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# The Adolescent Brain: Implications of Sexuality Education

by

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When well-intentioned people consider the issues involved in adolescent sexual health today they quickly begin to focus on solutions based on time-honored, but somewhat outmoded, education theories. Viewed from the broad perspective of education's general success in modifying behavior, the approach still seems logical. Today, I ask that you set aside what you think you know and consider the issue from a slightly different perspective, including the development of the adolescent's cognitive and – intellectual capacity.

Not long ago a colleague presented to me a hypothetical construct. It was a question and series of observations in the context of a discussion of adolescent sexual development. Its conclusion pointed out that things are not always what they seem. The construct asked: What would you think if you encountered an adolescent with a condition leading to:

- Decreased likelihood of establishing a successful marriage
- Lowered life expectancy.
- Increased risk of potentially fatal liver disease
- Increased incidence of infectious diseases
- Low likelihood that the adverse effects can be eliminated unless the behavior is changed
- Reluctance to change the behavior despite the destructive consequences
- Denial of the problem and a negative attitude toward those who encourage change.

In the context in which that construct was presented most people conclude that the condition is sexual promiscuity or perhaps promiscuous unprotected sex. In fact, the construct most closely illustrates the problems associated with alcohol abuse.

Is this a significant problem for adolescents? In 2004, the American Academy of Pediatrics noted that 10.7 million adolescents consumed alcohol in a given month. By the 12th grade, 77% had consumed alcohol and 58% of them admitted to being drunk. The percentages were only slightly lower among 10th graders. Among 8th graders those numbers were 46% and 20% respectively.<sup>1</sup> These young people drink because of peer pressure and because it “feels” good. We take some comfort in the fact that the risk for dependence decreases with each increasing year of age of drinking onset.

With that information before you, what approach would you take with your preadolescent or adolescent patient? Even more important to this discussion, I ask you to consider why you would take that approach. I’ll speak later about our usual stance with respect to this issue in order to make more obvious its relationship to the subject of sexuality education. Before we proceed there, it is important to understand the milieu in which we must work. We need to understand more clearly the development of the human brain.

Cognition, our ability to understand, relate to, and deal with the world around us, begins in utero. The pace of brain development increases from the time of conception and peaks early in the 2nd trimester. We know from a variety of studies that there are long-term effects, including such things as attention deficit hyperactivity disorder, which are more likely in the child whose brain had been exposed in utero to maternal smoking, alcohol, or drug use.<sup>2</sup>

Recent advances in imaging of the human brain, which demonstrate changes in its activity over time, have enabled us to advance beyond traditional concepts of brain maturation. Researchers at the National Institutes of Mental Health (NIMH) postulated that the brain is not fully mature in early adolescence, but rather at a much later time. To test this hypothesis, they screened by telephone 14,040 healthy individuals from age 4 to adolescence. Nine hundred and twenty-two were sent parent/teacher questionnaires and 490 were brought to the NIMH for face-to-face examinations, with 325 accepted for the study. Of that group, 272 measurable scans were acquired to quantify and map total and regional brain volume. Study individuals were brought back every 2 years to catalog long-term brain development.

In 2004, one of the principal investigators, Jay Giedd, M.D., presented the following summary finding. As a result of their studies, he concluded that “the brain of the adolescent is far from mature... both gray

and white matter undergo extensive structural changes well past puberty... probably to age 25.”<sup>3</sup>

Their findings also lead to the conclusion that cognitive maturation is poorly correlated with age, and furthermore, that the ability to weigh risks and benefits is not generally mature until adulthood. Finally, the extraordinary sculpting of the brain continues throughout adolescence, particularly in areas involved in “executive” decision-making abilities, the very abilities needed to make appropriate choices with respect to risky behaviors.

While this is new science, most of us probably recall our parents, and elders in general, telling us that we were too young, too immature, too intellectually deficient to do all the things we wanted to do in those omnipotent and omniscient days of adolescence. In fact, science has probably simply verified what our parents and others have always known.

I cannot tell you when we first decided that the adolescent brain was not yet mature, but in the 5th Century BC, in the Republic of Athens, Socrates noted the following, “Our youth love luxury. They have bad manners, contempt for authority; they show disrespect for their elders and love chatter in place of exercise; they no longer rise when elders enter the room; they contradict their parents; chatter before company; gobble up their food and tyrannize their teachers.”

William Shakespeare in *The Winter's Tale*, Act III, Scene 3, presented a somewhat different perspective, “I would that there were no age between 10 and three-and-twenty, or that youth would sleep out the rest, for there is nothing in between, but getting wenches with child, wronging the ancestry, stealing, fighting...”

Present research then simply confirms that the time between what an adolescent might want to do and when he/she has the intellectual and emotional maturity to choose correctly, has not significantly changed. By way of excuse, well intentioned “experts” have proposed a variety of explanations including the increasing length of adolescence, in part because of the steadily decreasing age at puberty (though Shakespeare spoke of age 10). While many of these postulates contain elements of truth, they are and will remain unrelated to the simple fact that until the early to mid-twenties people are simply not generally capable of making critical, often life and death, decisions. The American Bar Association admitted as much in 2003 when they noted that: “For social and biological reasons teens have increased difficulty making mature decisions and understanding the consequences of their actions.”

Even the oft-quoted Bette Midler noted to the popular press: “If sex is such a natural phenomenon, how come there are so many books on how to do it?”

With that background then, let's modify the original hypothetical construct and ask *why are we so concerned about modern sex education?* Is sexual activity a problem for our students? Yes, if you accept the *fact* that premature, premarital, promiscuous sexual activity is dangerous/harmful. Then please recall that 77% of 12th graders drink – 61 % of them have had sex. Fifty-eight percent of them drink to excess (get drunk) while 21% have had 4 or more sexual partners (increasingly, we find that all of these data points are related), each and all seriously risky behaviors.

While it is clear that adolescent alcohol use and abuse is a concern, I believe that more concern should be placed on the issues related to adolescent sexual activity. We know, for example, that 3 million teenagers acquire a Sexually Transmitted Infection (STI) each year, 30% of female adolescents are positive for Chlamydia, 30% to 50% are infected with Human Papilloma Virus (HPV), and adolescents make up 25% of those newly infected with HIV. It is clear to most that promiscuous sexual activity leads to the same set of problems we noted for alcohol – and more! Knowing that, what would you do?

When child and adolescent health experts gather to consider solutions to the problem of alcohol use, and almost any other risky behavior, their recommendation is very simple. These experts advise us that we must tell the adolescent to “Just Say No!” There is no wavering in this case, no suggested use of low-alcohol beer, or filter cigarettes, or even clean needles (though the latter are mentioned for the hopelessly addicted). On the other hand, when the issue is sexual activity, these same experts simply recommend that adolescents use condoms. Why is it that for almost every other risky behavior, the strategy of risk elimination is touted as the sole solution while for sexual activity many encourage only risk reduction, leaving adolescents (and others) vulnerable to an ever-expanding number of dangerous and often deadly consequences?

It is said that those who do not know history are doomed to repeat it. Those who advocate condoms (risk reduction) are clearly not in touch with the history of that failed medical device. The condom in some form has been available since antiquity. In its present form, it has been available since at least the middle of the last century. Intensive education has always been part of the condom use philosophy, but though the device itself is structurally an excellent product, it is nonetheless a failed technology. If any other medical device in use today had such a high failure rate, it would long ago have been discarded.

The experts, however, say that the failure is not intrinsic to the device, but rather to our lack of education of young people, in particular, about the need-to and the how-to of using a condom. Unfortunately, I'm old enough to differ. In the early 1970s, fresh out of residency, I knew it

was part of my mission as a pediatrician to teach adolescents that condoms existed, that they could be easily obtained, and to make it clear to them how to use them and why. I very quickly learned from adolescents in a rural university community and later in the "big city" that they knew all about the lessons I was trying to teach, and some of them knew more. The education of our youth about sexually transmitted infections and how to avoid them by using condoms has continued at an ever-accelerating pace to this present day. As long ago as 1998, greater than 90% of adolescents reported receiving HIV prevention education (condom education).<sup>4</sup> In 2001, the NIH reported that 45% of adolescent males said they used condoms every time they had sex. In different studies 15-50% of adolescent females said likewise, but perhaps most disturbingly only 50% of HIV serodiscordant couples say they use condoms with every sexual act.

Not surprisingly, in 2004 the American Social Health Association reported on the low level of condom use in their survey of sexually active men and women 18 to 35 years of age. They noted that 47% never use protection for vaginal sex, 82% never used protection for oral sex, and 64% never use protection for anal sex. Perhaps the age of complete development of "executive" brain function is well beyond the mid-twenties!

So, why don't these adolescent and other, presumably intellectually capable, individuals use condoms? Lack of knowledge is not the reason and with baskets of condoms in many schools, lack of availability is not the reason either. In reality, 22% of 15 to 19-year-old males say that "using a condom reduces the physical sensation."<sup>5</sup> They don't use condoms simply because they don't like to and don't want to. In addition, while adolescents are not intellectually mature, they're not altogether ignorant and they know that even if used, condoms give a false promise of protection. From the most conservative studies, we know that 100%, perfect, every time use reduces the risk of HIV infection by no more than 85%. The risk reduction for Chlamydia, Gonorrhea, and Herpes is no more than 50% and for Human Papilloma Virus (HPV) there is only a slight risk reduction. That's why 61% of parents of 7th and 8th graders believe that their sons and daughters should be 21 or married before they have sex, while 36% believe they should be more than 18 years of age. For 9th to 12th graders, that drops over time to 49% of parents of boys and 59% of parents of girls still recommending that they wait until they are 21 or married before having sex.<sup>6</sup> Society has clearly encouraged many parents to give up their resolve to protect their children.

Adolescents themselves continue to increasingly reject the notion that they cannot be abstinent, or that being prematurely and promiscuously sexually active is somehow a good or at least acceptable thing. Seventy percent of girls and 55% of boys 12 to 19 years of age who were sexually

active wish they had waited. Ninety-four percent of 12 to 14-year-old and 87% of 15 to 19-year-old boys state that teens should be given a strong message not to have sex until they are at least out of high school.<sup>7</sup>

Just as we encourage abstinence from other risky behaviors, parents and teenagers themselves say that we should be encouraging abstinence from sexual activity during the teenage years. What do the studies say?

Because abstinence education is so new and so relatively underfunded compared to condom education, there is a paucity of studies demonstrating its success. One of the earliest reviews was published in 1989 and was entitled *Schools and Sex Education: Does it Work?*<sup>8</sup> In that article it was reported that, "In one study, a somewhat lower prevalence of reported sexual activity in 15 to 16 year old teenagers was found" in an abstinence education program. No other (condom-based) program showed any success. A 2002 article entitled *An Evaluation of an Abstinence Education Curriculum Series: Sex Can Wait*<sup>9</sup> concluded, "results are encouraging and should be considered by those interested in helping young people postpone sexual involvement."

In 2004, a published study from a program in Zambia concluded, "A single session of school-based sexual health intervention resulted in the development of normative beliefs about abstinence that were sustained over a six month period."<sup>10</sup>

Meanwhile, the CDC reported that 53% of the decline in pregnancy rates for 15 to 17 year olds is attributable to decreased sexual activity.<sup>11</sup>

Perhaps the best modern example of the effectiveness of abstinence education comes from Uganda where, having adopted an abstinence education program in 1989 called ABC, the Public Health Ministry noted that by 1995 premarital sex among 15 to 24 year old males decreased from 60 % to 23%. Males with greater than one partner decreased from 41% to 21% and males with greater than 3 partners decreased from 15% to 3%.<sup>12</sup> By 2000, 95% of Ugandans had either zero or one sex partner.<sup>13</sup> HIV rates were cut by two thirds within a decade of the roll-out of this education intervention.<sup>14</sup> The annual cost of the ABC Program is less than \$1.00 per person age 15 and Up.<sup>15</sup>

Clearly, abstinence education works, but not as well as it might since we only currently spend \$1.00 on abstinence for every \$12.00 we spend on condom-based education.

Abstinence education works because it targets the age appropriate, concrete thinking, developing intellectual capabilities of its adolescent audience. It works because it supports what most parents believe and what most adolescents want. It works because instead of targeting simply self-esteem, it targets self-control. As Strayhorn noted, "Self-control is a psychological skill whose development could potentially prevent, or aid in the treatment of, vast amounts of psychopathology."<sup>16</sup>

So well does it work that an article in the *Lancet* in 2004, condensing the opinions of 150 contributing authors, concluded, "... when targeting young people... who have not started sexual activity, the first priority should be to encourage abstinence... after sexual debut, returning to abstinence... (is) the most effective way of avoiding infection."<sup>17</sup>

Finally, abstinence education works because it is risk elimination not just risk reduction. It provides a consistent and seamless message to adolescents that some activities engaged in by adults are not appropriate for adolescents or that they're appropriate for adults within a certain context (marriage), but not for adolescents absent that same context.

I note that I now live and work in North Carolina. This state is one of the major cigarette tobacco producing areas in the nation. Tobacco is a mainstay of our economy, yet North Carolina has recognized that it is too risky a product, particularly for our youth, for the state to continue to hold that distinction. There are, therefore, education programs in virtually every school to make this and future generations tobacco-free. A recent newspaper headline noted that "Making North Carolina Schools Tobacco-Free is Proving to be a Long Process."<sup>18</sup> The article detailed the difficulty of the process, but noted that there would be no giving up or turning back. Children were at risk and though, like alcohol, tobacco is seductive, popular and easy to obtain, we must convince our young people to abstain from its use because of its inherent dangers. I say, and we must say, that we should not do less for our children with regard to the seductiveness of premature, premarital, promiscuous sexual behavior. We as a society are firm with regard to other risky behaviors because we know adolescents do not have the cognitive ability to make appropriate decisions with regard to these behaviors. Neither can they make those decisions with regard to sexual activity and so, as with drugs, alcohol, and tobacco we must stand up, look our teenagers and society in the eye, and tell them to "Just Say No!"

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