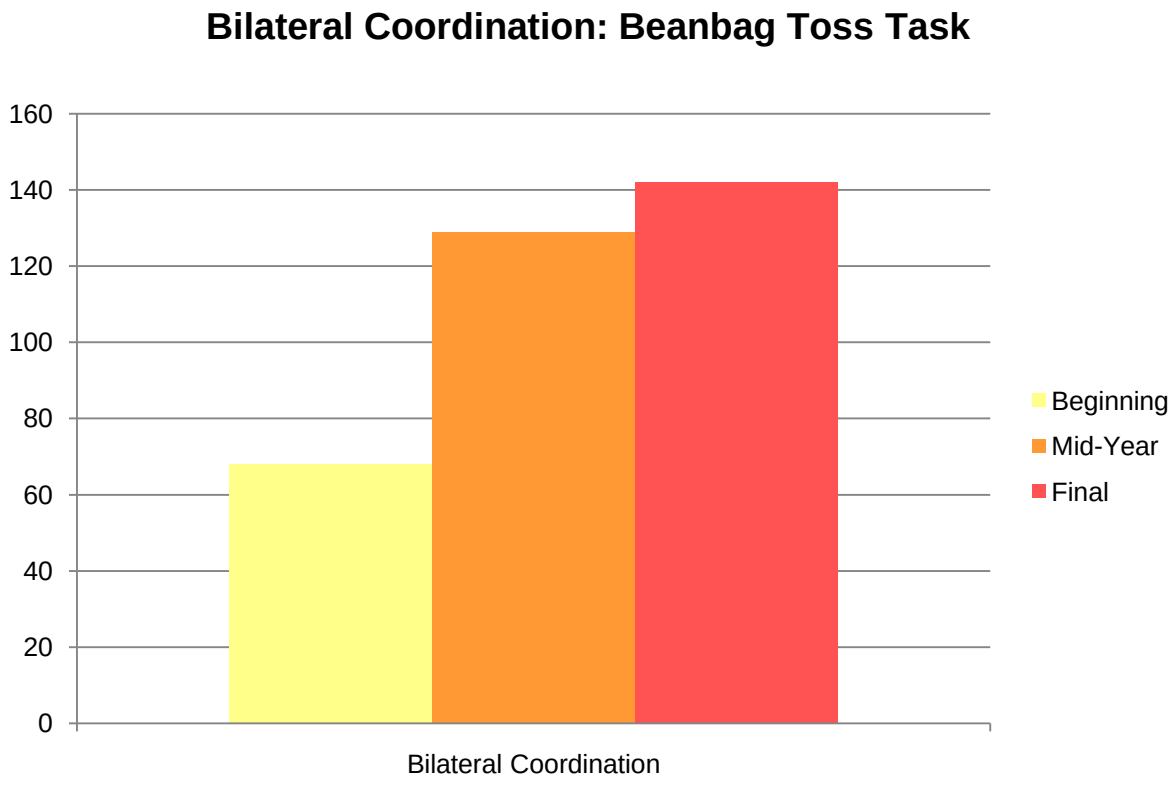


PF Scale: Final Report
PART II: PHYSICAL DEVELOPMENT

Bilateral Coordination

Drawing upon recent findings in biological research, Allegro enhances academic learning by engaging both sides of a child's brain simultaneously, ensuring a more complete learning experience. Warm-up exercises begin all classes where students with disabilities are asked to touch each hand to their opposite knee, crossing over the centers of their bodies. When a child touches his right hand to his left knee, the left side of his brain is activated to move his right hand while the right side of his brain recognizes the placement of his hand on his left knee, forcing integration of both hemispheres of the brain. When both sides of a child's brain are alert and responsive, he or she can learn in a more meaningful way through all five senses.

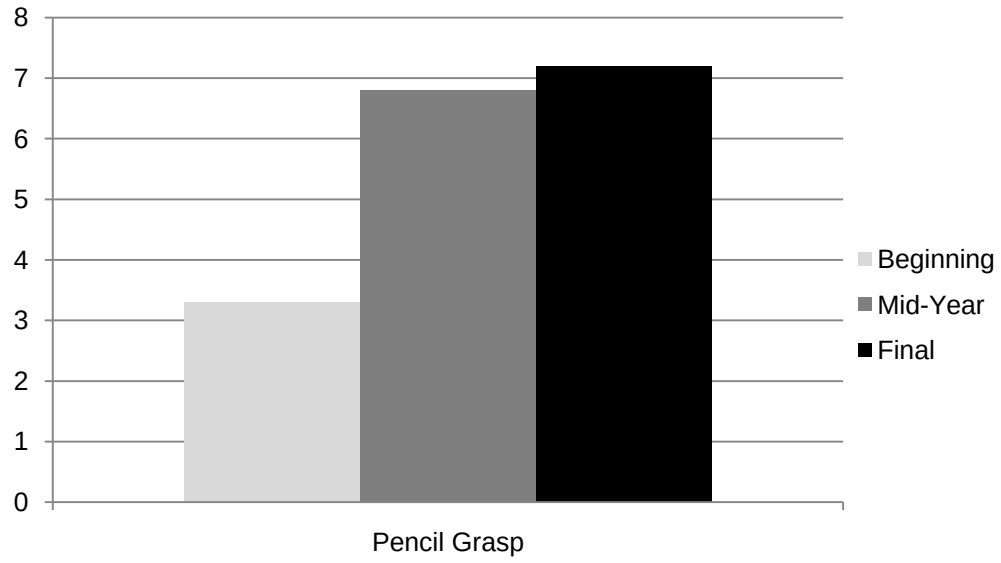
In this measure, Allegro instructors ask each child with disabilities to transfer the beanbag from their dominant to non-dominant hand and then evaluate their ability to carry out this task effectively as evidenced below.

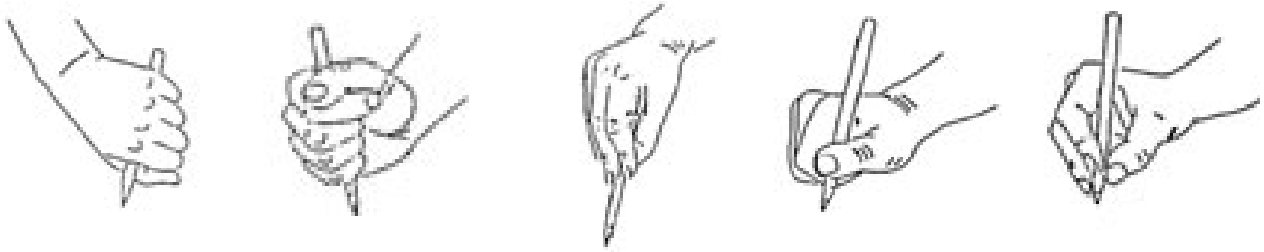


This quantitative measure of bilateral coordination provides further insight into an individual child's brain. For example, Noah, a former Allegro student who passed away in February due to brain cancer complications, showed mastery in bilateral coordination during his first assessment in September. Just a few days before his death, however, Noah was no longer able to complete the bilateral beanbag task, indicating that his **corpus callosum** (the connecting brain tissue between both hemispheres of the brain) had degenerated and was no longer functioning properly.

PF Scale: Final Report
PART II: PHYSICAL DEVELOPMENT

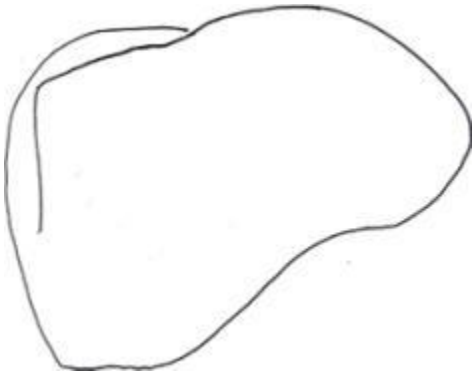
Development of Grasp as Evaluated by Pencil Hold and Control





While grasping their pencils, students with disabilities were asked to copy a circle on blank paper to evaluate their visual-spatial motor integration. Completed circle drawings were rated based on criteria published in the Beery-Buktenica Developmental Test of Visual-Motor Integration, 6th Edition (BEERY VMI). **Composite circle scores ranged from 1-4 with mid-year assessments reporting an average score of 2.2 and final assessments reporting an average score of 2.9.**

Example: Score 1 Circle



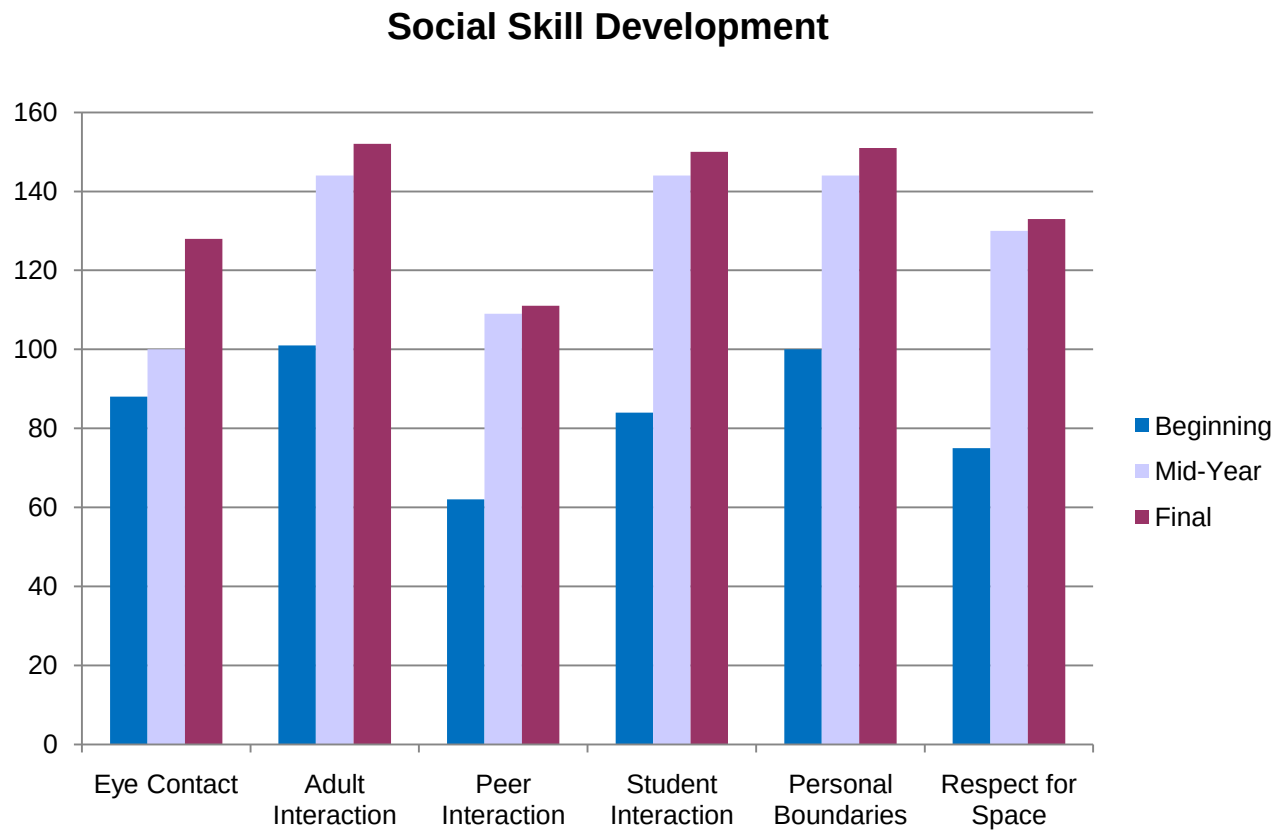
Example: Score 4 Circle

PF Scale: Final Report
PART III: SOCIAL DEVELOPMENT

Social Skill Development

Social skills, including increased attention span, ability to take turns, following directions, and proper social interaction, taught through Allegro's movement education programs, even at the most basic level, give children with disabilities a head start in school, lowering the achievement gap and exceeding the "No Child Left Behind" objective. With improved social skills and stronger understanding of the basic demands to classroom behavior, a child's conduct improves, and thus he or she is better able to learn. Allegro's instructors evaluated social skill attainment through measures of eye contact, positive interactions with adults, peers, and other students with disabilities, as well as acceptance and understanding of personal boundaries.

Over the past 20+ years, researchers have examined the effectiveness of teaching emotion vocabulary to preschool children at-risk and those with disabilities to reduce externalizing behaviors and aggression. Allegro's students with disabilities are in the midst of developing "theory of mind", when they begin to learn how and why their actions affect others, so emotion vocabulary has the potential to improve their long-term success, and was also an important component of our social skills assessment.



Case Study

Allegro Foundation

…a Champion for Children with Disabilities

Bilingual Research Color Study 2011

Researchers conducted a matched-samples cross-program evaluation over 12 weeks to quantify the effectiveness of Allegro's movement education techniques for teaching basic pre-literacy skills to preschool students at risk with unidentified disabilities. Three separate Bilingual Preschool classes were held throughout the Spring Semester, where students of similar abilities were matched for proper comparison using composite scores from the PF Scale, $r(47) = -.025$, $p = .882$.

Group Composition

Group 1: All preschool students at risk with unidentified disabilities were taught color names paired with color-specific movement education instruction.

Group 2: All preschool students at risk with unidentified disabilities were taught color names without movement instruction.

Group 3: All preschool students at risk with unidentified disabilities were taught color names following movement activities unrelated to colors.

Based upon previous evidence of Allegro's movement education techniques, children in Group 1 should excel and outperform students in all other groups. Students enrolled in Group 3 are predicted to perform moderately well with educational gains due to recent although unrelated movement instruction. The increased blood flow and oxygen to the brain in addition to other physiological changes in the body should facilitate learning in this third group. Finally, our control group, Group 2, is expected to perform the lowest of all three with only modest improvements in the color-naming task.

Results

Evidence presented below as gather by Student/Volunteer Coordinator Jessica Rossini validates our predictions. **Group 1, taught through Allegro's paired movement education instruction (36%) performed much better than the movement-only (31%) and control (23%) groups, providing empirical evidence for the importance of Allegro's techniques!**

Bilingual Research Color Study 2011 Results

Color	Group #	Number of Students in Class	Number of Students with Correct Response	Percentage Correct	Total Percent Increase
Red	1	14	8	57%	
		14	12	86%	**29%**
	2	17	6	35%	
		17	9	53%	**18%**
	3	16	9	56%	
		16	12	75%	**19%**
Orange	1	14	7	50%	
		14	12	86%	**36%**
	2	17	6	35%	
		17	10	59%	**24%**
	3	15	7	47%	
		15	12	80%	**33%**
Yellow	1	14	8	57%	
		14	13	93%	**36%**
	2	17	8	47%	
		17	13	76%	**29%**
	3	17	9	53%	
		15	13	87%	**34%**
Green	1	14	8	57%	
		14	13	93%	**36%**
	2	17	8	47%	
		17	12	71%	**24%**
	3	15	10	67%	
		15	14	93%	**26%**
Blue	1	14	8	57%	
		14	13	93%	**36%**
	2	17	9	53%	
		17	11	65%	**12%**
	3	15	9	60%	
		15	14	93%	**33%**
Purple	1	14	7	50%	
		14	13	93%	**43%**
	2	17	6	35%	
		17	11	65%	**30%**
	3	15	6	40%	
		15	12	80%	**40%**

Scientific Explanation of Allegro's Movement Education Techniques

The basic philosophy of Allegro Foundation emphasizes the total learning process by combining **cognitive** and **muscle memory** together to stimulate sequential and conceptual learning, problem-solving skills and communication, as well as producing emotional and physiological changes in the body. Simply put, Allegro's students with disabilities develop muscle memory through repetitive motion, strengthening and expanding neural circuits that operate as integral pathways to future academic learning.

So what is muscle memory?

Muscle memory can be most easily defined as a form of procedural memory, where a specific motor task is encoded and consolidated into memory through repetition. Muscle memory actually decreases the need for conscious attention to perform the resulting motor activity, and thereby creates maximum efficiency in learning.

Research suggests that humans are not the "tabula rasa" once argued by Locke. Instead motor memory appears to be genetically pre-wired in all humans. When an Allegro Foundation student with a disability first learns a motor task, movement is slow and easily disrupted without concentrated, focused attention. Through practice in weekly classes, the student's execution of motor tasks naturally becomes smoother, reflecting improvements in his or her brain's synaptic connectivity as a function of repetitive neural firing.

Why does muscle memory facilitate cognitive development and academic learning?

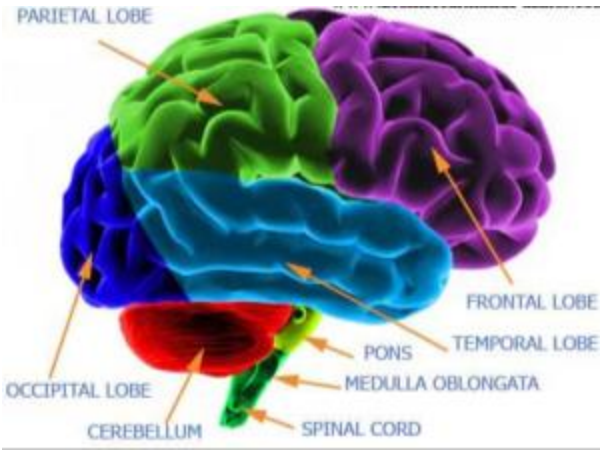
Because motor processing occurs in nearly all parts of the brain, the resulting muscle memory produces complex, neural networks for more efficient processing of a broad range of skills and abilities.

Cerebellum: coordination of voluntary motor movement, balance, equilibrium, and muscle tone.

Frontal Lobe: plan a schedule, imagine the future, use reasoned arguments, process emotion, solve problems. In the rearmost portion of each frontal lobe is a motor area, which controls voluntary movement.

Broca's Area: allows thoughts to be transformed into words. Recent FMRI data determines that Broca's area also plays a crucial role in encoding complex human movements.

Parietal Lobe: Controls movement, orientation, recognition, and perception of stimuli, as well as **reading and arithmetic.**



Thalamus: sensory and motor functions. Almost all sensory information enters this structure where neurons send that information to the overlying cortex. Basal ganglia, clusters of nerve cells surrounding the thalamus, are responsible for motor control.

Mesencephalon: vision, hearing, eye movement, and body movement. The anterior part has the cerebral peduncle, which is a huge bundle of axons traveling from the cerebral cortex through the brain stem and these fibers (along with other structures) are important for voluntary motor function.

Pons: motor control and sensory analysis. Some structures within the pons are linked to the cerebellum, and thus are involved in movement and posture.

References

Aldrige, M., Wood, J. (1997). Talking about feelings: Young children's ability to express emotions. *Child Abuse and Neglect*, 21(12), 1221-1233.

Alibali, M. W., Goldin-Meadow, S. (1993). Gesture-speech mismatch and mechanisms of learning: What the hands reveal about a child's state of mind. *Cognitive Psychology*, 25, 468-523.

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4th Ed, Text Revision ed.). Washington DC: American Psychiatric Association.

Antshel, K., Marrinam, E., Kates, W., Fremont, W., Shprintzen, R. (2009). Language and literacy development in individuals with Velo-cardio facial syndrome. *Topics in Language Disorders*, 29(2), 170-186.

Bellugi, U., George, S.M. (Eds.). (2008). Linking cognitive neuroscience and molecular genetics: New perspectives from Williams syndrome [Special Issue]. *Journal of Cognitive Neuroscience*, 12(1), 30–46.

Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American Psychologist, 57*, 111-127.

Blair, R. J. (2005). Responding to the emotions of others: Dissociating forms of empathy through the study of typical and psychiatric populations. *Consciousness and Cognition, 14*, 698 - 718.

Bloom, L. (1998). Language develop and emotional expression. *Pediatrics*, 102, 1272-1277.

Bourke-Taylor, H., Law, M., Howie, L., Pallant, J. F. (2009). Development of the Assistance to Participate Scale (APS) for children's play and leisure activities. *Child: Care, Health, and Development*, 35(5), 738-745.

Bretherton, I., Fritz, J., Zahn-Waxler, C. (1986). Learning to talk about emotions: A functionalist perspective. *Child Development*, 57(3), 529-548.

Bruni, M. (2006). *Fine motor skills for children with Down syndrome*. Bethesda, MD: Woodbine House, Inc.

Castelli, F. (2006). The Valley task: Understanding intention from goal-directed motion in typical development and autism. *British Journal of Developmental Psychology, 24*, 655-668.

Clark, R. A., Delia, J. G. (1976). The development of functional persuasive skills in childhood and early adolescence. *Child Development*, 47(4), 1008-1014.

Cook, S. W., Mitchell, Z., Goldin-Meadow, S. (2008). Gesturing makes learning fast. *Cognition*, 106, 1047-1058.

Cowden, J. E., Torrey, C. C. (2007). *Motor development and movement activities for preschoolers and infants with delays: A multisensory approach for professionals*. Springfield, IL: Charles C. Thomas Publisher, LTD.

Davenport, B. R., Bourgeois, N. M. (2008). Play, aggression, the preschool child, and the family: A review of literature to guide empirically informed play therapy with aggressive preschool children. *International Journal of Play Therapy*, 17(1), 2-23.

Dewaele, J., Pavlenko, A. (2002). Emotion vocabulary in interlanguage. *Language Learning*, 52(2), 263-322.

Finestack, L. H., Richmond, E. K., Abbeduto, L. (2009). Language development in individuals with Fragile X syndrome. *Topics in Language Disorders*, 29(2) 133-148.

Garber, P., Goldin-Meadow, S. (2002). Gesture offers insight into problem-solving in adults and children. *Cognitive Science,* 26, 817-831.

Gillberg, C. (1996). The long-term outcome of childhood empathy disorders. *European Child & Adolescent Psychiatry*, 5, 52-56.

Gimmig, D., Huguet, P., Caverni, J., Cury, F. (2006). Choking under pressure and working memory capacity: When performance pressure reduces fluid intelligence. *Psychonomic Bulletin and Review,* 13(6), 1005-1008.

Guerin, S., Buckley, S., McEvoy, J., Hillery, J., Dodd, P. (2009). The psychometric properties of the Attention-Distraction, Inhibition-Excitation Classroom Assessment Scale (ADIECAS) in a sample of children with moderate to severe intellectual disabilities. *Research in Developmental Disabilities*, 30, 727-734.

Harley, T. (2008). *The psychology of language: From data to theory.* New York, NY: Psychology Press.

Hartman, E., Houwen, S., Scherder, E., Visscher, C. (2010) On the relationship between motor performance and executive functioning in children with intellectual disabilities*. Journal of Intellectual Disability Research*, 54(5), 468-477.

Hebbeler, K., Rooney, R. (2009). Accountability for services for young children with disabilities and assessment of meaningful outcomes. *Language, Speech, and Hearing Services in Schools*, 40, 446-456.

Heimanna, M., Strid, K., Smith, L., Tjus, T., Ulvund, S. E., Meltzoff, A. N. (2006). Exploring the relation between memory, gestural communication, and the emergence of language in infancy: a longitudinal study. *Child Development*, 15, 233-249.

Howard, P. J. (2006). *The owner's manual for the brain: Everyday applications from mind-brain research, third edition*. Austin, TX: Bard Press Book.

Iversion, J. M., Longobardi, E., Caselli, M., C. (2003). Relationship between gestures and words in children with Down's syndrome and typically developing children in the early stages of communicative development. *International Journal of Language and Communication Disorders*, 38, 179-197.

Joseph, L. M., Seery, M. E. (2004). Where is the phonics? A review of the literature on the use of phonetic analysis with students with mental retardation. *Remedial and Special Education,* 25(2), 88-94.

Knudson, D. V., Morrison, C. S. (2002). *Qualitative analysis of human movement*. Champaign, IL: Human Kinetics.

Koyama, T., Osada, H., Tsujii, H., Kurita, H. (2009). Utility of the Kyoto Scale of Psychological Development in cognitive assessment of children with pervasive developmental disorders. *Psychiatry and Clinical Neurosciences*, 63, 241-243.

Krauss, R. M., Dushay, R. A., Chen, Y., Rauscher, F. (1995). The communicative value of conversational hand gestures. *Journal of Experimental Social Psychology*, 31, 533-552.

Martin, G., Klusek, J., Estigarribia, B., Roberts, J. E. (2009). Language characteristics of individuals with Down syndrome. *Topics in Language Disorders*, 29(2), 112-132.

Mayrand, L., Mazer, B., Menard, S., Chilingaryan, G. (2009). Screening for motor deficits using the Pediatric Evaluation of Disability Inventory (PEDI) in children with language impairment. *Developmental Neurorehabilitation*, 12(3), 139-145.

McAloney, K., Stagnitti, K. (2009). Pretend play and social play: The concurrent validity of child-initiated pretend play assessment. *International Journal of Play Therapy*, 18(2), 99-113.

Mervis, C. B. (2009). Language and literacy development of children with Williams syndrome. *Topics in Language Disorders*, 29(2), 149-169.

Murphy, M. M. (2009). Language and literacy in Turner syndrome. *Topics in Language Disorders,* 29(2) 187-194.

Paterson, S. (2001). Language and number in Down syndrome: The complex developmental trajectory from infancy to adulthood. *Down Syndrome Research and Practice,* 7(2), 79-86.

Paterson, S. J., Brown, J. H., Gsodl, M.K., Johnson, M. H., Karmiloff-Smith, A. (1999). Cognitive modularity and genetic disorders. *Science,* 28, 2355-2359.

Raver, C. C. (2002). Emotions matter: Making the case for the role of children's emotional adjustment for their early school readiness. *Social Policy Report, 16*, 3–24.

Schaefer, C. E. (2010). *Play therapy for preschool children*. Washington, DC: American Psychological Association.

Seikel, J.A., King, D. W., Drumright, D. G. (2005). *Anatomy and physiology for speech, language, and hearing*. Clifton Park, NY: Thomas Delmar Learning.

Straube, B., Green, A., Weis, S., Chatterjee, A., Kircher, T. (2008). Memory effects of speech and gesture binding: Cortical and hippocampal activation in relation to subsequent memory performance. *Journal of Cognitive Neuroscience*, 21(4), 821-836.

Thompson, R. A. (2006). The development of the person: Social understanding, relationships, conscience, and self. In N. Eisenberg, W. Damon & R. M. Lermer (Eds.), *Handbook of Child Psychology* (Sixth Edition ed., Vol. 3, pp. 24 - 98). Hoboken: John Wiley & Sons, Inc.

Vicari, S, Caselli, M.C., Gagliardi, C., Tonucci, F., Volterra, V. (2002). Language acquisition in special populations: a comparison between Down and Williams syndromes. *Neuropsychologia*, 40, 2461-2470.

Waters, R.D., Kuczai, S., (1985). Acquisition of emotion-descriptive language: receptive and productive vocabulary norms for ages 18 months to 6 years. *Developmental Psychology*, 21, 901-908.

Willner, P., Bailey, R., Parry, R., Dymond, S. (2010). Evaluation of executive functioning in people with intellectual disabilities. *Journal of Intellectual Disability Research*, 54(4), 366-379.