

Web-Based Radio Show

A COMPREHENSIVE APPROACH TO ADHD

Physical Environments

Stanley I. Greenspan, M.D.


April 18, 2008

Welcome. Thank you for joining us. Today we are going to complete our series on children with attention deficit disorders or attentional problems, and our discussion of a comprehensive developmentally based approach to helping children and families to help a child learn to pay attention, and hopefully often without a pill; without having to use medication. This is certainly a program that we would want to use for at least six months and see what kind of progress we make before even considering medication, but I have found in my own practice that most – a vast majority of children – can improve when we identify the underlying causes.

We have talked about a number of underlying reasons why children have difficulty with attention, ranging from being under or over reactive to sensations, to having trouble with sequencing, planning actions, to their level of thinking or their language or their ability to comprehend what they see. We have talked about the family environment and the role of emotions and thinking.

Today we are going to focus on probably what is perhaps the most controversial aspect of attention but also learning in general with children, and this is the role of the physical environment. Does the physical environment have a real important influence, and are some children more sensitive than others?

Here, before getting into some specifics, let me share some general principles related to the general controversies. The big controversy was, does sugar make children inattentive. There were some studies suggesting they don't make them more inattentive or more active and then other studies published in respectable journals like *Lancet* in England suggesting that it does and can. There is a little known study, for example, showing that glucose or sugar when it is metabolized, stirs epinephrine in the body, or adrenaline as it is more commonly known, and that certainly gives us an energy boost.




The question then becomes, does that create more inattentiveness or increase the activity? Now for some kids it probably wouldn't, but for other children, it might. This gets at the critical issue. In research, when we have competing or controversial results looking at an issue as simple as does sugar or glucose have an effect on attention, we have to consider the issue of subgroups. In other words, when you look at a large population or even look at a smaller group of 30 or 40 children, you're often mixing children with different profiles. They may share a common problem like attention or activity level, but they may each have, based on our prior discussions, in terms of whether they are sensory over reactive – does sound make them feel like it is too loud – or they often feel it is too soft instead and are under reactive – are they craving sensation all the time. Are they strong with language or weak with language? What is their emotional maturity like?

So depending on these other variables, you might have subgroups, for example, with one group of children with a low threshold for excitement, a little bit of extra adrenaline in their system might cause them to be quite inattentive and quite active. But then there might be another group of children with a high threshold for excitement and containment and might just give them a pleasant boost of energy that they enjoy and actually helps them focus and attend even better. Just like a couple cups of coffee will cause one adult to be jittery and for another it gets their day going and they are more organized and focused and more competent in what they do. Well these are just different responses to the same coffee – a little bit of caffeine. Same thing with wine – two or three glasses of a fine red wine with dinner with some people gets them nice and relaxed and organized and social and others it can get them a little tipsy and they begin stumbling or slurring their words because they are very sensitive to the affects of alcohol. For others it may have no affect at all until they have their 10th drink.

So we have a lot of individual differences in the way people respond. That is because everybody's nervous system is very, very different. The research, when it is not consistent, is often because we haven't looked at subgroups. Often we haven't looked at subgroups because we haven't known how to divide up the groups.

Now in this series of talks that we have had, we are providing a way of dividing up groups of children based on their underlying capacities for planning and sequencing for what we call modulating sensations; for comprehending what they hear or what they see. So we can divide up the profiles of children and look at different profiles and look at how children with different profiles respond to their physical environment. I think it is critical if we are going to move ahead and remove the controversies, as a general principle, that is why I said before we would talk about some general principles related to the controversies, is to do future research that looks at subgroups in clinically meaningful



ways based on children's developmental profiles and patterns – not treat all children with a common problem who meet criteria on some questionnaire or some observational scale or even some testing as the same. I think until we do that, we won't know what the results of existing studies mean. Unfortunately, most existing studies have not done that. We are still in the dark ages when it comes to many of these questions.


Same questions, I should add as a side note, has to do with the response to medication. For some kids, stimulant medications actually make them worse; for other children it seems to help them organize and focus but sometimes produces emotional flexibility or creativity. Again, these are different profiles; different types of children. The ways I described children in earlier talks are ways of looking at that question too if we want to study it more effectively.

So as we move ahead in the discussion today, what are the aspects of the physical environment that we need to take into account, we need to, again, underscore that we need to look at subgroups. But in the meantime, until that research is done, which could be years if not decades in the future, each family will need to look at their child as a distinct and unique child. He or she is the “n” of one; the “n” meaning the number of subjects in the research. So the key is to look at how your child, or a particular child responds if you are a clinician, to their physical environment. Start at the working assumption, well I have never heard of a case where a child responds this way to a noisy environment or a bright, highly lit environment or an environment with dull lighting or an environment that has a lot of visual stimulation in it; instead you ask the question, “How does this child respond to that aspect of the physical environment?”

So here are some aspects of the physical environment that we need to focus on and we need to take into account.

1. First, when you are looking at the physical environment, look inside the body and make sure the youngster is healthy physically – things like thyroid functioning, hypo thyroidism can certainly produce low energy and inattentiveness, and hyper thyroidism can certainly produce a lot of activity and distractibility. So have a good pediatric evaluation. Anemia can cause low energy levels and certainly sluggishness and inattentiveness. So overall nutrition and health status and having a recent pediatric examination evaluation is very important to rule out any physical basis for the child's difficulty with attentiveness that can be corrected through proper medical treatment and management.

2. Look at overall nutritional status. Does the child have a reasonably healthy diet with a balance of proteins and carbohydrates and vegetables and fruits? Many




children obviously don't. Is this child getting proper vitamins and minerals in their diet or in supplements?

So those are two pretty obvious issues and the reason why it is important for good general nutrition is because the child who is going to be hungry all the time or the child who is only eating carbohydrates and no proteins – that can create a physiological challenge for the child that will certainly contribute to the child's behavior.

3. Here is where we get into the more controversial issues which some folks, my colleagues thought there was enough research but I hold that until we do it on subgroups, we just don't know the answers to many of these, here is where we get into some of the more controversial areas. I won't take sides on these issues except to say that they need to be looked at vis-à-vis your child. So you start off being a good detective, looking for patterns. When your child is, after a birthday party, where they are ingesting all kinds of sweets and sugary things, how do they behave? When they are in a very stimulating environment with a lot of noise and a lot of visual stimulation, how do they behave? When they are in a very dull environment with not much going on, how do they behave? So be a good detective. Notice patterns. That is your first step. That gives you clues as to things you may want to investigate more closely. Here are some common areas that I think are worthy of investigation.

The first one, as I mentioned it as an example, will be a common one, which is the amount of sugar or processed carbohydrates in the child's diet. Processed carbohydrates, like white rice as opposed to brown rice, converts quickly to glucose or sugar in the body, as is fruit juices rather than the chewy fruits which take a little longer. Vegetables take even longer. So things that convert very quickly create a very quick glucose load for the body which some children may handle very easily but children with a low threshold may not handle so easily. It also may stimulate some adrenaline which may stimulate some increased activity or an inattentiveness in, perhaps, some children. Again, that is worth looking at in terms of a pattern for little child A or little child B, Harry or Sally – Harry may not show any reaction to it and Sally may. So you have to look at it vis-à-vis each individual child.

The next area is the area of additives, preservatives, food colorings, and dyes. Again this is very controversial. Some people feel these contribute, some feel they don't. Here too, I see a lot of individual variation. For some children, red dye #X and the child is wild as soon as they ingest something with it. Some adults have that problem also. For some other children, red dye #X has no effect on them at all. It doesn't just happen to the child who is prone to being active, it may have to do with a particular sensitivity. It may




not be a “food allergy” in the conventional sense of allergies. It may be a sensitivity, just like some individuals are sensitive to coffee or sensitive to wine, etc.

So here too, you have to look not just at the load of artificial substances – chemicals in the diet – but you have to look at, in particular, what may affect your child. So additives, preservatives, food colorings, and dyes and anything that is not natural to the substance itself, as well as particular foods; for some children, corn or eggs or dairy products or gluten products like wheat could be a culprit or problem. So you have to look for particular food groups as well as artificial substances. There are more and more artificial substances in foods including antibiotics, for example, to keep bacteria out of chickens. There are hormones to create more meat on animals. So any of these things can be a problem. You can compare how a child does on organic foods versus non organic foods, for example and see if that makes a difference in the child’s behavior.

When you are looking at these things, a useful way of doing your detective work is doing on-off-on-off; two weeks where you have the child free of that substance, and then two weeks where you don’t have the child free of that particular substance, and you see if there is a difference. You have your own 1-10 scale on what you are interested in – the child’s cooperativeness, inability to follow directions, inability to focus and attend and stay calm during that period of time, assuming the family circumstances and the emotional triggers are the same – you are not going through a particularly rough time at home or the child is not having a particularly difficult time at school.

Also, when we are talking about things the child is ingesting, it is also very important to also rule out, and this part of the general pediatric evaluation I mentioned earlier, things like lead and lead levels and other toxic metals that can be injurious to the child’s overall health as well as affect attention and the way the child focuses and the way the child is able to maintain a state of calm regulation, even in the face of lots of over stimulation. So that should always be checked out as part of the general pediatric evaluation and it usually is.

In addition to the chemicals, the third aspect of the physical environment is not things that the child is eating but things that the child may be smelling because what is in the atmosphere or in the air also affects the child. It gets into the lungs and then gets into the bloodstream and gets metabolized. So cleaning products, for example, soaps, toothpastes, well toothpastes you would take in the same way as food but you might think of it the same way you think about cleaning products; pesticides, rugs, mattresses with fire retardants in them – so a new carpet where a child is playing down on the floor that has recently been prepared will have all kinds of chemicals. If you just cleaned a carpet or just had your wood floors redone, if you get down really low, you’ll smell it. Lots of




adults will get headaches and a lot of children will get more active if rooms of the house have just been painted. It can take a couple months to air out. Oil based paints take the longest and latex takes a shorter amount of time. There are special paints now that are nontoxic that air out in a day or two and don't have any of the toxic substances in them that the oil based or even latex paints do so it won't have any negative effects on the nervous system.

Now all of these are the kinds of things that are controversial because they don't cause problems for all children. Some children will handle them better than adults; some adults will get headaches when they paint their house or put in new carpeting "indoor pollution" but other adults may not have any reaction and some kids won't have any reaction but some kids will have a super reaction. They may get lethargic, sort of depressed looking and inattentive or they might get hyper and impulsive and distractible that way. Schools also may have just done some construction and the materials may have a lot of toxic substances in them as well. Same thing with pesticides because children will play in the grass, and again there are alternatives to the ones that have toxic substances in them. So there is no question that things like pesticides have toxic substances in them because they are there to kill the bugs and pests around the house, as well as different things you might use to kill weeds also have toxic substances, and it is a question of the dose level. Remember, children are going to be playing in them and be closer to them and they have a smaller body in which to absorb it, but it tends to get into the fat tissue and stay there for sometime. Then it is in the body for awhile.

Now we will turn our attention to the other aspects of the environment – the physical environment: the noise level, the lighting level, or the types of lights. So a child who has been very sweet, attentive, focused, and regulated goes to preschool which is a noisy large class with a lot of activity, a lot of visual stimulation, and a lot of auditory, and this is a child who is sensory over reactive. All of a sudden the child is overly active and very, very distractible. Mom and Dad are getting different reports than they have ever heard before. Usually when little Johnny went over to a friend's house and played it was always, "Oh, you have the sweetest little angel in the world!" and now it's "He's a hellion on wheels – why aren't you being a better Mommy or Daddy to teach him respect?" It may be a reaction to the physical environment – the noise level, the lighting level, the way children bump into each other.

So you have to look at the actual physical environment. The child's classroom might be near the boiler room where the child hears a low rumbling noise and the child may be very sensitive to those kinds of low pitched noises. Or the child may be near an environment that has a high frequency or high pitched noises or the teacher may have a high tone of voice. So these are things that need to be looked at.



What you wash the children's clothes in is another area. There is a very good website called <http://healthychild.org/> an organization that looks at factors that affect children's physical environments and how they affect health because it is not just attention but can be proneness to illness including malignancy that are involved. They have very good information on how to look at the physical environment.

So the key point is when considering attentional problems, to look at the physical environment systematically. Stay up-to-date on new findings. But the key is to look at your child as an individual; as unique, and don't rely too heavily on the research. For Moms and Dads, when they are seeing the pediatrician, should raise this issue. Has the research that you are basing your recommendation on looked at subgroups of children because each child has a different profile or has it just looked at children in general, because individual variations can get lost in a large sample or large group.

Now the next topic is what to do when you have identified a culprit. First you can do your own on-off experiment to be sure you have identified a culprit or series of culprits. You can also try to have your child in an optimal environment. If you don't know and you just want to kind of hedge your bets in a favorable direction, have your child in the most favorable physical environment. Make sure the child is healthy physically with good pediatric evaluation including, as I mentioned, measuring lead levels and other toxic substances, have your child in a small, nurturing preschool if it is a young child or small classes, compare how the child's sensory reactivity whether it is over or under sensory craving compares with the teacher's style and the kids in the classroom, have the child on organic foods rather than regular foods so there aren't any additives, preservatives, food colorings, or dyes, minimize the processed carbohydrates and the sugars and juices and go for the slowly absorbing complex carbohydrates and healthy proteins, check out the emotional climate at home and the nurturing relationships, and make sure you are supporting all of the competencies that we talked about in earlier discussions – the child's thinking, motor planning and sequencing, ability to modulate sensations, and ability to comprehend what they hear and see. As you work in all of these areas and create an optimal learning, family, and physical environment for the child, see how your child does. Give your child a fair period of time. You may be surprised to see that you not only have a more regulated, attentive, and focused child, but an overall emotionally healthier child.

In conclusion, these are some of the aspects of the physical environment to look at. Again, I repeat, many of these are controversial, and I think you should take the attitude that the research data is not definitive because we have not looked at the subgroups and therefore you have to look at it in relationship to each individual child and be a good detective and consider all possibilities.



Thank you for joining us and we will return next week with a new topic.