Foundations for Social, Emotional, and Academic Competence:
Economic Disadvantage and the Development of Effortful Control
Front Porch Series Broadcast Calls

Gail Joseph: Welcome to the Front Porch Series. I'm Gail Joseph, Co-director of the National Center on Quality Teaching and Learning. And on behalf of my colleagues here at NCQTL, I'd like to thank you for joining us today for another compelling presentation related to young children and learning. Today's speaker – we are just thrilled about – is Dr. Liliana Lengua, Professor of Child Clinical Psychology at the University of Washington's Center for Child and Family Well-Being.

Dr. Lengua will be sharing today research related to effortful control and young children. As always, please feel free to type in questions as they occur for Dr. Lengua, and we will have a chance to have her address those at the end. And so, I know she has a lot to present, and without further ado, I will turn it over to Dr. Lili Lengua.

Dr. Liliana Lengua: Thank you, Gail; and thank you all for being here this morning if you're on the west coast, or this afternoon if you're anywhere west – or east of us. I'm really looking forward to talking with you today about children's development of effortful control and the impact of economic disadvantage on that, and in turn, the role of effortful control in children's social, emotional, and academic competence.

So, I'm going to take a little time today to talk about the context and impact of economic disadvantage; and then define effortful control and talk about why it's important in children's development; and then share a little bit of our research on the impact of economic disadvantage on the development of effortful control; and then end with some comments on implications for practice and policy.

Most of us already know that economic disadvantage or poverty is defined by families being at or near the federal poverty cutoff. Last year that was around $15,000 for a family of two or $22,000 for a family of four. But low income or the context of low income has far more impact than just the absence of resources, even in the absence of resources for food security or housing security. Low income or poverty is associated with a whole host of other risk factors.

Families who are living in poverty are more likely to be single parents. They're more likely to have many changes in their residential situation and less than ideal residential situations. They experience more negative life events or stress. They're more likely to live in high-crime neighborhoods. They either have poorer access to health care or they access health care less. And parents are more likely to have mental health or substance use problems. And these are just a few of the many risk factors associated with poverty.

So any one of these risk factors alone would lead to an increase in adjustment problems in children, but children living in low-income or economic disadvantaged contexts are likely to experience three or four

or more of these risk factors. We call that cumulative risk, or the accumulation of risk factors. And it's in that context that parents and families have to navigate the task of raising their children and contributing to their children's well-being. So, it shouldn't surprise us that economic disadvantage has a widespread impact on children's well-being, touching just about every area of their development. Children from – living in poverty have poorer health. They're more likely to have learning disabilities and emotional and behavioral problems. They're much more likely to be held back a grade in school, to drop out of high school, or to have an expulsion or a suspension from school.

So along with this widespread impact, there's an interesting fact that we now know about poverty, and that is that when children experience poverty early in childhood, it has a more pronounced effect on adult outcomes than when they experience poverty later in childhood or adolescence. Something about that early exposure to disadvantage is impacting children all the way into adulthood. And what researchers now believe is that this early exposure to economic disadvantage or – or adversity leads to disruptions in the development of underlying neurobiological systems, particularly self-regulation systems, that – and that disruption happens at a time when those systems are developing dramatically, and these result in long-term and pervasive effects of that exposure to adversity.

Another interesting piece of information about poverty is research has shown that about half the effects of poverty in early childhood are accounted for by family and parenting factors, so that gives us direction in thinking about how to prevent problems associated with children growing up in poverty. Particularly, when we can promote effective parenting and family functioning in early childhood, we may be able to prevent lifelong problems for children.

So these two premises guide the research we've been doing, looking at the effects of low income on children's developing social, emotional, and academic competence. We've been studying a cascade, or process, model where low income increases the likelihood of family adversity, which in turn diverts or distresses parents in their parenting, which in turn impacts effortful control directly, shaping children's developing effortful control, and indirectly through shaping children's physiological stress responses. And these in turn impact children's social, emotional, and academic well-being.

So, I'm going to spend a few minutes talking about what is effortful control and then talk about this research. Effortful control is thought to be a core basis of self-regulation. When most of us hear the term "self-regulation," we think of the stop mechanism in regulating ourselves. We think of stopping ourselves or controlling ourselves from doing things. But self-regulation is much more complicated than that, and does involve a go mechanism. We have to match the demands of the situation, sometimes inhibiting or stopping ourselves from doing things, but other times gearing ourselves up, finding the motivation, the energy to do things. Think about what you need to do to get yourself to exercise or go to work in the morning. So it sometimes is up-regulating and sometimes down-regulating.

There are both go and stop mechanisms when we think of self-regulation. And to match the demands of the situations – to titrate our thoughts and emotions and behaviors to match the demands of the situation, we're largely accomplishing that through our executive functioning. Executive function reflects

the most developed part of our brains and reflects activity in the prefrontal cortex. The executive functioning represents, like an executive of a business, the executive of our brain. It's overseeing, monitoring, and modulating activity in all other parts of the brain: our sensory input, our motor input and output, and our emotional input and output. And at the very core – executive functions include things like planning and decision-making and problem-solving. And at the very core of that is our effortful control, our ability to focus and shift attention and inhibit.

Now I'm going to define those in just a minute, but first I want to talk about how we measure effortful control so you get a sense of what we're talking about. One of the prototypical measures of executive function or effortful control is the Stroop Color Word Test. Many people will remember this from Intro to Psych classes. In this test, you would tell me the color this word is printed in. Don't tell me the word that's printed there but the color that the word is printed in. So for this item, the correct answer is blue.

Now, as you were doing that, you found that you actually had to engage in some pretty complicated mental gymnastics to produce the correct response. When the word "red" appeared on your screen, you automatically read it. It's – you couldn't help yourself; you automatically read it. And you were tending to the automatic stimuli, or the dominant stimuli, which are the characters that are printed there, the letters. But to produce a correct response, you have to suppress the automatic response or stop yourself from reading the word. You had to shift your attention from the automatic or dominant stimuli to the non-dominant stimulus, which is the color the word is printed in; and then produce a non-dominant or non-automatic response, and that is: say the color the word's printed in not the word that's printed there.

So, just a couple more examples; and as I put these up, you can reflect on your own cognitive processes as you're providing the correct response. So the correct response for this one is red, and this one is green. That works to measure executive functioning, or effortful control, for people for whom reading is automatic, so children around third or fourth grade and older.

People have developed tasks to measure executive function or effortful control in younger children. Some examples are "Day/Night," in which children are presented with a picture of a sun and a picture of a moon, and they're told to do something silly: when you see a sun, say "night;" when you see the moon, say "day." So, to say the opposite, inhibiting the automatic response and producing a non-dominant response. Another example is "Monkey/Dragon" or "Bear/Dragon," where children are instructed to do what the monkey tells them to do, like touch their nose or touch their head, but not do what the dragon tells them to do. This is a Simon Says-like task, and children have to inhibit responding under one condition – when the dragon tells them to do something – but not under the other condition – when the monkey tells them to do something.

So those are examples of measures of effortful control or executive function, and here's the definition. Effortful control includes attention focusing, attention shifting, and inhibitory control. When we think about attention and focusing, it's about focusing or attending to the important information when there's distracting or irrelevant information surrounding it. For a child in a classroom, this might look like being

able to focus on a worksheet they're working on while the teacher's providing instruction on the side. Attention shifting is the ability to shift your attention away from distracting information to be able to stay focused or attend to the relevant information. An example of this might be when we send our children into their rooms to clean their bedrooms, and along with the shoes and the socks and the books and the clothes on the floor, there are toys that may be appealing to play with. Children have to shift their attention away from the toys and focus on the task at hand, which is picking up their room.

Inhibitory control refers to inhibiting the automatic or dominant response to be able to produce a non-dominant but preferred one. On a playground, this might look like when children are playing tag and the tagger tags the child a little too hard and accidentally knocks him over. The child who falls down might have the impulse to jump up and push back, but they would inhibit that response and produce a more preferred response like asking the person to be more careful.

So we use attention focusing and shifting and inhibitory control to monitor or modulate, to titrate our thoughts and emotions and behaviors to match the demands of a situation to be successful in a situation. And this isn't something we employ once or twice a day, but we do this moment by moment all day long. So inherently, you can see how that's important to just get through the day. But there's also research that shows that effortful control is important for other reasons. Research is showing that it's a protective factor; that when children are experiencing other risk factors, like economic risk, neighborhood risk, or family and parenting problems – that children who are higher in effortful control seem to be buffered from the effects of those risk factors.

So for example, from our research, the red line shows children who are low in effortful control have increasing levels of adjustment problems as they experience high levels of risk; and that's expected. But for children who are higher in effortful control, their exposure to risk does not impact the development of adjustment problems. They tend to have lower levels of adjustment problems that remain stable over time. That's the buffering effect.

Effortful control is also important because research shows it to be an important basis or foundation for a number of competencies and skills. It's related to academic readiness and competence. It predicts children's development of empathy and social competence. It's related to committed compliance and moral development. Committed compliance is when children follow a direction or a rule even when ostensibly there's no one there to make sure they're doing that. And it's related to the development of emotion regulation. Importantly, it's also related to lower emotional and behavioral problems. So when we look at this array of competencies and skills that effortful control is related to, we can see that it – it really forms a key foundation of children's well-being.

I'm going to focus on school readiness and competence for just a couple minutes, but I could spend just as much time on the other competencies as well. But what we see in school readiness studies and measures of academic competence – we see that pre-K verbal skills and numeracy skills are important for kindergarten readiness and gains made in kindergarten on academics. But effortful control represents learning readiness, not just content area readiness, so it tends to predict kindergarten gains

in multiple areas. And also, it predicts competencies in different academic areas all the way into grade school years. It's been shown to predict academic competence in addition to and over and above IQ and verbal skills, so it's an additional important variable to consider. And it partly accounts for the effects of low income on children's grade school achievements, meaning that children who are in low income settings tend to have lower effortful control; and studies show that that accounts for their lower grade school achievement to some extent.

It's also important to know that effortful control predicts academic achievement not just directly through learning readiness but also through other factors, like social-emotional competence, school liking and engagement, and positive teacher-child relationship. These are important factors further because they're also important in preventing school dropout and sustaining achievement over the school years. So, effortful control is important not only for school achievement, but for success in life.

A 30-year study by internationally renowned researcher Terrie Moffitt showed that children's preschool self-control, similar to their effortful control, was related to their achievements and their success as young adults. Children who had problems with self-control as preschoolers had more health problems, were more likely to have a criminal record, more likely to be living in poverty or be single parents when they were young adults. And in their research, three factors from childhood emerged as important to a person's success in life: the child's intelligence, their family's socioeconomic status, and the individual's self-control. And self-control predicted adult success even after accounting for these other factors.

When I look at this list of factors that predict adult success, self-control seems the one that we can impact the most in young children. So, I hope I've convinced you that effortful control is important. It's related to a wide range of indicators of children's adjustment and it serves as a protective factor for children experiencing other risk factors. So it's a critical task for – for us to understand the factors that contribute to the development of effortful control, particularly in children growing up in high-risk contexts. If we know the variables that predict the development of effortful control, these can be the targets of preventive or promotive interventions or programs for children in high-risk contexts.

I want to say a little bit about how effortful control develops typically, and then I'll talk a little bit about how it develops in children in poverty. We see initial individual differences in attention focusing and shifting as early as the second half of the first year of life. And up until about two, these individual differences seem to be temperamental or reflexive in the individual. Starting around two, though, children become more effortful in – in deploying their attention and inhibiting their behaviors. And at around two-and-a-half to three, we really begin to see developmental increases in effortful control. From three to five or six, we see a dramatic increase in effortful control, and then it continues to develop through the grade school and adolescent years into early adulthood.

For children growing up in low-income settings, we see an initial difference in effortful control as early as two-and-a-half to three years of age. It's a modest difference at that point, but it is significant. And then we can see that there's a diversion or derailment of the development of effortful control, that by

the time children are getting ready to enter school, there's a pretty notable difference or a moderate level difference in their levels of effortful control.

So, our research has been focused on trying to understand what contributes to this developmental derailment of effortful control in children growing up in low-income settings. And as I already showed you, this is the process or cascade model that we've been studying. We've been looking at this in a couple of samples of kids, starting at three years old and following children over time. And in both of our studies, families were socioeconomically diverse, representing the full range of income, with some overrepresentation of children in poverty and low income, but with also representation of families in upper income settings so that we could compare their development.

What we found is what we already knew, that low income is related to lower effortful control. And we're also not surprised by the fact that low income is related to more family adversity. What we showed was that low income and family adversity are related to lower levels of the parenting variables that promote effortful control. Maternal scaffolding, warmth, and limit setting are all shown to lead to increases in effortful control over time, and those are lower in low-income families. I just want to focus on these parenting variables for just a moment because I believe these are very similar parenting variables that research on teachers in classroom settings also highlight as important in the development of effortful control.

Warmth involves positive emotions towards children and engagement in parent-child interactions. Consistent limit setting is setting clear boundaries or rules and consistently and appropriately enforcing them without using harsh or critical discipline. And scaffolding, which seems to be one of the more important factors in promoting effortful control, we call "stepping in and stepping out." It's knowing when to step in and provide structure and guidance as the child needs it, and knowing when to step out and provide support for autonomy and independence. And again, I think research on teachers in classroom settings has also been showing this to be important in the development of effortful control.

The other pathway that we were interested in – in understanding the development of effortful control is through children's physiological stress responses. And we've been studying children's cortisol. Cortisol is an indicator of the hormone or neuroendocrine stress response system, and we can take a daily pattern of cortisol as an indication of regulation of the system. Research has shown that when individuals – adults and children – experience chronic strain or adversity, we see disruptions in the regulation of this system. And that's what we also saw in our research.

The green line shows a typical diurnal pattern in that cortisol is highest in the morning and declines steadily through the day, and lowest in the evenings. In our research, we also find a group of children with elevated levels of cortisol – the gray line. And it's a small number of kids, and it's not related to low income or family adversity in our study. This may reflect kids who are experiencing an acute stress or something that happened to them that day. But about 10 percent of the children in our – both of our samples show this blunted or flat, disrupted diurnal pattern, where they don't show the expected elevation in the morning. That blunted diurnal pattern is overrepresented among children in poverty.

Twenty-three percent of kids in our sample in poverty had the blunted diurnal pattern, where only six percent in poverty – in – not – of children not in poverty demonstrated that pattern. And that blunted diurnal pattern was related to significantly lower effortful control. So, it represents a plausible pathway through which adversity and low income are impacting the development of effortful control. Further, we examined its relation to parenting; and what we found was that the emotional aspects of parenting – parents' warmth and/or their negativity – were related to disruptions in diurnal cortisol, whereas the structuring and guidance, limit setting components of parenting were not. So, warmth leads to a lower likelihood of – of children having this disrupted diurnal cortisol pattern, but even more profound was the relation between negative affect and disrupted diurnal cortisol.

When parents were high in negativity and critical, harsh behaviors towards their children, children were more likely to show this disrupted diurnal cortisol pattern. And it seems to represent a unique or an independent pathway to influencing effortful control so that low income and high family adversity are relating to more negativity and critical, harsh parenting, which is leading to a disrupted diurnal cortisol pattern and predicting lower levels of effortful control.

So that represents our research looking at a family and parenting pathway to the development of effortful control, but there's a whole other line of research that's looking at the classroom context and teacher-child relationships and how curricula can impact the development of effortful control. That's not my area of research, so I don't want to spend a lot of time on that. There are other studies that have shown preschool-based, classroom-based programs that predict the development of effortful control. I want to talk about the findings of one study in particular. And because of the classroom that this was tested in, this is a really unique finding.

This is the dissertation of Shauna Tominey, who was being supervised by Megan – Megan McClellend at Oregon State University, and they developed a classroom-based intervention that builds attention focusing and inhibitory control through multi-sensory activities. What's really unique about this study is the classroom in which it was conducted. The classroom is a pre-K classroom that has – half the children in the class are children of the faculty and staff at Oregon State University and half the children are Head Start children. And so when we want to understand the effects of poverty or low income on kids, one of the things that are a challenge are holding the classroom quality or context constant. So, that's held constant in the study.

Children in the study were pulled out of the classroom to receive the intervention, so they were able to randomly assign some children to the intervention and some not. What you can see in the light blue dashed line is the developmental trajectory from fall to spring of the non-Head Start children who did not receive the intervention or the program. And we see here what I already showed you earlier – is that steep developmental increase during this developmental period of effortful control or executive function.

The solid blue line are the non-Head Start children who did receive the program or the intervention; and the program was very effective in promoting executive function or effortful control in these kids. This is a significant increase over the typical developmental trajectory. The yellow line are the Head Start control kids, the children who did not receive the intervention who are Head Start children. And you can see here also the trajectory I already showed you, where effortful control is developing less precipitously for these children. They're derailed or diverted in their development of effortful control.

The brown line are the Head Start children who did receive the program, and we can see that they did increase more in their effortful control over their Head Start peers. And this is a significant difference, but those children did not attain levels of effortful control that were equal to the more typical trajectory. So even though a classroom-based intervention did get the children halfway there – got them closer to the typical trajectory, it wasn't all the way there. And I'd like to think that that suggests that we need to think of more comprehensive programs that integrate both classroom-based and parent-based programs or family-based programs.

So, I want to take a couple minutes to talk about some implications for intervention and policy. Effortful control appears to be a really critical factor that underlies the development of children's social, emotional, and cognitive competencies. It's also related to lower mental health problems. Given that it's predicting such a wide range of indicators of children's well-being, it should be a key target of preschool-age programs, especially for children in high-risk settings. Developing this form of self-regulation or effortful control should be a key target of preschool-age development.

If we're going to promote effortful control, we need to think about supporting parents and families, as their contribution to the development of effortful control seems to be critical. Programs might target building parenting practices that are specific to promoting effortful control. There are many parenting programs that exist, but few target specifically scaffolding and building other skills in parents that might promote effortful control.

It also appears that early intervention is critical. Children are developing their effortful control during the preschool period. Although it develops later in childhood as well, this is a key period in its development, and it may be a key opportunity to facilitate the development of effortful control in young children. We may have our greatest impact on the development of effortful control by coordinating parenting and school-based programs. We – if we can get them halfway there with one or the other, we might be able to get children to a typical level of effortful control with coordinated programs. And it would be none too soon, as it's exactly at the time that they're entering school and really depending on these self-regulation skills.