

Developing Self-Regulation in Young Children: Lessons from Research

Sarah Lytle: Good afternoon everyone and welcome to the Front Porch Webinar titled, Developing Self-Regulation in Young Children: Lessons from Research, presented by the National Center on Early Childhood Development, Teaching, and Learning, NCECDTL.

I'm Sarah Lytle from NCECDTL. Today's webinar will be presented by Ross Thompson from the University of California, Davis. Ross Thompson is a distinguished professor of psychology at the University of California, Davis and is director of the Social and Emotional Development Lab. A developmental psychologist, Professor Thompson studies early parent-child relationships, the development of emotional understanding and emotion regulation, conscious development, pro-social motivation and the growth of self-understanding in young children.

But before we begin I'd like to go over some information regarding the webinar. We'll be using some of the Adobe Connect features to help us interact. At times we will ask you to type in the chat box located to the right of the PowerPoint slides in response to specific questions. We would also like to point out the Q and A box on the lower right-hand corner.

If at any time you have questions related to the presentation or other related topics please type your question there. We will be monitoring that box throughout the webinar. Supporting documents for this webinar including a PDF of this presentation can be found in the supporting documents box in the bottom right of your screen.

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So, without further ado I will turn it over to Dr. Ross Thompson.

Ross Thompson: OK, thank you Sarah. And greetings everybody. I'm so impressed that you've been signing in and sending greetings in the chat function, that we have people here from all over the country. So, welcome. It's good to be with you this morning or this afternoon depending on where you are. Self-regulation as we all know is really central to children's thinking, their attention, their emotions, their social skill.

But children under 5 do not have a sterling reputation for self-regulation. And so, I want to begin by asking you: What are the signs you observe in preschool children that self-regulation is

a challenge for them? What kind of indicators in their behavior give you the awareness that self-regulation is something that they are often struggling with? What do you see in your work with children?

Sarah: An immediate response from Desiree saying, sit throwing [Laughter] or sitting when angry.

Ross: I see difficulty in transitions, difficulty waiting to take turns.

Sarah: Difficulty negotiating with peers. If you can use the chat box instead of the Q and A box, actually, that will allow everybody else to see the responses as you type them in.

Ross: Frustration, tantrum.

Sarah: And Katrina mentions, extreme feelings.

Ross: [Laughter]

That's right, yeah. So, I think we're on the same page here. Children in the preschool years experience a lot of difficulty with self-regulation. And you've really identified the characteristics that give us that awareness, difficulty managing your emotion. Their attention wanders from what they're doing quite often. They get into conflict with other children over materials and resources. They have trouble focusing their attention, their thinking especially on tasks that require multiple attempts or complex solutions. They can wander away from those kinds of challenges.

And they have difficulty following multi-step instructions. In fact, self-regulatory challenges for young children are something that teachers grapple with, of course, both in preschool but also once children enter school. Kindergarten teachers most often identify young children as not ready for school because children show poor, they'll show poor what? Sometimes, we might think that kindergarten teachers identify young children as not ready for school when they show poor number skills or they're not recognizing their letters. But in fact, surveys show that kindergarten teachers most often identify young children as not ready for school because children show poor self-regulation.

No matter how much children have mastered letter or number skills self-regulation is a major, major challenge to school readiness. And this is because limitations and self-regulation effect many of the other skills that are relevant to children's classroom achievement. You can't do well in school if you aren't able to manage your thinking, your attention, your emotions, your impulses. And furthermore, for kindergarten teachers they know how to teach letter or number skills but figuring out how to help children achieve developmentally appropriate levels of self-regulation is a greater challenge for them.

And so, this leads us to our question that is really the focus of our conversation today. Which is: Why do young children struggle with self-regulation? And later on, we're going to ask: What could we do to help them with this? Now, to give you a sense of what our objectives are for today's presentation here's what I hope you 'll be able to do by the time we've finished our time together. I hope that you'll be able to understand what self-regulation is. And also, how it's based on what scientists call, executive function.

And we're going to define what executive functions are. And I think you'll find it an interesting way of thinking about how the mind operates both for children and for adults. We're going to identify then the three components of executive functions which consists of, Inhibition, working memory and mental flexibility. And understand better how they support self-regulation. We'll spend some time describing how the growth of self-regulation is based on the maturation of the brain. And that's really important for us to understand where young children are in that developmental process. I hope by the end of our time you'll be able to understand the influence of the temperament and also of stress on individual differences in self-regulation, recognizing how much children do vary one from another at any age in how well they can manage themselves. And then finally we want to talk about what parents and education staff can do to support the development of self-regulation.

So, with respect to our agenda today then we're going to start by defining self-regulation. We'll talk a little bit about the relationship between self-regulation and executive functions. We'll talk about self-regulation and the developing brain. And then consider individual differences in self-regulation. And at that point I'll bring up a temperament dimension called effortful control that I think you'll find useful in thinking about the children you work with. We'll consider stress and its influence on self-regulation. And then finally consider how can parents and education staff and childcare providers support the growth of self-regulation in young children.

So, let's begin at the beginning and consider: what is self-regulation? And I would offer you this definition. Self-regulation is the ability to internally manage one's attention, thinking, emotions and behavior without external control. The focus of self-regulation then is on the development of internal rather than external controls over one's thinking, attention, emotions and behavior. Self-regulation is often called self-control. But I think that an easier way of thinking of self-regulation is quite simply this, self-regulation consists of doing what doesn't come naturally rather than what does. And that is a challenge where young children are concerned. And part of the reason it's a challenge is that self-regulation takes time to develop because many things go into its development.

And so, it takes time for the various processes involved in self-regulation to mature and to grow. Self-regulation is based on the growth, for example, of areas of the brain that enable self-control. We're going to talk about what some of those areas are. It's based on the growth of temperament. It's also based on the growth of cognitive ability related to memory and judgment and to mental flexibility. Self-regulation is also based on experience with culture and adult practices for helping children achieve self-regulation that vary a lot in different cultural settings.

And self-regulation is based on the growth of capacities for managing stress because of the effects that stress has on the development of children's self-control. So, let's consider next the association between self-regulation and executive functions. Self-regulation in fact can be viewed as being based on the development of cognitive processes that enable self-controlled, goal-directed thought and behavior. And this is what we call executive functions. Now that's a pretty complicated definition of executive functions.

So, here's a simpler way of thinking about that. Executive functions are in many ways like the air traffic controllers of the mind. And lord knows we need mental air traffic controllers as

adults to help us in all the various tasks that we're involved in. I mean, think about when you're multi-tasking you're doing multiple things at once, you are responding to a message on your cell phone at the same time that you're carrying on a conversation. And perhaps planning dinner this evening. But you're aware, chances are, in situations like that of the functioning of your mental air traffic controller. We need a mental air traffic controller to help us plan the next steps while we're in the middle of doing something.

We use those executive functions as mental air traffic controllers to help us in social interactions while we're monitoring how others are responding to what we're saying or doing. And getting along with other people such as when we have to mentally keep in mind what their goals are as well as our own. Those executive functions function as mental air traffic controllers for emotional self-control. To figure out how it's most appropriate to respond regardless of how I'm feeling at the moment. And of course, a mental air traffic controller is important for mental concentration such as ignoring distractions while thinking or problem-solving.

So, I think it's clear when we think about it that we use executive functions as adults all the time. And we rely on them. We couldn't do the things we do without these mental air traffic controllers. So, let's delve in a little bit deeper, more deeply and figure out what executive functions really consist of. And there are three components to them that really help us understand how they function as air traffic controllers of the mind. It'll also help us understand understanding these three components of executive functions. Why is it young children have so much difficulty with self-control? So, one thing that executive functions include is what we call inhibition. And inhibition consists of the ability to resist a strong inclination to do one thing and to instead do what is most appropriate or needed.

So, let me ask you: How do you use inhibition in self-regulation? Where does inhibition come into play when you are managing yourself, when your mental air traffic controller is operating? Any ideas about that? Many of you are responding. Right, not screaming during a frustrating meeting. Or in my case a frustrating faculty meeting. Right, staying calm and polite when you're upset. One person writes, driving in L.A. Well, yeah, you're inhibiting what? The tendency to use your horn? Probably so. S

o, we use inhibition all the time. We know how to think about what is most appropriate, what is most useful. And to do that instead of how we might impulsively want to respond. And of course, then children are needing to learn inhibition as well. And many of the situations that they're faced with that involve self-regulation requires that they inhibit what they most want to do. Children use inhibition when they're having to stay on a task for example rather than being tempted by what other kids are doing in the room.

Children use inhibition while they're waiting until the teacher calls on you and keeping your hand raised while you're waiting, or waiting for a parent to fix a snack. And not wandering off or getting frustrated. Children use inhibition when they resist retaliating to a peer who's provoked them in some bad way. And all that involves doing what does not come naturally, stifling that response in order to do that which is most appropriate or helpful. And that's one component of executive functions called inhibition, obviously, a really important part of it. But that's not all. Executive functions also include a second component called working memory. And working memory involves holding information in mind while mentally working on it.

So, let me ask you this question. How do you use working memory in self-regulation? Can you think of ways that working memory's involved when you're managing yourself when that air traffic controller is operating? Yeah, thinking about what it's worth to calm yourself before responding, knowing how to be intentionally responsive. As we mentioned earlier working memory is involved in mental multi-tasking, keeping in mind dinner plans while responding to a phone call, juggling a lot of ideas and thoughts at the same time. Planning your day while getting ready in the morning, thinking about the reasons behind somebody's angry outbursts while you're deciding how to respond. Remembering a phone number, right? Not being impulsive, just thinking before you act. Thinking before you act is often a part of working memory as well as of inhibition.

So, it turns out of course that a lot of the time the children, young children are needing to be self-regulating. They are also needing to use working memory in doing something. So, for example and I'll show you an example of this a little bit later but when children are faced with multi-step instructions, you know, let's get ready to go outside and play. Children need to have working memory to be able to keep in mind the overall goal while conducting the necessary steps in order to reach that goal. Transitions are a real important part of self-regulation that involves working memory as children are finishing one task and transitioning to another. And that's why transitions can be really hard for young children. Interestingly enough working memory is involved in children's remembering a story narrative. Knowing how the things that are happening when you're midway through the story relate to things that happened earlier on in the story.

That's a working memory challenge. And of course, social pretend play, knowing what the shared script is that you're enacting as you're in the middle of continuing that story and developing it in new ways. So, working memory it turns out to have a really important and surprisingly important role in executive functions and of course in the development of self-regulation for children. But even that's not all. There's a third component of executive functions that is also important to self-regulation. And that consists of what we call, mental flexibility, the ability to switch perspective, attention or mental focus. To be able to switch from one point of view to another point of view, from one agenda to another agenda.

So, now let me ask the third time. How do you use mental flexibility in self-regulation? In what ways does mental flexibility make a difference for you in terms of your ability to manage yourself? Yeah, problem solving social situations. Being able to take the other person's point of view and not just be focused on your own. Switching from concentrating on one task to another. That's exactly right. Seeing the other side, right. Using all the information to make a decision, good. My wife is sometimes required to show mental flexibility when I suggest to change a plan. Perhaps many of you have that experience, as well. Getting unexpected behavior or an unexpected response from a child.

Excellent. So, we have to have that mental flexibility in order to be able to quickly adapt to circumstances and to be able to manage ourself as we're making that adaptation. And, of course, therefore young children have to also be able to use mental flexibility as they're self-regulating as well. Just as when they're adjusting to a change in plans or a schedule or making a transition. Also, mental flexibility is really important in creative problem-solving. When your

first attempt to solve a problem doesn't work mental flexibility's involved in figuring out what another solution might be that you hadn't thought of at first. And of course, as some of you mentioned social conflict resolution is really important. To recognize that the competition you have with the other child over some valued toy or resource but that other child may feel just as desirous of that toy as you are. And mental flexibility is important in being able to recognize that and maybe take that into account.

So, it turns out that when we think about self-regulation from the point of view of executive functions self-regulation is a surprisingly multi-faceted and complex phenomenon. It's something that is not necessarily easy for children to be able to do, in part, because it involves so many different skills that they're only in the process of developing. So, to reiterate, to review, executive functions include, inhibition, working memory and mental flexibility. And so, the question is then, "How are all these skills important to how preschool children learn, pay attention, solve problems and get along with other children and the teacher?"

Other ideas about that that you have? Yes. Our teaching and empathy. These executive functions are important in that. Taking another child's point of view and being able to understand that. Yes, many of our school readiness goals are related to children's ability to use executive functions to concentrate on what they're learning in a classroom to be able to focus their thinking on problem-solving tasks. That's very much involved where executive functions are concerned. Yes, helping them realize they can find other ways to solve a problem.

The important thing that I want to make sure that you understand here but it looks like you already do is that executive functions and self-regulation is not just relevant to children's impulse control or their behavioral self-management. It's not just relevant to their emotional self-regulation. But it involves their cognitive functioning, as well, their thinking and problem-solving, their ability to focus their attention.

And of course, they're getting along with other people. So, that's why self-regulation is so important. That's why executive functions are so pertinent. And that is that because they really are relevant to virtually every aspect of the child's behavior in a classroom. That really makes a difference in how children are getting ready for school success. And the degree to which once they are in a kindergarten or a first grade classroom they're able to accomplish and succeed academically.

So, to make this all a little bit more real perhaps a little bit more applicable consider the following example. At preschool, when the teacher claps her hands and says, "Let's all get ready to go outside, but it's raining." what is it the children need to do in order to go outside when it's raining? Well, if you think about it they need to first of all finish the activity that they're currently involved in however interesting that is and put things away. Then they need to go to their cubby and put on their rain gear.

But that involves a successive set of steps that begin with perhaps taking off your shoes. But to take off your shoes you got to sit down on the floor. And then you got to pull off your shoes and put on your rain boots. And then you got to stand up again. Hopefully keeping in mind while you've been doing all this stuff you've got to put on your hat and coat and then join the other children and the teacher at the door.

And is it any wonder that a novice teacher might simply provide children as a group with the instructions; OK, let's get ready to go outside and it's raining and then turn around five minutes later and discover that there are three children who are ready and dressed and at the door? There are half a dozen children who are at their cubbies in various stages of undress. And there are several other children who may have started that process but have wandered away elsewhere in the room and have found something else that is more interesting to do at the moment. Because this kind of multi-step instruction really pulls on all the various executive functions that we've been talking about doesn't it? When the teacher says, "Let's ready to go outside and play in the rain," children have to be able to practice inhibition to finish the activity they're currently working on however interesting it is in order to get ready and to avoid getting distracted by other things in the room while you're doing so.

Not all children are equal to that task. It involves working memory, keeping in mind the overall goal of getting ready to play in the rain and not getting waylaid along the way. And it involves mental flexibility, being able to turn away from the activity that you've been involved with in order to get interested in going outside and motivated to change your boots and put on your hat and coat in order to participate in that new activity. What we're looking at here of course is a transition. And transitions like this are actually quite complex tasks of self-regulation for a preschool child. And this helps us understand why it is that children when faced with a general suggestion or a general requirement like this are often unequal to the task. It's not that they're not interested in going out and playing in the rain it's rather that this multi-step instruction is far too complex to remember and to enact than most preschool children are capable of.

And the reason for this, the reason that children are often unequal to a self-regulatory challenge like that is because of what the brain science tells us. And that is that self-regulation develops very slowly. Self-regulation is based on areas of the brain most of which are located in the prefrontal cortex. Now, the prefrontal cortex is that part of the brain that you would cover if you put your hand over your forehead. It is one of the most sophisticated areas of the brain. It is also one of the slowest to mature because it is so sophisticated in the behavioral functions that it fills. Here is just one of the areas of the brain in the prefrontal cortex that is related to the development of self-regulation, that dorsolateral prefrontal cortex. There are many other areas of the brain that are relevant to self-regulation. But this is just one that I thought to identify for you. And the maturation of the dorsolateral prefrontal cortex begins when children are about 1-year-old. And it continues.

Now, let me show you how far it continues. What I'm showing you now is a chart that describes to you, for you the maturational course of areas of the brain related to some of the most important psychological developments that take place in the early years. And you can see on the bottom that we've started prenatally actually because that's when many of the advances in brain development have already begun. And this timeline takes us through birth. And then the months of the first year of life. And finally, each successive year up to the age of 25. And so, what I'm going to show you is the developmental course for some of the most important psychological developments of the early years.

Let's begin with sensory experiences, seeing and hearing. And that's a timeline that begins prenatally of course because seeing and hearing and other sensory experiences are absolutely essential to a young child being able to be in contact with the world.

So, the development of sensory areas of the brain starts very early and continues on. But really concludes relatively early in the first year. If we consider a more complex task like language that also begins early but continues on to about the age of 12 or 13. The age of 12 or 13 is important of course because this is the age in which many school districts in their inestimable wisdom start requiring students to take a foreign language class. Just when the brain has kind of finished its language learning optimal time is when schools sometimes start foreign language instruction, go figure. Now, if we think about higher cognitive functions like thinking and reasoning and problem solving we find that this time table also begins early but lasts much longer into mid-adolescence. And that's because a lot of these higher cognitive functions are continuing to develop in adolescence.

The capacity for abstract thinking for example which we begin seeing flourishing when kids are teenagers is part of that developmental process. Now, what we're leading to of course is the development of self-regulation. And look at how long the maturational time table is here. Did you notice? It starts before birth but it also continues up into the early adult years. Ages 24, 25 and 26 is about the time that the areas of the brain like the dorsolateral prefrontal cortex that serve the development of self-regulation, that's the time in which that maturational course is just about completed. So, if you have a young adult friend of yours or if you are like myself and have had young adult sons then you can expect that by the time they're in their mid to late 20s maybe the developmental course of self-regulation has been completed. Although, sometimes you may doubt that. But the bottom line then is that young children are only taking their first baby steps in the brain's development of self-regulation.

A lot a things are happening in the first two years of life. But there's a lot more that has to happen with respect to the development, the brain's development of self-regulatory ability. Likewise, over the course of the first five years a lot is going on in brain development. But a lot remains to be done with respect to the growth of self-regulation. And this means therefore that when young children have the experience of I can't stop myself from having an emotional meltdown, from kicking off aggressively at a peer who's provoking or having my mind wander in a boring classroom presentation that might well be the truth, in fact it's very likely to be true, that their ability to manage themselves to control their emotions, their impulses and their attention and thinking is just very much out of their hands.

They genuinely can't stop themselves from impulsive emotional or sometimes very distracted behavior. And it's very important for us to recognize because it is based on the development of the brain. And when children are faced with self-regulatory challenges that are beyond their capabilities it's not that they don't want to it's not that they're not trying it's that that core dorsolateral prefrontal cortex is doing the best it can at such an early stage of a child's maturation. And I hope that makes sense to you because that's the key to understanding how to help children with self-regulation.

The key is recognizing that oftentimes children's brains have not developed to a point that they're capable of the kind of self-control that we might wish they had. And as a result, we have

to provide them with the support to enable the dorsolateral prefrontal cortex and other areas of the brain to do the best job it possibly can do. Now, I'm a psychologist and so, I know what you're thinking right now. Many of you are thinking about that child that you know or those children you know who despite what I've been saying in this presentation show great self-regulatory skill. These are the kids who are at the door in their rain gear ready to go outside within moments after the teacher had said, "Let's get ready to go outside and play" and it's raining.

These are the kids who are doing exactly what the teacher is telling them to do at the moment the teacher has said so. These are the kids who you would like the rest of the class to be like and for some reason they're not. And your tendency is to ask, Well, what's wrong with all these other kids who can't line up, who can't follow instructions, who can't control their emotions the way these kids can? And this leads us then to considering the nature of individual differences in self-regulation and particularly the role of temperament. Because temperament can help us understand why kids differ at any age despite the brain's maturation in their capacities for self-regulation. Now, sometimes temperament can really make self-regulation really hard for kids, when their temperamental profile includes a tendency towards great extremes in emotion or a tendency toward negative emotion.

Self-regulation can be a real challenge for these kids. But at times self-regulation can also be boosted by temperament. And in particular by a quality of temperament, a dimension of temperament that researchers call, effortful control. Now, effortful control can be defined in this way, as the ability to inhibit a dominant response in order to perform a subdominant response. And let me ask you. You've heard about an aspect of executive functions that sounds very similar to effortful control. Of those three aspects of executive functions which executive function does effortful control most resemble? You guys are great. You're on top of it. Exactly, it's inhibition. Effortful control gives some children with this temperamental quality a temperamental boost in their capacity for inhibition.

And because of that they are more capable of putting things away when the teacher tells them it's time to transition to something else. They're more capable of following instructions and of not being distracted while they're doing so. And that's what effortful control seems to help these children with. So, when you see these children in the classroom or when you see these children in other contexts and they seem to be astonishingly well self-controlled. And you're wondering: Why can't other kids be like that?

The answer is because they don't have the same temperamental profile as these children do. And rather than asking yourself as we naturally do: What's wrong with all these other kids that they can't be like these kids who are always doing the things that are expected of them when they're asked to do so? We might instead ask, So, what's so different about this kid who seems to be capable of self-regulation in a way that other kids are not? And the fact is that these children have a temperamental boost called effortful control. It's not that anything is wrong with the other kids they're just temperamentally different. They are typical.

It is the children with effortful control who have been given a special temperamental assist. And I think this is especially important to see the kids who are extraordinarily self-regulated as having this benefit, that it's not that there's anything wrong with the rest of the kids. And that's

so important because one of the things that research is showing us is that oftentimes parents and others who care for young children expect too much of young children with respect to self-regulation. We wish that young children were capable of greater emotional and behavioral self-control than they are. And so, sometimes we expect that they will show greater self-regulation than their brains make it possible for them to show. Now, some of the evidence for this actually came in a national survey.

The organization with which I'm affiliated called, Zero to Three. And in this national survey of more than a thousand parents, representative sample of more than a thousand parents nationwide, all parents of young children the first three years of life. We asked parents at what ages children should be capable of important developmental achievement? Because we wanted to get an idea of sort of, what are parents thinking they ought to be seeing as they're children are maturing? And part of that has to do with what parents think they can do to help their children in these major developmental milestones. So, we asked about self-regulation. And here's some of the questions we asked. And you might consider what your answer would be to each of these questions.

So, we asked parents in this national survey: At what age should a child be able to follow instructions, like, go and pick up your shoes? So, what age would you expect a child ought to be able to follow an instruction like that on their own? Any ideas? OK. 2 ½ ... 3? It would be based on the child, of course.

We've got some 4. So, here is the age that was the consensus of the respondents of parents in our national survey. They believe that children at 1.7 years of age on average ought to be able to follow instructions like, "Go pick up your shoe." Here's another one. At what age should children, a young child be capable of sharing and taking turns with other children? What would you think? Sharing and taking turns with other children. Oh, I see a lot of fours. Threes, 3 ½, five, OK. So, here's the average response from parents in our sample. These are parents of kids in this age range. And they have the figure of just short of 2 years, 1.9 years is when children ought to be able to share and take turns with other children. So, here's the last one. At what age should parents expect that a young child could control his or her emotions such as not having a tantrum when frustrated? What would you guess?

Oh my: 6, 7, 10, 3 ½, 3, 4, 12. 12 is good. Here's the age that was the average response from parents in the sample, 3.1 years. Just over age 3. Now, the question we might ask is and I think the question that you've been answering is this: Are these realistic expectations? And I think when we compare parents' expectations of self-control for young children with what the brain science is telling us as well as other developmental studies of what young children are capable of, we really need to conclude that probably these are not very realistic expectations. And the reason is that if we ask the question,

Are they consistent with the child's brain maturation? We have the same answer, that it really isn't. That children at these ages are really just taking their first initial steps in the development of self-regulation, they've got a long way to go. And expecting these things from them at such an early age is really expecting too much. And, of course, you know what could happen if the parent is expecting that a child can calm down when they're in the midst of a tantrum simply by being told to do so and the child does not calm down because their brain is incapable of making

it possible for them to do so parents may come to the conclusion that the child is being intentionally stubborn or willfully defiant or as parents sometimes put it, "My kid is just trying to push my buttons." And you know that that does not lead in a good direction when parents believe that the child's inability to calm down is based on willful defiance rather than simply an inability. We'll turn to that, back to that in a few moments.

Now, it's important to recognize that there are individual differences in children's capacities for self-regulation. We talked about temperamental effortful control earlier. But there's another factor that contributes to individual differences in self-regulation. And this has to do with the influence of stress. Why does stress impair self-regulation? Because it does, doesn't it? And that's true not just for children but it's true for all of us. I mean, think of the last time you were upset about something that somebody had said or something that happened at work. You really had trouble thinking clearly. You felt your emotions beginning to get out of control. If you're like me you feel your breath getting short. You feel a little bit kind of mentally disoriented. Stress really is tough on any of us as it relates to our ability to focus our thinking, focus our attention, control our emotions, manage our behavior. It's as if stress undermines that air traffic controller of the mind.

And makes us function in a much, much less optimal way. And it's also true now, research is showing, that stress has an impact on self-regulation for young children, as well. And that's in part because of the ways that stress can affect brain development. Now, we know that most children can manage the ordinary stress that they encounter. Being reprimanded by a parent, experiencing peer conflict. You know, especially when there's an adult there to support them most kids are capable of handling ordinary expectable stressful events.

Those aren't the ones that we're talking about here. But when children, some children who experience chronic and persistent stress, at high levels which is sometimes called, toxic stress, that's a term you may have heard of. When they experience that kind of regular, persistent high level of stress we know that they're biological coping systems adjust to that high level of persistent stress.

And one of the things that happens biologically is those systems become recalibrated, rewired in a sense to make the child more sensitive to stress and more capable of reacting quickly and immediately to threats or dangers when they occur. It's almost as if the system is thinking, Well, I'm in this really dangerous world, I better be sensitive to danger because it might overtake me. And so, these children's biological stress coping systems become super vigilant for signs of threat or danger and they react quickly and immediately when threat or danger does occur.

And the consequences of this is that young children tend to become more sensitive to stressors that take place. They seem to be vigilant for further signs of danger. And they react more quickly and intensely to any threats that occur. Most of you can recognize the behavioral profile that I'm talking about. You know, these are the kids who respond aggressively to a peer provocation that most other kids wouldn't be bothered by. Or they fall apart emotionally when they're reprimanded by an adult. And these kinds of consequences are reflecting, we're recognizing, an underlying biological change that's taking place as a result of chronic, persistent, toxic stress.

But it turns out now that we're recognizing that chronic stress also has other effects on the brain beyond how children cope emotionally with stress because it turns out that many areas of the brain are sensitive to the kind of stress hormones that our brains naturally produce when we're under threat. And so also, they too become rewired as a result of chronic exposure to stress hormones in the brain when a child is experiencing threat or danger on a regular basis. And here are three of the areas of the brain that seem to be most sensitive to stress hormones in the context of toxic stress.

One of those areas is called the hippocampus. And this is the area that has an important role in forming new memories from current events. If you remember anything that we've talked about today and you can report it to somebody tomorrow it's because your hippocampus is active right now and that's a good thing. Also, the frontal lobes are sensitive to stress hormones within the brain. And as we had talked about earlier frontal lobes are involved in self-regulation, in particular the prefrontal lobes. And finally, the temporal lobes are also sensitive to stress hormones within the brain. And these are the areas of the brain that among other things are very important for language.

What I'm showing you here is that persistent chronic stress impacts a whole lot of skills that children need in order to learn in the classroom. And it's not just the ability to engage in emotional coping that is undermined by persistent stress but it's also the ability to remember, the ability to use language effectively. And the ability to self-regulate. It means therefore that it's no wonder that children who are experiencing stress are perceived by their teachers to be more distractible and to have difficulty focusing their thinking. And to be less self-controlled because we're now finding that biologically that chronic stress is affecting gray areas that relate to focusing thinking, self-control and focusing one's attention.

And so, no wonder these children don't do as well in the classroom as children who are not so stressed. So, stress is a really important factor that contributes to differences in self-regulation. And where the temperamental quality like effortful control can make self-regulation easier for some children the experience of chronic stress makes self-regulation much harder. And it can also undermine a lot of other skills that are important to children's school readiness and to their academic success. So, the question for us is: How do we help children develop self-regulation? How do we help all children develop skills of self-regulation?

And I think one of the most important things for us to recognize, those of us who are parents but also those of us who are involved in children's lives outside of the home on a day-to-day basis is that if we cannot expect such great self-regulation, if we cannot expect the kind of self-control that we might wish young children have, then we should not overlook the fact that we play a very significant role in supporting self-regulation for the children in our care. Because in a sense we have to provide the external management of children's emotion to help them focus their attention and thinking on learning activity.

And to provide assistance in controlling their behavior through the guidance we offer, through how we organize daily activities to stay within a child's capability and how we can help children when they experience the inevitable emotional meltdowns that occur. Viewed in this light we have to provide external assistance in doing what children's developing brains are struggling to achieve which is to help children manage their own emotions, impulses, thoughts and

attention. We have to provide support for that poor dorsolateral prefrontal cortex to do the best that we can. But more specifically what are the strategies we can use? How do we do so?

And the reason that I have put this picture of a drawing by a 3 ½-year-old up here is because it's a nice example, I think, of the kind of external support that in this case Sofia's caregivers managed to provide for her. Because she likes this picture and then she dictates a story that is written down by another teacher describing the mad dance that she felt when she was teased by some other children.

And the fact that Sofia had a mad dance that she could do when she was really angry suggests that someone in her life was giving her the tools for managing her anger that she would not otherwise have had. And that's a good illustration of the ways in which we can provide external support or the kind of self-regulation the children's brains are not really well-equipping them to do at a young age. So, to be more specific, how do we help children with self-regulation? Well, probably most important is to have developmentally appropriate expectations for them, to not expect that children can simply calm down their own emotional meltdown simply by being asked or told to do so, to not expect children to sit still for a long period of time even though it might be convenient for us if they do so but the fact is that that's beyond their capability. So, to recognize what children of this age are capable of and to respect those capabilities when we're creating expectations for their self-control.

Now, here's another idea that I find really neat. And that is to guide children with "do" statements not "don't" statements. We always want to tell children or caution children about the things that they ought not to be doing. Don't run! Don't speak in a loud voice. But every time we're doing so we're asking the brain to inhibit the child's behavior. And we've already seen that inhibition is not one of the executive functions that young children are really good at. By contrast the areas of the brain that enact behavior, that can follow "do" instructions are already online. They don't present the child with as much of an inhibitory challenge as a doing challenge which as you know young children were good at. So, instead of saying, don't run, we were to say instead, walk with gentle feet.

We have given children a "do" statement that they might be better able to enact. If instead of saying to children, don't talk loudly, we say, use your inside quiet voice we're using a "do" statement that children are much better at enacting rather than inhibiting its opposite. Another important quality, another important way of helping children achieve self-regulation is to enable children to anticipate transitions, to give them some anticipatory warning that we're going to be finishing what we're doing now and we're going to be doing something else in a moment. It helps children in the kind of mental flexibility they need in order to pull themselves away from something that may be absolutely consuming and interesting to them and to begin to think about the time that will be coming in a moment when they'll need to put that away and move to something else. We can help children use words to regulate their actions and thinking.

Now, we do that a lot with respect to emotional self-control don't we? We tell children to use their words instead of acting out how they're feeling. Say that you're really mad when you do that to me. But the fact is that words not only help in children's emotional self-control but it helps in all other kinds of self-control, as well. So, it can be helpful for example when children

are in doing a science project planting a seed in the soil in order to watch how it grows over the subsequent weeks for children to self-instruct as they're digging a little hole for the seed in order to put it in, in order to watch the plant grow. That can help keep them focused on the activity as opposed to what might happen in the alternative which is that children start getting involved in the act of digging and in a moment start wondering, "Well, can I dig farther? And, maybe I could get to China."

And suddenly you've got dirt all around and no seed that's been planted. Help children use words to regulate their actions and thinking. We can help children self-control when we have a predictable but flexible daily schedule. A predictable daily schedule because that helps children manage transitions. But a flexible one because it is not rigid and it can adapt to changes in the schedule, changes in children's interests or needs or changes in opportunities that present themselves. It is good for us to give options for children to self-regulate, a quiet corner where they can calm down can be a fantastic way. The children when they begin feeling overwhelmed can manage themselves.

We've given them a tool to do so. And of course, we can model emotional self-control, cognitive flexibility and attentional focus. My wife who's a gifted early childhood educator described one instance where she had a whole tray of beads the children were going to be stringing but she stumbled, it all fell on the floor and she looked and said, "Oh my, those beads have to be picked up, I can't do it by myself. Is there anybody here who can help me?" And she had 10 volunteers but she also modeled the kind of emotional self-control that the children can also display with our help.

And then finally to recognize that there are individual differences in self-regulation so that one size does not fit all as far as your expectations are concerned. I provided a slide with some additional resources that I hope can be helpful for you if you wanted to think about this or read up a little bit more about the development of self-regulation. I certainly hope that this has been a helpful time for you and now I think we have an opportunity to answer questions that you might have in the time that we have remaining. Sarah?

Sarah: Yes, yes indeed. Thank you so much, Ross, for such great information. We have about six or seven minutes here for some questions, so if you have questions please type them. You can put them either in the chat box or in the question and answer box in the lower corner and we will get to them. A couple of questions have come in during the presentation. So, Misty asked, "How do teachers tell if a child needs help with executive function skills or ADHD especially when parents want to medicate?"

Ross: Yes. Well, ADHD, of course, is a clinical diagnosis in which the manifestation is often serious problems with self-regulation. And a diagnosis of ADHD should not be made by any of us who don't have the clinical skills but rather a physician who knows what kinds of things to look for. If a child has that diagnosis they will need special help in helping to manage their own behavior, their impulses, their emotions.

And there are strategies that can be used to do that as well as other strategies beyond those that I've described that can be used to help all children in the development of executive function, in the development of self-regulation. I will typically mention as one illustration that

without endorsing it a curriculum called, "Tools of the Mind." Tools of the Mind is a curriculum for preschool children that has specifically been designed to develop self-regulation skills in the middle of other kinds of activities that can develop other kinds of skills in children. But whether one uses it as a curriculum or just simply borrows ideas from it there are lots of good strategies there for helping children develop self-regulatory skills at any age. And so, these are I think some of the things that we can do. One should not assume that a child has problems with ADHD unless you are aware that there's a diagnosis of this. As I've suggested earlier, this child may also be showing the effects of chronic stress in which case how you think about the child's needs and how you respond might be very, very different.

Sarah: Thank you so much. Diana asks: What are some materials if you have any suggestions that could be used in a quiet corner to support self-regulation?

Ross: Picture books. Picture books, story books, puppets. Any activity that a child can use to reconstitute. And that involves quiet activities that are favorite activities that children can enjoy doing when they're by themselves. Because that's what a quiet corner is all about. Those are the two, suggest puppets, story books, anything to give a child an opportunity to mentally refocus. So, that's really what a quiet corner can be all about as it relates to enlisting executive functions that might be needed in order to restore self-regulation.

Sarah: Great. Clara is curious if you have any information about how culture may impact self-regulation.

Ross: Culture does make a difference. And as I mentioned earlier, you know, children's experience with cultural practices that involve parental support for self-regulation and the incentives for self-control can really make a difference in terms of the capacities for self-regulation that children develop even though their brains are not at a more advanced stage of development than our children growing up in other cultural contexts.

Our common stereotype is of children growing up in some Asian countries showing greater self-regulatory skill, that has been documented with respect to children living in China and Japan. And it turns out that that's in part because especially in China children who are self-regulated are very much esteemed. They are praised for those self-regulatory qualities. Compared to I think in the United States and many other Western countries where children who are more inhibited, who are reserved, who are self-controlled are sometimes not seen as being as desirable as children who are impulsive, who are more capable of asserting themselves, of being independent and taking the initiative. But because of those cultural values then children growing up in Asian cultures like China, like Japan are often showing greater self-regulatory ability. Indeed, research has shown the temperamental qualities that involve children being reserved are seen more positively in some Asian cultures. And are seen more negatively in the United States. Another reflection of how much culture can make a difference.

Sarah: Wonderful, thank you so much. We have two minutes left. So, one more question here. We've got a couple of questions coming in about children who've experienced adverse childhood early childhood experiences or toxic stress. And people are interested in what additional supports we can give those children to help them develop self-regulation skills and how you might communicate that to parents.

Ross: Well, it's important for us when we have identified a child who seems to be showing the signs of chronic stress that we find out what we can do about what might be the sources of that stress in the child's experience. And usually it involves sources of stress that we don't have any control over.

Sometimes, we can change it; but, oftentimes these involve stresses outside of the setting in which we're interacting with the child. So, we cannot alleviate the child's stress. We can try to enlist adults who might be helpful and supportive in doing so. But at the same time we can provide young children with an experience of being in a setting that is not threatening, it's not dangerous, it's not stressful but it's developmentally appropriate, it's child-centered and it's nurturing and helpful to the child. And by enlisting those kinds of practices that I described earlier and by helping give the child tools for managing their own stress we can give that child a better means of coping with their difficult experiences than they otherwise would have.

And when that child goes off into another classroom, when they go into a pre-kindergarten or a kindergarten classroom, they now have not just the prior experience of being in a dangerous or threatening environment perhaps as their expectation for what will happen in this classroom but they will have the experience of being in your classroom where they have experience in developmentally appropriate child-centered nurturing setting as perhaps another way of expecting what might be happening in this classroom also. And that's a tremendous gift for them.

Sarah: Wonderful, well, thank you so much for such great information and thank you all for listening and tuning in to our Front Porch webinar today. We hope this information will be valuable to you as you help programs consider ways to enrich the experiences for children and families that you serve.

So, thank you all so much for attending, and thank you Dr. Thompson for giving us such great information.