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>>This is Robbin Bull with NCDB. Welcome. I will go through some housekeeping items before I handed over to Linda McDowell who will be kicking off today's webinar. First, phone lines have been muted to eliminate background noise. All presentation audio will be coming through the phone. However, we will be showing a few videos. During this time, the audio will play for your computer speakers so you will want to have them turned up. We will be providing a link in the chat pod to a captioned version of the videos if you choose to watch those. The question-and-answer session will occur at the end of the presentation. However, you can write your questions in the chat pod at any time during the presentation. As it will be monitored throughout the webinar in preparation for the question-and-answer session. We do want to let you know that this webinar will be recorded and archived for future viewing. We will put a link to that where you can find that on the NCDB website in a few days. I will start the recording now. Linda, when you hear -- Linda McDowell, when you hear an announcement, that will be your queue to start.

>> Hello and welcome. This is Linda McDowell. I am the executive director at the National Center on Deaf-Blindness and it's my pleasure and today -- today to introduce our speaker, Linda Alsop. This is part of a series of webinars to discuss recent research findings from the field of deaf-blindness. This is what we know and need to know and what we can do in the field. Last month the focus was on professional development and personnel properly -- preparation. That was in March. This month April in the next called the focus will be on recent research-based information to help us and our knowledge of how to best help children who are deafblind communicate and learn. A link to a forum post about last month webinars will be put in the chat pod. The forum post is -- includes a link to December webinar recording and forum posting for post-webinar discussion. Our presenter today, Linda Alsop, is the director of the deaf blind program at the sky high -- SKI-HI Institute Institute at Utah State University in Logan Utah. She has extensive experience working with children with hearing loss in the family including serving as a classroom teacher of students with multiple disabilities and a teacher of students with hearing impairments and an early intervention service provider for children with deafblindness. She has experience with early intervention part C program in educational part B programs. And has coordinated statewide intervener services for kids who are deafblind. She has developed numerous curriculum and training materials and resources that are being used by families, professionals, and intervenors throughout the country. She acts as a consultant in deafblindness and is actively involved in national efforts to professionalize the intervener practice in the United States. She developed and implemented the first online higher education training program in the country. The strains intervenors to work with individuals who are deaf blind. And she

helped establish the national intervener credential through the national resource Center for paraprofessionals. She works closely with parents of children who are deaf blind on intervener applicant efforts and provides training and support related to educational laws and the rights of children with deaf blindness. To have equal access to educational settings. Last week, Linda became the recipient of a 2017 CEC division of deaf blind exemplary advocate award. It's my pleasure -- it was my pleasure to watch or receive that award. In the introductory remarks cut you are encouraged to ask questions or make comments in the chat pod, and if you are interested in continuing with conversations on this topic, about the brain or issues raised by our presenter, Linda Alsop, or if you have only been able to listen to the recording and want to join the conversation, please consider my invitation to partner in national efforts to develop qualified personnel in deaf blindness by coming to the NCDB website where there will be a place for ongoing discussion. Robbin will place in a chat pod a link for the initiative. There are already post that could use your voice as we seek solutions to the need for qualified personnel for children who are deafblind. I will turn it over to you Linda, and we really appreciate your putting this presentation together today. We look forward to all you have to share. Thank you for being with us.

>> Thank you, Linda. I didn't know you were going to give that long introduction. That made me tired listening to all that. Thank you. I appreciate the invitation to do this as part of the webinar series because it forced me to organize a lot of what I have been thinking. I read everything I can on the brain because I can get answers to a lot of the questions I have that are still really tough to answer for children who are deafblind. So I appreciate the opportunity.

>> How I gauged this presentation because obviously this could take us days to look and everything, what I felt was the goal that we should focus on which is the goal I really try to figure out all the time is how do we support the development of strong bring architecture -- bring architecture. There is so much research now. Every day you see something on the brain related to autism or related to stuttering. There was an interesting article on that. It's important for us to understand the issues of the brain and then be able to apply them and ask good questions about where we are at in our field. I am always questioning why I don't seem our progress or why we haven't somehow been able to see better outcomes. So related to that, I think going into what we know and what we are learning and then getting some conclusions based on that is really a good effort and that is what we will try to do today and I have gone with the most early logical sequencing so we will be looking to four areas, the early brain development and functioning so we will start at the beginning basically related to where we all begin. And how that relates to communication development. Then what stress, how that impacts us. We know that is a big thing. And then with social and emotional development because all of what we are talking about really guides us toward social and emotional development. The goal here is not just to go through a lot of research and citations but to look at what we are

being given and what we know and then begin the process of thinking about what changes need to be made. I know I am always thinking about what can we do differently. I think it's a good exercise for all of us to question where we are at and why we are not doing better with something in the brain and why we don't see better outcomes and what we might do differently. So at the end of each of these four areas, I have some questions. I have some recommendations as well. So if I go to each one of those and you can think of something you would like to add, just put it in the chat pod are on a piece of paper or whatever and then at the very end, we will take time to get your input and thoughts based on these four areas and based on may be what your experience has been and what your opinions are related to what we might do differently because again the idea is to change what we are doing and improve what we are doing.

>> So we will start at the beginning with experience with building the brain and these are from the Harvard university website. And I believe, Robbin, you will play this for me. It's about a two minute video.

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>> Also if you can mute your phone Linda during this that would be great.

>> Again how this will come through your computer speakers.

>> [Video playing] [No sound on video]

>> [Video ended]

>> This website I would recommend it to anyone who wants to learn more. They have done a wonderful job with information and short little vignettes. But I think they are worth a lot of words because we can visually see what these principles are. So I will be using these little vignettes a few times as we move forward so just to review what we saw there were the actions of the neuron which are the carriers of all that information. And basically the process was with the signal coming through. We see that the signal comes in one part of the neuron and then moves through and it moves along the link of the neuron and out to the end of the branches of the sun -- axon. In it moves on to the next axon. So this is a slow version of what you saw of this process. It's very quick as is on the video and it is literally what is occurring as these networks are being made and as these nerves are firing.

>> We know that the connections are made as based on the experiences in the information. This is just an example of how they are connected so our neurons grow dendrites and you can see them and how the axon of one neuron will connect and the dendrites of another neuron. And so the process as our brains expand and as we get more information and as we learned we then continue to grow and that is enabling more connections and more abilities of the brain and these chemical impulses to go quickly from the brain.

>> This again is a still picture we want to see this. This is our hope. I think it would be great to get a picture of our brains at any given time to see what they look like. You can see here the cell

bodies and you can see the quick signals going from place to place we can see a lot of connections going on. By three months look at all of the connections it's an amazing amount of connections and networks that have been formed. What we know is that is the process in the first several years and in the brain begins to prune back but it's not being used so those are networks that are used in enforced and built upon and those will continue to be strong and they will fire and continue to go but those that are not used will literally be pruned back because the brain doesn't need all of them. So here is another example at birth and you can see the beginning and by six years, a little bit less than what we saw at two years and by 14 years quite a bit of pruning going on. So I am not sure I would actually want to see this in my brain but the idea is that our brains become very efficient. They prune back and those neurons that are used in both connections that aren't facilitated. The idea here is that we have to use one and make our brains be active so that we both continue to be viable connections.

>> For the note -- the other thing we know is neural plasticity and we have known about that for a while and there is a lot of good information about that it is the capacity of the nerve -- nervous system to modify. The brain is the only organ in our body that modifies itself it rules itself and modifies itself and decides what is going to do. There is a good Ted video on YouTube that I referenced by Laura Boyd and she said that after watching this your brain will not be the same. I enjoyed that statement because literally, all of us today you're watching this and going through this, all of our brains will have changed. This is as a result of just sitting and listening to information and thinking through things. That changes our brains. This, I think that is good information. The brain modifies itself in three ways. One is chemically. So chemical changes, what that means is the brain is increasing the amount of signaling between neuron so as we saw, that flashing and signaling in the video, that becomes intensified when there are chemical changes that have to do with the jumping between the synapses in the chemical reactions throughout the network. Those changes occur between neurons and they happen very fast. They affect our short-term learning on memory on a skill that is more short-term. It's quick and it may be happening now for all of us. The structural changes, those happen when the brain physically changes. So with a structural change, you would see a new connection are neuron connecting to a dendrite or something structurally that is different after a learning period. That has to do with more long-term memory. Or long-term improvement in the motor skills. Also long-term learning. So if any of us have had experience where even with our students seen they learn something one day that then the next day it's like we can't remember or we can do what we did the day before, that is because of the changes that occurred were chemical. That we didn't do enough practicing and enough work to alter the structure of the brain so it became more of a long-term memory and a long-term skill development. So this helps us understand why it's important to have structural changes. The other way that it will do that is its

function. How that happens is the region's that work. For example, if someone is an athlete, and they are playing basketball or whatever, and they practice and practice and I play a lot of hours, and then using that region over and over and over makes it very excited and very prone to firing and working. And then it is easier to use again. So the brain shifts how and when those are activated. You can kick into those things you learned quicker because there are some functional changes. The three areas of change I think is important and we can apply that to our student and understand they are learning and of course what we want instructional -- structural change in chemical changes those are very valid as well but they know about structural changes is for example people who read braille have larger hand sensory areas in the brain so that would be a structural change. They have done some research on taxi drivers who have larger areas in their brain related to spatial concepts and relations because they have to think about that all the time as they are driving taxicabs. Those of the different areas that are brain can change. It's all related to neural -- neuroplasticity. It's taking place all the time. It's happening even when we are resting, our brain is active even when we are resting. This Lera Boyd who has done this presentation set the biggest indicator of poor driver of neuroplasticity -- neuroplasticity changes is our behavior. She makes it clear that we have to do the work. To change the brain we have to do the work. It's our behavior. Again how that applies to students. They have to actually do the work and I have to have both experiences -- those experiences for those changes to occur in the brain.

>> So we look at the sensory processing areas. We know our brains are predisposed Cobbett neurons are, to be hearing or vision or touch or whatever. There may be issues related though to some type of damage or sensory loss. So this again has to do with plasticity of the brain. The quote here from the citation is the acetyl cortex is normally associated with visual processing. I will go back so you can see that. You can see where the visual is. What happens is with blindness, that is recruited to process tactile information. Those neurons are recruited literally to process differently. And that can be braille reading and recognition of complex forms or shapes. Also auditory information. Those neurons will bring information for sounding speech and verbal memory task. That is part of that adaptability with individuals who are deaf both cortical regions on both side associated with language and processing for language are activated in response to tactile stimuli again. This should say observing sign language. It's an interesting -- interesting that the areas of the people who are deaf those neurons are recruited actually help with the observation of sign language.

>> Again part of the wonder of how the brain can manage itself. Let's see how this applies to learning. What that means as well for us with tips for those who are deafblind. This is a quote I have used before. A person's ability to interact, perceive, and learn from the environment comes from the ability to process incoming sensory information and to react to that information with a motor response

which in turn feed

>> Sensory information. The important thing here is we are talking about sensory information. That is one of those terms that when we hear it, we should immediately perk up and say this is relevant to our students because we are dealing with students for whom sensory information is limited or not available.

>> We know and many of you have seen as graphic before, the information flow is constant. That information goes then and is auditory and its verbal and it's tactile and its visual. All of our senses pull in that information. That is very important. We have to have that because all of those little networks that we have been looking at are all based in the flow of information coming into the brain. So those networks would not be formed a must the information is able to get in. These seven principles are related to learning based on information. Again, if we think about how we taken the first step, of course is you have to receive it and you have to pay attention to it. We can gather uninterpreted and synthesize it and generalize it and then hopefully we remember but the bottom line is that the first thing that has to occur is the receiving. That is the thing we have to keep in mind as we work with our students that that receptive peace and that receiving of information is our step. If we don't take care of that piece, everything else that happens, it doesn't mean there won't be any of these other things and that they won't be efficient and complete. There will be a struggle to learn. We have to think about this piece and we have to think about the receiving. We have to think about that related to brain architecture. So let's talk about information access. All of our learning relies on the ability to access that information. Again, why we care about this, why this is important to study and understand, is we have to think about this early on. If any of us go on to evaluations or if we are asked to do an observation or whatever, our questions always begin with what is the access and how does the child access. Is there any visual or auditory information or tactile information? With my students I use the term access point. I have them graph what the access points are for the students they are working with. They have to use chart similar to what you see in the learning media assessment to actually be able to grasp where the access points are visually, and they have to decide what the access points are auditorily. Then we talk about, well, is the information even getting in or clearly getting in and is that understood.

>> Information access is our beginning point. This is for all of what we do with our students. We again have to be very clear and diligent about this as we work with others in the educational system. I have to say, I am always surprised when I go out and work in classrooms or with others. I will say what is the students vision or hearing loss. And many of them don't know. They don't know how to get it. So that, again, is something that I think is not necessarily paid attention to a must someone is there to emphasize it and say this is so important. We have to start here before moving forward.

>> Also, we know that with the learning, we have no incidental

learning. So to the sky where we talked about receiving, we have to remember that we are not going to rely on incidental information being received. We have to look at the receiving of information in other ways beside -- besides that which is incidental.

>> So knowing this, if we are starting, and say are starting point have to be information access, you know, what are some of the questions and what are the really relevant questions in our field? All of this is evidence-based. I went through it quickly but you can look up more. There is more to study and learn related to how the brain forms and what happens before birth. But the big question is if information is not getting into the brain or the visual and auditory areas, how will those neural networks be built? Of course the answer is difficult. They won't to be. We will see the brain and the architecture of the brain will be different. We know that with those that are perhaps having a visual loss, they will have -- the hearing will come and say [Indiscernible] auditory cortex will reflect that and we will see more neurons in that area functioning. And those who maybe have a hearing loss we will see the brain reflecting the need to access visual information as a complement -- complementary sense. We don't have that luxury with deafblindness because we don't have a compensatory sense. We have to really really think about how we get information and and not just in but early in. But not realize if we begin working with students say at age 10 or 11 who have not had good access, we still begin where they are at and we work on getting information in because we know what the processes of the brain and it's always very helpful. One of the questions I always have is how do we help the teacher and the teams understand access better. I often will go in and see that people are talking to the student. I will do an observation, even in my intervenors in their practice, and I will see them talking to their student or not signing or I have had one I worked with this past year through is a signer. She is a really good interpreter. She will sign with a student. But as I watch the student, he will turn his head and he looks other places. Visually he is not hitting the signing so he is missing a lot of information. We have to think about these access points. We have to be very diligent about getting information in. It feels like being a broken record sometimes. And I feel that way because an activity is only as effective with that student is that information is getting in. If that student has time to access it and really process it. You will hear me talk about intervenors after all of these areas because again, that is part of the role of the intervener and the access information to be thinking about that. This is when others can't. When the classroom is busy or teacher is busy cut the intervener have to think of that. At this point, I have put a few things in for questions and recommendations. If you can think of some to write down or put in the chat, the idea here is in these areas is to begin some discussion on them and to see if we as a field can come up with some recommendations and can put forward opinions based on here is where we are at and we really need to see this change and we really need to focus on this more. We need to be better educated on this area. So these are just a few that I put

in but still free to add more and think about more and we will talk about them at the end.

>> Let's talk about communication development now. Again how we will watch the next video. It will lead us in. Robin?

>> This is called serve and return interaction.

>> [Video playing]. The key to forming strong brain architecture is what is known as serve in return interaction with adults. In this developmental game, new neural connections form in the brain as young children instinctively served through battling facial expressions and gestures. Adults return the servant responding in a very directed meaningful way. It starts very early in life when a baby clothes and the adult interacts and directs the baby's attention to a face or hand. This interaction forms the foundation of brain architecture upon which all future development will be built. And helps create neural connections between all the different areas of the brain building the emotional and cognitive skills children need in life. For example, here is how it works for literacy and language skills. When the baby sees an object, the adult says its name. This makes connections in the baby's brain between particular sounds and their corresponding objects. Later, adults show young children that those objects and sounds can also be represented by marks on the page. With continued support from adults, children then learn how to decipher writing and eventually to read themselves.

>> Each stage builds on what came before. Ensuring that children have adult caregivers who consistently engage and serve in return interaction beginning in infancy builds a foundation in the brain for all the learning behavior and health that follow.

>> [Video ended]

>> This is a term now that you will hear, this serve in return interaction. It's interesting to study it a bit. It is an early part of brain architecture. What I have read said it is the key to forming this architecture and structure. It forms the foundation upon which all the future development is told. That is a pretty strong statement when you think about it. Neural connections are formed as young children that serve. In other words they make a sound and the caregiver and they smile or giggle and the child responds and the caregiver serve

>> Basically in a child responds and with that process it creates neural connections between all the parts of the brain so everything is working during those interactions. This is building on these emotional skills. Again it's vital to have adult care that if you consistently engage in the serve and return process from infancy.

>> This is an early principle and process that is so important to building brain architecture. Again, as we listen to that we should think of, okay, how does this apply to children and youth who are deafblind. Obviously, the lack of information that we just talked about with the servant return process, and that means communication skills aren't as easily developed. And so we have issues with just a few here like I contact. You know sometimes the student doesn't get I contact and that is not helpful to the parent. Lack of responsiveness because the child can't hear any response or see any response. There



is a lot of parent stress involved in this. And a very strong lack of parent training and how to communicate in these other ways when these typical servant return indicators aren't going on. So this is an issue, a major issue, and it affects the brain architecture because during that period of time when these networks are supposed to be forming related to this interaction and communication, again, they are not happening or they are not able to help in without intentional intervention and people who are trained, who know what to do.

>> In thinking through this back-and-forth, communication is a huge area to study. And I have been very interested from my own research on this tactile development these because as I have been working the last few years and as I train intervenors, I have seen a lack of tactile programming with the students that they work with. And that is all across-the-board cut young kids and older. And so I chose to look into what I could find related to deaf blind children and tactile information. And Nicolas has done work on this. Again, he talks a lot about tactile cognition as an overall umbrella statement and talks about tactile learning so tactile cognition is the higher order processing and integration of tactile information to touch, active touch. And the tactile learning is the process of acquiring new information through tactile exploration. And research studies of tactile information processing and humans have shown that people can be trained to receive a large amount of this information by means of their sense of touch. This is just kind of a little picture that some of you may have seen before. This shows the sensitivity of the different areas of our body as it relates. You can see that our hands are by far the most sensitive of all the parts of our body related to getting information and related to exploration and related to anything we might do with them. So we know that the research tells us that there is a large amount of learning that can be done through the sense of touch. That again if we look at the fact that the majority of our students, even though they have some vision and hearing or they don't have a compensatory sense and that always the sense of touch is connected to any migration and the visual neurons or the auditory [Indiscernible]. They always are returning -- retrained to do something related to touch. Touches related to both of those. Again, we should be thinking about touch and what we can do related to information gathering or related to communication. Again, another quote from Nicholas, he says deaf blind people use active touch in ways that no one else does to explore objects in the environment and to perceive feelings and acting communicate. There are various tactile communication and tactile language interventions which are used. Some examples are communication and corrective signs and hand over hand. The studies that he quoted indicate that deafblind individuals perform more effectively than cited hearing people on tasks of tactile working memory and tactile memory. A possible explanation is that they have to have more tactile experience so we would expect that, that they would do better on those tasks. Again, looking at what the evidence tells us about the ability to use the tactile system.

>> Some of this for me has been because again as I have worked with

intervenor and then observation, I have seen not a lot of tactile communication. If anything I have seen a resistance using tactile communication. I have seen much more comfort in intervenors who are in her -- interpreters using that more comfortable. Trying to make them use that in the tactile language take some effort on their part and encouragement. The question is what can we do? How can we better understand the tactile cognition and learning? It's valuable. In many ways for some of our students that is the way. That is going to be the past that allows for them to learn and learn to communicate. And how can we encourage the practice of tactile communication for interaction and language development. I think that is a huge issue. I have asked others their thoughts and some of you may have seen something differently and your experiences, but I have found that over and over I have to really really talk to people about tactile communication and time doesn't permit for case studies but if everyone -- anyone is interested I have some related to that where I have seen by the intervener beginning with tactile communication with students really opening up the floodgates of progress and communication beyond what the student is doing because we know that the tactile piece engages the brain differently. We know that when we touch or when we are connected with somebody else's hands our brains are connected differently than they are when we are just listening or looking and listening. So some recommendations, and I am hoping others will have more, parent training. Again, the servant return we talked about. We need to help parents be able to do this early on. This is in our early intervention program. If that is all we do in our program is help the families learn how to do this tactile servant return, even if the student later on doesn't use it that much, this is a critical piece for this brain architecture development. And so we have to focus on that. We have to have more of an emphasis on tactile communication and then language. Not just one word but the flow of language. Of course also the skilled communication for intervenors. This is a whole area I think that requires more discussion. I would definitely support any of us who want more on that. I think that would be a good thing for us to do.

>> Let's talk a little bit about stress. We know that is as -- a huge issue on which there is a lot of research. Here is our last little video. Robin, take it away.

>> [Video playing] learning to deal with stress is an important part of healthy development. When experiencing stress, the stress response system is activated. The body and brain go on alert. There is an adrenaline rush and increased heart rate and an increase in stress hormone levels. When the stress is relieved after a short time, or young child receives support from caring adults, the stress response winds down in the body returns to normal quickly. In severe situations, such as ongoing abuse and neglect, where there is no caring adult to act as a buffer against the stress the stress response stays activated. Even when there is no apparent physical harm Cuddy extended absence of response from adults can activate the stress response system. Constant activation of the stress response overloads

developing systems with serious lifelong consequences for the child. This is known as toxic stress. Overtime cut his results in a stress response system set permanently on high alert. In the areas of the brain dedicated to learning and reasoning, the neural connections that comprise brain architecture are weaker and fewer in number. Science shows that with a prolonged activation of stress hormones in early childhood can actually reduce neural connections on these important areas in the brain when they should be growing new ones.

>> Toxic stress can be avoided if we ensure that the environments in which kids grow and develop our nurturing and stable and engaging.

>> [Video ended]

>> It is hard to watch those neurons dying and getting dark. That is sad to think about that occurring as a result of stress. We know that our students have the stress. I don't think anyone would debate that. So let's look quickly at what evidence has shown us. I have this picture to show you the reticular activating system. This is a reminder that all of the information that comes in through our eyes and ears and are vestibular system and are tactile system, everything but smell comes through this system. Again, it's not directed the brain from those sensory pieces like the eyes and ears, but it comes up through the reticular activating system and a reminder because that is very relevant to where it goes. We will talk mostly about the limbic system because that is where the stress pieces are. I am sure some of you are aware that more and more we are hearing about the limbic system, the emotional brain. VanDyke has been teaching for several years on the emotional brain and what that means. So it's this piece that has engaged our learning and helped to open a greater understanding of what is really happening. These are the areas, just briefly we will review the thalamus the hypothalamus and the hippocampus. It is important to note that all of this here is occurring because the information is coming up here through the activating system and things are happening with it all right here. That is before it ever gets out here up to the cortical level. So everything is occurring quickly before it gets too conscious thought.

>> So we know the thalamus is helping us to [Indiscernible] our brain has a way of determining what it will pay attention to. It's a way of protecting us and to tell us if it's harmless information if it is ignored. If it is new we may pay attention to it, but we don't really worry unless it is harmful information or unless it contradicts something that is going on and that is where we began that alert process. The thalamus the same to the brain, I am sifting is true and here is what is important and if it's really harmful than the alerts are sent out from the system.

>> Then are limbic system works as kind of all together in one piece. You can see where those pieces are. We will talk first about the hypothalamus. Does all deal with our emotions and her memory. Memory is very much a part of this area. Memory processing. You can see there that the amygdala has a very key role in aggression and fear and fear is based very much there in that fight or flight. Are hypothalamus helps us with hunger and body temperature and hormones and that kind

of thing. Does all work together on our behalf.

>> So the hippo thalamus is the one that releases hormones or can release a lot of the hormones that we are talking about. That is the one that prepares us for danger or prepares us if we are worried about something or if we are afraid of something. If the situation becomes threatening enough, then we have this fight or flight response that kicks in. Again, this is something that happens before the thought ever gets to the upper cortex. All of this occurs very quickly. Then you have seen as I think before where we have, we see all of these things happening that the body will prepare for battle or for survival. We see all of these things occurring. It's not something we can consciously monitor. It's not something we have control over. We know this occurs. It occurs in occurs. Anytime the brain perceives danger. It may not be that there is danger. But if the brain perceives danger, or if the child is afraid, all of these things will kick in. Our bodies will change and become in a more hypervigilant state.

>> Again, that is the result of stress. Our amygdala and hippocampus, again, there is the fear and pleasure and addiction. What is important about these is the memory. In anticipation and habituation which are so much a part of learning. So the memory of emotional events, all of these things are kind of world and dictated through the little amygdala and the hippocampus. They are very powerful little areas of our brain. Again, need understand. Anticipation is a big deal here and we work with students who are deaf blind and we talk about hitting them the opportunity to anticipate what is coming next with queuing or some type of signing, that is because if we don't, we have problems here. It kicks in to this area of the brain. It's also very affected by stress. That is where we will see it.

>> We know stress has detrimental effects on the brain. There are three types, the acute stress which is activated for a short period of time in response to a temporary stimulus. I remember going down the road and some car came right out in front of me and I had to hurry and jerked the wheel and go around it. Boy, I could feel my heart rate going up and I have that acute stress but I was able to calm down once the incident was over. That level of stress. Chronic stress is activated where it is frequently or for prolonged periods of time or in response to some type of persistent stimuli. If we look at a student who is afraid to get on the bus every morning, and that stress comes in to play every time, every day, that long period of time. Or if it is persistent stimuli related to a person or whatever, then we see chronic stress, which goes on and on. Toxic, when it becomes toxic is that the body than experiences for prolonged periods of time and it changes our system and it's overwhelming. The body can't manage it. There are brain changes in emotional changes related to toxic stress. That is the term you will see used in talking about this type of stress. We know that it changes brain architecture. It is literally toxic. There are some normal typical morons with connections and you can see what it looks like on the right. And then you look at toxic stress and this is in the prefrontal cortex and hippocampus. The neuron is damaged. It's hard to see. Fewer connections. That will not

fire. That network won't be as strong and the stress indicators are going to become part of the memory of the hippocampus and it will affect any time that incident comes then our whenever that student is involved in it.

>> We know stress hormones are released. When there is any kind of threat. There has been a lot done on cortisol. [Indiscernible] did her study on cortisol and we know that kids who are deafblind have cortisol in their system. This is because we all have it. It increases our vigilance and it helps to grab us up when we need to. It decreases our attention to other things. But if we have high cortisol levels, again, consistent with prolonged stress, that will affect her memory and the ability to control her behavior. It can affect our ability to focus attention and it will slow down our immunity system and we can get more sick. So we know that that is a factor with our students and we can see it. You know, if you walk in a classroom car you can see those students who have those high cortisol levels. It's like for some of them, it's like they are in a war zone for some of them. We can see that and have to pay attention to that.

>> Toxic stress again changes the structure. These are some of the things that they have seen. Smaller limbic regions and smaller synapses and the hippocampus is smaller. Neurotransmitters signals are scrambled. This isn't good stuff. We want to avoid this and we don't want to see this. All of this is so counterproductive to learning.

>> I think we have to ask ourselves does deafblind does deafblindness equate to stress. It doesn't away. Without the vision and hearing them without information as we have all gone under stimulation, we all feel stress only take away our vision and are hearing and try to function there is stress. Lack of information a stressful. That is part of the state of what our children and students are in. For many of them, the limbic system is always on high alert. We will see that. I have a gal I worked with in another state. When I first observed her in the classroom, she would go to different periods and she would fall to the ground and crawl out the door. She would just wait for her moment and then she would be gone. They would struggle to keep her in art class or in these lovely environments. For her, the stress level is so high that she just had to escape. That was her way. So beer and confusion are part of that. If information is in clear we can't communicate, that is where we see these behaviors. You know, we have to look at that and think about that. We have to be careful about educational programming and the environment. We have to look at the environment and make sure they are emotionally manageable. Before we even look at what the instructional programming is we should do that. We have to say the student dishy and a high level of stress here or is this a manageable environment. Of course we know that intervener support helps with that. We have lots of qualitative data based on that. Julie [Indiscernible] today qualitative evaluation of intervenors after they had done some training. She presented at want to one of our PDM's. It's interesting because within a few months period of time one of the things they said differently was having intervener support and that the student was happier. They were less

stressed and they -- there were not so many behaviors. Not that the learning was off the charts at that point but the huge hurdle to overcome was to get the stress levels down. So we really need to look at that because we know that that is inherent in this disability.

>> Café I like your comment. I have seen lots of stress will behavior when a student is connected. That is absolutely evidence-based now. Everything that you read and when we talk about social and emotional development, there will always be that piece for a trusted adult. A trusted companion or someone who has a relationship with that student. That is the key and that is the peaceful piece to everything, through all of these four areas. That emerges in the research. Thank you for that comment, Kathy.

>> Let's move into social and emotional development. All that we have talked about leads into this. It's all a part of that developing person. Obviously if we have a student who can't access information or can't communicate, we won't sit down and say why does the student not have social and emotional development. That is a no-brainer for us. So we know that we have to get these other pieces in place and they have to be our quality indicators if that is what we want to call them. We have to take care of those things first, and then we can start to look at the overall social and emotional development.

>> So it is a term. There has been a lot of writing about this in the references at the bottom. He has worked with Dave Brown and others and published. I would recommend those. I was only able to use a little bit of what he has written but a lot of his work is related to charge children. He has a son with charge. It's applicable across the board. You will see me quoting him because again his focused and on deafblind children. It's a term used to describe a growing child's ability to form close and secure relationships and to use their emotions productively in interactions with others. We have relationships and we have security and we have interaction. So if we have a student who doesn't have secure relationships or who can't interact or communicate, we are stuck. We can't really get into this hurdle yet. So I will probably say it several times that we have to take care of these beginning pieces and then we can move into this piece. But the three areas that he talks about that I think were helpful, one was attachment. And I think it is very important that the research tells us that without attachment and bonding with parents, again, that serve in return process, that kids don't form attachments. It just doesn't form. He did a study with some charge students and three of them were identified as deaf blind. The others didn't have both. But in those three as they studied them, none of the three were securely attached. The other one had to assess and others had blindness and those showed some attachment. But we have an issue with attachment. Again, going back to that serve in return. Back to that development of the brain architecture and that ability to make those networks and the ability to think. You know, I think someday the research will tell us about how if those networks aren't there, how do we know how to think. We can't think without the network. So if the networks aren't there, do we think to make those connections. It can't be over emphasized enough

to talk about the need for these networks. What that means for us. So attachment is a big deal. We have to step back to get attachment to families and in working with them and those relationships and empathy is part of where a child can field for another child. That means they are connected to another child. You know that is challenging for kids who are deaf blind because they have problems with orientation and they have problem with the information and communication even knowing and observing that other people are around and having experience. Friendships he talks about and it's important. And this is very challenging of course because it is hard for children who are deaf blind to have friends yet he is you know has a circle of friends work he did with his son and he talked about friendship and so we have to think about our students to friends and others and again that means that someone has to be able to communicate. We don't just put them in the same room. That is not inclusion. There has to be some connection and friendship and communication going on.

>> Again, I recommend more reading on your part. I just picked and chose some things here to emphasize the point of moving forward. He says the risk factors that put children who are deaf blind at risk for social and emotional development. He writes about these and I wanted to list them. One is the genetic risk. They know there are certain genetics that lead to poor social skills for the interpretation of what is going on and of course with the charge being a genetic thing here he has information and has been looking into that. The second one here is sensory impairment. That puts kids at risk for poor social emotional development and for all the reasons that we have just talked about. Everything that we have just discussed leads up to their. Family stress of course a family is under stress having a child who is deaf blind. Having other children with disabilities. So that is a piece that is difficult in terms of that child's early development and lack of resources and it helps the child and lack of experiences and lack of others around them challenging behaviors and he talks quite a bit about those and how that puts peers off and how that actually makes it more difficult for people to interact because of that behavior. And then he talks a lot about self-regulation and self-monitoring and I will take a few minutes to talk about that.

>> Again, we know our students are at risk and probably -- I would save stronger. They are not only at risk but they probably will have poor social and emotional development unless our interventions are effective and early on or at least they are strong and effective with support systems there. self-regulation, he talks a bit about the capacity to manage one's own thoughts and actions and feelings and physiological states and adaptive -- and adaptive and slept -- flexible ways. This area is being written about and I saw a lot of research about this related to all the disabilities. Because that is inherent in disabilities besides kids who are deafblindness. We do know that that ability to manage and to be self-aware and to be able to manage one's own thoughts and feelings is very difficult. Again without a communication system and without a connection to other people and without a strong brain structure. Then some quotes. This

interferes with aspects of self regulation because of a lack of understanding of the environment and the behavior of others. Social and emotional development depends on watching the behaviors of others and learning from the interaction of others. Children rely on role models. This is the challenging -- this is challenging and the presence of sensory impairments again based on the lack of information. Children who are deafblindness just like other children and perhaps even more than other children, require interaction with others for development to happen.

>> It's a very important statement. This goes back to that serve in return them back to the communication development and back to those pieces we are ready talked about four this to be able to happen.

>> Just one other quote. Typically developing children learn social skills through observation and auditory feedback and children who are deaf blind have difficulty learning information this way because of their impairment. They are not incidental learners. They are unable to take in visual and auditory information from the environment it is clear that social and emotional development does not occur in a vacuum. Children for deaf blind are just like other children. I included that again.

>> So some questions. Related to what we have just discussed. How can healthy social and emotional development be facilitated for children who are deaf blind. How can we support the forming of close secure relationships. Over and over in the readings it talks about the need for close secure relationships. That includes that serve and return interaction in the receptive interaction and recommendations. Previous recommendations, I have to say a recommendation here is to follow all of the previous recommendations to support social and emotional development and then provide more opportunities for the development of close secure relationships and provide opportunities for friendship and understanding self-regulation and support that and again I put intervener support their because that is part of what that intervener is there to help do related to a close interaction and helping with social skills and understanding what goes on.

>> Those four areas are the areas that I wanted to cover based on research. I can share, if anybody needs any citations, I didn't want to do a lot of slides with citations on them but this is evidence. This is -- these are things we should be paying attention to. I don't know that in my opinion. Again, this is my opinion, I don't think we have done all we can. I know that we have not done all we can in some of these areas related to communication and early work with families. I know that NCDB have started their early identification and early training which I think is a step in the right direction. But I think there is more we can do to help families and to get these Communications Systems going. If you think about the students, those you know, many of them don't even have a communications system may be they are 12 or 13 years old or 18 years old and they still don't. Again something we should be focusing on and doing better with an looking at ways and interventions that we can specifically recommend and then provide training or materials or whatever. There is still a



lot of work to be done.

>> At this point, I thought that there would be time, which there is. This is for us to share some thoughts if we want or have any questions. Have any of you written down any thoughts? I have not covered everything obviously related to recommendations. Do any of you have any experiences that you would like to share? I know you can put those in the chat pod. As I talked earlier with Robin, we could at this point have people unmuted themselves and they can comment if they would like to. So how do they do that, Robin? To they raise their hand or what do they do?

>> They can use the star and the number six on their phones to unmuted themselves. If they have problems that they can use the little icon at the top of the page to raise their hand. I can see if I can take the mute off for them.

>> Michelle, Thank you. She agrees. Brad, I wanted to be strong and show a commitment to these changes. I see over and over there is more we can be doing and I would like to see a sense of network come together in some of these areas and find ways to move forward. I see some people typing. Anyone want to make comments?

>> Maybe while people are thinking, just quickly, a case study that we have been doing. Some of these aren't case studies that we start out with but they are once we see. Again, it's a privilege to be training intervenors and to follow them as they work with their students and to be able to coach and see what is happening. It is very hopeful to see some of these things that occur with students. One particular student who was very difficult for the intervener who is in a state. I am sure I can share the names with you but I didn't get permission had a time. We have been following him and his intervener because he was a biter and a hitter. It was very tough on the intervener is an interpreter. She was using visual sign language, and a student again bit. He would be kind of abusive and difficult and anyway, nobody knew what to do with him. So she was working through it and she was one that I had to say, you must be signing with him taxed tactfully. You need someone visually. Even though he can see it when he is looking at a. Is not paying attention to it and it's not meaningful. So kind of under protest cash in the teacher decided to start because they were worried because he didn't like people holding his hand. That was always the answer we get. They won't let you touch their hands. So they had to really work with him to get him to tolerate it that over a period of a few months, he began to accept that and they would do it more and more with him and as that occurred, and over again the past year, they kept me informed, but he was originally evaluated as being very low cognitively and very difficult behavior wise. Now, I have in the last month or so been on the phone with the teacher, he has been so blown away with his progress. He now not only is doing the tactile work better and focus better but he has also and assisted -- assistive device that he uses and now her comment to me is he is so smart I can't keep up with them. I can't even plan for him. I had no idea he was the smart. So that kind of story is not that unusual. It is a matter of eating the pieces in place that need to be in place and I

can see that happening. I hope you see that happen. But again it is hopeful that these things we know can work if we can get them implemented.

>> A question was can you explain a little on how the role of intervener goes by a different name for adults and what skills should we work to build so they can qualify as adults for this with a certain level of independence that is needed to apply for SST. I think that is a really good question. It's very relevant. We have been talking about the difference in SSP and intervenors. How to work the training is mainly the [Indiscernible] there they don't have, and at least I am going by the things I have done in my own state. Our SSP's don't have a lot of training related to deafblind an adult to use those have better communication skills than some of our congenital deafblind. We have been trying to work to get intervenors in our adult system or to train but it has been a very difficult road here so it's something we are still working on. But the role of the intervener of course is to provide independence but the intervener is a 10 there to facilitate access to help with the communication and to help with the choices and not make the choices for the deaf blind adult the to help with the choices. We are working on them and we are working on a paper and Sally and I and cc Morgan have talked about trying to revisit that and get something put together. I am sorry that is not the greatest answer but if you want to I can give you the information.

>> Bringing people together to discuss these four areas would be helpful. I think we can come up with suggestions that -- like how to get students to accept touched. That is great. I am glad you said that, Kathy. I think we should do that and I am all in for that. I guess we will talk again soon.

>> Marcy, how can you get the slides from today. Robin?

>> Yes. They will be posted on our website and I provided a link there that -- where we will have a link basically all of our recording listed there after the webinar for the next few days we will have it on their.

>> There was some success with students were nonverbal because of motor problems they have been successful with eye gaze for kids not ready for [Indiscernible]. It is true there are some children can't expressively do much with tactile signing but they can use some things with signing and there is a process for that to work with the tactile peace and then look at ways for the expressive to be built on top of the tactile, the signs that are there. if anyone wants more information on that, give me a call and I will let you know what we are doing with those types of students.

>> Anything else? Did I miss anything? Michelle, thank you for your comment. We work with children in rural areas. Thank you.

>> Marcy, thank you for your comment. I would say thank you for hanging in there and staying awake. I see a lot of names that you are on here today and I look forward to more discussions and I appreciate NCDB facilitating this process and hopefully it will be the beginning of more discussion. Thank you.

>> We are out a little early which is pretty cool.

- >> Excellent job. You did a really good job.
- >> Thank you, Linda. I hope everyone has a great day.
- >> Okay. We will end the meeting now. [Event concluded]