

Don Jacobs

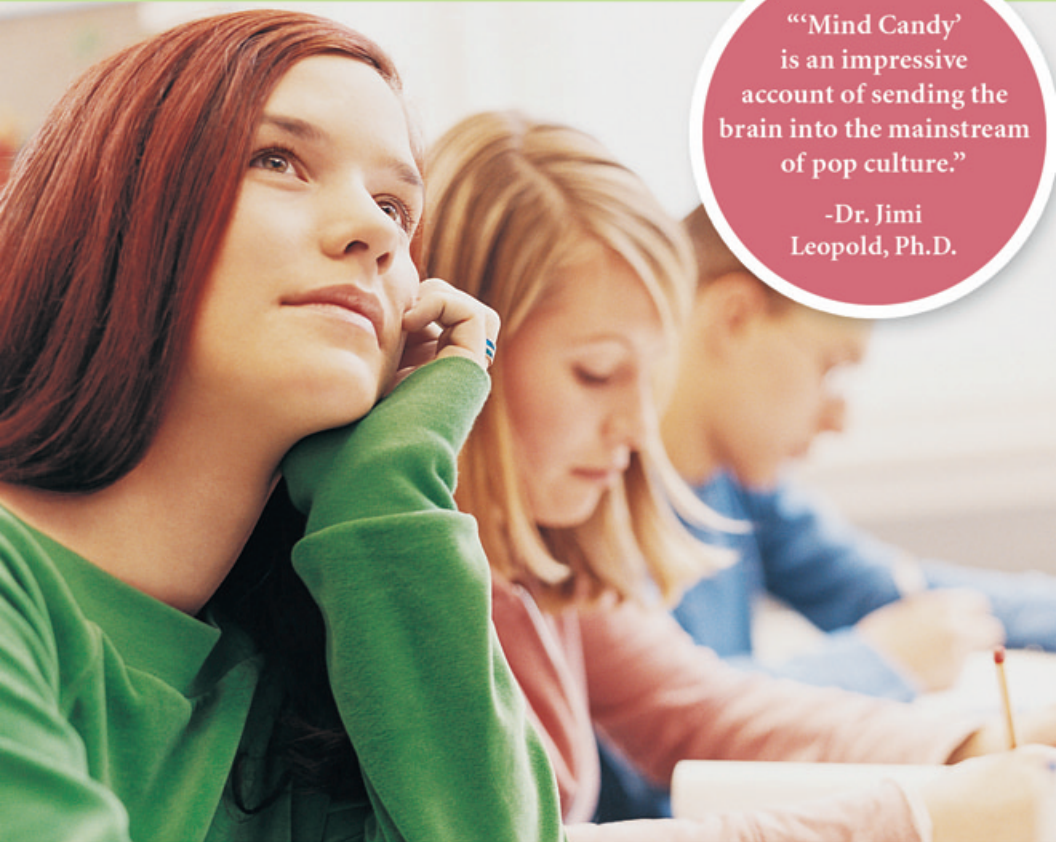


Mind Candy

Who's Minding the Adolescent Brain?

“Mind Candy’
is an impressive
account of sending the
brain into the mainstream
of pop culture.”

-Dr. Jimi
Leopold, Ph.D.



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Mind Candy

Who's Minding the Adolescent Brain?

By: Don Jacobs

**Embracing the Neuroscience of
'The Adolescent Brain'**

Is it time to Reinvent Adolescence?



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Printed in the United States of America.

10 9 8 7 6 5 4 3 2 1

ISBN 978-0-7380-2138-6

Hayden-McNeil Publishing, Inc.
14903 Pilot Dr.
Plymouth, Michigan 48170
www.hmpublishing.com

Jacobs 2138-6 F06

Have you ever wondered?

Why teenage girls can be so mean to each other?
Why teenage boys often mistreat teenage girls?
Why addiction is so prevalent during adolescence?

Is the Generation Gap detectable in the brain?
Do specific brain regions lie behind certain teenage behavior?
What brain chemistry lies beneath most teenage behavior?

Why is adolescence the most dangerous period of life?
Why do bullies bully?
Why Columbine?

In the Age of Neuroscience, is it time to reinvent adolescence?

Foreword

By: Dr. Alan H. Hall, M.D.

Don Jacobs understands what adolescents are like, who they are, and what they can be, if we, as parents and adults, do it right. He understands what all caregivers—parents, teachers, counselors, and others who deal with adolescents—should know and the urgency to, at least, make a start. And he has put it all into a book that everyone can read and understand. *Mind Candy* will help all of us who care about the fact that, when *we're gone, there has to be competent and effective people to replace us*. Perhaps, even do it a little better. That's the real reason he wrote his 'work of love'.

Mind Candy was written to help understanding exactly what's going on in the adolescent brain. Possessing knowledge of the adolescent brain and parental strategies to successfully shepherd teens through this most dangerous period of all, **BAD THINGS DON'T HAVE TO HAPPEN.**

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A Note from the Author

My book *Mind Candy: Who's Minding the Adolescent Brain?* is not intended as a 'slam' on our beloved teenagers. Nor is it intended to 'trash' parenting. I have had parental experiences with four teenagers myself at home and thousands of teenagers in the classroom. For the most part, teens give parents and educators much more treasure than trauma and vice-versa. Yet, a lot of wasted time is spent in worry and sleepless nights hopeful that our teenagers will be OK spending the night with friends or away from home in college. What could we have done differently to make them aware of how dangerous some activities they may engage in can be? Will they make responsible decisions when we're not around?

To this professor of psychology, *increased knowledge* is always the first step and a good start. 'Mind Candy' is simply a start. In addressing adolescent issues I tell my students '*Just Say Know*'—know and trust lab-driven, peer-reviewed, scientific articles and studies to get them along as safely as possible until they get older and find their own way. In the meantime, trust your instincts and watch your back.

Fortunately, I know adolescents fairly well since I have been privileged to teach them for over twenty-five years. In teaching the art of writing and publishing psychology papers I required one assignment in particular—the *Psychological Autobiography*—an essay that encouraged students to share many of their concerns and fears on paper. Many of the essays centered around relationships, acceptance, rejection, and parenting. Many talked frankly about suicide, drugs, eating disorders, peer pressure, and bullying. I have heard a steady outpouring of these and other issues over my entire professional career.

Those essays and my work as a co-founder of a college forensic science program and fifteen-year independent study into neuropsychology were the motivating factors behind writing 'Mind Candy'.

In parenting adolescents, many parents try to combine common sense strategies with reading a few pop culture magazine articles or pop psych 'how to books'. In all of this, where is knowledge of the brain? Who's minding the adolescent brain? Little of practical substance in adolescent neuropsychology existed until the decade of the brain in the 1990s. In that decade and those that followed, the teenage mind in terms of the adolescent brain started to emerge. In the intervening years, the neuropsychology of adolescence was launched with the most recognizable organ of behavior in the universe—the human brain—as the centerpiece.

I believe you have chosen the right book to translate the adolescent brain into exactly what's happening in the teenage mind!

'Mind Candy' provides up-to-date, cutting edge brain research written in easy to understand non-technical language. If you get to a section that has some technical words just keep reading. Eventually, you will find my point even if the terms are difficult to grasp. I try to end such sections with a tidy, non-technical summation.

I have included several landmark studies. For example, The Giedd Longitudinal Study of brain sequential development, and the Volkow Addiction Study both of which provide insight into powerful regions of the brain known as the midbrain limbic system (MLS) and how addiction to the brain's powerful neurochemistry works. In fact, it is within the MLS and brainstem and connections, where addiction, sexual experimentation, and other behavioral scenarios exist.

These powerful regions provided the inspiration (and notoriety) behind the title 'Mind Candy'. When kids get into a candy store, clerks better watch them carefully, or they might load up on far too much junk! Sometimes this leads to more than a stomachache. It could prove to be a lifelong headache.

Don Jacobs, 2006

Mind Candy

Who's Minding the Adolescent Brain?

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CHAPTER ONE

"The dream of all parents would be to raise cautious adolescents; the fear this won't happen ends up in sleepless nights and garish nightmares."

--Don Jacobs

1 The 'Super-sized Brain'

Our big, super-sized brain lies encapsulated within the protective cocoon of our skull like a buzzing utility plant, yet it is woven into every fabric of our being. Today, *mind in terms of brain* is starting to be quantified (measured) by developmental studies of growth progression. These longitudinal studies are changing the way we conceptualize puberty and adolescence. High-resolution neuroimaging of the brain, soon to be addressed, and in forensic neuropsych by brain fingerprinting, a highly sophisticated brainwave detection technique, is disclosing secrets of criminal mind. Brain fingerprinting is slowly replacing the notoriously inaccurate 'lie detector' physiography. For example, in brain fingerprinting, when the brain recognizes a bit of information (from a crime scene) it registers what's known as a P-3 wave almost instantaneously from sensitive monitors strategically placed around the head. There is no place to hide in mind within cortices of a guilty brain. Research continues in the interpretive phases of both brain neuroimaging and brain fingerprinting.

In the age of neuroscience, brain technoscience is here to stay and is changing everything we thought we knew about The Adolescent Brain. What neuroscientists now observe in cortices of *specific brain regions* and *powerful neurochemistry* illuminated there, and the roles they play in adolescence, is frankly disturbing and far beyond the hormonal 'storm and stress' of 'The Awkward Years', used to describe teenagers in decades past. As we will demonstrate, the Old School view of adolescence is *not only dangerous, but also potentially deadly.*

'Predator-Prey' Scenarios

Let's get to some specifics. We have known for sometime that regions of the brain and neurochemistry lie behind 'competitor-rival' scenarios commonly observed in our national obsession with sports. Fierce competition can be observed in every ballpark, soccer field, stadium, and sand lot on any given day of the week. Most of us have plenty of personal experiences of going to great lengths to win against rivals. As brain-driven behavior, competitive spirit is understood as an intoxicating mix of testosterone for aggressiveness, norepinephrine for focus, and the release of dopamine upon anticipation of winning (the thrill of victory) and the endorphins for feeling exhilaration, and analgesic soothing for aches and pains.

But is there a darker side, a deeper, more sinister side to competitor-rival scenarios? Is this side characterized by more aggressive and more manipulative behavior? Might 'predator-prey' scenarios exist? Could these more dangerous features lead to heightened aggression spilling over into violence? What causes this to occur? One thing is for certain: we have not survived as a species atop the food chain by having a 'lame brain' or by being meek and unresponsive to surroundings.

What part of bullying is not 'predator-prey'? Bullying is certainly not an instance of competitor-rival scenarios. It's far too extreme, often leading to violence and retaliation themes. Manipulating of a despised person to the point of humiliation, potentially leading to suicidal thoughts, or serious retaliation by those bullied, goes far beyond 'competitor-rival' scenarios.

What part of date rape drugging is not 'predator-prey'? Are there specific regions in the brain that function as biological templates for assertive, aggressive, and even savage behavior? (Tellingly, all new

authors seeking agent representation find a website entitled 'Editors and Predators' to be of immense value in dodging 'predators' and 'sharks' out for the quick deal.)

While puberty provides chemical illumination of testosterone and other powerful chemicals during adolescence both boys and girls may demonstrate a highly competitive nature in sports and in competition for the attention of a 'hot' classmate. But, how thin is the line between competitor-rival and 'predator-prey' scenarios? This is an underlying theme that runs throughout 'Mind Candy'. Neuroscience may not have all the answers yet, but they are hot on the trail of many possibilities.

The release of testosterone in the Y chromosome 'hard-wires' the male brain prior to birth while absence of testosterone 'wires' the female brain. Accompanied by high levels of testosterone, adolescent males in the grasp of puberty are far more capable of segueing from 'competitor' to 'predator' in adolescent scenarios. But, females appear to be becoming more 'predatory' as headlines remind us daily. 'Girl fights' and attacks upon boyfriends, teachers, and peers can be on par with boys and be down right nasty. As new stories remind us, some adolescent girls have recruited male classmates to murder their parents—a clear instance of predatory-prey.

That adolescents are capable of aggressive behavior far beyond competitor-rival scenarios, once described as juvenile delinquency, have now arrived at the doorstep of neuroscience. What explains teen violence that seems to occur daily in schools and in neighborhoods? For example, a carload of teenage boys targets a front yard with a few kids talking and minding their own business. They careen up to the curb, empty into the yard, and start a brawl as the melee is caught on videotape. Bones are broken, skulls are fractured, and blood is spilled.

Have some adolescents never been taught to control their impulses, or to say 'No!' to a crowd of their peers? Is bad parenting to blame? Regardless of psychosocial and instrumental learning components, at a deeper level, are specific regions of the brain—regions that might hijack other more cognitive regions—a part of 'predator-prey' scenarios? Could it be that prefrontal regions of the brain are not well connected, immature, or have not been stimulated to develop precociously?

As we will soon discover in the Giedd Developmental Study of brain sequencing, the brain follows BY NATURE a bottom-to-top, back-to-front developmental agenda. The regions of cognitive decision making—the prefrontals—are, in fact, *the last regions to develop in adolescence*. This explains a lot of teenage behavior. However, this sequencing *can be modified* somewhat as detailed in subsequent chapters.

No Stale Candy

'Mind Candy' offers no 'stale candy' excuses for delinquency or criminal behavior: when kids 'do the crime they do the time'. We seek to disclose a more complete picture behind adolescents' 'behaving badly'. Only with the full picture may we move confidently forward toward a neuropsychology of adolescence and a neuroscience of parenting.

Until the next chapter, I will persist in using quote marks around the word 'predator-prey' to soften the reality of these regions, while allowing the compelling arguments from neuroscience to slowly unfold. Parents and educators are urged to withhold judgment until then. Let neuroscience be convincing or not.

Adolescent Psychopathy

What neuroscience knows about The Adolescent Brain (and the brains of violent criminals and psychopaths) will take the entire book to present. Could features of *adolescent psychopathy* comprise the line between competitor-rival and 'predator-prey' scenarios? As we will see, *psychopathy* is a clinical diagnosis referred to in the DSM (Diagnostic & Statistical Manual of Mental Disorders, the clinician's guidebook of psychopathology) as *antisocial personality disorder*. In fact, there is so much more to psychopathy. Is psychopathy a clinical disorder, or is it a NATURAL aspect of the 'super-sized' *Homo sapien* brain that is particularly evident during the adolescent years? Could it be argued that *features of psychopathy* are, in fact, REQUIRED to survive among fierce competitors and 'predators', with some adolescents who are prone to violence? How often do adolescents act cavalierly (carefree disregard) and/or appear emotionally indifferent in the face of dangerous activities? How many teens act glib (slippery), or routinely lie to adults? Are teens often superficially charming and full of self-serving (egotistical) agendas? Do adolescents ever exploit peers for personal gain? Do some teens 'write off' hurting others because they 'had it coming'?

A cavalier attitude, emotional indifference to danger, acting glib and telling lies, possessing a self-serving, superficial charm, and lacking a conscience, comprise characteristics and features of psychopathy.

It is precisely within the DSM where a society-wide alarm should have sounded for the growing problem with adolescent behavior, especially taking modern popular culture into account. Diagnostic criteria directly connected to adolescence dominates the pages of the DSM with disorders of addiction, learning, development,

communication, eating, sleep, mood, personality, sexuality and gender, paraphilias (sexual disorders), impulse control, adjustment, and conduct disorders. Adolescent antisocial behavior (somewhat analogous to psychopathy) is characterized by oppositional defiance, often observed in juvenile offenders. Roughly half of the DSM is devoted to adolescent disorders and dysfunction.

It is no wonder that 'Mind Candy' is so adamant about adolescent reinvention and guidelines for a creation of a neuroscience of parenting. Since politicians, educators, and parents have not been vocal enough in this endeavor, are we already 'too far gone' as a society to try to salvage the physical and mental health of our children and protect them from escalation of 'predatory-prey' scenarios?

Now, let's get down to business. The region of the brain that is the most dangerous and the most challenging to bridle during The Teenage Years is the midbrain limbic system (MLS), which is garishly illuminated and powerful during adolescence.

2 'Gimmicks of the Limbic'

Early on, scientists knew of the sheer survival necessity of the brainstem and cerebellum in mammalian species and connections to autonomic (automatic) functions. Centers for the control of heartbeat, breathing, blood pressure, digestion, neurochemistry, and homeostasis house many *ritualistic and obsessive-compulsive-like mechanisms* necessary for survival.

It is not difficult to comprehend how such everyday, ordinary behavior such as the drive to defeat competitors; aggression, courtship, mating, and territorial defense (turf wars) set the brain's cruise control to ALERT with possibility of 'predator-prey' scenarios. Granted, most individuals are non-violent and choose to handle threats and disagreements in civilized ways. But not everybody does.

In the 1960s, psychologist Jose Delgado pinpointed a regional architect of mind and a component of 'predatory' behavior (other than the brainstem). This event occurred in Delgado's famous 'charging bull' demonstration. Delgado implanted an electrode in a bull's hypothalamus within the MLS. Delgado became an instant celebrity when his radio-controlled electrode caused the charging bull to stop dead in his tracks, mere hoofs away from the stoic researcher. The 'Gimmick of the Limbic' worked. (Although some critics maintained the media hungry Delgado actually implanted the electrode in the bull's motor cortex, which would account for his sudden passivity with a single click from his handheld transmitter). Yet, the demonstration of *controlling emotion* (and allegedly identifying the regional source in the brain) produced implications for human manipulation in the intervening years. This event spawned a generation of application from unvarnished quackery to quantum mechanics.

Fast-forward to the 1990s when neurologist Paul MacLean identified the 'brainstem—cerebellum' connection as the 'reptilian brain' (or his preference of R-complex brain) with similar *repetitive and ritualistic agendas* observed in lizards and snakes. Beginning with the 1990s *Decade of the Brain*, neuropsych textbooks were being rewritten fueled by advances in brain developmental sequencing and brain neuroimaging. Suddenly, brain was catapulted into the limelight of mind—the perfect metaphor for brain.

Surely, the extraordinary images of high-resolution brain scanning would open doors long padlocked by the slow advance of medical technology merging with science. (I prefer the term 'technoscience'). Misapplication has a long and sordid history. We need mention only lobotomies, shock therapy, and physiography—the notoriously inaccurate 'lie detectors'—to make our point.

From mapping the brain's glucose consumption in colorful PET scans to spectacular three-dimensional models in SPECT scans and others, the brain became the center of the universe for mind.

Applications of *brain imaging technology* ranged from fiber optic surgery to medicolegal courtroom drama. Twenty-first century high-resolution neuroimaging hogged headlines in respectable newspapers all over the world. Mind in terms of brain was finally going somewhere.

Suddenly, criminologists perked up their ears to the groundswell of forensic neuropsychology and the technoscience of brain scanning uncovering 'Gimmicks of the Limbic'—the very regions illuminated during adolescence. Far more troubling was the garish illumination of sexual shenanigans and addiction, honeycombed within the MLS. Along with the MLS and in conjunction with the brainstem's focus on territoriality and 'dominance of competitors', *Homo sapiens* can be a most troublesome species—especially to some of its own members.

It is troubling but accurate to put the word 'sexual' next to the word 'predator' when describing the MLS. Known in pop culture as *serial killers*, sexual predators are the scariest criminals imaginable. They kill a string of strangers and may be constantly on the move. Criminal profiling had to be invented to capture this most elusive of all predators. The MLS is indeed a potentially savage place.

In the preceding years leading up to and including insights from the Decade of the Brain (1990's), BOTH regional architects behind 'predator-prey' scenarios were identified, delineated, and expounded upon by neurologist Paul MacLean in his celebrated *Triune Brain Paradigm*. Although MacLean had coined the term limbic system in 1952, the full impact of the brain's *complex interdisciplinary connection to other regions* was not well understood until the 1980s. In this decade and spilling into the 1990s' the *specificity and functional*

autonomy of brain region themselves, coupled with deep *interconnections* to furthestmost regions and how potentially savage the MLS could be absent prefrontal regulatory control was perhaps the most significant advances. Yet, the general public remained in denial and comfortably numb connecting the dots of adolescence to 'awkwardness' and 'storm and stress of hormones'. In the 1990s journal articles in neuropsych said otherwise.

What lies beneath *impulsivity, violence, and embracing inherently dangerous activities, and the nightmare of addiction* is due to *specific regions* of the brain by name the midbrain limbic system (MLS) and the brainstem.

Civilization and appropriate behavior are NOT POSSIBLE without adequate prefrontal regulatory control. Bad parenting, or the incompetent variety of the Brad and Janet Dodger School would, of course, negate successful shepherding of teenagers into prefrontal regions.

One of the worst habits from Brad and Janet style of parenting is to over-indulge or over-protect children, especially the favorite child. And, regardless of parental denials, there is a favorite child, just ask children themselves. This condition of favoritism artificially inflates self-esteem often escalating toward grandiosity. Adolescents thus afflicted can become arrogant, manipulative, and psychopathic to the point of becoming abrasive to classmates; they often make very poor choices.

3 Academy of Mind

In the late 1990s, armed with mounting evidence of *frontal lobe abnormalities* in violent criminals, neuroscientist Adrian Raine at USC, Daniel Amen, a forensic psychiatrist in private practice, and neurologists Jonathan Pinkus and Antonio Dimasio, and a cadre of