

Memory

Frequently Asked Questions

What is Short-term Memory?

A. Short-term memory tends to define what we are able to cognitively or consciously pay attention to. So we measure it in terms of digit spans. (see digit span explanation) The national norms according to long term studies determined the average short-term memory digit span to be 7 (+ /- 2) digits. Which makes the norm between 5 and 9.

What is Intermediate or Working Memory? A. Your working memory tends to define the output of the expressive speech and language because you use that most of all.

What is Long-term Memory?

A. Long term memory is broken up into 3 primary pieces: episodic memory (the episodes or the events we learned or experienced) and that is stored away in the sensory contextual format. They have a distinctive beginning, middle and end.

The second piece you have in long term memory is semantic memory. Semantic memory is how we go about communicating. Its devoid of emotions and feelings it is strictly syntax, how we communicate. The third part of long term memory is called procedural or habitual. It is strictly a learned association in order to make things happen. It is reactive in a sense, but it is procedural.

So we draw upon our long-term memory of how to express and do things. That is the reservoir of what we know.

So, what is the difference between short-term memory and intermediate memory?

A. Short term memory typically lasts for 1 second to 24 hours, whereas intermediate memory remains within our recall capacity but we have not mastered the knowledge.

What part does memory play in neurodevelopment?

A. It is a key issue of how the conscious mind is able to come into fruition. Memory is one of the most important aspects of brain function because it defines who we are, what we know and how we utilize what we know.

What part does memory play in aging?

A. As we age our metabolic processes slow down and certain memory systems become harder to access. Others become more accentuated. If we continue to master and develop our remembering abilities, typically the longer we can use our various skill sets. What we remember then becomes how we define who we are, what we are and how we have lived.

What part does memory play in learning?

A. The Learning aspect of memory plays an enhancement role (brain acceleration development) making the brain stronger, more robust lets say you are already within the normal range, enhanced memory will take you to the gifted level.

Why is memory important? Why do we see it overlapping all children's issues?

A. The way the brain actually matures is through functional development. Different parts of the brain mature differently. Within the prefrontal lobe areas we are looking at the executive function, which subjectively we want to translate into making proper decisions, proper choices

and gain a strong sense of identity. That is the subjective understanding of memory. The more practical side, in terms of the brain point of view, how does it (the brain) execute and learn skills. If the short-term memory is strong and robust enough then we will learn certain types of techniques.

If however, you have a short, short-term memory or a not very robust one you will find yourself immediately wanting to "chunk" information. It isn't a bad thing. As long as you are able from a personality development point of view (which is different from a neurodevelopment point of view) to integrate well its not a big deal at all.

But on the other hand, if you are within the school system today the demand is different. Kids today are being labeled because they can't repeat word for word what they hear. So kids who were considered bright years ago are considered ADD today. A lot of the kids that I see have short-term memory issues.

Do you work on the child differently during Neurotherapy to improve short-term memory vs. intermediate memory?

A. Up until recently, I worked on them the same way. The reason being, short-term memory has always been viewed as the function of the temporal lobes mainly with a little bit of dynamics and interaction with the different senses but we didn't know how to get to them.

So what are you doing differently now?

A. What I am doing differently now is I have abandoned the temporal lobes theory.

Why?

A. Because I don't think it is accurate. I think the temporal lobes were misperceived. I think the temporal lobes are involved but I think it is something more with the executive function. And I think it is an interaction between the arousal system and the pre-frontal lobes.

I don't know this as fact because nothing has been documented on this. I can't wait to find some way to get to the next level of measurements.

I now work several sites around the executive area, working both short term and intermediate memory. I think there is interplay between the two. So I am attempting to work it from both points of view.

I'm seeing in the kids where I work this areas changes occurring in a good way.

How are digit spans determined? What is it?

A. Digit spans represent how much data or bits of information we can take in, hold and remember at any given time. Digit spans between 1 and 4 tend to correlate to development and specifically to maturity. A child with a digit span of 2 typically has the maturity level and neurodevelopment of a two year old, a digit span of 3 typically reflects the maturity and emotions of a three year old and those with a digit span of 4 exhibit responses typical of four year olds.

Once the individual reaches a digit span of five responses relate more to how the individual uses their short term memory capacity. That is why many adults with digit spans of 5 do fine. They have learned to maximize their abilities into "chunking" information.

However, chunking is inefficient and processing inefficiencies coupled with chunking inefficiencies can compound problems. An individual with both slow functions in processing and digit spans may exhibit difficulty with phonics, sequencing and writing comprehension.

How does digit span fit into the overall picture of neurodevelopment?

A. The auditory digit span comes from the auditory systems which is the dominant left brain processing and your visual digit spans come from your visual processing systems.

Your visual processors tend to be more concrete, more absolute in terms of "what I see is real." They are not abstract in terms of how they do things.

Your auditory processors develop your language. It develops your abstractness and principles and therefore helps in your ability to understand why we do things.

So auditory digit span of short-term memory tends to time the social and emotional maturation of the child as well as the cognitive ability. If low digit spans increase the child will absorb things cognitively much more quickly.

So ideally, the higher the digit span the better off the child will be. That of course is assuming that their right/left dominance is in place. I see a lot of kids and adults, where the dominance is not in place and they have high digit spans and they go crazy because they can't process.

What happens when the digit span is not the minimum 5, but rather a 4 or 3 or 2? How does that effect short-term memory?

A. Again, short-term memory helps the pre-frontal lobes understand. This would include the executive function and how it integrates with planning and pre-planning information.

Along with that we have loops that feedback through the arousal system that go to the cingulate and limbic systems. These are our emotional feelings that ultimately matures into our values systems. How we make choices, perceive things and how we feel about things are centered in these systems.

When an individual hits digit spans of 5 they may be slower in their maturity but they will eventually catch up. It may be harder for them emotionally, but they will catch up.

A two-year-old is a very didactic emotional state. It is I-you. The reason is there are only two pieces of information (digit span 2). As you get to the age of three (digit spans of 3) you get something else that can come into play. Typically those are called consequences. So it goes from "I want" to "I want but what does Mom also want?" "What is the consequence?"

When you get to 4 years old (digit span of 4) things begin to balance a little bit and you begin to see a bigger picture. The child begins to understand the results of consequences. And you as a parent can begin to explain a little bit more to them not a lot but a little more. But then at 5 (digit span of 5) their world begins to open up. And they begin to question. They begin to understand. Precocious 4's will do the same thing. How do digit spans effect intermediate memory?

A. This is a grey area. The reason is because I don't know of anyone who has done much work in how the working memory actually matures in terms of subjective stuff.

Why are digit spans so important?

A. There is a story that is being misinterpreted that digit spans define and control everything. Early digit spans are essential. They are a key, key element to the whole cognitive piece, but digit spans do not define and control everything.

I have heard where parents feel they need to force the issue with their child to get the digit spans up. Keep in mind, short-term memory will last anywhere from 3 seconds to 24 hours. It will stay there for that length of time based upon the need to retain it. So if the child doesn't care about the information they will just blow it off and not retain it.

Also, if a parent puts too much emphasis on reaching a certain digit span it can be counterproductive from another stand point. For example, if a Research child has a span of 5 and a

parent thinks "oh, my goodness this child will not be able to ever do thus and such!" you put that child at a disadvantage through lack of expectations.

So much has to do with innate intelligence or the drive, something I call the strength of character. The individual has to adapt, which is not compensation, per se. It is more a case of "let me use what I have to the utmost."

How do you balance the need to get the program done to make it effective with the bored child who will not cooperate?

A. I will give you some guidelines. Believe it or not but as you work with all children, your typical children as well as special needs children you do this naturally. If they are helping you make dinner you ask them to get 2 or 3 items. What you want to do is make the transition with the kids from working with them daily making sure they did digit spans to integrating it into things they do naturally with you daily. So the trick is how to camouflage it in order for the kids to actually enjoy and do it. It can be made into a game so that they don't get bored but you get the intensity level up.

What happens when the Auditory Digit Span differs from the Visual Digit Span?

A. Labeling. ADD in particular. In my personal opinion, it is more of a cultural thing as opposed to a real child thing. In the ADD population what we are really seeing is a disparity in auditory digit spans vs. visual digit spans.

For example, if a child has a 5 for an auditory digit span and 7 or 8 for visual digit span there is a disparity of 2 digits. That child is going to want to pay attention to the visual processing and appear to be distracted and in fact they will be. Their attention will be immediately drawn to the visual piece and they will ignore the auditory.

Under the same scenario, the second thing that is going to happen is under any kind of confrontation that child is naturally going to pay attention to the visual and tune out the auditory. So now it is going to appear to the parent or teacher "you're not listening to me." If their auditory digit spans are 5 they won't even be able to parrot it back.

And instead of this being viewed as an auditory/visual disparity the kids are being "labeled" something .