

Canaries in the coal mine

The symptoms of children labeled 'ADHD' as biocultural feedback

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Were the field of attention deficit hyperactivity disorder to have a 'poster boy' to promote its cause (in the way that muscular dystrophy or cerebral palsy organizations have a child with the disorder appearing on television during fund-raising campaigns), it would surely have to be Calvin from the celebrated comic strip Calvin and Hobbes® by Bill Watterson.¹ In one of my favorite Calvin and Hobbes strips, Calvin is sitting at a school desk, utterly bored. Finally, he shouts out to the teacher and all of his classmates: 'BO-RING!' In the last panel, we see Calvin being sent to the principal, saying: 'Yeh yeh . . . kill the messenger.'

This particular comic strip symbolizes for me how children who have been labeled 'ADHD' are the messengers of today's frenetic stressed-out culture. Optimally, they should be characterized by educators and mental health professionals, not as intrinsically dysfunctional or biologically damaged organisms, but rather as a kind of early warning signal for cultural instability. Canaries have been traditionally used in British coal mines as an early warning system for detecting potentially poisonous gases such as carbon monoxide. Miners would see the canaries fall off their perches and know that they still had time to get out of the mines safely. Similarly, I believe that children labeled ADHD are the canaries in today's noxious cultural climate, and are responding in a natural way to the social conditions of the times by developing the symptoms of hyperactivity, distractibility, and impulsivity that are characteristic of ADHD. Instead of 'blaming the victim,' that is, diagnosing ADHD 'within the child,' we ought instead, to be reading their behaviors as symptoms of a wider dysfunction and using that information to make substantial reforms in our cultural institutions. In this chapter, I will make the case for how the so-called ADHD child's behaviors reveal much more about the context in which we live than about the specific mechanisms that reside within an individual brain.

Short attention span culture

It has always fascinated me that so much research money in education, psychology, and psychiatry has been spent on investigating short attention span in individual children, but no money has been invested by these fields in looking at short

attention span in the broader culture. When I put the phrase 'short attention span culture' in PsychInfo, an online search engine of the American Psychological Association (of which I've been a member since 1985), I discovered that since I have been a member of the APA, there has been only *one* article written on this topic (in 1985), and ironically it defended television as a positive contribution to children's cognitive development. A similar search for the term 'ADHD' yielded 4,428 documents over the same period of time. On the other hand, research in investigating short attention span in the broader culture has received *considerable* financial support from the field of advertising. As so often happens in fields that operate according to different paradigms, however, there is quite a different phrase used in commercial media advertising to characterize this investigation: 'jolts per minute.' The Center for Media Literacy of the Ontario Ministry of Education defines this term as follows:

'Jolts per minute' programming is often cited as a principle – almost a first law – of commercial television. 'Jolt' refers to the moment of excitement generated by a laugh, a violent act, a car chase, a quick film cut – any fast-paced episode that lures the viewer into the program. Television and screen writers often inject a jolt into their scripts to liven up the action or pick up the pace of a story.

Readers can investigate for themselves how the number of 'jolts per minute' on commercial television has increased over the past several decades. Watch a television show made in the 1950s and count the number of 'jolts per minute' (as noted above, this would include camera changes, noises, laughs, etc.). Then compare this number to that of any current television program or commercial. The increased tempo is immediately obvious. It has come to the point where advertisers now talk about 'jolts per second.' One media commentator, for example, refers to: 'MTV-style hyper-visuals, *where anything less than a dozen jolts per second is considered boring*' [my italics].

The reason for the dramatic increase in 'jolts per second' in television programming over the past many years (and we should add, in other media sources, including video games, computer software, and the Internet) should be obvious to the reader. Television programmers need to grab the attention of their viewers in order to sell their products. Advertising money is the grease that makes the world of commercial television run. To make a living, programmers use this trick of 'jolts per minute/second' to grab their viewers' attention. This is essentially Pavlovian conditioning. It was the Russian physiologist Ivan Pavlov who, in 1927, described what he called 'the orienting response.' This describes our instinctive biological reaction to any sudden or novel stimulus, and includes dilation of the blood vessels to the brain and constriction of blood vessels to major muscles groups. During the orienting response, mental arousal becomes heightened and visual and auditory perceptions are sharpened. The orienting response evolved in part to help protect human beings (and other living creatures) from sudden environmental changes,

such as a mountain lion about to strike. Television programmers (and manufacturers of video games and computer software) use this powerful and important evolutionary gift, not to save us from being eaten by lions and tigers, but to sell their products. They are essentially exploiting a several-million-year-old evolutionary adaptation for short-term commercial gain.

What happens, however, is that over time our attention becomes habituated to this stimuli. Like the people who heard the boy cry 'wolf!', we discover that there really *isn't* a mountain lion waiting to eat us and that we've been fooled. The next time we hear that loud sound, or see that blast of light, or experience that sudden camera shift, we know better. And we stop paying attention. In order to get our attention back, media programmers have to *up the ante* and increase the number of jolts per second. Thus, over a period of years, we've seen an exponential growth in the tempo and intensity of stimulation on television and in video games. At the same time, we've seen a steady decrease in the ability of viewers to maintain any kind of sustained attention. In short, we've become a short attention span culture.

An important component of this culture are the children who have been labeled ADHD. In attempting to build a case for a 'medical disorder' existing *inside* of individual children, ADHD advocates have repeatedly pointed to the neurotransmitter dopamine as a key factor in its etiology. Dopamine is a chemical in the brain that plays a central role in the modulation of *stimulus seeking*. When dopaminergic pathways are disrupted, an individual can develop an insatiability for stimuli. This is what researchers have typically seen in many children identified as ADHD: they require higher levels of stimulation than the average person. Ritalin and other psychostimulants help to provide this missing stimulation in chemical form. There is evidence that video games and other media may actually facilitate the release of dopamine in the striatum, a part of the basal ganglia that is regarded as a crucial structure in the etiology of ADHD. Mass media may serve to overly stimulate and exhaust the dopaminergic system in vulnerable individuals. One study saw a correlation between the number of hours of television viewed each day at ages 1 and 3 and later attentional problems at age 7. Other studies have linked media viewing to violent behaviors, and to physiological responses such as 'TV-induced fright,' 'video-game epilepsy,' and 'television addiction' that is comparable to substance abuse. It is plausible to suggest that viewing television and other media in excess can have an effect upon neurological development in children. The average child in the United States watches four hours of television a day, and 20,000 commercials a year. This may be part of the reason why the American Academy of Pediatrics has recommended that children below the age of 24 months not be exposed to *any* television, and that older children watch a maximum of one or two hours a day of nonviolent educational programming (e.g. without commercials).

Despite of all this, ADHD researchers have typically discounted any assertion that mass media may have any significant role to play in the etiology of the disorder. One recent consensus statement on ADHD signed by 74 international scientists working in the field of ADHD assails those who suggest that 'behavior problems

associated with ADHD are merely the result of . . . [among other things] . . . excessive viewing of TV or playing of video games.' However, it is significant that the growth of the concept of attention deficit disorder since its 'discovery' in the early 1970s parallels the increased tempo of mass media in our lives. While correlation is not causation, it has become almost a cliché to say that people in today's world have shorter attention spans and live life at a faster pace. That there might be a subtle and intricate interrelationship between biology and culture with regard to mass media and ADHD, therefore, should not be such an astounding assertion to make. Children labeled ADHD may be the canaries in this high tech coal mine, possessing greater neurological sensitivity than average to powerful media stimuli, and thus be the first to drop off their perch when placed into a frenetic mass media culture. We might, therefore, be smart to spend at least part of our time as educators, researchers, and mental health professionals interpreting the behaviors of these children as a kind of biocultural feedback.

The disappearance of play

Another strong social undercurrent that deserves attention with regard to ADHD symptoms is the gradual decline of free unstructured play in our time. As play expert Brian Sutton-Smith (2001) puts it:

American children's freedom for freewheeling play once took place in rural fields and city streets, using equipment of their own making. Today, play is increasingly confined to back yards, basements, playrooms and bedrooms, and derives much of its content from video games, television dramas, and Saturday morning cartoons.

Where children once made up games that they played over a distance of several city blocks, or engaged in rough-and-tumble wrestling, or created imaginative scenarios played out with simple props found around the house, kids now spend more time indoors playing with their action toys, or engaging in highly competitive games and sports supervised by adults, or doing their homework, or watching TV, the Internet, or video games. One report issued by the National Association for Sport and Physical Recreation recommends that children engage in one or two hours of physical activity every day, yet increasingly schools are cutting back on physical education programs and recess periods in order to dedicate more time to academic achievement (often spent in front of a computer), and to make matters worse, research suggests that children are not making up the physical activity they are losing in school by increasing their physical activities after school. The reasons for the decline in play are numerous: fears of parents concerning strangers in the neighborhood, legal liability for 'unsafe' playground equipment, increased academic demands, and, of course, the rise of technologies described above. This failure to play in active ways, however, may be taking a significant toll on our children's neurological development.

Research in ADHD has focused on problems with the executive function in children with this label, that is, the ability to reflect, plan, inhibit impulses, and set goals, among other tasks. Areas of the brain typically referred to in the ADHD literature as the locus of the disorder include the frontal lobes, striatum, limbic system, and cerebellum. Essentially, there appears to be a dysfunction in the circuitry between emotional and motor activity in the limbic system and cerebellum, and the higher cognitive areas of the frontal cortex. The striatum, in particular, which appears to mediate motor and emotional responses and influence inhibitory control over those responses, is a key component in what appears to malfunction in children labeled ADHD. While the causes of this breakdown are typically viewed in the ADHD literature as genetic and therefore fixed at birth, a richer interpretation must include environmental influences as a key factor in the smooth functioning of this circuitry. Free unstructured play appears to have an important role in this process. There is evidence that the kinds of social adaptations and learning experiences that young children acquire through play actually modify brain structure and functioning from a very early age. It has even been suggested by some researchers that the evolution of the frontal lobes in primates occurred in part as a result of the experience of play. As children play, they learn to modulate their cerebellar motor movements and their limbic system impulses as they create imaginative play scenarios, practice 'faking out' an opponent in a wrestling game, plan a game strategy, or organize their play experiences as spontaneous and yet fully socialized events. These activities, then, serve to mediate between frontal lobe thinking and inhibitory functions and the highly motoric and emotional processes of sub-cortical structures. As neuroscientist Jaak Panksepp (1998) has pointed out:

Indeed 'youth' may have evolved to give complex organisms time to play and thereby exercise the natural skills they will need as adults. We already know that as the frontal lobes mature, frequency of play goes down, and animals with damaged frontal lobes tend to be more playful . . . Might access to rough-and-tumble play promote frontal lobe maturation?

(Panksepp 1998)

Panksepp indicates that '[t]he explosion of ADHD diagnoses may largely reflect the fact that more and more of our children no longer have adequate spaces and opportunities to express this natural biological need – to play with each other in vigorous rough-and-tumble ways, each and every day.' In a series of controlled experiments with rats, Panksepp and his colleagues have discovered a number of interesting effects regarding play, including significantly elevated brain-derived neurotrophic factor (BDNF) (a key modulator of neuronal development, plasticity, and survival) in rats who played. He has also done studies suggesting that methylphenidate or Ritalin inhibits play behavior in rats.

These studies raise some troubling issues regarding current approaches to ADHD treatment. If some children exhibit ADHD symptoms because of the loss of rough-and-tumble play in our culture, and then undergo methylphenidate

treatment which further suppresses the drive to play, then these children may be receiving a double dose of harm from society. Add to this what we have observed in the first part of this chapter – that play-starved children are sitting in front of highly stimulating fast-tempo television, video games, and computers without being able to respond with large motor movements and playful responses – and it becomes easier to understand how ADHD symptoms could indeed be a form of biocultural feedback. As we saw above, the most neurologically sensitive ones – the ADHD canaries – will be the first to show up on the radar screen, but the wise professional will understand and interpret these symptoms as a comment, as well, about the broader culture and its need for more play in early childhood development for *all* children.

Pushing back developmental timetables

Another cultural phenomenon that deserves our careful scrutiny in understanding the cultural underpinnings of ADHD symptoms in children is the way in which expectations for reaching developmental milestones have been pushed back to earlier and earlier ages by parents, educators, and researchers over the past three decades. Simply put, younger children these days are increasingly being asked by adults to do things they are not developmentally ready for. In my work as a teacher-trainer in the United States I have heard preschool teachers say something like: ‘I really don’t like using an overhead projector, worksheets, and lots of sitting time with my little ones, but it gets really rough next year in kindergarten, and I’ve got to get them ready for it!’ My wife, who is a psychotherapist, reports on kindergarten-aged children coming to her practice and saying that they have two hours of homework to get done that night. These kinds of pressures were unthinkable in the 1950s, when a kindergarten was what is really means in German: a ‘children’s garden,’ where playing, singing, painting, dancing, storytelling, and nap time were the order of the day.

However, in the late 1960s in the United States, American education underwent a profound and lasting change. Stung by the 1966 landmark report *Equality of Educational Opportunity* written by sociologist James Coleman, which indicted America’s schools for their lack of equal educational opportunity for people of color, more emphasis began to be placed upon the concept of *accountability* as an important goal for American education. Education historian Diane Ravitch (2002) writes:

In the wake of this report . . . policymakers, public officials, community activists, and parents started to conclude that many of the problems [in American education] were structural consequences of the bureaucratic . . . system of public education and could only be addressed by market competition or structural changes. This shift in focus from inputs (resources) to outputs (results) was facilitated by the increasing availability of test scores. The establishment of the National Assessment of Educational Progress (NAEP) in 1970

provided cumulative new data and trend lines to document the educational achievement of American students.

(Ravitch 2002)

It is telling that the accountability push in American education in the early 1970s coincided with the original formulation of attention deficit disorder in 1972 by Canadian psychologist Virginia Douglas.

The availability of comparative test data in turn set loose a new set of demands on teachers to boost test scores. These pressures were in turn visited upon students, who were prodded to succeed in a more rigorous academic *curriculum* (a Latin word, meaning 'racetrack'), and who were viewed with concern by parents if they not did score at or above *grade level*, which became a more important measure of a child's overall competence than his IQ score. At the same time, American educators besieged the Swiss developmental psychologist Jean Piaget and asked him how his cognitive stages of development could be *speeded up*, a problem he regarded as 'the American question.' One unintended outcome of this American drive for speed and achievement was a new phenomenon termed by developmental researcher David Elkind (1987) (who was a disciple of Piaget), 'the hurried child syndrome.' Elkind argued that the push over the past three decades to maximize a child's potential at an early age had created a situation where preschool children were being given a watered-down version of the first through third grade curriculum. This trend, he warned, set the stage for the 'hurried child syndrome,' which included physical symptoms (headaches, nausea, irritability), learning dysfunction, attentional difficulties, and behavioral problems.

These symptoms of the 'hurried child syndrome' are in many cases indistinguishable from the symptoms of ADHD. Many cases of ADHD may, in fact, arise from these underlying cultural pressures on children to achieve before they are developmentally ready. It is actually quite interesting to regard children labeled ADHD from a developmental perspective. It turns out that many children identified as ADHD exhibit traits characteristic of children younger than they are. We should note here that the symptoms of ADHD are developmentally *normal* for infants. Every healthy baby is hyperactive, distractible, and impulsive, often to the chagrin of many a mom! These traits are generally seen as abnormal, or as examples of 'developmental immaturity,' when they appear in older individuals. The question is at what age should they be considered abnormal, and can this age shift from one historical period to another? If culture has indeed pushed back the developmental milestones for a child's growth to an earlier age, then these behaviors will be seen as abnormal at an earlier age as well, and many children who decades ago might have been seen as exhibiting normal behavior, or even somewhat lagging development (but within normal levels), are now regarded as ADHD for these same types of behaviors that are now set against a different cultural backdrop.

Another factor to consider is that the so-called developmental immaturity of some children labeled ADHD may actually be a *good* thing for society. Here we must introduce the concept of *neoteny* (a Greek term meaning 'holding youth'),

which refers to the retention of childlike traits into adulthood. Evolutionary thinkers such as Stephen Jay Gould (1985) and Ashley Montagu (1983) have characterized neoteny as an evolutionary *advance* (e.g. *homo sapiens* has a greater tendency to retain youthful characteristics into adulthood than do chimpanzees, bonobos, or gorillas). As it turns out, many highly creative adult thinkers, including Einstein, have been seen to possess childlike (and sometimes 'childish') qualities that were integral to their great discoveries. Einstein said, for example, 'I never grew up.' One has to ask the question here whether the so-called 'developmental immaturity' of some children labeled as ADHD is really a problem or whether it may actually be an evolutionary *advantage*.

While many kids labeled ADHD have childlike or neotenuous qualities that continue into adulthood, in other cases these traits disappear with time. As normal myelination processes occur in the brain, many ADHD behaviors slip into the sub-clinical realm, and may disappear entirely. The flailing arms and legs of the hyperactive 8-year-old become the nervously tapping fingers and toes of the 40-year-old, and vanish forever in the 60-year-old. One study suggested that the rate of ADHD in any given age group appears to decline by 50 percent approximately every five years. Thus, assuming an ADHD prevalence rate of 4 percent in childhood, the estimated rate of adult ADHD would be 0.8 percent at age 20 and 0.05 percent at age 40. Many children labeled ADHD may simply be individuals who mature later than the norm, and yet, in a culture that has pushed back developmental timetables to earlier and earlier ages, they are viewed as having a disorder. One of the great champions of childhood development in the 1950s, Louise Bates Ames (1985) of the famed Gesell Institute, wrote about a boy who had been referred to her clinic in the 1980s by an evaluator who had seen him as potentially a future 'learning disabled child with emotional problems' because he had thrown objects and couldn't concentrate. He was 56 weeks old! Elsewhere, Ames (1968) suggested that if children entered school when they were developmentally ready, rather than according to when they were born (the usual methods of determining placement) we might eliminate 50 percent of all learning disabilities in the country. Ames' suggestion came before ADHD had wreaked its vengeance upon the United States, and it seems likely that she would say very much the same thing about ADHD if she were alive today.

Conclusion: the need for a biocultural approach in ADHD research

The three issues discussed above – the impact of mass media, the disappearance of play, and the pushing back of developmental timetables for children's development – are only a starting point in examining the deeper cultural roots of ADHD symptoms in children. Many other issues could be looked at as well, including the breakdown in the nuclear family over the past several decades, the increase in violence in schools and neighborhoods, and the creeping medicalization of human behavior in contemporary society. What is important, however, is that a beginning

be made in establishing a biocultural basis for research in the field of ADHD. As noted above, ADHD researchers are generally blind to these influences. They are not necessarily to be faulted for this, since their training does not usually include a strong component of anthropology, sociology, or systems theory. It is simply not possible to use the current tools of the ADHD researcher to investigate many of the claims made above. You simply can't roll the clock back to 1956, when mass media ran at a slower rate, and measure the number of children who would qualify for an ADHD diagnosis. The fact that one cannot run controlled scientific studies like those done in typical ADHD research, however, does not invalidate these claims. Rather, it requires that a different set of tools be brought to bear upon the issue. One can, for example, investigate contemporary cultures where mass media has been slower to develop. In one such study in the 1980s, for example, sociologists tracked the changes that occurred in a mountain community in Canada after it acquired access to television for the first time. Over a period of two years, the adults and children in the community became less able to persevere at tasks, less able to engage in creative problem-solving, and less tolerant of unstructured time.

Similarly, one can investigate these questions by essentially *creating a mini-culture*, that is, by changing the existing environment in some significant way. One study, for example, provided children labeled ADHD with therapy balls to sit on rather than chairs in school, and discovered an improved ability to concentrate on their school work. Another study investigated children identified as ADHD in outdoor natural or 'green' settings compared to indoor or formal outdoor environments, and discovered that green outdoor activities reduced ADHD-related symptoms. The problem for ADHD researchers is that these studies were done outside of the field of ADHD (in the fields of communications, occupational therapy, and public health), and like a foreign object intruding upon the membrane of a cell, have been not absorbed into the ADHD collective body of work. What is required are researchers in the field of ADHD who possess interdisciplinary minds, who can bring to bear the tools of other fields of study – especially those that investigate biology at the cultural level – upon the problems of children who can't sit still, concentrate, or make good decisions. Or perhaps we need to envision this process in reverse. Perhaps it is the ADHD field itself that has become too narrow in its focus, too focused upon its limited methodologies – scanning the brains of children engaged in artificially contrived learning tasks, evaluating the pros and cons of different medications, and testing the effectiveness of lock-step cognitive-behavioral training programs on children's symptoms – to effectively see the forest for the trees. Perhaps the ADHD field itself needs to be turned inside out, or even upside down, so that fresh research methodologies, novel intervention strategies, and new ways of looking at children can revivify the work of those who seek to help the Calvins of this world experience joy and vitality in school and in life.

Notes

- 1 The Calvin and Hobbes comic strip appeared in over 2,300 newspapers worldwide over the period 1985 to 1995. Calvin is a boy of about 7 or 8 whose energy, according to creator Watterson, 'is unhindered by common sense.' Hobbes is his 'imaginary' friend, a stuffed tiger that frequently comes to life.

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