

Selected Topics in Psychology
Neuropsychology
Prof. Vivek Benegal
Department of Humanities and Social Sciences
Indian Institute of Technology, Kanpur

Lecture - 29

Who is at Risk and Why? The Neurogenetics of Vulnerability to Addiction

Professor: Any questions?

Student: Ok sir, I have one question. You spoke about high-risk growth especially when we were talking about children having smaller brains, did you include children with fetal alcohol syndrome?

Professor: No, because like I explained to you will careful to include people whose brains had not been altered, who may have been altered by the substance use. The issue is as you have you probably would have realized that the problem exists long before these children have touched have the first drop of the alcohol touching their tongue or had their first smoke. The alcohol with the drugs in a way are their self medication of their own problem, because the social systems are failing them or failing to recognize it.

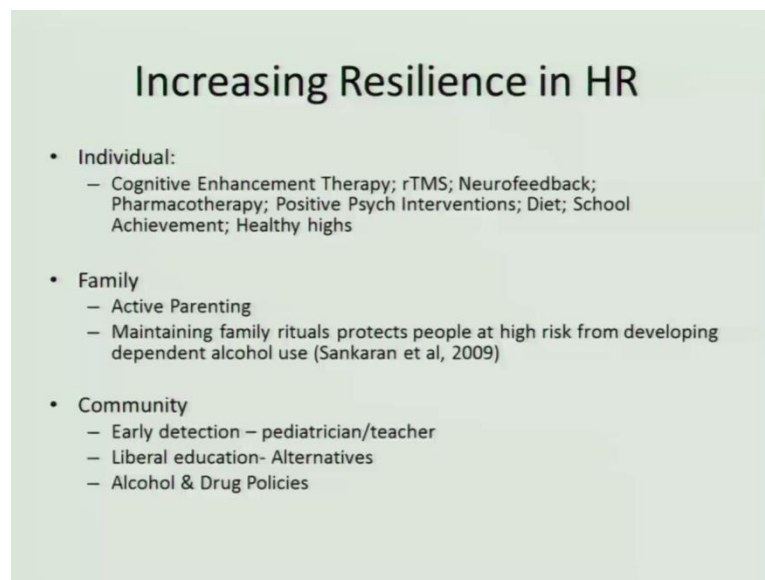
Student: I have one more question you spoke about children or individuals who have show propensity towards externalising behaviours more prone to getting getting addicted isn't it that individuals who are introverted on the other side of the spectrum, they are equally at risk, because socially they kind of are isolated and hence more prone to these alcohol.

Professor: That was what was believed earlier, and yes I mean people who are introverted who have difficulty in coping with who are coping strategies do use alcohol and drugs to deal with it. But I am dealing with a particular condition called addiction; and here more than the introversion we find the externalizing to be a risk factor. To be honest that the introverted people that we do find have externalizing traits, which is people who have more of, see externalizing does not necessarily meaning impulsive, I am going to do beat you up etcetera. Externalizing also means difficulty in sustaining interest in a difficulty allocating interest. Sometimes what happens is that I get so disturb, because whatever I do, nothing is happening. I know, I am good, but whatever I do, I cannot reach my goals. You know people who are half is good is mean I just going

past we are achieving their goals, I am left here like a fool on the hill and then you try you withdraw, you do not want to talk to people, you become more depressed. So, what we are again finding is that this whole thing of internalizing externalizing often is not such a rigid boundary as we used to think when I started my career.

Student: Like you said it is not a problem with ((Refer Time: 03:20)) it is a problem with the social system. So, what is that can be done like...

(Refer Slide Time: 03:35)



Increasing Resilience in HR

- Individual:
 - Cognitive Enhancement Therapy; rTMS; Neurofeedback; Pharmacotherapy; Positive Psych Interventions; Diet; School Achievement; Healthy highs
- Family
 - Active Parenting
 - Maintaining family rituals protects people at high risk from developing dependent alcohol use (Sankaran et al, 2009)
- Community
 - Early detection – pediatrician/teacher
 - Liberal education- Alternatives
 - Alcohol & Drug Policies

Professor: As in fact, this is something that I have, was on my list of slides one of the things we are we are focusing on is increasing resilience in high-risk children. How do you do that, you that at an individual level that you enhance their cognitive abilities. If I am not able to sustain interest, teach me how to sustain interest. If I am not able to sit at a place and study for two hours teach me, how to chunk or break my study thing into half an hour, half an hour, half an hour. Teach me how to use my brain you know there is a lot of data on how to use, how the brain learns and knowledge of how the brain learns to learn.

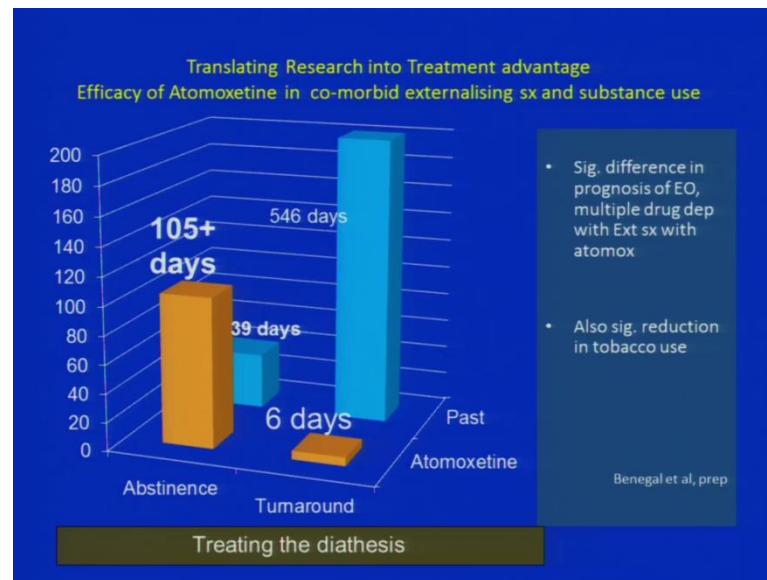
For example do you know that the old style of learning, you know walking around while is a very good way of learning because as your body moves parts of your brain which are responsible for coding information, hard coding information also works better. So, these are some other things that we trying teach them. For example, we we are using neuro feed back getting these young people to produce the right kind of brain as you saw

actually I did not present the data here. We have more of the faster brain waves, the beta brain waves, the fast beta brain waves they are not able to produce this lower more relax brain waves. So, we use bio feedback to get them to produce, for example, we get them to play again, where if only if they produce their alpha waves that is the if they get their brains to relax can they make a ball stand on a fountain, if not ball falls down.

It has other applications as well, because I am sure you would have read things where you can use your brain waves to fly a plane and to target missiles, but we are not we do not want to do that we want to teach kids to get more control over the brain. We are teaching children how to achieve healthy highs. You know I personally do not believe in any human being can live without a high, but there are harmful highs and there are healthy highs you know I will teach this children to have healthy highs then we are trying to do at it family levels to do active parenting. You know there are three kinds of parenting, there is an aggressive parenting, where you just beat up the kid and get the kid to do whatever you want. Then there is passive parenting, say at here whatever you want you do both worse in this situation. Active parenting is where you are involved, what you also let the child be part of the decision making.

Then we found for example, there is another study that we found maintaining family rituals. For example, I just put it as an example you know families where there are you know the family meets at the dinner table, everyday, where the family is not one person eating dinner at the TV, another person is eating dinner somewhere else; you know the families which go out for shopping. For example, at this moment to the market together, these have been found to be protective increase resilience especially in this particular group. Then of course, there is the community level interventions which are effective.

(Refer Slide Time: 07:04)



And what we been also working on is we been working on certain medicines which are given to people with a d h t m e found that these medicines also help in preventing or at least reducing the impact of drug using these children. So, it is not one answer, its a number a number of answers and I would not pretend that I know the answers because this is something that has just happened we are where in the process of discovery I am just sharing to you some other of the things we discovered in the last ten years. So, I would not be arrogant enough to say I know the answers, but I feel that something is work, even working on things like diet where the evidence is very poor.

For example, using omega fatty acids in diet, somebody said if you get them to play table tennis or any game like that where they have to concentrate on that works, got that I do not know. But the biggest thing is the understanding that there are people who are at higher risk, they are at higher risk because this, this, this, this. And there are we need to find out ways and you know I am glad of speaking to you guys because there are design solutions these are engineering solutions, these are pharmacological solutions. It would not come from one particular group it has to come through a dialogue of different people working on it, because this is a big, big problem, this is a huge problem.

Student: Sir, as you mentioned that in children regarding who have the high risks. So, it is not necessary that they are like in addiction of alcohol and all these things but, they might like...

Professor: All kinds of high risk

Student: Ok so if you talked about the education system (()) in a there should be something like different classes or something like (()).

Professor: Yeah, see because that has been worked know, that is not been useful because you are segregating them; you are saying you are abnormal go and sit, he is a not abnormal children, these are highly intelligent children. So, you need to integrate them and give them different solutions. One of the solutions is cut down the number of people in a class, where the teacher can you know look at more individual solutions that is not going to happen in a hurry in India, but that is where a lot of these schools are going that you have more teachers to the student ratio. Because once you do that you find the children do much better, they do very very well. For example, in one of the things that I have been discussing with in schools is instead of just giving theory [FL], give it as a project.

You know people go find out or you are doing something in social studies about parliament, you go to your local self-government, you go find out the children are given assignments which lot of you must have done when you are in school. We did not do it, we just had to read and memorize. What we do find is giving projects and I am sure right now in your postgraduate education, you are doing projects and you are learning much better because of that. So which brings us this whole new set of thing which is called brain based education, and that is very very important because again we are learning, but those are things which need to come back to the class room as fast as possible.

Student: (()) Sir, the brain is wide differently (()), so such interventions how to it is affect the wiring (()).

Professor: It is not the wiring which is affected, it is the actually the insulation of the wiring which is affected is delayed. You see that wire there, there is an insulation. You see in electrical other, inside is copper wire know copper wire whatever metal. Now, similarly here in the brain we have normal wiring on top of that there is a coating. When the brain matures, the part of the brain where the design is complete. Suppose you know when what happens, when I grow up and I start learning, how to walk, the brain is kept fluid so that I can learn to walk. When I am born, I do not know how to walk unlike elephant or a giraffe, when they come out, they know whatever they will know for the

rest of their lives. So, their brains are complete for human beings, we can be in anything we can be in the [FL] we can be... So, we have to our brains have to be absolutely flexible, it is kept flexible, so that you can learn and once you learnt, whatever you need to learn then the brains is lets close the design, shut the design that is what you do in your design process. That you work, work, work, keep it open and then you say done, lets shut the design and the brains shutting the design is by coating it. No more is going to happen here right and at different ages, a different stages, different parts of the brain gets shut. One part you learn how to move the motor movements another part you learn how to move the motor movements, another part you learn how to make judgements another part you learn how to distinguish right from wrong, and these happen at different different stages, these are delayed.

So, what happens is its almost as the as if the brain in these kids is saying time is not right, it is too much going on time is not right to close the design, keep it open. But it is a time window, if that time window there are effective time windows in which you should learn things. If you do not learn how to sing by that time you are six, seven, eight you know it will be you can still learner at thirty five, but it will be very very difficult. You have not learnt third language by the time you are ten, you are not going to do it that is what happens in this kids, it gets delayed.

Student: (()) early stage how this actually (()).

Professor: That I told you these are the kids who are you know pulling things, who are not able to sit in one place, who are you know probably learning the nursery rhymes two minutes, when the other kids have learnt it at a take twenty minutes to learn. These are the kids, there is no difficulty in learning, you know in in distinguishing there is usually a slide that I showed to a school teachers. I do not know whether you seen have you read this book wind in the willows by this tiger and way [FL] you see way pooh you seen the figure of tiger there, the tiger, all the time jumping getting into that is it.

I just have to show the picture to those teachers that child that child it comes out. So, it is not difficult, because these are kids you know these are kids, I know these are kids we are some of us have been. And also continue to be as adults because this continues in adult hood because as I said the solution is not just recognizing. The solution is putting in interventions and the interventions are from different fields.

Student: Generally when we see kids who are addicted to as alcohol and (()) in country India like, people consider it like it is very wrong activity, so how to create the awareness to people see this is the reason, this is not a I mean...

Professor: Yeah, one is you need to talk, you need to talk you need to I told you something you need to go out and tell somebody that we all need to talk, we all need to create this awareness. And of course, hopefully more and more of this evidence will come, and more and more people will know. Like I said the best way is tell other young people, the old people like us are not going to learn anything new. So, target the young people that is where change has to happen that is where change will come. And this is lot of information, they are coming out.

For example, the other day, I was reading this story about in Kenya, they did this wonderful study. They looked at a at a thrive who about a hundred years back half the thrive there were hunter-gatherers. Hunting in the [FL] half the tripe came and settled down in villages and all that started doing agriculture. And then they found that the same group of people that I was talking to you about in the hunter gatherer society where the heroes because three would find out where the antilog, where they would find out where the best gracing you know fields war, there were the heroes same guys you know with the same genes.

In the Agradian society, they were the zeros, they were feeling, they were getting in to trouble, they were getting drunken disorderly beating people up you know. So, in a way its fascinating that the same drink in different social circumstances you know flowers as a different flower the same seed you know. So, who is wrong, is the seed wrong or the environment wrong. You know in the morning I met a group of people who are studying about adjustment, and all of us have to adjust to our circumstances. Sometimes the circumstances are like that they throttle you, but you still have to learn adjust how to them well, but there are some people who adjust better some people, who do not adjust better. And up till now we have said what to do people who do not adjust will just sink and die or go to prison.

The time has come to change this, and say that our worlds are going to get even more complicated are going to get even more frustrating and suffocating. So, our more and more of you young people going to just suffocate and die is that right? Should not be

recognize that most people have lots of talent and that flower, and whatever circumstances human beings I mean your next generation will be living in mars. So, how will you guys adjust, how will they adjust. So, what we hope is that you will use this information to bring about changes in human societies.

Student: Sir, but even we are aware of something, (()), he knows that is bad, he is trying to get predominated, it is three years like (()) he is like participating in horse riding (()), but still he is not able to do that, completely get rid of them.

Professor: Just ask him who he does horse riding and Bungi jumping does he still drink and smoke?

Student: No

Professor: See that is the whole thing, see yourself have brought up the solution.

Student: There he gets the urge to smoke.

Professor: Fine I mean, see if you stop treating it as a moral problem, bad, you use the word bad. What is bad, why is it bad health, health wise it is not good, but that is not the way, we look at it. The way we deal with it is bad, bad boy do not come near, go that does not help that does not help him, because as you probably would have realized that he is a very bright better than average person.

Student: (())

Professor: So, next time you go realise that he is using it to control him you know whatever to normalize his functioning. And if he is given great good enough challenges, he would not need that. It is not automatically you are going he is got to use to it. So, he will have to find high which you know takes care of it. He also have to deal with it, there are ways and means to deal with it, but if he does not have an alternative, and he only has if he come keep coming back to this. But as you rightly said when he goes horse riding he does not do it. When he is out saving the world he does not do it is not it. (()) did not need ganja he had apple to take care of

So, in a way, it is about finding that project that great dream on the hill, which all of us have to do. All of us you know because in an certain you guys have reached IIT, you

cannot be you know dumb fools and to a great extent, you will also be those who have little bit of this. Because you also have you know, you reached here because you have some level of genius when the other side of genius is this is restlessness sit there get bored easily. So, you also carry great dangers on your shoulders, I do not mean you personally, but all of you, because none of you have reached this place without being slightly abnormal. I mean it in a good sense.

Student: Sir that children who are (()) what is the best way to identify this children.

Professor: Yeah good question, very good question first answer to that is I do not know because there are tests so people fall very clearly on this side of the bell curve. But these case, if we are talking about a lot them are do not are not diagnosable disorders you know. I strongly suspect that I had a d h t as a as a child not a d h t diagnosable, but as my friends will tell me [FL], why you all the time moving around. I find it difficult to stop my second thought coming before my first thought finished. I would never had I was a the quintessential good boy. I would never have satisfied criteria for attention deficit hyperactivity disorder, but throughout my life I have seen that there are ways you know half way through a project, the second project would have entered my mind you know and it is been difficult.

So, it is not your right it is I do not know the answer to that is I do not know how does one catch hold off see. I think that the message should go out is that this is not a problem this is actually latent genius then we will catch catch it more. If we send out the message that this is not a problem, but this is something to encourage the other part of the coin then we will probably get the message through then mothers will say [FL] this is something look forward. So, we will give more positive influences and positive influences will help the children who needed help the children who do not need it.

Student: (()) stimulation then they each children are equally susceptible to other (())

Professor: Exactly.

Student: So, what is the specific?

Professor: No, no nothing. You asked a very good question nothing. You know tomorrow I am going to talk about behavioural addictions which include things like work

holism. There are seven of the IT billionaires in this country who I think had fall in to this category none of them touches I mean none other have problem with drug and alcohol, but they have problems in their work place. They are riding rough showdown work people, they do not come home to eat dinner, they are least bothered about what their children are doing is so concentrated in the work, but they have created major resources for this country.

So, there is no black and white dimension, you are absolutely right this is not just about drug and alcohol. I got involved in it because I work in this area and my research took me from this area. So, what you know talking to you about is research from this particular area, but what we are realizing now is it is not just about this particular group, it is about a huge proportion of humanity. It is generally what I told you was not about alcohol, what I told you was the story of how brains work and sometimes work in different ways. Now the just saying please let us out.

Professor 2: Can I ask?

Professor: Sure please

Student: If you know somebody is vulnerable to sustain from a policy point of view, should the quantum of punishment not be different for a.

Professor: Yes this is the soul.

Professor 2: Right now we did not never think so, but this should not come into picture.

Professor: Yeah that is a much more difficult question the question that is being answered today and you know in the courts of India in this whole review that happened about the juvenile justice thing is whether children who are seventeen years old should get because of the crime that they have committed is so serious. Whether they should be judges adults that is a bigger question to my mind. And as a neurobiologist, I find it difficult to say that a seventeen year old brain whatever the crime should be judged as a thirty five year old brain. Because a seventeen year old brain is still trainable, you know a seventeen year old brain is still plastic, it can be moulded. The thirty five year old brain is not. So, if you see a thirty year brain is becomes such a bad criminal that you cannot do anything other than you know put even jail for life, do not agree, but still

understandable. But if you tell me seventeen old is without help and the brain cannot change any longer treat him like the thirty five year old and put him in jail for life, I do not agree, I do not agree you know. This is bigger question which is now being entertained in the courts of the US is whether people with this kind of a you know brain dimension required to be seen differently that is a bigger question and then the courts in the US assigned that they are as culpable as people who do not have this issue.

It is difficult ethical question, but as far as you know criminality of a seventeen year old brain and the thirty five year old brain, I am firmly on the side of the seventeen year old. It is a very very difficult ethical question after this Delhi incident is is a very topical question.