Lesson 3 – SEEN

Full Transcript

Slide 1 - 00:02

Hello and welcome to lesson three of the SEEN Oxford Project. Today's lesson is going to be about brain development throughout life. A reminder that my name is Louise Auckland and I'm the lead researcher on this project and I'll be taking you through today's lesson. Alongside the lesson, you want to have a student instruction leaflet associated with lesson three and you may want to have that open and ready in case you need it. I will be playing the video clips in this lesson during this recording; however, you will have the clips within your information sheet so you can click on them and stop and start them as you like. There'll also be times in this where you may want to pause the lesson in order to be able to answer some questions on your information sheet for students. Okay so let's start, today's lesson. Today's lesson is on brain development throughout life.

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And our learning objectives today, there's three of them, we're going to be looking at the importance of early years for long-term health outcomes. So, we'll be looking at some of the evidence. We'll also be able to state when brain development is most sensitive to experience and in fact you may already be able to do that from the previous lessons, but we will be focusing on that particularly today. And finally, we'll like you to be able to describe what can be done to enhance resilience across the life course. So, that's throughout a lifetime.

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So, our first objective then. Thinking about early years as a foundation for long-term health outcomes and how do scientists know this. Well, scientists tend to undertake research and we gather evidence to support our claims.

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So, let's have a look at some of the evidence to support the idea that the early years are important for long-term health outcomes. And so the study I'm going to look at is the ABC longitudinal study. So, a longitudinal study - one which follows participants over a number of years or over a period of time with regular monitoring and regular measuring over that time period. And I've just picked out just one set of the data and you can ask your teachers they have a few more pieces of information there but I've just selected one piece and you'll see that the table says high blood pressure or the percentage of people with hypertension (hypertension means high blood pressure) and increased risk of heart attack or stroke. So, people that have high blood pressure tend to be at greater risk of heart attack or stroke. So, I'm sure that you can agree with me that that is going to be a long-term health measure or health outcome.

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So, we've got two sets of [data] in this experiment. They had a control set of people - so people that were being compared with the intervention. So, [the control group are] a similar set of people but who did not receive the intervention. And we've got males and females divided down the data is being presented here as two sets. And an overall total so you'll see that the percentage of the group that had high blood pressure for the control - the males was 44.4% the females 31.8%. And an overall total of 35.5%. And on the intervention the males only at 10.5%, the females 22.2% and the total 16.2%.

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Now we ought to really say what the intervention is in this experiment and when this was done. So, the measures that you can see here were actually taken at age 35. So, these people will have been followed all the way from birth up to age 35 and this here we're seeing the data point at age 35. So, what was the intervention? So, the intervention was a child care programme from eight weeks post birth until school. So, for the first eight weeks after they were born there was nothing. But then this intervention started and they received this intervention right the way up until they started school. And it included different forms of education, so some cognitive programs around thinking, some games - so lots of that playful learning we learned about last lesson, some one-to-one caregiver attention - so that's going to help with that serve and return that we looked at last lesson and the baby talk and some health care and nutrition information which you may recall was covered a little bit in the baby talk film that we looked at last week.

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So, you can see at the bottom of the page there, the source Cambell et al Science done in 2014. And you can always look that up now that you've got that reference if you're interested in the full study.

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So, I've asked you to consider three questions. One, what do the results tell you about the impact of early years on adult health? Two, what do you think is meant by longitudinal study? And three, what is a control? So, if you'd like to pause this video now and go to your student information sheet and have a go answering those three questions which are also written down there for you, together with the results so you can see them. So, pause this and go away and have a go at those questions before coming back to mark them.

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Okay, so welcome back let's have a look at marking these three questions.

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So, I've tried to keep it, I know there's a lot of text on the page, but we'll go through one at a time. We've got our results here in case we want to refer to them as we go through. So, question one said - What do the results tell you about the impact of early years on adult health? And well, individuals who have the intervention, so this is the bottom row here, were less likely to have high blood pressure and therefore had a lower risk of heart attack or stroke. So, it's always good to quote some of the figures that you can see in the table, so I've quoted here 16.2 compared to 35.5 at age 35, which is this total here. So, comparing those two pieces of data. So, the 16.2 is for the intervention group. I could have included that there and said intervention group compared to 35.5 in the control group.

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This effect was particularly strong in males, with 44% for the population at high risk of high blood, sorry it shouldn't say blood temperature should say blood pressure, compared to 10.5% for males who had the intervention. Okay, so that difference there I've given another example there for us.

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What do you think is meant by a longitudinal study? So, question two - so, a longitudinal study are participants who are followed over time with continuous or repeated measuring.

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And question three - what is a control? The control group is a group of similar participants who are not exposed to the intervention. They are compared to the intervention group to see if there is a difference resulting from the intervention. So, feel free to pause and correct your answers maybe in a different colour and typing to show improvement.

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Or listen on to hear a little bit more about the results of the ABC study. So, what do they show the results? Well, they show that early childhood interventions do indeed affect long-term health outcomes in adults and the evidence is particularly strong for men. So, for example men in the control group were four times more likely to have high blood pressure than the intervention group at age 35. And high blood pressure obviously increases the risk of cardiovascular diseases which is one of the biggest killers in the western world.

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Individuals in the control group had a higher risk of severe obesity at 36.7% than the intervention group which is 16.5%. We didn't have that on our data but it's one of the other pieces of data from the paper. And obesity increases the risk of other diseases such as diabetes, heart disease, stroke and some types of cancer. All diseases that can be influenced by lifestyle factors.

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And what were the conclusions for the researchers? Well, they decided that caregiver child relationships do not determine life's outcomes, but they play a major influence. So, one of the reasons we know that they are not the only factor is that those numbers weren't zero compared with a hundred percent. There are other things at play. However, they are a major influence. Change is always possible, but it gets much harder as the child gets older. So, remember they monitored these people from zero up to 35 which was the data point we looked at and they found that the changes get a lot harder as we get older and that other factors must also be important. As I mentioned there is variation in the numbers and not a hundred percent for the control and naught percent for the intervention. So, whilst those early years are important, we say they are not deterministic, they are not the only thing that affects health outcomes in the longer term.

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Okay, so for our main part of the activity for this lesson we're going to be looking at again another video and this is a slightly longer video called ‘Journey to Resilience’. And after this video we're going to be having a think about these four questions here and you've got them on your student instruction sheet as well that you can look at. I will play the video clip through this recording however if you prefer to just stop it and start it yourself you do have the link in your instruction material. And you'll be thinking about these questions as you go through. If your teacher is delivering it, you may well be having a more discussion based activity and it's to think about this longer term implications of the early years. We've been looking at the first five years of life but what does that mean for life after that?

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So, let's have a listen to our clip.

**Brains: Journey to Resilience** **Video**

Filmmaker:

Brains. They are everywhere, in the world's gentlest places and its harshest.

In this unforgiving environment, some brains exhibit troubling signs: addiction, illness, depression, social disorder. Yet others thrive. Why have some brains developed the ability to cope in harsh conditions while others struggle? It is one of nature's great secrets.

Scientist:

Ha, ha, hi. Hello? This is amazing, but I just need to clarify a few things. This great secret, it's actually science. Severe adversity isn't good for any brain, but it is true that some brains do better than others in the face of significant challenges.

Filmmaker:

Oh, a scientist. Yes, I agree.

... This is a great secret of science.

Scientist:

Great, yes, but not a secret. Let me explain.

Scientist:

We're born with brains, but our brains change as we grow. They develop based on experiences we have, and different brains respond to experiences in different ways. 'Kay, thanks. I'll let you get back to it.

Filmmaker:

Indeed. Some brains show robustidity and strongitude, while others

Scientist:

Sorry. Can I just? We scientists use the word resilience. Some brains are more resilient than others.

Filmmaker:

Yes, resilientsis.

Scientist:

Resilience.

Filmmaker:

Resilience, revenge of the cortex.

Scientist:

No. Resilience is a result of the interplay between genes and life experiences. It's a brain's ability to maintain good functioning under adversity.

Filmmaker:

Resilience makes us invincible.

Scientist:

Nothing makes us invincible. What resilience does is to give less leverage to negative factors in our lives and tip the balance in favour of positive outcomes.

Filmmaker:

Resilience, fate's legendary prize.

Scientist:

Whoa, no. Some people are born with more resilience than others, but resilience can also be built over time. It's a big project involving parents, caregivers, teachers..

Filmmaker:

Kith, kin, karaoke comrades.

Scientist:

Soccer coaches, counsellors.

Filmmaker:

Pastry chefs, associate producers, even millennials. Like a barn raising in times of old.

Scientist:

Yeah, yeah. In fact, we scientists believe strong brain architecture is the foundation for resilience, and, oh, look over there.

Filmmaker:

Oh yes. A young brain returns after months of isolation and adversity. No words can describe what this poor brain has suffered.

Scientist:

There are words that describe it. We scientists call it toxic stress.

Filmmaker:

Toxic stress lies in wait.

Scientist:

No, that's not, no ... Stress happens inside the body. It's the fight or flight system kicking in. But if stress hormones are elevated too high and for too long, it can have negative effects on the brain and body.

Filmmaker:

Stress, a nasty poison.

Scientist:

Not all stress, just toxic stress. With the right supports, we can make severe stress tolerable, which means it won't do lasting damage. Stress can even be positive because it helps us to learn problem solving and coping skills, which leads us back to resilience.

Filmmaker:

Alas, this brain is resilience-less.

Scientist:

No, it isn't. Let me explain.

Remember when I talked about giving less leverage to negative experiences and tipping the scale in a positive direction? Well, here's a little something I've been working on. It's a really amazing metaphor. Here it goes. I call it the resilience scale.

Filmmaker:

Resilience scales. Protective armour plates.

Scientist:

The resilience scale helps us understand why some brains are more resilient than others.

Filmmaker:

The resilience scale sends out invisible resilience rays that…

Scientist:

It's really just a scale, see? It's a beam being held up by a fulcrum.

Filmmaker:

Full of crumbs?

Scientist:

Jeez, no. A fulcrum. You know, like high school phys ... never mind.

Let me just clean this up. See, negative experiences add weight to one end of the beam, and positive factors add weight to the other end. Ideally, we want the scale to tip toward the positive side and lead towards positive life outcomes.

Filmmaker:

The brain's future literally hangs in the balance.

Scientist:

The position of the fulcrum can be understood as our original capacity for resilience. It's something like our genetic starting position. Remember the young brain that was struggling to survive? Look, it started life with the fulcrum off-center, giving more leverage to negative experiences, serious stuff like abuse, neglect, and chaotic environments. That means positive factors like responsive relationships, safe environments, and learning opportunities had less leverage. Over time, the negative load shifted the fulcrum even farther in a negative direction.

Filmmaker:

Tragedy. Doom.

Scientist:

Not at all. Right now, this brain is experiencing poor health, but with help, the scale can be tipped toward more positive outcomes. The first thing we can do is to stop negative experiences from stacking up. Then we can add more positive factors, loading up the positive side of the scale, and we're not done. We can work to shift the fulcrum in a way that favours positive outcomes.

Filmmaker:

The fulcrum, an amazing instant fix-it button.

Scientist:

No, it's a process. It involves many supportive people and plenty of time. Remember? This brain is still young, so adult brains can work with it to relieve toxic stress and teach coping skills. In early childhood, these efforts can push the fulcrum a considerable distance.

Filmmaker:

Childhood, filled with fascination and fulcrum flexibility.

Scientist:

Sort of, but there are other sensitive developmental periods that are windows of opportunity, like adolescence, and even if this brain doesn't get help until adulthood, change is still possible. It will take more support and the change will be less dramatic, but any fulcrum can be moved to make positive outcomes more achievable.

Filmmaker:

The bad experiences disappear.

Scientist:

I'm afraid not. It's hard to undo the effects of past negative experiences and it takes time, but we can eventually relieve the burden of those negative experiences. Our little brain can get the help it needs to adapt, recover, and enjoy good health and wellness.

Filmmaker:

07:10 And everyone everywhere can become more resilient for eternity.

Scientist:

Why not? With the right support, everyone everywhere can become more resilient.

Filmmaker:

I'm so glad I saved humanity. It's been a majestic experience.

Scientist:

Yeah, me too. Well done.

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Okay so that video is slightly longer and a reminder that you've got that clip on your student instruction sheet so you can, you can watch it you can go through and stop and start it as you like in order to try and answer these questions. So, what factors affect brain development? What is meant by stress or toxic stress in the sense of brain development? What is meant by resilience? What can we do to help to build resilience? And when are the brains two main periods of sensitivity to experience? So, four questions there. Pause this film and go and see if you can try and answer those questions. Watch any bits of the video again that you need to and when you're ready come back and press play again and we'll look at some answers.

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Okay, so let's go through those questions then. So, the first one - genes and life experiences individuals have both affect brain development, it's important people in someone's life for

instance, and strong brain architecture. So, those are all things that are going to affect brain development.

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And question two, so this was, I’ve got to remind myself - what is meant by toxic stress? So, when the fight or flight system kicks in and the stress hormones like cortisol are too high for too long. Okay so that idea that really stress has been around a bit too long and this is toxic if it has a negative effect on the development of the brain and body. Because so often stress actually can be either useful or very temporary and therefore not have too long-term effect on the body. So, it only becomes toxic when it's longer term.

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And so, our third question - what is meant by resilience and what can we do to help build resilience?

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So here we've got the resilience is the brain's ability to maintain good functioning in the face of serious adversity. You may have come across a broader use of the term resilience, maybe in PSHE or character type education, so specifically here we're talking about the brain's ability to maintain good functioning in the face of serious adversity. So specifically, about the brain. It tips the balance towards positive outcomes we've got the scale here that they went on about on the video. They talked about the idea that we've got positive supports at one end and negative experiences at the other and this fulcrum or this pivot point in the middle. And saying that some are born with more resilience than others. So, at birth we all have differences as we know, but it can also be built and changed over time.

So, to build help build resilience we increase the number of positive experiences on the right over here in life. And that can be done through responsive relationships, that doesn't necessarily have to be the parents, it can be other caregivers, other adults that people might have come across. Some of the examples they gave, there were things like sports clubs and so on and safe environments.

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So, we can also try to prevent negative experiences from increasing. So, whilst those might not go away there's a lot that can be done to shift this over into the positive and to build resilience.

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And the final question there - when are the brains two main periods of sensitivity to experience? So, remember this is our neuroplasticity coming back in here. The two periods when our brain is most neuroplastic i.e., it's most responsive to the environment and going to change its structure or the way in which it's developing.

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So, our two periods there are early childhood that we learned about in lesson one and two, the nought to five years but also adolescence, so 11 to 24. So, that's the period that you guys will be in at the moment or just starting it is a very neuroplastic time period when a lot of changes will be taking place in the brain and therefore the environment in which you find yourself is very important also. So, a lot can be done in this period.

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Okay and so that brings us really very close to the end of our three lessons and what we've got here is just that discussion again about neuroplasticity there. This idea that this very early period that we looked at in the first two lessons is when the brain's ability to change is very high and the amount of effort that such change requires or funding or amount of time and so on is very low, so this is where the difference between the two lines is where the benefit is greatest. So, the interventions that we do in the first few years can make the biggest difference, however you look at the period that you're all in at the moment, so students of your age are here there's still a lot of changes that can be made so the brain's ability to change is still quite great and the amount of effort is still not too much effort is needed. Whereas if we wait until adulthood those changes require a lot more effort to do so and actually our brain's ability to change is much lower. Which is why um asking me to learn Japanese tomorrow, I may well struggle compared with you, with your much more plastic brains. Okay, so that's the idea behind those curves there.

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And that does bring us to the end of our three lessons and what we'd like to do now is to revisit a quiz about what you've learned over these three lessons and but also ask you to evaluate the three lessons. So, as I mentioned at the start very start of this, this project is brand new and you'll be the first students to be receiving these lessons, so we'd love to hear back from you what you think of them. What you think about the resources, what you think about the activities you're doing and whether you think this topic is important going forward. So, we're asking for your honest feedback in order to be able to change the resources and adapt them for schools going forwards. And then also making recommendations on whether this topic ought to be taught in schools. So, two things there. Now you've got this link in your student information pack, so you can click on it there. And we ask that you complete that as soon as you can, so ideally straight away now and that recall and give us as much feedback as you can on the evaluation that you're happy to do so that we can make changes going forwards. And all it remains for me to say is thank you very much, I hope you've enjoyed these three lessons and we look forward to seeing the results of what you thought. Thank you very much and goodbye.

24:59

I'll stop my share and pause the recording.