

We need to *carefully frame* how ASD children/teens focus their attention so that they are able to experience emotional intimacy, feel a sense of belonging to a social community, achieve meaningful employment, and find a partner/spouse – rather than develop “techno” competencies.

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poor behavioral regulation to hyper verbal, intellectually advanced, with average behavioral regulation. The reason that the work of Lovaas at UCLA in the 1970's and 1980's was so significant was he demonstrated applied behavioral analysis (ABA) could increase IQ points, language, and adaptive functioning in children who had deficits in these areas.

Today, the children diagnosed with Asperger's syndrome and/or high functioning autism have very different deficits/needs and thus we now have an expanded understanding of autism and what type of intervention is effective.

I think it is fair to say that 30 or 40 years ago the "high end" of the spectrum went largely unnoticed – perhaps they were described as shy, antisocial, odd, strange, eccentric, or "nerdy." Because we now include children who have an abundance of language (but are poor communicators), may be intellectually advanced (but cannot think dynamically), and are often skilled at following rules (but lack resilience) the true incidence rate of autism may now be reflected in 1/88 statistic recently released by the CDC.

One thing is certain, three decades ago (and more) NO child was living inside their homes – isolated from their peers and community, sitting in front of a computer scrolling through facts/images, playing video games, looping through YouTube videos, or simply watching a scene in a DVD for hours on end.

Until such time that autism research focuses on the impact of technology on the developing ASD brain, it make sense to safeguard the ASD brain from high levels of technology exposure. Given the particular limitations and vulnerabilities of the ASD brain common sense clearly dictates that parents and educators should exercise great caution in the way in which ASD children and teens interact with any form of technology -- with computers at the top of the "toxic" list.

In developing an approach to working with ASD children and teens it is important to keep in mind that the process of neuroplasticity can result in an expanded capacity for problem solving, insight, and empathy.

diagnosed with autism spectrum disorder is unrelated to the dramatic rise in home based technology, particularly the use of the home computer.

If one were to sit down and design a form of environmental stimulation that would be toxic/damaging to the ASD brain by virtue of exacerbating the core neurological deficits of the ASD brain, that stimulation is 21st century technology: laptops/the home computer gaming, internet surfing, tablets, handheld gaming devices, and video gaming.

21st century technology successfully:

- 1) increases social isolation
- 2) ***combines pleasure with social isolation***
- 3) decreases the need to develop reciprocal conversation skills (and encourages monologues/lectures)
- 4) decreases the need to read and react to non-verbal communication
- 5) provides limitless opportunities for the acquisition of static information
- 6) encourages static thinking (rote application of procedures/facts)
- 7) eliminates the need to develop skills in innovation and improvisation
- 8) decreases need to develop collaboration/teamwork skills
- 9) decreases the need to develop conflict resolution and compromise strategies
- 10) eliminates the need to develop “grey area” thinking/”good enough” problem solving (problems with no “right” answer or problems with multiple “right” or “wrong” answers)
- 11) decreases the need to develop empathy and insight (mindsight)
- 12) serves as an obstacle to physical exercise and outdoor forms of recreation
- 13) increases involvement in fantasy and decreases opportunities for three dimensional problem solving and competencies
- 14) decreases opportunities for neuronal growth/neuroplasticity.

When discussing the dramatic rise in ASD diagnoses, I am often asked the question: ***“Where were these kids 30 or 40 years ago? Did they really exist? Did we simply not see these kids?”*** It is certain that the range of children diagnosed has expanded – from non-verbal, intellectually challenged, with

As an alternative to prohibiting all entertainment-based technology use Monday through Thursday, some ASD children/teens can effectively manage sixty minutes of screen time during the week and ninety minutes of screen time on the weekend.

If a family decides to try to create a balance, integrated, growth producing lifestyle, then, they need to have a clear understanding of how technology can be used to enhance the off-line life of an ASD child and teen.

Healthy (balanced/integrated) technology use involves the following activities and practices:

- 1) using social media to communicate about daily events with off-line friends
- 2) using social media to arrange for off-line/community based outings
- 3) using social media to participate in a political action group
- 4) using social media to post photographs, videos, and music (created by the child/teen)
- 5) writing a blog on a topic related to daily life, current political events, or reviews of music and film
- 6) creating a website
- 7) editing video or mixing music
- 8) creating an online photo gallery
- 9) e-mailing family and friends
- 10) completing homework assignments by using word processing/power point/spreadsheet software
- 11) conducting meaningful research on topics related to school assignments
- 12) connecting with off-line social, recreational, or political ***groups***

Summary

Whether the exposure to technology proves to be an environmental toxin for the ASD brain is a research question that has yet to be pursued. As noted above, it is difficult to imagine that the dramatic rise in children and teens

- 5) **one “play” computer** (used for games, social media, down loading music, internet surfing).
- 6) **Wi-Fi is allowed**, although all wireless technology (e.g., i pad and smart phones) must comply with a “tech” curfew – meaning at 900pm all wireless devices are given to the parents/caregivers and are plugged into a power bar for the night (**under adult supervision**).

With respect to access, technology is **NEVER allowed in the bedroom** of children/teens -- whether they are ASD or typical (smart phones, laptops, handheld devices, tablets, and gaming consoles).

Monday through Thursday there is no access video games, computer games, or TV/DVD’s. **Sixty minutes** of social media time **is** permitted – after homework and household chores have been successfully completed.

Friday through Sunday ninety minutes of screen time is permitted, again provided that all homework and household chores have been successfully completed.

Screen time includes:

- 1) video gaming
- 2) computer gaming
- 3) net surfing
- 4) social media
- 5) YouTube
- 6) EBay
- 7) Wiki research
- 8) TV/DVD.
- 9) Most importantly, at no time can the ASD child/teen utilize technology to reinforce repetitive/static thinking. **In other words, there is a prohibition on repetitively researching a particular topic on the internet, watching YouTube videos repetitively, watching scenes from a DVD repetitively, scrolling through eBay pictures (NO STATIC use of any form of technology).**

played/squirt guns/water balloons, involvement in local or global political movements, support of heal the bay/green groups, participating in homeless shelter food program.

The “B.I.G” Approach.

If the ***Time Machine*** approach is not a realistic option due to the impact on siblings, or the belief that a radical change in technology consumption and the resulting change in lifestyle does not make sense given the overall impact on the family (i.e., the benefits of technology outweigh most of the risks), then I recommend the ***B.I.G.*** approach.

The acronym **B.I.G** stands for **Balanced-Integrated-Growth**. This approach allows for greater flexibility and greater quantities of screen time than is permitted within the ***Time Machine*** -- with the understanding that parents/caregivers will create a ***balanced, integrated, and growth oriented lifestyle.***

In this approach technology is viewed as offering opportunities for entertainment, education, communication, artistic expression, and social and political awareness and action. Technology is also seen as offering experiences that can ***augment or enhance off-line life.***

Technology is therefore ***not considered as central or indispensable to any member of the family or the family as a whole.*** Face-to-face interaction is a priority and the family recognizes the importance of allotting time for rest, self-reflection, exercise, community-based recreation, and working through boredom.

The B.I.G approach sets firm and consistent limits on access to technology and the way in which technology is utilized.

The B.I.G approach allows for:

- 1) ***one videogame console***
- 2) ***one television/DVD player***
- 3) ***one tablet/I pad***
- 4) ***one “work” computer (2 if there are siblings)***

As would logically follow from the parameters that are in place for siblings, parents should make similar changes in their screen time consumption. Parents may have a computer in their bedroom that is hardwired to the Internet, a printer, and a television and DVD player. ***Clearly, it is best for parents to model healthy “online” and “offline” behavior -- which means a balanced and integrated lifestyle.***

For many parents, the thought of significantly reducing their screen time is anxiety provoking and is generally met with various arguments focusing on why maintaining a Wi-Fi connection, tablet technology, Facebook accounts, and Internet research, is an essential and necessary part of family life in the 21st century.

Although it is certainly true technology has become woven deeply into the fabric of family life in the 21st century, it is by no means the case that our relationship to technology is leading to a more satisfying, happy, and productive family life. It is therefore recommended that parents try for a period of a ***minimum of 60 days*** a reduced “***screen time diet***” and a simultaneous commitment to expanding family time, outdoor activities, and involvement in a wide range of enrichment and recreational activities.

Given the current consumption of screen time and the reliance on technology for entertainment and communication, it has become very difficult for parents to remember what types of activities and events they were engaged in prior to the advent of multiple computers, gaming systems, tablets, smart phones, etc.

The following is a list of activities that parents can integrate into their daily lives: ***family dinners, family reading time, creating a family tree/genealogy, hiking, biking, fishing, renting a boat, listening to music, attending a live concert, drawing/painting, pottery/clay play, going to museums, writing a play, creating a short film, photography, writing poetry, gardening, cooking, housecleaning, home repairs, animal care, volunteer activities/community service, craft activities, puzzles, board games, science experiments, astronomy, window shopping, food shopping, going to the beach/boogie boarding, swimming, bowling, camping, creating memory books/scrapbook, window shopping, picnics, water***

- 3) handheld devices/Nintendo DS
- 4) or a “gaming” computer.

With respect to access to technology or “screen time,” the ASD child/teen has a **maximum 30 minutes** of television or DVD time Monday through Thursday after all homework and household chores have been completed.

A maximum of 60 minutes of screen time is available to the ASD child/teen Friday, Saturday, and Sunday after all homework and chores had been completed. Parents can designate one night per week as “movie night” – during this time the family selects a film collaboratively and watches the film together.

In families with siblings the **Time Machine** approach can be modified so that siblings have access to the Internet/social media, computer based games, and video games, **provided that all technology is confined to one room that can be secured any time by closing and locking a door** (den, family room, or parental bedroom). In this scenario, siblings are **not** allowed to have **any form** of technology in their bedroom, including laptops, tablet technology, and smart phones.

It is strongly recommended that siblings adhere to a similar entertainment screen time schedule as their ASD sibling. It is also strongly recommended that use of social media, Internet surfing, instant messaging on the computer, be considered **part of their daily screen time allowance**.

Obviously, this approach means siblings will have a dramatically reduced amount of screen time compared to their peers. The rationale for this approach is the amount of screen time currently consumed by typical teens – which according to the Kaiser Family Foundation exceeds 7.5 hours per day (10.5 hours when switch tasking is factored in) -- is excessive and leads to a variety of problems, not the least of which is the loss of the art of conversation, the loss of time for self-reflection, a sedentary lifestyle, weight gain, headaches, eye strain, and orthopedic problems such as carpal tunnel syndrome.

Each day the parent/guide and child/teen review the ***wheel of balance*** and decide collaboratively (if possible) on how the child/teen's attention will be focused. With each day offering new/novel experiences and elaborations and extensions of previous experiences, the child/teen can develop new neural growth and uses the internal process of neuroplasticity to counter act the damage of technology focused awareness.

The “Time Machine” Approach.

In addition to developing mindsight, it is critically important for parents to limit their ASD child/teen's access to technology. The approach I recommend most I refer to as the ***Time Machine***. As would follow from the name, the ***Time Machine*** approach involves rolling back the clock on the availability and use of technology in the home.

This approach involves a radical change in lifestyle that is based on a commitment to limiting access to technology, while simultaneously incorporating activities that expand cognitive, emotional, and social growth.

In the ***Time Machine*** approach the ASD child/teen has access to:

- 1) **one** television
- 2) **one** DVD player
- 3) **access to one desktop computer**, referred to as the “***work computer***” (assuming the child/teen is ***required*** by their school to use a computer to complete homework).
- 4) **no technology is allowed in a child/teen's bedroom at any time**

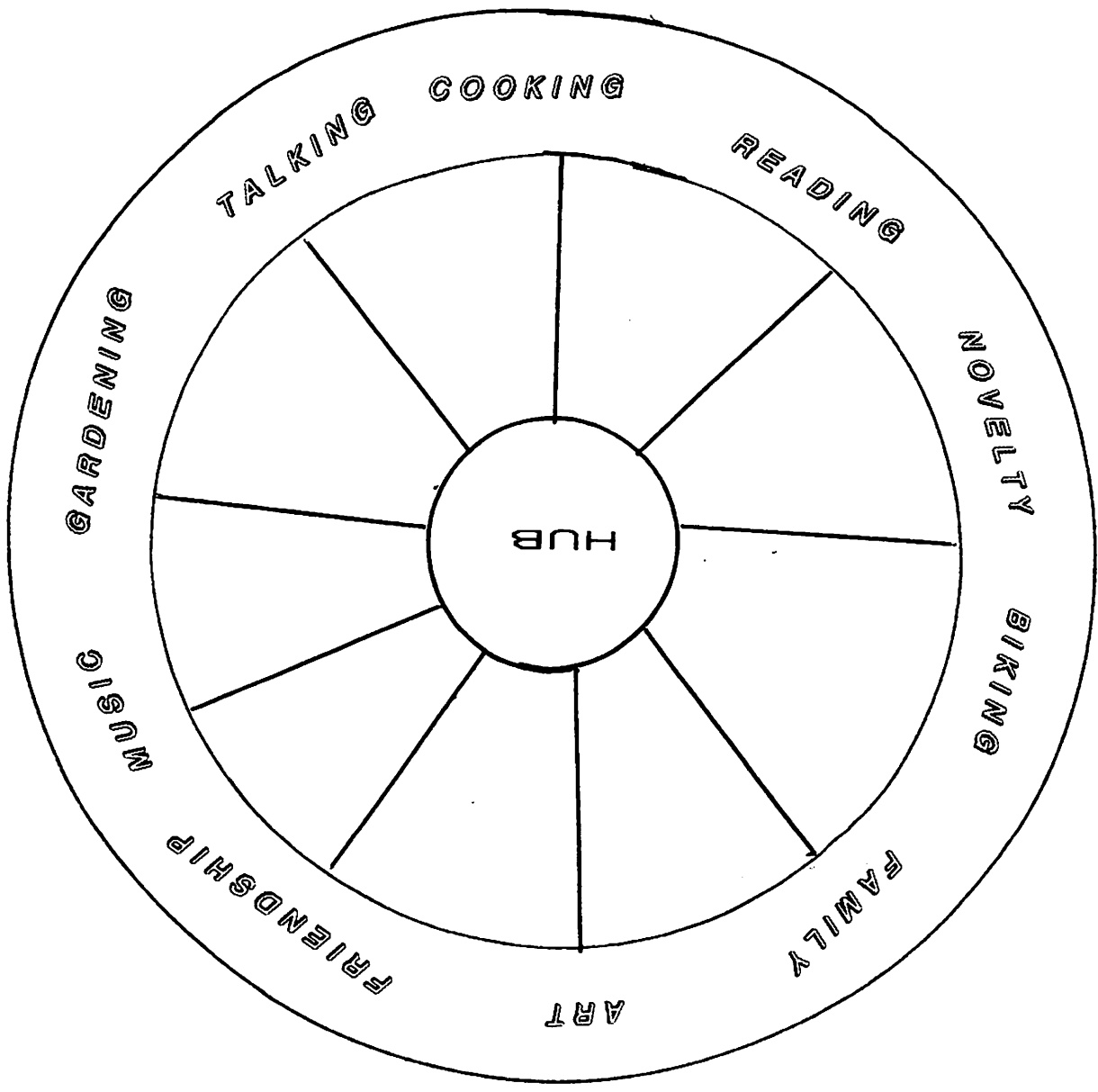
The “work computer” has word processing, power point, and spreadsheet software. The work computer has a hard wired internet connection {no wireless internet}. The “work computer” has filtering software installed that prevents access to Facebook, MySpace, gaming websites, pornography, and any other cyber destination that is used for entertainment.

Ideally, the ***Time Machine*** household ***does not*** have:

- 1) a videogame console
- 2) I pad/tablet technology

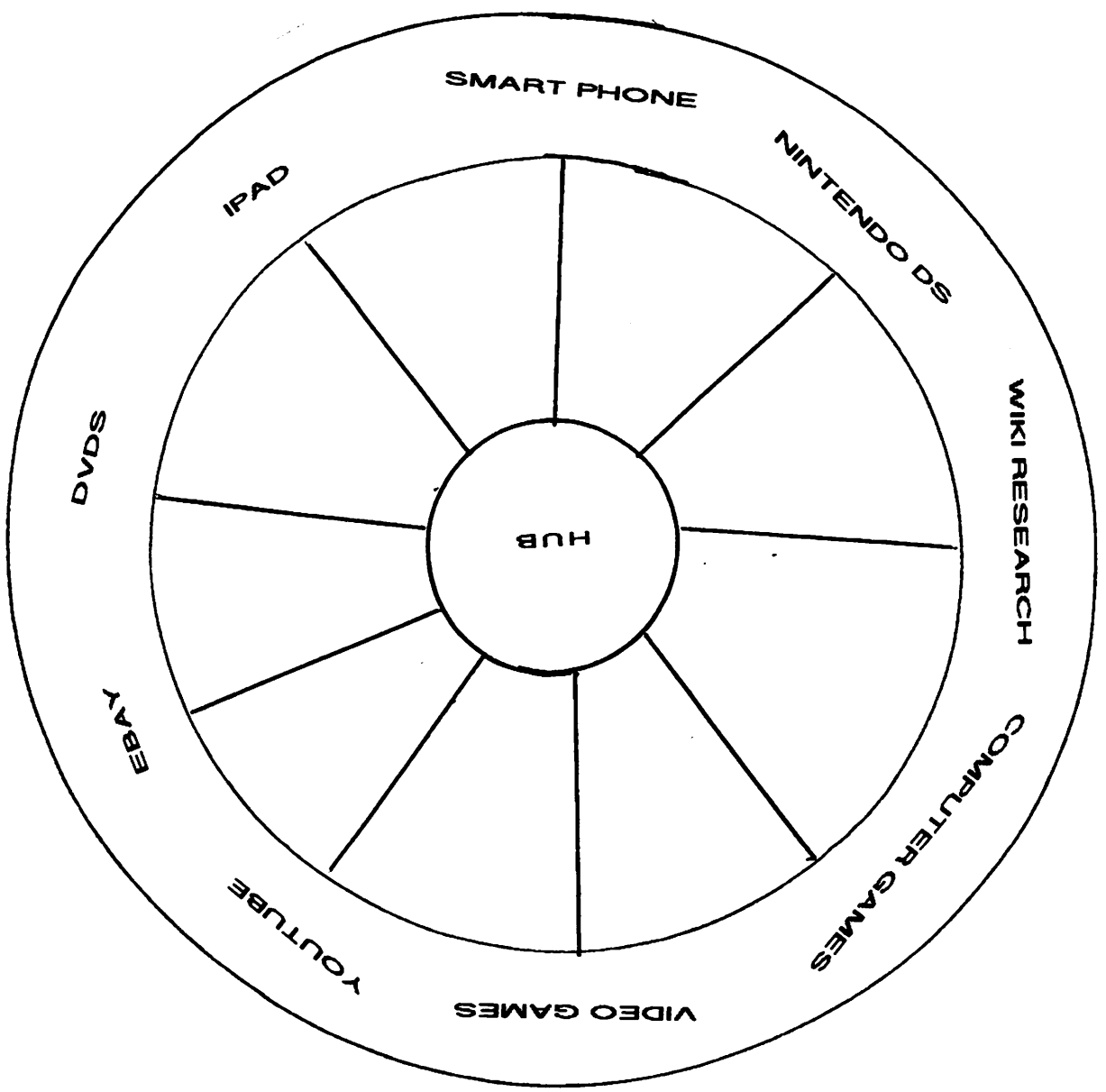
In addition to using the wheel of awareness, it is also important for ASD children/teens that are having a toxic reaction to technology to construct a "wheel of balance." The *wheel of balance* identifies points of attention (rim points) that create a healthy and balanced (integrated) lifestyle: friendship, family, physical exercise, art, music, travel, reading, gardening, cooking, cleaning, animal care, etc.

Wheel of Balance

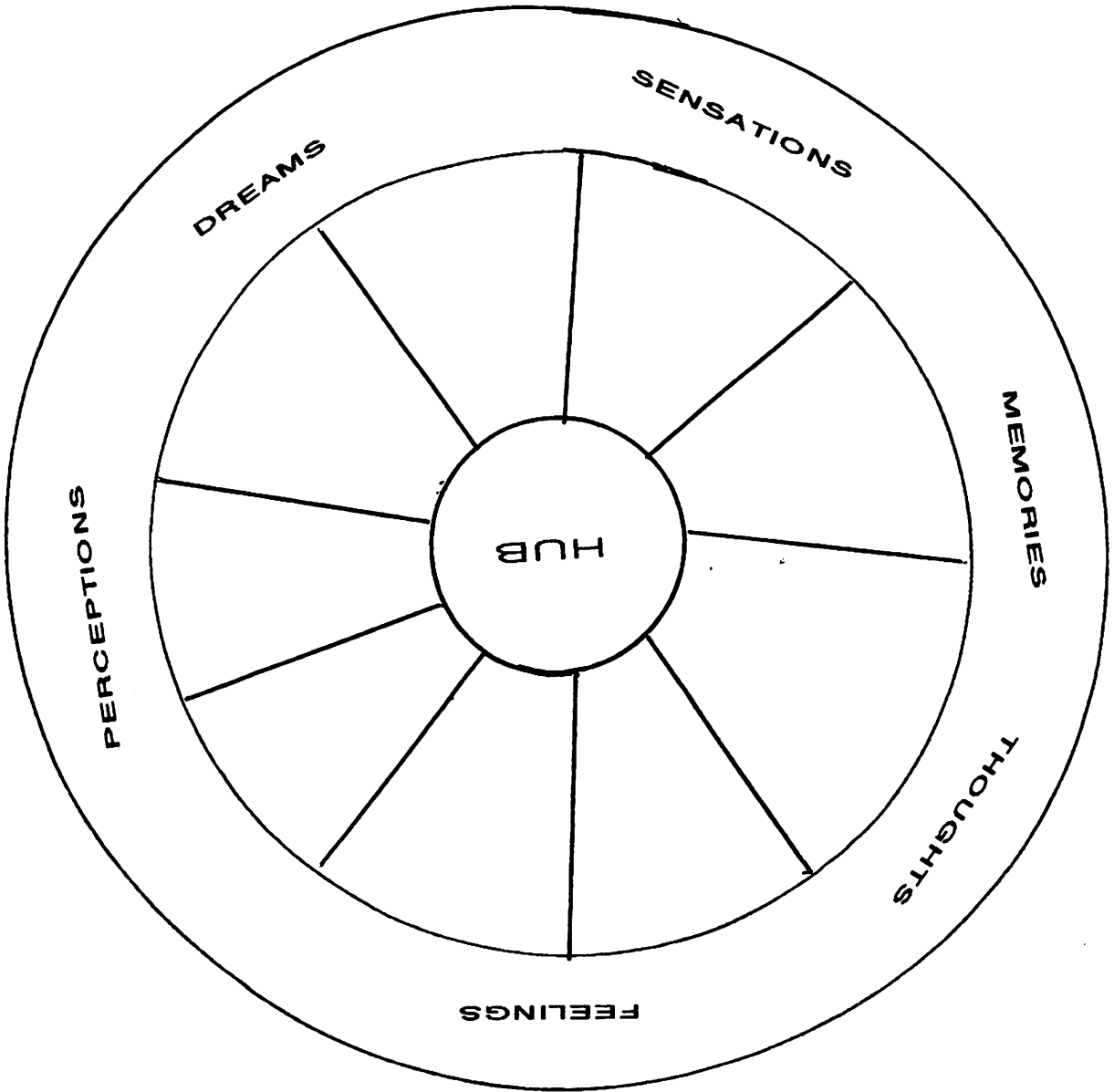


technologically oriented experiences, then the capacity for awareness will be limited to awareness of technologically focused activities and skills.

"Techno" Wheel of Awareness



Wheel of awareness



If we look at the wheel of awareness from the standpoint of a technologically dominated lifestyle, then the various points on the rim consist of videogame strategies, computer games, computer database searches/facts, YouTube videos, handheld games, smart phone games, and more than likely pornography. *If the ASD child is permitted to "fill" the rim with*

In Dr. Siegel's **The Whole Brain Child: 12 Revolutionary Strategies to Nurture Your Child's Developing Mind** (co-authored with Dr. Tina Payne Brison) he states the human brain is a "***social organ***" that is wired to be in relationships. It is "***organized to take in signals from the social environment and these signals in turn influence the way we understand our inner world.***"

According to Dr. Siegel, what happens "***between brains***" shapes and informs what happens "***within each individual brain.***" Dr. Siegel explains that the self and the community are "***fundamentally interrelated***" -- as every brain is constructed by its interactions with others.

The brain is set up for ***inter-personal integration***. Dr. Siegel writes: "***Just as the brain's many different centers are made to collaborate and communicate, each individual brain is made to relate to the brain of the people we interact with.***"

Thus, to enhance the empathy part of mindsight, parents/caregivers must support the ASD child/teen in attending to and narrating their experience of human relationships. By learning to focus attention on the dynamic world of relationships, the ASD child/teen can develop new mental processes that support empathy, intimacy, reciprocity and commitment to others.

Here, again, the parent guides the child/teen through reflection on ideas, memories, and feelings related to being engaged with friends, family, teachers, etc. The process of developing empathy involves taking the time not only to reflect on how others feel (practicing walking in the shoes of a friend or family member), but also ***removing*** technology as a barrier to experiencing ***human relationships as a source of safety, joy, support, and guidance.***

By using the wheel of awareness as a tool for practicing mindsight, parents and caregivers can take a child/teen with ASD on a structured and visual mental journey -- a journey that can result in understanding that they have a mind and that their mind is made up of thoughts, emotions, perceptions, hopes, dreams, and memories.

quieting the environment and 2) engaging in daily **reflections** on feelings, thoughts, sensations, perceptions, and memories.

The key here is to “exercise” the mind by generating attention on mental activity rather than focusing on technology. A discussion/reflection about an emotional event (fear, anger, happiness) or a focused effort to remember a past experience (a success at school or a trauma of being excluded) **builds insight** – slowly but surely.

Every day the parent and child/teen practice **observing and naming mental activity** – and this can be done through a verbal reflection, a journal, a photo gallery, or art work/drawing. Again, the central idea here is to **practice** self-observation.

This process can happen at dinner, in the car, in a one-to-one conversation laying in the back yard, riding bikes, or taking a walk/hike. **For some children/teens engaging the body can be very helpful in centering their attention in the “hub” of awareness.**

In Dr. Siegel’s **Pocket Guide to Interpersonal Neurobiology**, he refers to the acronym **SNAG** - which stands for “**stimulate neuronal activation and growth.**” He writes: “**When we SNAG the brain, we are intentionally trying to promote neural firing and the subsequent gene expression that enables neurons to grow their connections with one another.**”

If we think about all of the opportunities that are swept away by technology in the course of a typical day that could be used as opportunities to **SIFT and SNAG**, the process of creating change is really very manageable. The key is to reduce the noise of the day, particularly competing stimuli from technology, and find ways to engage in the process of **SIFTING, which creates the brain’s ability to SNAG.**

We can also enhance the capacity of the ASD child/teen to see and connect with the minds of others – which is the second part of the capacity for **mindsight (empathy).**

can become aware of -- *our thoughts, feelings, dreams, desires, memories, perceptions of the outside world, and the sensations from our body.*

The hub is the place in our mind from which we can become aware of all that is happening around us and within us. For Dr. Siegel, the hub represents “prefrontal cortex” -- which functions to integrate different regions/centers of the brain.

In Dr. Siegel's book **The Pocket Guide to Interpersonal Neurobiology (An Integrative Handbook)**, he describes the role of the prefrontal cortex in the process of awareness:

“The prefrontal cortex ... Plays an important role in how we put something on the chalkboard of the mind within working memory for short term, temporary memory storage. This is how we seem to keep something in the front of our minds, so that within awareness, within this working memory, we can reflect on something, manipulate it, and then encode the outcome of such processing of this more elaborated form into storage for access at a future time ...”

“We can teach people to develop forms of awareness that empower them to create integration in their lives. What this means is that awareness is the gateway to fostering and respecting the differentiation of others in the cultivation of linkages through compassionate and empathic communication that is at the heart of vibrant relationships.”

The ASD child/teen can learn to center themselves in the hub by turning off technology and then “**SIFTing**” through the activity of their mind with the **guidance of an adult**. For Dr. Siegel “**SIFT**” stands for the act of **observing** Sensations, Images, Feelings, and Thoughts. By engaging in **SIFTing** the ASD child/teen can develop self-awareness and the capacity to make meaningful choices about how and when they focus their attention (rather than be consumed by technology).

The process of observing mental activity may seem outside the reach of a child/teen with ASD, but is actually a straightforward process that involves 1)

who have played console video games, the average age at first use was just under 4 years old (3 years and 11 months). Among 5- to 8-year-olds, 17% play console video games at least once a day, and another 36% play them at least once a week.

We now have a generation of children that have been exposed to massive “doses” of technology and within this generation are children with ASD – children whose particular neurological deficits make them uniquely ill equipped to use technology in ways that stimulate healthy neural development. ***In fact, research has established that youth with ASD show a much higher risk of developing compulsive computer/Internet use than youth without ASD and report higher rates of loneliness and depression related to compulsive use.***

Developing Mindsight

Given that the central problem of technology for the ASD child/teen is the way in which technology consumes their attention, it is imperative for parents, caregivers, and educators to take great care to ***limit access to technology.***

It is also imperative that the ASD child/teen receive ***ongoing support and guidance*** in order to learn to focus their attention on experiences that generate ***intrapersonal and interpersonal awareness, meaningful and lasting community involvement, productive employment, and the capacity for friendship and romantic intimacy.***

By using the research and therapeutic methods developed by Dr. Siegel, it is possible to develop “***mindsight***” in ASD children/teens -- and “mindsight” can protect their attention from being taken over by technology as well as generate new opportunities for social, emotional, and cognitive growth.

As noted above, Dr. Siegel coined the term “mindsight” to capture the uniquely human capacity for self and other awareness. The basic concept of mindsight is described by Dr. Siegel using the image of a bicycle wheel, with the hub at the center (awareness) and the spokes radiating toward the outer rim.

Dr. Siegel says that each spoke represents the way we divide our attention. The rim of the wheel contains everything we can focus our attention on and

With the explosion of laptops, smart phones, and iPads many autistic spectrum children now have access to digital technology, including the Internet, *beginning within the first months of life*. The constant “techno” stimulation of the ASD brain has become so much a part of everyday life that its impact on thinking, attention and social-emotional functioning has gone unnoticed by parents/caregivers and educators.

Statistics from Common Sense Media on Technology Use Zero to Eight

TOTAL DIGITAL MEDIA USE. Today a substantial proportion of the time that young children spend with screen media is spent with digital media — including computers, handheld and console video game players, and other interactive mobile devices such as cell phones, video iPods, and iPad-style tablet devices. Among 0- to 8-year-olds as a whole, a quarter (27%) of all screen time is spent with these digital devices.

MOBILE MEDIA. Half (52%) of all children now has access to one of the newer mobile devices at home: either a smartphone (41%), a video iPod (21%), or an iPad or other tablet device (8%).

More than a quarter (29%) of all parents has down-loaded “apps” (applications used on mobile devices) for their children to use. And more than a third (38%) of children have used one of these newer mobile devices, including 10% of 0- to 1-year-olds, 39% of 2- to 4-year-olds, and 52% of 5- to 8-year-olds.

In a typical day, 11% of all 0- to 8-year olds use a cell phone, iPod, iPad, or similar device for media consumption, and those who do spend an average of 43 minutes doing so.

COMPUTERS. Computer use is pervasive among very young children, with half (53%) of all 2- to 4-year-olds using computers, and nine out of ten (90%) 5- to 8-year-olds having done so. For many of these children, computer use is a regular occurrence: 22% of 5- to 8-year-olds use a computer at least once a day and another 46% use it at least once a week. Even among 2- to 4-year-olds, 12% use a computer every day, with another 24% doing so at least once a week. *Among all children who have used a computer, the average age at first use was just 3 ½ years old.*

VIDEO GAMES. Playing console video games is popular among young children: Half (51%) of all 0- to 8-year-olds has played a console video game, including 44% of 2- to 4-year-olds and 81% of 5- to 8-year-olds. Among those

the state of California. Mr. Zarembo reported that in California 1.1% of public elementary school students have been identified as autistic. However, the rate in Orange County is 1.6%, which is nearly triple that of Fresno County. **Many rural school districts in California list no autistic students at all.** Autism accounts for 14% of the caseload at the Central Valley Regional Center, whereas at the seven regional centers in Los Angeles County autism accounts for 34% of the caseload.

The “digital home” and the rise in autism

The overlap in findings between the UC Davis study and the Columbia University study support the conclusion that autism incidence rates are **influenced** by communication and socioeconomic dynamics. In analyzing these results another common **related** factor is clearly involved– namely: in the identified geographic clusters families have the **economic resources** and the **educational background** to utilize computers and digital technology on an **everyday basis for education, entertainment and communication.**

Certainly, digital communication, computer based technology, and electronic entertainment is pervasive in the Los Angeles and Orange County autism clusters located by the UC Davis and Columbia University studies and is comparatively minimal in the rural areas of California that have a zero incidence rate of autism described by the Los Angeles Times.

It is difficult to measure the difference in **opportunities for mental and physical development** between an ASD child coming home from school and attending to livestock, watering crops, mending a fence, cleaning a barn stall, climbing trees in an orchard, and sitting down to a family dinner without smart phones buzzing/chirping compared to coming home to an environment flooded with the visual and auditory stimuli from multiple screens -- and then engaging in hours of isolation while surfing the Internet for static information, memorizing “factoids,” repetitively watching YouTube videos, repetitively watching a scene from a DVD/movie (forward/back/forward/back/forward), or disappearing into a role playing game that combines social isolation with pleasure and the experience of mastery and competence.

district boundaries. These children are likely exposed to the same environmental conditions, but their parents likely belong to different social networks.

The research showed that the increased chance of diagnosis only existed when parents reside in the same school district. Children who live equally close to the child with autism, but in another district, were no more likely to be diagnosed with the disorder than children who do not have a neighbor with autism. **Results are a strong indication that the “proximity effect” is a social phenomenon and not the result of an environmental toxin.**

UC Davis researchers engaged in a search for autism clusters with the aim of finding an environmental cause for the disorder and identified 10 clusters around the state. The clusters consisted of **highly educated parents, primarily Caucasians, with high incomes.**

The researchers within the UC Davis study obtained birth records for 2,453,717 children born in the state between 1996 and 2006. By 2006, the children all reached at least the age of six, which is the age by which a diagnosis of autism is generally accomplished. State records showed that about 9900 autism cases were in the records of the Department of Developmental Services.

The research team reported in the *Journal of Autism Research* that they identified 10 clusters of autism among the 21 Regional Center offices and two potential clusters. Clusters were primarily in the high population areas of Southern California and to a lesser extent in the San Francisco Bay Area.

The UC Davis researchers concluded that in United States, the children of older, white, and highly educated parents were more likely to receive a diagnosis of autism or autism spectrum disorder. The researchers also concluded that the clusters found were probably not a result of a common environmental exposure, but instead related to **differences in education, age, and the ethnicity of parents.**

In an article in Los Angeles Times written in December 2011, Alan Zarembo (investigative journalist) found different concentrations of autism throughout

themselves in the following year. In this paper, Bearman reports that the likelihood of being diagnosed is not due to environmental factors such as a contagious agent, rather the likelihood of being diagnosed with autism is ***due mainly to parents learning about autism from other parents who have a child diagnosed with the disorder.***

Bearman argues that the Columbia research shows that the likelihood of getting an autism diagnosis is clearly associated with ***person-to-person transmission of information.*** The study reports that parents learn about autism symptoms, learn about doctors who are able to diagnose autism, and learn how to navigate the process of obtaining a diagnosis and services ***from parents who have already been through the process with their own child.***

Bearman emphasizes that these results do not mean that autism is a fiction or that it is over diagnosed. The study does not address the underlying cause of autism, but rather describes the mechanism by which the number of diagnosis is increasing. Bearman states that it could be that the ***real incidence of the disorder is only now being uncovered.***

In the case of West Hollywood, social influences seem to be relevant as there is increased awareness of autism, decreased stigma associated with the disorder, as well as increased numbers of local advocacy groups in this area.

The Columbia University researchers reviewed data on over 300,000 children born between 1997 and 2003 throughout California. The team found that children who live within 250 meters of a child with autism have a ***42% higher*** chance of being diagnosed with the disorder in the following year compared with children who do not live near a child with autism. Children who live between 250 meters and 500 meters from a child autism are 22% more likely to be diagnosed.

The chances of being diagnosed decreased significantly the farther the child lived from another child with autism.

In an effort to learn whether the increase in autism could be explained by a social influence or by environmental toxins or a virus, the researchers looked at children who live close to each other, but on opposite sides of school

“If computer time subtracts from talking, socializing, playing, imagining, or learning to focus the mind internally, this lost ground may be hard to or impossible to regain ... One important aspect of development is to integrate the workings of different brain systems -- Clay into figures, boxes to bird houses, movement to dance, ideas into sentences, impressions into philosophy ... Much of today's technology fragments children's experience instead of integrating it and distracts their mind from the job of making sense and sense making.”

Geographic patterns of ASD in California

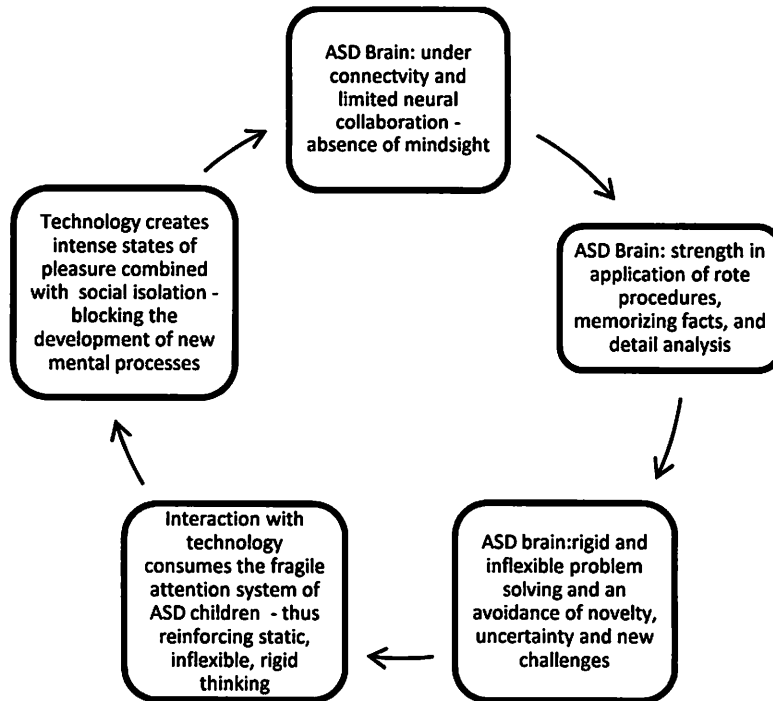
Two recent studies -- one conducted by researchers from the MIND Institute (University of California at Davis) in 2009 and the other by Columbia University in 2010 -- report there are ***specific geographical areas in California with high concentrations autism.***

According to the research in the Columbia study, autism is a condition determined by a ***child's local environment***, challenging the claim that causal factors exist evenly across the country. The study, originally published in the ***Health and Place Journal***, pinpoints a 348 square mile area near West Hollywood that is the epicenter of California autism cases. Peter Bearman, a principal investigator in this study, reports that the findings point strongly to the idea that ***local rather than global processes*** are associated with increased risk of autism.

He states that such local processes could be ***either an environmental factor or a social influence factor or both.*** Bearman believes that the findings suggest that resources should be devoted to understanding what ***“environmental drivers”*** are operative in autism cases. Specifically, he believes that we need a better understanding of how the ***“diffusion of information”*** operates in how we identify the symptoms of autism, how we secure appropriate diagnoses, and how autism is treated.

In a paper published in the ***American Journal of Sociology***, Bearman reports that children who ***live near*** other children who have been previously diagnosed with autism ***have a much higher chance of being diagnosed***

ASD and the cycle of techno-toxicity



Content consumers vs. content producers

Although the computer can be used to develop connections and create meaningful content and skills -- such as website building, blogging, posting poetry, uploading videos/short films and photo galleries, and engaging in political action -- ***children/teens with ASD very rarely use the computer in any way except to reinforce rigid and inflexible neurological and experiential patterns.***

Children, teens, and adults on the spectrum are ***content consumers*** rather than ***content producers*** and the content they consume is static, repetitive, limited in complexity and disconnected from the development of self-awareness and “other” awareness or ***mindsight***.

Dr. Healy writes about the social-emotional cost of the computer:

altering, experience that is accessible across settings (home, school, neighbors, and work), is endorsed by the autism community, and thereby allows for endless opportunities for the development of rigid neural networks.

Once the ASD child or teen becomes hyper focused on technology-based experiences and the corresponding neural networks are formed, it is extraordinarily difficult to enlist their involvement and engage their attention in **any** activity or experience that can expand social, emotional, and cognitive growth.

Prolonged interaction in cyber space and virtual reality ultimately deprives the ASD mind of rich, complex, and **healthy life** experiences that contribute to an **integrated** brain rather than a under connected, rigid, and lopsided brain.

In a discussion of the role of **integration in mental health**, Dr. Siegel states:

“Over the last 20 years, I have come to believe that integration is the key mechanism beneath both the absence of illness and the presence of well-being. Integration-- the linkage of differentiated elements of a system-- illuminates a direct pathway toward health ...”

“As a system moves toward complexity, it is at its most stable and adaptive... Could it be that mental health is indeed a function of integration?”

“When our minds move away from integration, away from harmony, are we then prone to live in chaos and or rigidity?”

If integration is the key to mental health and overall well-being, it is fair to say the ongoing technology and computer use creates **disintegration** -- or compartmentalized, rigid, and closed neural circuits.

experience). Five hours on the Internet, and the naïve subjects had already rewired their brains ...”

“If our brains are so sensitive to just one hour a day of computer exposure, what happens when we spend more time? What about the brains of young people, whose neural circuitry is even more malleable and plastic? What happens to their brains when they spend their average eight hours daily with their high-tech toys and devices?”

Dr. Small warns:

“As the brain shifts its focus toward new technological skills, it drifts away from fundamental social skills, such as reading facial expressions during conversations are grasping the emotional context of a gesture. A Stanford University study found that for every hour we spend on our computers, traditional face to face interaction time with other people, drops by nearly 30 minutes ...”

“With the weakening of the brain's neural circuitry controlling human contact, our social interactions may become awkward and we tend to misinterpret and even miss subtle nonverbal messages ... Although exposure to new technology may appear to have a much more subtle impact, its structural and functional effects are profound, particularly on young, extremely plastic brain ...”

The constant stimuli coming through the computer monitor hijacks the ASD brain's capacity for attention, thereby limiting experiences that can produce mental processes that have value and application in three-dimensional reality.

The ASD child/teen has **a fragile attention system** which requires ongoing support and nurturing. Parents and caregivers must provide **varied experiences** that allow for growth of attention and through expanded attention comes the ability to meet cognitive and emotional challenges.

Given the particular neurological deficits and vulnerabilities of the ASD brain, the stimuli provided through electronic entertainment and the computer is overwhelming and toxic. Simply put, technology provides an intense, mood

The opportunity to avoid the complexity of dynamic social environments and protect oneself from anxiety, confusion, and rejection, while simultaneously experiencing power and competence within virtual worlds, ***creates a relationship to technology that surpasses the reinforcement and value of face-to-face/human relationships.***

Can technology create rapid transformation in brain functioning?

According to Dr. Gary Small's research at UCLA, the brain functioning of ***adults*** can change in ***as little as a week after daily exposure to the Internet.*** With respect to the brains of infants and toddlers – a period when the brain is exquisitely sensitive to external stimuli -- the intense exposure to technology can produce significant and lasting changes in brain architecture and thereby limit the capacity to develop normative social and emotional mental processes.

Dr. Small writes:

“We know the brain's neural circuitry responds every moment to whatever sensory input it gets, and that the many hours people spend in front of computers ... trolling the Internet, exchanging e-mail, video conferencing, instant messaging, video shopping, expose their brains to constant digital stimulation ...”

“Our research team wanted to look at how much impact this extended computer time was having on the brain's neural circuitry, how quickly it could build up new pathways, and whether or not we could observe and measure these changes as they occurred ...”

“We hypothesized that computer searches and other online activities cause measurable and rapid alterations to brain neural circuitry, particularly in people without previous computer experience ... Our initial hypothesis turned out to be correct ...”

“After just five days of practice, the neural circuitry in the front part of the brain became active in naïve subjects (adults without computer

Ongoing use of computers, particularly Internet database searches and online gaming, produces intense and sustained states of pleasure, including euphoric experiences similar to the “high” associated with the use drugs.

The autistic child/teen -- who often feels overwhelmed by the complexity of social interaction and experiences pervasive alienation from typical peers -- can use the computer to escape into an endless variety of cyber fantasy worlds.

Dr. Gary Small, Director of the Memory and Aging Center at UCLA, discusses in his new book **I Brain: surviving the technological alteration of the modern brain**, the way in which technology “hooks” the human brain into compulsive use:

“When we think of addiction, we usually associate it with alcoholism or drug abuse. However, the same neural pathways in the brain that reinforce dependence on those substances can lead to compulsive technology behaviors that are just as addictive and potentially destructive...”

“The access, anonymity, and constancy of the Internet has helped create several new forms of compulsive behavior fueled by the World Wide Web and other digital technologies ...”

“Internet addicts report feeling a pleasurable mood burst or “rush” from simply booting up their computer, let alone visiting their favorite websites -- just as shopping addicts get a thrill from scanning sale ads, putting their credit cards in their wallets, and setting out on a spending spree ...”

“The brain wiring system that controls these responses involves the neurotransmitter dopamine, a brain messenger that modulates all sorts of activities involving reward, punishment, and exploration ...”

“Dopamine is responsible for the euphoria that addicts chase, whether they get it from methamphetamine, alcohol, or Internet gambling ... The addict becomes conditioned to compulsively seek, crave, and re-create the sense of elation while off-line or off the drug.”

Why Technology is Toxic for the ASD Brain

If we consider the relationship between technology and the autistic mind, we can see how the **attention that is consumed through engagement with technology** -- whether it be computer database searches ("research" on areas of special interest), repetitively watching YouTube videos, eBay shopping, video gaming, or searching for pornography -- blocks the brain's capacity to develop new mental processes which, in turn, undermines the possibility of remediating deficits in dynamic thinking and mindsight (insight + empathy).

Dr. Jane Healy, in her book **The Failure to Connect: How Computers Affect Our Children's Minds -- and What We Can Do About It**, addresses the issue of neuroplasticity, attention and technology:

"Human brains arrive in the world with excess potential to make connections (synapses) between different types of neurons. As a youngster carries out certain types of activities, those connections are strengthened, whereas habits that don't get much stimulation or practice may lack a strong neural base. Repetition of an experience tends to "set" connections to make that particular form of learning more automatic ..."

"Age-appropriate computer use may help establish some forms of connections, but inappropriate use may also build resistant habits that interfere with learning. Once set into the brains connectivity, such patterns are hard to break ... Brains tend to become custom-tailored for skills that the environment promotes ..."

"What kinds of connections will our children need most? I advocate giving them the widest repertoire possible so that they will be equipped to deal with multiple eventualities. A child with lopsided experiences is likely to end up with a lopsided brain."

For those professionals who devote time to evaluating and treating children, teens, and young adults with ASD, the development of a **lopsided brain** is a reality and accounts for the failure to develop a wide variety of social, emotional, and cognitive competencies.

“These conditions include repetition, emotional arousal, novelty, and the careful focus of attention. Strengthening synaptic linkages between neurons is how we learn from experience ... Our experiences stimulate neural firing and sculpt our emerging synaptic connections. This is how experience changes the structure of the brain itself -- and could even end up having an influence on our innate temperament.”

Static vs. Dynamic Abilities

Despite limited collaboration and connectivity between different centers in the brain, individuals with ASD seem to be capable of developing ***advanced static*** cognitive abilities (i.e., rule following, schedule following, categorizing, and memorizing procedures, rules, algorithms, scripts, and protocols) while also demonstrating advanced skills in memorizing details and static facts (information that does not change based on context).

As is evident in children, teens, and young adults diagnosed with high functioning autism or Asperger's syndrome, it is common to see exceptional abilities in applying procedures and rules, memorizing categories, identifying errors in the application of protocols, deductive reasoning, formula application, imitating, and numerical computation, and instrumental referencing.

The cognitive or mental processes that appear to be most affected by “under connectivity” or limited neural collaboration fall into the category of dynamic thinking and problem solving: ***innovating, reflecting, anticipating, evaluating, expanding, elaborating, grey area thinking, fuzzy logic, synthesizing, and contextual processing.***

Most importantly, individuals with ASD -- young and old -- have a universal deficit in the capacity for what Dr. Siegel calls ***mindsight: the ability to understand one's own mind as well as understand the minds of others.***

Individuals with ASD -- ***independent*** of IQ scores, quantity of vocabulary, independent living skills, capacity to adhere to social protocols rules -- struggle to understand their own thoughts, feelings, attitudes, preferences and the thoughts, feelings, attitudes, and preferences of others.

Dr. Minshew has concluded:

"Lower functional connectivity has been found in functional MRI studies involving language, working memory, problem-solving, and social cognition, providing evidence of a general problem with functional under connectivity within and between neocortical systems in autism."

"Under connectivity" and neuroplasticity

If we combine the research and clinical insights of Dr. Siegel with the work of Dr. Just and Dr. Minshew, we can hypothesize that the autistic brain, although limited by under connectivity and neural collaboration, ***can change*** through the process of neuroplasticity by carefully focusing attention on experiences that create new mental processes.

As Dr. Siegel states:

"In the skull portion of the nervous system alone there are hundreds of trillions of connections linking the various neural groupings into a vast spider web like network ... One of the key practical lessons of modern neuroscience is that the power to direct attention has within it the power to shape our brain's firing patterns, as well as the power to shape the architecture of the brain itself ..."

"As we work out, we need to coordinate and balance the different muscle groups in our body in order to keep ourselves fit. Similarly, we can focus our minds to build specific "muscle groups" of the brain, reinforcing their connections, establishing new circuitry, and linking them together in new and helpful ways."

Dr. Siegel concludes:

"There are no muscle groups in the brain, of course, but rather differentiated clusters of neurons that form various groupings ... And just as we can intentionally activate muscles by flexing them, we can "flex" our circuits by focusing our attention to stimulate the firing in those neural groupings ... Under the right conditions, neural firing can lead to the strengthening of synaptic connections ..."

When we *sustain* our focus on an object, person, or process, brain neurons “*fire*” and then “*wire together*,” creating connections and links between neurons and different brain centers.

Dr. Siegel writes in his book **Mindsight, The Science of Personal Transformation:**

“The brain changes physically in response to experience and new mental skills can be acquired with intentional effort, with focused awareness and concentration. Experience activates neural firing, which in turn leads to the production of proteins that enable new connections to be made among neurons, in the process called neuroplasticity... Neuroplasticity is possible throughout the life span, not just in childhood ... Where we focus our attention channels our cognitive resources, directly activating neural firing in associated areas of the brain ... The implication is that neuroplasticity is activated by attention itself, not only by sensory input ...”

Autism and Neural Connectivity

The research team of Dr. Marcel Just and Dr. Nancy Minshew at Carnegie Mellon University and The University of Pittsburgh report that autism involves the failure of the brain to develop ***neural networks or neural collaboration*** between different centers in the brain. Utilizing functional MRIs, they have established ASD brains ***universally*** suffer from “network under connectivity.”

Dr. Just writes:

“Individuals with ASD demonstrate significant under connectivity in the formation of neural patterns. Specific types of problems and stimuli become rigidly linked to specific brain centers. This limits their ability to respond flexibly and in a more holistic manner to changes in their world ... Findings provide strong evidence that autism is a disorder involving the biological connections and the coordination of processing between brain areas ... At this point, we can say that autism appears to be a disorder of abnormal neurological and informational connections of the brain, but we cannot yet explain the nature of this abnormality.”

retardation, speech and language disorders and deaf and blindness are ***employed at a higher rate than individuals with ASD.***

As is also consistent with research on young adults with ASD (conducted in the United States, Western Europe and Northern Europe), the members of my groups rarely date and virtually never develop meaningful and lasting romantic partnerships. In the twelve years I have been working with ASD teens and young adults I have never seen a client go through the process of courtship/dating resulting in a ***long term committed relationship.***

Although there are complex cultural, sociological, and economic reasons ASD young adults fail to obtain meaningful employment and develop lasting romantic partnerships, ***I believe that daily interaction with computers specifically, and technology generally, plays a central role in blocking the development of the mental processes needed for successful employment and satisfying long-term, intimate relationships.***

Put in a different way, the interaction between the autistic mind and computer-based technology, video gaming, television, DVD-based entertainment, and handheld devices ***increases static and repetitive thinking, communication, and behavior***, and thereby serves as an obstacle to the ***dynamic*** cognitive, social, and emotional demands of the 21st century.

The brain and neuroplasticity.

There is a broad consensus in neuroscience research that the human brain is an ***experience dependent*** organ -- which simply means that brain functioning and brain architecture are influenced by the way in which we interact with our physical and social environments. Recent research by Dr. Daniel Siegel, clinical professor of psychiatry at the UCLA School of Medicine and co-director of the UCLA Mindful Awareness Research Center, shows the brain is capable of transformation and growth, a process referred to as ***neuroplasticity***, throughout the lifecycle.

According to Dr. Siegel's research, neurological growth is not confined to an "early" window of opportunity. Dr. Siegel explains that when we focus our attention we can create ***new*** neural connections in the brain.

The Toxic Relationship: Technology and Autism

Christopher Mulligan LCSW

The relationship between technology and autism

It is widely held that computer literacy skills are critically important for children, teens, and young adults diagnosed with autism spectrum disorder (hereafter ASD). Parents of young children are informed by a wide variety of autism specialists that school achievement and achievement in the 21st century workplace is dependent upon mastering computer skills.

Although it is undeniable 21st century education and employment requires computer literacy skills, the importance of these skills in the lives of autistic individuals has been vastly overstated. More importantly, the cognitive, emotional, social and physical damage associated with the use of computers (and technology in general) is vastly understated or ignored altogether within the autism community.

Over the past 12 years I worked with more than 500 children, teens, and young adults with ASD in the context of socialization groups, family therapy, parent consultation, school consultation, and individual therapy. Based on a review of my records, 88% of my clients grew up with a computer in their homes. 90% of my clients grew up with either a hand-held or console-based videogame system and 97% grew up with a DVD player. Perhaps the most significant statistic is that 85% grew up with a computer and/or a video game system *located in their bedroom*.

My practice now focuses on teens and young with ASD, ranging in age from 13 to 25. I currently facilitate six relationship development groups per week and work with a total of 46 clients. 97% of my clients who are 18 and above are unemployed and 99% are underemployed (that is they have jobs that do not match their cognitive/intellectual skills and capacities). Large scale studies conducted through the U.S. Department of Labor report an unemployment rate of 50% to 75% for adults with ASD. The employment statistics on adults with disabilities confirm that individuals with learning disabilities, mental

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