RELAXATION TECHNIQUES FOR AUTISTIC PEOPLE:

Articles of interest

CONTENTS

The following articles will hopefully be of interest to autistic people and those that support them. They reflect different ideas and approaches which are not necessarily endorsed by the National Autistic Society. It is also important to appreciate that each autistic person is unique and no one approach is right for all autsitic people.

Author: Chris Mitchell
Organisation: Autism Works
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Coping with the effects of Asperger syndrome through mindfulness techniques

Imagine you are a Vietnamese motorcycle rider visiting London. You are used to pedestrians in Hanoi or Saigon crossing the road by walking into the traffic while you swerve around them. In London you would find yourself outside your comfort zone waiting for traffic to cross the road.

Understanding how it may feel to be a person with Asperger syndrome can involve coming out of your comfort zone; being in an environment where you don't know anyone or where nobody speaks your language so you can ask for directions. This is how it may feel to be a person with Asperger syndrome. In social situations, people with Asperger syndrome are operating outside their comfort zone most of their time.

Coming out of your social comfort zone can help a non-autistic person to understand how it may actually feel to have Asperger syndrome. For a person with Asperger syndrome, coming out of their comfort zone can help them to notice things about their social presentation that can really help with confidence when developing social relationships. It is often assumed that people with Asperger syndrome either prefer their own company or are not interested in making friends. Though some may feel this way, there are also many who desire social relationships, including intimate relationships, but find them hard to come by due to difficulties with non-verbal communication.

Most of our communication as a species is done non-verbally, through eye contact and facial expressions, which a person with Asperger syndrome can appear 'blind' to. A person with Asperger syndrome can also be oblivious as to how their own non-verbal presentation both affects and is perceived by others around them.

For example, other people may perceive prolonged eye-contact as staring, or absence of eye-contact may imply that one is not paying attention or listening. While most of us develop non-verbal communication skills through intuition, many people with Asperger syndrome feel that they have to learn non-verbal communication from observation.

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As a person with Asperger syndrome, as well as observing how others communicate non-verbally I have also noticed how a lot of body language originates from how you feel within. In 2010, I undertook an eight-week mindfulness-based stress reduction (MBSR) course, which included some simple yoga stretching exercises, meditation and body scans.

From these exercises, I noticed how interconnected the body is and how bodily sensations that occur within one region of the body affect the body as a whole. This includes when the body is moving involuntarily, e.g. practicing meditation when standing we may notice how we perhaps sway very slightly from time to time, to maintain our posture and balance.

With patience, one is eventually able to apply and notice the effects of mindfulness practice in normal life, including how our posture, sitting or standing, affects our body language.

Personally, one of the aspects I began to notice about my own non-verbal presentation was the effect that my breathing had on my facial expression. When doing the exercises, particularly the yoga stretching, I found myself taking up different postures that I wouldn't normally assume in normal life, including lying flat on my back. As well as a big step outside my physical comfort zone, I felt that changing from one stretch or posture to another helped me with normal life.

Being able to cope with and manage change more effectively is something I have had difficulty with, often needing a routine or timetable to ensure predictability. Many people with Asperger syndrome can experience high-level anxiety when faced with change or coping within unpredictable scenarios e.g. when crisis response is needed.

Difficulties with social skills can lead to social isolation for many people with Asperger syndrome, which can then in turn cause depression. It is well known that many people with Asperger syndrome, especially those diagnosed relatively late in life including myself, have received their diagnosis after a period of depression.

As Asperger syndrome is life-long, the condition will likely affect a person in situations over the course of their life that they either don't feel prepared for, or are yet to experience. This increases the chances of relapsing into depression at a later stage. Though people not on the autism spectrum also experience depression and are also as likely to relapse, overcoming depression can be especially difficult for a person with Asperger syndrome. This is because they can become very obsessed with the thoughts and feelings that bring about relapse, with the obsessive compulsive tendencies almost becoming a 'lock-in' factor.

Going beyond noticing sensations at the physical level as they occur, within mindfulness practice, a person can eventually notice their thought patterns. Comfortable or pleasant sensations experienced during mindfulness practice may induce positive thoughts. Awkward sensations may induce negative thoughts and feelings, including frustration.

When experiencing such thoughts during a mindfulness session, one is encouraged to notice the type of attention one may have a tendency to give such thoughts and feelings. This can allow a person experiencing depression to notice the type of attention they may give to certain thoughts, feelings or preconceptions and what can result from that type of attention when acting on it, to

the extent that a person can become what they think they are, rather than be who they actually are.

Mindfulness practice has helped me notice my personal thought patterns, how my mind wanders and the difference in physical sensations as they occur.

Like physical sensations, thoughts and feelings arise and pass. Stepping back from the flow, using the breath as an anchor of awareness of the present moment, allows one to be able to observe thoughts and physical sensations as they arise and pass, helping to bring about control over action.

Depression and relapse into depression can often result from becoming constrained by negative thoughts. Over time though, and with the appropriate effort and patience through mindfulness practice, a person with Asperger syndrome can gain control over how they are affected by their condition both in the sensory world and mentally, enabling more freedom to make their Asperger tendencies work for them.

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Mindfulness with adults with autism spectrum conditions

Mindfulness meditation can be thought as a way of being that helps us be in contact with our experience on a moment to moment basis. This allows people that practice mindfulness to be more present in the moment rather than concentrating on what may happen in the future or what might have happened in the past, which can often lead to anxiety or depression. Mindfulness can also help people become less judgemental, as it encourages people to view their experiences without assigning labels or interpretations to internal or external events that occur.

There is a lot of research evidence on the benefits of mindfulness. For example, there is evidence that it can help you:

- to cope with pain,
- to relieve stress,
- to improve sleep,
- manage depression and/or anxiety,
- manage anger,
- improve memory,
- aid learning,
- improve emotional stability.

In recent years the use of mindfulness in mental health settings has become widespread. Stemming from its use in pain management, introduced by Jon Kabat-Zinn, mindfulness has been used for more generic mood management (e.g. Mindfulness Based Stress Reduction, MBSR) and for specific applications of Cognitive Behaviour Therapy (CBT) to certain mental health conditions (e.g. Mindfulness Based Cognitive Therapy, MBCT). These interventions have been widely researched for use in depressive and anxiety disorders with some very positive results. More recently the use of mindfulness has been applied for use with people with Autism Spectrum Conditions (ASC); initial research findings are proving to be promising.

I have been developing CBT based interventions with adults on the Autism Spectrum with co-morbid mental health problems for many years now. During this time I have used several styles of CBT, usually matched to the people that I have worked with. I first became aware of the use of

mindfulness techniques in its use with adults with psychosis. Having read much of the research and finding out about other people's experience of using mindfulness it soon became clear that in order to use mindfulness in my clinical practice I would need to learn to practice it myself. This led to me attending an initial 8 week course designed for staff in the South London and Maudsley NHS Trust.

During the 8 week course I found the experience to be immensely rewarding and immediately asked if I could sign up for co-facilitation of such a group in order to gain further experience. Over the next two years I continued to practice mindfulness and attended a teacher training retreat with Bangor University (one of the leading mindfulness training universities in the UK). Fully immersed in the practice I then started to apply the techniques to my clinical work. Working with adults with autism and co-morbid mental health problems for the National Autism Unit (Inpatient and Outpatient services) allowed me opportunities to collaboratively use these techniques on a one to one basis over the past few years.

At first I tended to use MBSR techniques in individual therapy sessions as a way of providing a basic emotional management technique. Eventually I started to weave in more CBT techniques in my approach, for example, to assist with the management of difficult trauma based memories. Please note, when I say trauma, this is in the context of a person with autism who may have vivid memories that cause them subjective distress rather than post-traumatic stress disorder (PTSD) type memories, although my clinical experiences suggests to me that they're very similar in nature.

When working with such memories I tend to use what is termed "imaginal exposure", which involves going over the memory and experiencing the emotion rather than trying to avoid associated negatively perceived emotions. This is usually carried out once a person has a full CBT based understanding of their difficulties and mindfulness practice is fully established. We then start a session with a mindfulness practice and in the middle of the practice the difficult memory is introduced and the person is asked to focus on the sensations that they feel in the body. These sensations are then experienced rather than avoided allowing for more objective processing of the experience. In most cases this eventually leads to a resolution of the difficult memory.

In my experience of using mindfulness with adults with an ASC, as with the condition itself, I have found some extremely varied responses ranging from an utter distaste to the experience to full immersion in mindfulness practice. I am still a little unclear to what variables predict engagement in mindfulness practice but there are some common themes emerging from my clinical experiences. For example, many people who have difficulties monitoring their internal states quite often struggle to establish a regular mindfulness practice, whereas people who are able to introspect a little more tend to be more able to use the techniques. It also seems that people with alexithymia (a sort of dyslexia of emotions or unawareness of emotional states) tend to have more difficulties engaging with the recognition of sensations in the body. This tends to lead to difficulties in initial practice but gains can be made if the person remains engaged and motivated to continue the practice.

It's clear from my own experiences of using mindfulness that regular practice is difficult to keep up, particularly when you have completed a course and no longer have others to share your enthusiasm/difficulties with. Many people that I have worked with find the same in their practice.

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It's quite often that we set out with good intentions for regular practice but find that other priorities take over and the practice tails off. Although, research in the Netherlands (Kiep, Spek & Hoeben, 2013) indicates longer term gains (9 weeks post ASC adapted mindfulness group) in emotional management in adults with an ASC, in my experience the impact effects quite often reduce when practice is not consistently applied. It should be noted in their research that they only included people that consistently attended the group, which seems to support my opinion.

Individual MBCT sessions also appear to work well when it is adapted in terms of tailoring the approach to the individual who is not ready to attend a group. I have found that when I have used this approach the person is likely to attend a group at a later stage, ideally when they have gained a little more control over their emotional states. In the Individual sessions and groups we run from the NAU CBT outpatient service at the Maudsley Hospital we have found this to be the case on many occasions. I believe the reason for this may be connected to an increase in self-esteem and a building of social confidence resulting from the individual intervention but further research would be needed to check if this is correct.

Overall, there seems to be an acceptance that mindfulness works with emotional management. Further adaptations have been made to apply mindfulness to conditions such as ASC but the main component of such interventions appears to be to adapt the delivery method of the treatment rather than the treatment itself. This is much the same for most psychological interventions that are used for treating adults with an ASC. The relationship in which the treatment is delivered is often as, if not more important that the application of certain therapeutic techniques. From my clinical practice this seems to bear true in the delivery of all CBT based therapies adapted for use for the ASC population.

References

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Review Article

Meditation as a Potential Therapy for Autism: A Review

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Autism is a chronic neurodevelopmental disorder of unknown cause that affects approximately 1–3 percent of children and four times more boys than girls. Its prevalence is global and its social impact is devastating. In autism, the brain is unable to process sensory information normally. Instead, simple stimuli from the outside world are experienced as overwhelmingly intense and strain the emotional centers of the brain. A stress response to the incoming information is initiated that destabilizes cognitive networks and short-circuits adequate behavioral output. As a result, the child is unable to respond adequately to stimulation and initiate social behavior towards family, friends, and peers. In addition, these children typically face immune-digestive disorders that heighten social fears, anxieties, and internal conflicts. While it is critical to treat the physical symptoms, it is equally vital to offer an evidence-based holistic solution that harmonizes both their emotional and physical well-being as they move from childhood into adult life. Here, we summarize evidence from clinical studies and neuroscience research that suggests that an approach built on yogic principles and meditative tools is worth pursuing. Desired outcomes include relief of clinical symptoms of the disease, greater relaxation, and facilitated expression of feelings and skills, as well as improved family and social quality of life.

1. Background

Autism belongs to a group of related disorders that starts in infancy and remains throughout adult life [1]. Impaired social interaction at a young age affects early milestones of human development and a myriad of immune deficiencies will also afflict the majority of these children [2–8] The etiology of autism is not known. However, it is currently agreed that a combination of genetic and epigenetic factors, contribute to autism, the first trimester of pregnancy being a particularly vulnerable time to triggers of the disease. Autism is characterized by widespread disruption of the brain networks that underlie complex cognitive and emotional functions that results in an imbalanced neurological response to cues from the external world and, particularly, in the way the child responds to stress.

A myriad of treatments for autism have been proposed; however, in most cases the existing data are insufficient to support their efficacy [9]. This is primarily due to the confounding complexity of genetic traits of the disease, as well as the difficulty in distinguishing the cause from downstream pathologies. And yet in the United States, the lifetime cost of care for an individual with autism can reach as much as $3.2 million [10].

2. Social Interaction

Social interaction from an early age is fundamental to human development at many levels. The development of skills, relationships, and character depends on adequate and repeated brain stimulation to enforce strong networks that support decision making for well-being [11]. Furthermore, it is necessary to protect the brain from unhealthy sensory overload [12]. Maintaining a healthy balance between receptivity and detachment to others is critical to flourishing relationships and to physical and mental health. Lifestyles that include regular exercise and meditation have been shown to have a greater chance at achieving such equanimity [13]. Infants and children have signature brainwave patterns that influence physiological rhythms and mental capacity adequate to

their stage of development. From newborn to two years of age, a predominantly delta (0.5–3.5 Hz) wave pattern supports a strong immune system, anesthesia, release of growth hormone and, limited awareness of the physical world [14]. From the age of 2 to the age of 6, brainwaves shift into the theta range (4–7 Hz) where creativity, learning and, a high tolerance to stress maximize the child's success in creating social skills. Although much is yet to be learned in this field, research has clearly shown that synchronicity of these events and of neuronal activity *per se* is a critical part of higher cognitive function, perceptions, and behavior [15–17]. At this tender age, symptoms and abnormal physiology begin to emerge in persons with autism consistent with the progression of inadequate neuronal development and abnormal brain synchronization [18–20]. Lack of brain synchronicity may be responsible for the atypical sleep and stress mechanisms in these children [19] and changes in brain activity signatures may be predictive of disease and its severity. The inability to regulate social interaction through basic behaviors such as eye contact, facial expression, and body gestures is common in children with autism [1]. These children typically lack spontaneity to share enjoyment and achievements with others. This becomes a major hindrance and frustration to the development of peer and child-teacher relationships in the school setting [9, 21, 22].

Meditation, both traditional and more modern, is a tool to access higher states of consciousness. It is said that in these higher states of consciousness duality is dissolved, conflicting thoughts and feelings subside, and one regains a sense of connectedness, tranquility, and equanimity. This search for a deeper and vaster meaning to life, beyond immediate or gross desires and memories, involves finding new possibilities and greater potential to manifest a more productive and healthier life. Meditation is a stepwise process that begins with focusing on an object associated with positive, higher principles (such as compassion). As the practice continues, the focus naturally shifts from the physical object itself to the meaning of the object and, eventually, objectless concentration is achieved, or merger of observer and observed. When monitored by clinical EEG, the meditative process is accompanied by distinctive stages of brain activity and results in greater synchronicity of brain patterns in both new or long-term meditators (for review see [23]). Several physiological changes associated with these brain patterns occur, in particular ones that support the immune system [24–28]. The significance of meditation as a strategy to treat chronic neurological diseases is not confirmed by evidence-based research. However, it has been shown that a variety of forms of meditation have been beneficial adjunct therapies in anxiety [29–32], depression [33–35], epilepsy [36], posttraumatic stress disorder [37], and pain [34, 35, 38–40]. Meditation is described in great detail in the Vedas (approx 1500 BC), the oldest written texts found to date, and in a succession of commentaries and corollaries over time, such as the Upanishads (pre-Buddhist period to 500 BC) and the Yoga Sutras (100 BC to 500 AD) [41–43], that interpret the meaning and distill the key sounds of the Vedas (mantra), such as AUM (OM).

As early as 700 BC, universities in the Indian Subcontinent included Physiology and the Vedas in their medical syllabus and attracted students from as far as Babylonia, Greece, Syria, Arabia, and China. Higher education was therefore a major vehicle of dissemination of meditation to the West. Similarly, Buddha brought meditation to the Himalayan plateau from India. Migration and trade between the Indian Subcontinent and the Fertile Crescent later influenced Egyptian, Sufi and Christian-Judaic meditation. This influence is still traceable to this day in Jewish and Gregorian chanting traditions. However, the vedic texts were only recently compiled and translated, causing a renewed interest and study of the methodology of meditation [44–46]. Vedas are songs or hymns intended to be recited for physical and spiritual well-being and progress, of both the individual and society. Many methods of meditation have been derived from the original Vedas, and it is important to scientifically weigh their therapeutic value, in face of their antiquity and benign nature [36].

For the purposes of the present paper, which focuses on autism, it is particularly important to systematically study these different forms given that the youngest children affected by this condition are not yet able to sit still and direct attention. In these children, the use of mantra (singing) will be a particularly interesting hypothesis to test. Programs for autistic children that include mantra have been previously reported [47] and in the authors' own experience, mantra is a feasible and beneficial practice in a clinical setting with children as young as 3 years of age (data in preparation for publication). It is also well known that the human brain can be entrained and synchronized by musical stimuli—especially in very young children [48].

In this review, we propose that meditation practices receive more attention in the scientific and policy-making arena as a potential intervention to treat or relieve symptoms of autism.

3. Imitation

The neural basis of the human ability to read minds and predict other peoples' intentions is a specialized network of neurons in the frontal cortex called the "mirror system" [49]. Mirror neurons are active when one performs a certain task but also when one observes the same task performed by others. In other words, the brain forms a theory of the other's mind using one's own experience. This mechanism enables imitation learning and explains the feeling of empathy towards other beings. Having emerged early in the evolutionary development of the human brain, this system also plays a critical role in the formation of language and cultural inheritance. Imitation is an early milestone in child development, and impaired socialization and lack of imitative play in children with autism are among the diagnostic criteria for the disability. Indeed, in autism, this network is underdeveloped, resulting in deficient copying skills and the inability to recognize and interpret another's mind [49–54]. Noninvasive interventions using rhythm, such as dance and singing, present great potential in the treatment of autism because

rhythm inherently entrains movement through the stimulatory effect on residual mirror neuron function, and children are most receptive to these cues [47, 55].

4. Empathy

By the age of two, children normally begin to display the fundamental behaviors of empathy. Empathy is an emotional response that begins with the recognition of another person's mental and emotional existence. Awareness that others' mental position may be different than one's own is called the "theory of mind," coined by Humphrey and Baron-Cohen [56]. In the theory of mind, one evaluates other's emotions in reference to their own emotions instead of simply picking up others' emotions [49]. This process of adopting others' mental state and evaluating it from one's own perspective, anticipating intentions and feelings, is essential for social interaction and a stepping stone to the virtue of compassion. Several studies indicate that the theory of mind may be disrupted in autism, involving the mirror system of neurons and its connections to emotional and associative centers of the brain that construct consciousness [57–59]. In essence, the child with autism is unable to create self-consciousness and as a result consciousness of others. For this reason, the exploration of noninvasive meditation techniques that foster self-awareness and feelings for others, as an extension of self (higher consciousness), is a natural direction for autism research. Given its benign nature and ability to protect and shape the brain, as well as its solid research record in other neurological conditions [29, 34, 36, 39, 40, 60], there have been surprisingly few reports of its use for autism. Meditation is unlikely to present itself as challenging to these children and individuals, if built upon a yoga practice that includes movement, breathing, and chanting [47]. Moreover, this form would be easily read and interpreted by investigators.

5. Molecular Mechanisms of Autism

The brain is composed of three distinct tissue types: gray matter, white matter, and cerebrospinal fluid. Grey matter is composed of neuronal cell bodies, dendritic extensions, and supporting glial cells. These are the structures involved in synaptic transmission, the basic process that underlies memory. White matter corresponds to the long, fat-insulated axons that carry information to distant neurons. Measurement of the thickness and surface area of these tissues provides information on the density, number, and degree of myelination of these neurons, respectively. Being highly plastic, brain tissues undergo short- and long-term changes in structure when cognitive tasks are performed and repeated. These changes have been associated with cognitive performance in studies that show that individuals who score highest in general intelligence in standardized tests have thicker grey and white matter in specialized areas [61]. On the other hand, F-18 fluorodeoxyglucose positron emission tomography (FDG-PET) has shown that brain glucose consumption is lower in more intelligent individuals, suggesting that rather than just growth, these changes reflect the fact that neurons are used more efficiently. It is therefore hypothesized that neuronal activity causes network "pruning" or the formation of new synapses and concurrent elimination of old synapses, resulting in a positive increase in synaptic efficiency, tissue thickness, and enhanced cognitive ability [62, 63]. Importantly, greater cognitive performance does not correspond to global enlargement of the brain but instead reflects changes in short- and long-distance wiring resulting in localized growth.

In autism, several structural abnormalities of the brain have been reported. Particularly striking is the abnormal overgrowth of the brain cortex surface area (grey matter) and the thickening of white matter in the corpus callosum and temporal lobe in autistic children before the age of two years [20, 64]. This initial phase of brain enlargement is followed, in adolescence and young adulthood, by arrested growth and accelerated thinning of the cortex in areas involved in cognitive performance and the formation of emotional memory [65, 66]. The observed bulking seems to indicate aberrant migration of neurons, a greater number of long-distance neuronal projections, or excessive myelination that inadequately wire the brain. It is possible that these changes amplify sensorial processing and the ability of the brain to retain and "feel" auditory and visual experiences, as also evidenced by the similar pattern of early growth and later regression is shown in the amygdala, the structure responsible for adding emotional memory to experiences [22, 57, 67]. Similar changes in convolution have been observed in other pathologies such as attention deficit hyperactivity disorder (ADHD) [68] and Parkinson's disease [69]. Among the areas where cortical thinning is observed in adults with autism is the mirror neuron system (inferior frontal gyrus) where the degree of thinning is proportional to the severity of symptoms experienced [52]. The mirror neuron system, as mentioned previously, is essential for learning imitation and the neural correlate of empathy [49, 54]. It seems, therefore, that early events in brain development disrupt the structural organization of the fully developed adult brain, affecting in particular the connections between the temporal, parietal, and frontal mirror systems that jointly formulate the theory of mind and the basis of social reciprocity [50, 59, 70]. In parallel to these structural changes, individuals with autism show atypical activity in these areas and significantly decreased connectivity across their functional networks [54, 71]. Together these studies suggest that the social and emotional deficiencies in autism are associated with cortical thinning of the functional networks supporting social interactions, possibly due to errors in neuronal migration or apoptosis in early development [52, 72]. Interhemispheric transmission of information is also compromised by the thinning of the corpus callosum (CC), and, as a result, also the capacity to integrate complementary experiences such as musicality and language, mathematical relations, and abstract symbols [64, 73]. The CC is a white matter structure and the largest commissure in the human brain, connecting the right and left hemispheres by more than 200 million fibers. A larger CC is associated with better cognitive performance, perhaps because additional or better-myelinated callosal pathways facilitate a more efficient interhemispheric

information transfer likely to benefit the integration and processing of information and positively affect intellectual performance [74].

Disrupted neuronal axon function might explain why, in autism, long-distance connectivity of different areas of the brain involved in emotion processing is impaired, but also why it may be difficult for these individuals to shift attention from a particular task to another, resulting in repetitive behavior [75–77]. In this scenario, long-distance under-connectivity caused by a decrease in the number of large axons would explain the impaired coordination and integration of time-sensitive information necessary from different brain regions, resulting in deficient social interaction and language skills. On the other hand, local overconnectivity associated with an excess of locally communicating short axons can be linked to the repetitive and restrictive behaviors observed in autism [22]. Hyperfunctional local neuronal microcircuits, with excessively reactive neurons and synaptic plasticity, are the likely cause for the characteristic hyper-perception, hyperattention, and intense emotional response to stimuli (such as light, touch, and sound) in children with autism [78–80]. Indeed, the prefrontal and somatosensory cortexes, and the amygdala, are significantly more active and plastic when a stimulus is presented [81, 82]. The excess amount and intensity of information flowing through the amygdala is likely to cause a severe stress-response and emotional overload, with heightened experiences of fear and anxiety that culminate in self-withdrawal and decreased social interaction. This mechanism is consistent with the observation that children with autism have greater levels of stress hormones in their blood and heightened autonomic nervous system activity [83, 84] and why anxiety and phobias are frequent comorbidities of autism [21]. Also in the somatosensory cortex, exacerbated sensory representations of the body are transferred to areas of integration that are unable to properly process the information and carry out behaviors.

At the molecular level, some suggestions have been made to explain the functional and structural changes in autism described above. Inhibitory neurons, which control excitability and reduce the duration of each stimulus, may undergo abnormal cell death in these functional areas resulting in more frequent and more intense activity. In the cerebellum, for example, a greatly reduced number of inhibitory Purkinje cells is observed [67]. Overexpression or irregular function of NMDA receptors of glutamatergic circuits in particular pyramidal neurons of the cortex, which are highly plastic or adaptive to stimulation [22, 82, 85, 86], and their associated transduction pathways may also be responsible for these effects by increasing postsynaptic excitation [87, 88]. Genetic studies have identified synapse gene mutations on chromosome 22 [89–92] and are therefore consistent with a model of heightened synaptic plasticity in autism.

In summary, a molecular sensitization of yet unknown origin lessens the protective functions of the brain, leading to an extreme response (hyperplasticity, hyperperception, hypermemory, hyperattention, and hyperemotionality) to external stimuli that would otherwise provide an enriching environment for brain development. At a young age, strong reactions and memory of experiences in subcortical connections may prevent or outcompete normal development of long-distant connections, higher order cognition.

6. Meditation

After more than 20 years of committed research in autism, there is ample reason to pursue alternative solutions to treatment. Prospective studies have generally found that 60–75 percent of individuals with autism followed into adulthood experience poor or very poor outcomes [1]. There is also no effective medication for autism. Risperidone, the only FDA-approved drug for the treatment of altered behaviors in autism, has known adverse effects and is only indicated for moderate-to-severe behavioral problems associated with autism since there is no clear benefit in treating core symptoms. The economic burden of this disease to affected families and indirectly to society is unbearable, reaching $3.2 million per individual in the USA. The current model of care is therefore unviable to transfer to developing countries where the prevalence of autism is equally high. Because autism is a pediatric neurodevelopmental disease carried into adulthood, the search for nondrug alternatives to treatment is warranted. Several approaches have been suggested such as acupuncture, massage, auditory integration training, detoxification, and neurofeedback. However the studies available so far are insufficient to support or oppose their validity [93].

Meditation is a conscious process of self-regulation that tempers the flow of thoughts, emotions, and automatic behaviors in the body and mind. In our accomplishment-driven society, the human brain constantly receives and processes countless pieces of information from the outside world that are contradictory, opposing, and threatening to the organism. As a result, the brain commands a stress response in the body that recruits defense mechanisms and demands high expenditure of energy resources that can severely tax the body in the long run. It is now recognized that cognitive stress is linked to accelerated cellular aging and DNA degeneration [25, 94] that can span generations [95–98]. Furthermore, research suggests that practically every chronic disease of the western world is caused or triggered by stress, particularly in early life [27, 99–103].

As one of the earliest recorded systematic approaches to promote health and longevity, the unifying principle of meditation-centered disciplines that have emerged over thousands of years is to move from a state of duality, characterized by conflict or maladaptation to one's environment, to one of singularity or harmony. Singularity corresponds to a psychological state of unity, timelessness, and totality in which threat cannot exist, since there is nothing exterior or beyond our being-universe continuum. From a physicochemical standpoint, relaxation in the present moment is the state of maximum preservation of our energy resources, harnessed for optimal health and inspiration towards higher ideals.

Yogis and eastern physicians knew of the existence of the circulatory and endocrine systems and circadian rhythms as early as the 6th century BC [46, 104, 105] and describe a more refined level of signaling in organisms at the

physical and atomic level than the chemical and molecular known to modern medicine today [42, 46, 106]. (e.g, verses 1–12 of the Mandukya Upanishad describes four levels of consciousness from waking to pure consciousness, and nineteen channels: four functions of mind, which are manas, chitta, ahamkara, and buddhi, that operate through five pranas (prana, apana, samana, udana, and vyana), the five active senses and the five cognitive senses.) Rather than ignoring this vast amount of information and the millenary arts from it derived, it is naturally desirable to yield these principles to scientific rigor to understand them.

Meditation creates a one-pointed mind that helps restore the coherence of the human system and as well as harness energy to overcome physical and psychological challenges. As a complementary approach to personalized medical care and conventional therapies, meditation has shyly made its way into several clinical settings and has undergone unprecedented scientific research in the last few years. The main driving force for this sudden interest is the undisputed need to develop less costly health programs for rising chronic diseases and noninvasive, self-initiated strategies to promote wellness in a fast-paced, technology-dependent society that promotes multitasking, constant sensorial stimulation, and less contact with Nature [12, 107–110].

Moreover, neurological disorders that severely impair social integration, professional development, and quality of life have found no solution in drugs or clinician-facilitated psychology [111, 112]. Discovery or rediscovery of mental training strategies to protect the human brain while stimulating the mind and better process our perceptions of the world is therefore of great interest. And most importantly, a great deal of research is necessary for us to learn how to use these tools in younger populations [108, 113–115].

Traditional yogic exercises and meditation techniques constitute a comprehensive body of knowledge that shows a profound and thorough understanding of human physiology and neuroscience obtained through experimentation and systematic practice that rivals that established by the western world in the last century [42, 45, 104, 116]. Through our modern advances in imaging and nanotechnology, we seem now to begin to understand the molecular underpinnings and objectives of each component of these ancient practices. To facilitate the study of the neural correlates of meditation practices from different traditions (Chinese, Indian, and Buddhist), scientists have divided them into three main categories of cognitive processes reported by brain activity [23, 117, 118]: those that emphasize concentration or focused attention on an object [119, 120]; those that emphasize moment-to-moment, dispassionate observation of experiences [117, 121]; those that transcend the object of focus automatically [23, 118]. Each of these cognitive processes (focus, nonjudgmental observation, and effortless transcendence of practice) is associated with a signature brainwave activity recorded by electroencephalography (EEG) (for review see [23]). Focused attention on an object such as feelings of compassion during meditation has been shown to elicit gamma (30–50 Hz) and high-range beta activity (20–30 Hz) as well as increased frontal-parietal gamma coherence and power [122]. Practices that emphasize non-judgemental focus on the flow of thoughts and experience such as Vipassana or Sahaja Yoga have shown a predominantly theta activity in the frontal midline cortex (5–8 Hz) [120]. Lastly, practices that focus on transcending the object of meditation such as Transcendental Meditation have been shown to elicit frontal alpha activity (8–10 Hz) [123]. Each characteristic brainwave is in turn associated with specific physiological changes such as increased immunity, regeneration and growth, deep sleep, and high concentrative power. "Tuning-in" to specific brainwaves regularly through meditation seems to shift brain activity to states of greater coherence, power and plasticity or task-appropriate frequencies. States of heightened alpha brainwave, considered the gateway to meditation states, promote physical relaxation and cognitive performance, and regular training may facilitate day-to-day troubleshooting and socialization [121].

This classification is a notable initial attempt to organize meditation into meaningful groups but it is important to keep in mind that duration and repetition of the practice are factors that will almost certainly change the patterns of brain activity. Furthermore, there are uncharted forms of traditional meditation that have not been included in this classification, such as those that involve chanting of mantra accompanied by mudras or hand gestures that facilitate focused attention and interhemispheric synchronicity set into motion by rhythmic vocal sounds and breath patterns. This older form of meditation is inherently easier to adhere to and to monitor. Recently, it has become known to western practitioners through disciplines such as Kundalini Yoga as taught by Yogi Bhajan and Naam Yoga [47, 60, 124, 125].

Breathing exercises are part of the meditative process and are often an object of focus but are particularly interesting in the context of autism given that most children with this condition have left nasal dominance [126]. Yogic breathing includes exercises that force the flow of air through the right or left nostril alternately that result in selective activation of the sympathetic or parasympathetic branches of the autonomic nervous system [127]. Left nostril breathing while closing the right nostril has a calming effect and has been shown to increase vagal tone and right hemisphere dominance while right nostril breathing is associated with increased sympathetic and left hemisphere activity [30, 127]. Alternate nostril breathing patterns may help correct abnormal breathing patterns and physiological rhythms. In general, breathing control exercises autonomic balance, hemispheric performance and mood, and both meditation and yogic breathing have been suggested to induce the secretion of estrogenic hormones such as oxytocin that facilitate bonding and affection [127, 128]. It has been postulated that a prenatal or neonatal exposure to excess testosterone may explain the fact that autism is much more frequent in boys than in girls, who are less vulnerable due to the protective effect of oxytocin [129, 130]. These observations suggest a beneficial role for meditation to mothers during pregnancy and postpartum periods. It is also possible that meditation in young children, particularly boys, may reduce symptoms of autism by increasing the release of oxytocin in the brain [131].

It has been shown that diverse activities such as computerized training support executive control in early childhood are critical for success throughout life. However, it is evident that executive function development is best achieved by simultaneously addressing emotional, social, and physical development [13]. In situations of high executive demand, a combination of exercise and character building or mindfulness positively affect core executive functions such as self-control, cognitive flexibility, and working memory [13]. Successful programs do not require that children remain sitting still for very long but encourage social bonding, joy, and confidence. Focus on compassion and higher ideals in meditative practices are nurturing and can facilitate conflict resolution and socialization. Social isolation, occurring in persons with autism, may impair pre-frontal cortex mediation of executive control, once again indicating that early interventions of this nature are sorely needed. The combination of exercise, breath training, and sound designed for therapeutic use, and resembling play, may be an excellent approach to teaching meditation to children and warrants further study. Others have described benefits to teenagers with transcendental meditation and kundalini yoga [29, 132]. It is important to note that relaxation training may increase cardiac parasympathetic tone but may not confer other effects associated with meditation.

Heightened brain synchronicity is the most frequently observed effect in these practices. Structural changes in several areas of the brain have been observed in meditators [133, 134] although the correlation between these changes and improved health requires further investigation. As a matter of fact, we do not know if meditation can reverse the abnormal wiring and thinning observed in autism and other diseases, and we do not know which form of meditation would be most beneficial. However, positive subjective accounts of meditative experiences have been repeatedly documented with adults, adolescents, and even children, indicating better coping skills, less pain, improved mood, and stronger immunity [28, 35]. Furthermore, meditation improves breathing patterns, and studies showing changes in hormone levels confirm the ability for meditation to change physiological parameters and rhythms [119, 135, 136].

The practice of focus on a stationary, positive, and life-promoting symbol, whether it is breath, mantra, or an ideal, allows us to collect and silence dispersed thoughts, disharmonious feelings, and destructive behaviors that over time progressively destabilize body functions, signaling systems, and genes. In evolutionary time, stress is a primary engine for species adaptation to the environment, driving cell renewal, and gene modification that is heritable. However, in the lifetime of an individual or in a few generations, chronic stress causes several genetic mutations that rapidly accumulate in cells until they manifest into pathologies such as cancer, diabetes and arteriosclerosis [137].

During meditation, the restorative mechanisms of the body are strengthened and downregulate the uncontrolled function for survival. Life-promoting hormones such as human growth factor are secreted and more glucose is directed to the brain to fuel more efficient neuronal pathways that result in a feeling of well-being, while old habits and the neurons sustaining them "die out" [134, 135, 138].

Chanting mantra remains a part of many traditions and lineages of practice today. These patterns are used as catalysts of meditative states and Samadhi (pure consciousness) because of their perfected rhythm, sound, tone, focus, and meaning. This is not uncharted territory since it is known that musical beats have entraining power [139]. For example, it is well documented that slow-tempo musical pieces induce delta brainwaves and sleep. It is also known that language, music, and singing share functional networks and therefore singing and music may compensate for deficiencies in language [140–142]. In its original form mantra does not make use of any common language but appears to be a system of sounds or a symbolic language that, when thought of or pronounced, entrains a particular brain activity or body rhythm and creates one-pointedness in the mind. A few studies have reported these benefits; the mantra "om" has been shown to synchronize respiratory signals, cardiovascular rhythms, and cerebral blood flow while another mantra, "SaTaNaMa," was reported to significantly change cerebral blood flow patterns measured by CT [143, 144]. Figurative translations of different mantra describe higher ideals of beauty, unity, and love and are prescribed for many ailments. However, a comprehensive comparative study of these mantra as psychophysical modulators of health has not been attempted.

7. Conclusion

In summary, the practice of meditation may provide unique benefits that complement a lifestyle with balanced physical exercise, good nutrition, and a nourishing environment. Meditation is one of a few interventions that have been shown to effectively strengthen self-control and character development simultaneously [13]. There are several styles of meditation available today. Each form uses different degrees of focused attention on a variety of objects to reach a clear, meditative mind. Despite the differences in methodology, they all share the objective of self-relaxation, self-healing and consequently, improved cognitive and behavioral performance. There is much to be gained by exploring meditation as a strategy to override impaired brain synchronicity and debilitating symptoms arising in early years of persons with autism. The authors suggest that mantra meditation may be most useful in young children. In a pilot program, our results indicate that mantra is a feasible intervention for children between 3 and 14 years of age to improve health outcomes, and we are implementing a clinical trial to verify our initial findings. We encourage a concerted effort from all fields of research to incorporate ages of ancient wisdom into the health challenges we face today.

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Relaxation Training for Kids on the Autism Spectrum

5 Essential Modifications

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Anxiety anxiety in autism.

Given the high prevalence of anxiety in autism, it is important to equip children with coping tools they can use when feeling overwhelmed.

What type of relaxation skills should be taught?

Effective relaxation skills work by preventing our nervous system from spiraling into a state of panic. Once we have interrupted this chain of events we can then begin to redirect our nervous system from a state of anxious arousal to a state of calm.

There are relaxation strategies that target the body, strategies that target the mind, and activities that address both.

Some examples (for illustrative purposes only, not a substitute for formal training):

Body Techniques

Diaphragmatic/"Belly" Breathing: When we become anxious our breathing becomes rapid and shallow. This kicks off a chain of physiological events that can fuel panic. To reverse this process, a child can learn to take slower, deeper breaths from the belly. Lowering the diaphragm muscle on the inhale (resulting in the stomach expanding outward) allows for greater expansion of the lungs and, thus, more oxygen.

Progressive Muscle Relaxation (PMR): Muscle tension sets in at the earliest stages of distress. Although this tension can maintain anxious arousal, it often occurs beyond our awareness. With PMR, a person is instructed to go through various muscle groups-first tensing and then relaxing them. With practice, it becomes easier to detect and reverse muscle tension (note: for those who find

tensing muscles to be uncomfortable, a Body Scan technique is an effective alternative).

Mind Techniques

Relaxing Imagery: The mind can concoct all kinds of vivid, terror-filled scenes that can both cause and worsen anxiety before and during stressful situations. The use of pleasant imagery is a way to counter these scenes. When we can hold a pleasant image in our minds, the nervous system will follow suit.

Relaxation techniques are powerful coping skills.

Source: Courtesy of Pixabay

Anxiety disorders are common in autism, and this is just as true for children as it is for adults (e.g. Leyfer, et al., 2006)

In a previous article, I explored some of the reasons why kids on the autism spectrum have such high rates of anxiety and how to use this knowledge to develop effective accommodations.

Establishing supports to lessen the impact of anxiety should still be a first-line strategy. However, no amount of support or environmental prevention strategies will fully eliminate anxiety across all settings and situations. Life is just too unpredictable and there are myriad of factors that can fuel anxiety in autism.

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Meditation: When anxious, the mind tends to dwell in a future that is full of "what ifs". Meditation can help to bring awareness back to the present.

Activities that Combine Mind and Body

Yoga combines mind and body techniques.

Source: Courtesy of Pixabay

Activities that combine mind and body techniques such as Yoga or Tai Chi can reinforce the practice of techniques and serve as a holistic means for long-term stress management.

Modifications

Kids on the spectrum are far more similar to other kids than they are different and many teaching techniques will be the same as for any other child. However, there are modifications for the autistic child that can bolster learning and motivation.

1) Justify the Technique: The child on the spectrum wants to know why they are being asked to learn something. Learning needs to be relevant and make sense. Scientific explanations help. I like to explain how the nervous system responds to stress and anxiety and the reasons why relaxation techniques work to counteract this response. Although the terms and concepts will vary depending upon the age and developmental level of the child, I find that these kind of explanations can really kickstart motivation for a wide range of kids.

2) Use Visual Supports: Autistic children tend to be visual learners. Incorporate visuals into teaching relaxation skills whenever possible. Demonstrate how the body reacts to stress and how to do relaxation techniques through drawings, online videos, charts, graphs, etc. Visuals can also help to prompt and remind a child when to use a technique (e.g. showing cue cards with pictures displaying a skill).

3) Be Wary of Abstract Terms: Speak accurately but plainly when teaching techniques. Avoid abstract, metaphorical language such as "be as cool as beans" or "breathe in the goodness". When comparisons are needed

concrete phrases work best (e.g. "your stomach should expand like a balloon filling up with air".)

4) Be Aware of the Stressors Associated with Autism: Anyone working with kids on the spectrum should be aware of the different types of stressors associated with autism. These include coping with change and transitions, sensory sensitivities, challenges with language processing, the strain of being in social situations (where support/understanding is lacking), and frustration that can arise when learning styles are not accommodated for. Knowledge of these stressors can help with integrating relaxation techniques into an overall plan of support.

5) Emphasize Generalization: When teaching a skill, emphasize when and how to implement that skill across different settings and situations. Don't assume that this will occur automatically. Instead, provide specific, real-life examples and clear guidance on when and how to use techniques. Enlist the help of parents, teachers, and other support persons to gently remind and prompt the child to use skills in real time.

Conclusion

Relaxation techniques can help any child to cope better with stress and anxiety. With some modifications, children on the autism spectrum can also acquire these valuable coping skills.

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Promoting happiness in autistic people

It is remarkable that emotional wellbeing and the pursuit of it, although being highly valued for every human being, has received so little attention in the field of autism. Studies of the effects and outcomes of certain interventions rarely include emotional wellbeing as a desired outcome.

Measuring effects

The effects of interventions are evaluated by measurements and assessment of aspects such as:

- number and degree of autism symptoms
- levels of cognitive functioning
- skills and behaviours, in particular social skills.

It is nice to see that certain autism interventions are evidence based, using evidence such as:

- significant increases in the child's IQ
- adaptive behaviour scores
- decreases in challenging behaviours
- less need of support
- more inclusion.

These children are smarter, more skilled, less challenging, more independent and more included, but are they necessarily also happier?

Measuring outcomes

What we see in these research interventions is also true for follow-up or outcome studies, those that explore the outcome of autism in adulthood. When assessing the outcome of autism in adult life, 'objective' criteria tends to be used such as:

- whether autistic adults have a job or not

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- where they live
- what their levels of cognitive and adaptive functioning are
- if they have friends and how many
- how much support they (still) need.

So criteria for success in life focuses exclusively on the level of independence and adaptive functioning, not on quality of life and certainly not on the personal experience of emotional wellbeing.

Underneath this approach is the assumption that success in life and happiness are based on high levels of independence and adaptive functioning. That assumption should be challenged. It is not because an autistic person has a job and lives more or less independently that he or she is also happy and thriving. Conversely, living in a group home with a lot of support does not exclude a high quality of life.

Using positive psychology to measure well-being

When the focus is on wellbeing, it is often from a negative perspective, namely the lack of wellbeing and quality of life in autism. A lot of research has been done to explore mental health issues in autism and these studies have indeed shown that being autistic involves an increased risk for developing mental health issues, mainly stress, anxiety and depression.

However, based on the principles of positive psychology, we argue for a change in focus and we suggest that instead of concentrating on the lack of emotional wellbeing in autistic people, we should develop strategies to facilitate their feeling of happiness.

The pursuit of happiness

To start with, the first and most important step in promoting happiness in autistic people, is to develop autism-friendly ways of assessing their positive feelings. We should avoiding forcing autistic people into a neurotypical concept of happiness: happiness is a personal and subjective construct and the things that make an autistic person happy do not necessarily mirror those that make a neurotypical person happy.

There are a lot of tools and questionnaires to assess negative feelings such as anxiety and depression, but tools to find out what is related to emotional wellbeing are lacking in the autism field, especially questionnaires that are adapted to the typical autistic style in understanding language and communication. Traditional questions about emotional well-being such as “do you usually wake up feeling fresh and rested”, can be quite confusing for a brain that is inclined towards literal understanding of words and sentences.

Once we know what makes a person with autism flourish and thrive, we should develop strategies that aim at supporting the autistic person in pursuing emotional wellbeing. This does not always mean that more support will increase the wellbeing. We should not forget that autistic people, just as any other person, need challenges in life.

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So, we should aim at the right balance between support/protection and challenges. Support should be adapted to the needs of the autistic person in terms of:

- quantity (how much)
- content (for what)
- style (how).

'Goodness of fit' is more important than how much support is offered.
In interventions and education, the aim should not be the highest level of functioning, but one that gives life a meaning for autistic people. Being proud of what you are able to do (having success in life) is more important than higher scores on all kind of objective measures of independence and levels of functioning.

In creating sources of pride and a meaningful life, one of the biggest challenges will be to create job opportunities for autistic people. I am convinced that every autistic person can contribute to society, and that this feeling of contributing is one of the main sources of wellbeing.

Six Simple Mindfulness Practices for Kids with Autism

By Krupa Patel | 2/24/17 9:10 PM

Autism resources and Community (ARC)

The practice of quieting the mind, otherwise known as mindfulness, is increasingly being practiced across the board – from Google executives to classrooms as a replacement to detention (Bloom, 2016). Mindfulness specifically refers to the practice of paying attention to the present moment non-judgmentally. Observation of our thoughts and feelings allows us to better understand our emotions and react rationally to negative situations.

Imagine snacking on a bag of chips. We then think about yesterday's meeting, or all the dishes that need to be washed. Eventually, without even noticing, a few chips turn into half of the bag. Our minds are constantly wandering, ruminating on anything but the present, which can lead to increased anxiety or depression. This is where mindfulness comes in. Despite all the recent buzz, mindfulness is backed by hard science: the practice has been shown to not only reduce stress, depression, and aggression but also change brain regions associated with emotional regulation, introspection, and awareness (Holzel et al., 2011).

Although most of the research has been done on typically developing adults, a new body of work has shed light on the benefits of mindfulness in children with Autism. Aggression, an especially challenging behavior, has been an important behavior of study in the scope of mindfulness techniques. In contrast to the current behavioral and psychopharmacological interventions for aggressive behaviors, mindfulness-based interventions empower individuals to develop self-management strategies to regulate their challenging behaviors. In a longitudinal study and intervention, researchers had adolescents with autism learn the "Soles of the Feet Procedure," which involved shifting attention from the emotional trigger to the soles of their feet (see below). Aggressive acts were significantly reduced from 14-20 per week to 4-6 per week after the 3-year follow up period (Singh et al., 2011).

Additionally, mindfulness techniques have been shown to improve parent-child relationships and significantly reduce parental stress, improve parental wellbeing and overall health after just a few weeks. This parental change in behavior has the reciprocal effect of reducing stress and anxiety among their kids (Keenan-Mount, Albrecht, & Waters, 2016). In addition to parents, mindfulness

training can allow teachers to better regulate their reactions to stressful classroom situations and manage the social, emotional, and educational needs of their students with Autism Spectrum Disorder (ASD). A five-week mindfulness teacher training intervention introduced stress management and relaxation techniques as well as the application of mindfulness techniques to teaching. The training not only improved teacher's self-efficacy beliefs but also allowed teachers to better cope with challenging situations (Benn et al., 2012).

Therefore, mindfulness practices may be a viable technique in not only improving behavioral and cognitive responses in those with ASD, but also the overall well-being of their caregivers. Although mindfulness may seem like foreign territory, incorporating mindful practices into daily life can be quite simple.

Here are six simple mindful practices you can introduce to your child (and yourself!)

1. Bell Listening Exercise: Ring a bell, either a physical bell or one from an App or online, and ask your kid to close their eyes and listen to the vibration of the bell. Tell them to raise their hand once the ringing stops and pay attention to any other sounds they hear for about another minute. This is a simple but powerful exercise that shifts one's attention to the present moment and the surroundings.

2. Bedtime Mindfulness: Ask your child to lie in their bed, close their eyes, and bring their attention to various parts of their body. Start at the toes and slowly move up to the head. Here are some scripts that you can follow: 1, 2. This is a calming method to return to one's body at the end of the day and develop a sense of gratitude for their body.

3. Mindful Walks: Stroll through your neighborhood in silence for a few minutes and have your child pay attention to all the sounds they hear. Then have them report back what they heard. You can also guide them to other sensations such as the breeze through their hair or the crunching of the leaves as they walk. If your child is particularly active, you may ask them to run or skip and notice their increased heartbeat or breath.

4. Mindful breathing and meditation: Ask your child to close their eyes and sit comfortably. Direct their attention to the sensation of breathing in and out. Ask them to put their hands on their stomach and feel the rise and fall of each breath. You can do this for about five cycles then guide them to any present feelings or thoughts. Tell them to observe those thoughts and feelings and let them go like a balloon. You can repeat this as many times as needed or possible. Here is a guided meditation.

5. Soles of the Feet: This technique was developed by researchers to manage angst, anger and aggression. When faced with emotionally arousing situations, you can teach your child to redirect their attention and awareness to a neutral part of the body such as the soles of their feet. This technique helps calm and clear one's mind during stressful and arousing situations. Here is a free download of a short step by step guide to the Soles of the Feet exercise to practice with your child.

6. Glitter Jar: Fill a clear jar with water, some glitter, and glycerin or baby oil. A snow globe would be equally great for this activity. Particularly when your child is having a stressful day, ask them to shake up the jar and watch as the glitter settles after swirling chaos. This technique allows for

a powerful metaphor that relates the internal state of the mind to a visual object. Here is a script that can be followed and adapted.

Research and Resources

Recently, a good amount of research and publication has focused on this subject. The following is a list of additional resources:

1. Self-Regulation and Mindfulness: Over 82 Exercises & Worksheets for Sensory Processing Disorder, ADHD, & Autism Spectrum Disorder by PESI Publishing & Media
2. CBT Toolbox for Children and Adolescents: Over 200 Worksheets & Exercises for Trauma, ADHD, Autism, Anxiety, Depression & Conduct Disorders by PESI Publishing & Media
3. A Mindfulness Intervention for Children with Autism Spectrum Disorders: New Directions in Research and Practice (Mindfulness in Behavioral Health) by Springer
4. Flexible and Focused: Teaching Executive Function Skills to Individuals with Autism and Attention Disorders (Critical Specialties in Treating Autism and other Behavioral Challenges) by Academic Press

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Using yoga with autistic pupils

Special Yoga is an organisation that offers yoga therapy programmes to children and adults with special needs. We provide yoga classes to individuals, families and schools, and we also offer training programmes to share Special Yoga's practises to educators, parents, carers and paediatric professionals.

The methodology that we use at Special Yoga includes the classical yoga practices of:

- movement
- breathing
- deep relaxation.

These are combined with:

- sound
- rhythm
- massage
- sensory integration techniques.

Sensory integration techniques aim to improve body awareness and balance, helping us to be aware of our own body and how it interacts with the environment.

We meet every child, both in individual and in group sessions, with the aim of creating a practice that encourages them to their fullest potential. Celebrating the strength within each child and working from there.

Yoga is simply the process of paying attention to the present moment and calming the mind. We aim to help the child retrain his/her automatic stress reaction, and replace it with one more conducive to happiness and overall well-being.

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Why yoga in the classroom?

Classrooms can be very stressful environments for autistic children for reasons such as sensory difficulties and the requirement for high levels of social interaction. Many autistic children will also experience high levels of anxiety which can present with breathing patterns that are out of regulation. Frequent shallow breathing and breathing through the mouth consistently stimulate the sympathetic nervous system at a low level. This means that being 'stressed out' becomes the norm.

When the nervous system reacts with a fright or flight response, breathing quickens and becomes shallower. When we slow the breath we change the physiological response. By consciously slowing the breath, especially the exhalation, we can facilitate the relaxation response and develop some control over how our nervous systems responds to our environment. We develop the ability to change our emotional state.

Working with the breath can therefore effectively 'wake up' or 'calm down' the child. We might for example:

- put the child's hand on their belly to 'feel' their breath
- stretch the body to help open up the capacity for the breath - rhythmic movements of arms up and down done slowly can really help here.

Mindfulness and yoga

"Mindfulness means knowing directly what is going on inside and outside ourselves, moment by moment"

In 2016 the Special Yoga team was commissioned by Havering Clinical Commissioning Group (CCG) to develop a programme to build up mental health resilience in the 80 schools within the borough of Havering.

We designed three mindfulness programmes, each consisting of 6 hours split over three sessions:

- mindfulness for the staff
- techniques to explain mindfulness to pupils
- additional tools to integrate the practice into the curriculum for both staff and pupils

The results indicate that the programme had a positive influence on both teachers' and pupils' emotional wellbeing and resilience. The training programme provided teachers with useful strategies to manage their own stress levels.

Teachers were able to successfully integrate regular mindfulness practices into the curriculum. Results suggested an increase in pupils' emotional wellbeing and resilience after being exposed to mindfulness practices in the classroom.

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The benefits of using yoga in the classroom

I believe that it is imperative for teachers and staff within schools to develop and learn calming techniques for themselves so that they can hold a more balanced and peaceful space for the children. From our experience of running a daily programme in the classrooms we found that when the children and staff practised yoga together in the morning and in some cases again after the lunch break, that the children were more organised in their functionality and emotions and therefore more able to manage and self-regulate themselves - learning then became more possible.

In our experience any of the movements used in yoga can balance and regulate the vestibular and proprioceptive systems that help the child to know where they are in space and to be more comfortable.

We have seen many autistic children become so much calmer and happier through the practise of yoga. Parents report back that the children have improvements in:

- quality and quantity of sleep
- body awareness (eating, toileting etc)
- motor planning and control skills
- physical strength, muscle tone and balance
- self-regulation and resilience
- concentration
- ability to transition from one activity to another without stress.

Further information

For information on how we bring special yoga to your school, please visit our website

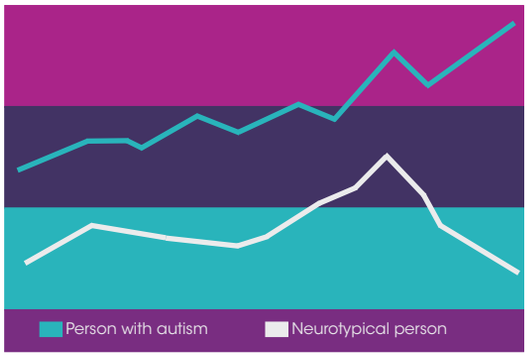
Managing stress and anxiety
Supporting people with autism

autism west midlands

This information sheet is designed to give an introduction to stress and anxiety in people with autism, and how best to support them.

We all suffer stress, to different degrees and levels of severity and we all get anxious sometimes. However, neurotypical people (people who do not have autism), realise when they are becoming stressed or anxious and can take positive steps to relieve this.

When we wake up in the morning we generally start at a very low level of stress (see diagram) and this may rise through the day as stressful events occur. However, a person with autism may start their day with a much higher level of stress and anxiety. This means that they may reach crisis point more quickly than others.



Anxiety is very common in people with autism. Around 9.2% of the general population suffers with an anxiety disorder of some kind, whereas, in people with autism the number rises to something more like 30%. These numbers only account for those people diagnosed with an anxiety disorder but many more people, particularly those with autism, suffer with heightened stress and anxiety levels and this has a significant impact on their quality of life. Anxiety can be caused by a huge range of triggers and these will depend entirely on the individual, their likes and dislikes and their past experiences.

Sensory issues

Many people with autism have sensory issues. This means that they are over-sensitive or under-sensitive to some kinds of sensory input. Sensory input is anything that is interpreted by our physical senses – sight, hearing, smell, touch, taste, where our body ends and the rest of the world begins (sometimes referred to as proprioception), and balance (sometimes referred to as the vestibular sense).

Problems with interpreting information from each of the senses can increase stress, as it is harder to make sense of the world. Sensory issues may also be very intrusive for a person, particularly if they are over-sensitive to the environment around them such as smells and sounds. For some people, their sensitivities are so extreme that bright lights, loud noises or strong smells may be physically painful to experience. These difficulties can make everyday life considerably more difficult and therefore stressful and fear of these triggers could go on to cause people severe anxiety about encountering these environments.

Struggling with these sensory issues can also make it considerably more difficult for people with autism to relax once they are already stressed. Loud noises and bright lights, for example, may make it difficult for somebody to think clearly enough to work out what they need to do to reduce their stress. Even if the solutions is as simple as leaving the situation, the person may be too distracted and distressed to process this.

Sense	Hypersensitivity (over-sensitive)	Hypo-sensitivity (under-sensitive)
Sight	Covering eyes, dislikes sunlight/ bright lights	Stares at objects and people, uses hands to explore items as well as vision
Smell	Wears the same clothes over and over, dislikes perfumes	Smells objects and people, seeks out strong smells
Taste	Fussy eating, gags easily	Eats everything, mouths objects
Touch	Does not like to be touched, dislikes messy play or activities	Seeks out deep pressure hugs and holds, fails to notice injury
Hearing	Covers ears, hears sounds not noticed by others (e.g. fluorescent lights buzzing)	Bangs objects and doors, likes loud places like crowds or busy roads
Vestibular	Moves slowly and cautiously, dislikes bending	Crashes into things, likes to spin or swing
Proprioception	Struggles to manipulate small objects, turns whole body to look at something	Appears floppy and leans on things, applies too much force in everyday tasks

You should establish what sensory issues the person with autism has and then find ways to make things easier for them.

For example, it may help for them to wear sunglasses or noise-cancelling headphones or to use a swing or a sensory room. Once you have started to help the person to cope with their sensory needs then they may start to experience a lower level of everyday stress and be better equipped to cope, thereby reducing their long-terms anxieties.

Change and transition

We all experience change and transition throughout our lives, and some people cope with this better than others. Major changes, like moving house, changing schools or starting a new job, can cause significant stress, which may be even more pronounced in people with autism.

People with autism often need a routine and predictability. This can be due to anxiety, but it may also cause anxiety. Even when a person is able to follow their usual routine, they may feel anxious about something disrupting this or preventing them from following the routine in the future. This can then cause anxiety for the future as well as reinforcing the person's need to follow a routine.

Any kind of change, even seemingly small ones, could cause stress and anxiety to a person with autism. This may be a new support worker, a different shampoo or even a new mug. When change happens to a person with autism, it takes away their predictability and familiarity. This can make them feel vulnerable and scared and can be a source of great stress.

Transition tends to refer to specific, life-changing events such as starting at a new school, puberty or losing a loved one. These can be extremely difficult times for a person with autism and should be dealt with carefully and sensitively. The key is to understand the person and learn what helps them most and what their specific concerns are. This will help them to make sense of the changes and feel safe and supported throughout.

When a person with autism is stressed, they may seek predictable responses to reduce their anxiety. For example, they may have learnt that behaving in a certain way results in them being sent out of a room. A neurotypical person may see this as a punishment, but a person with autism may enjoy the time alone and therefore repeat the behaviour to escape stressful situations.

The best way to ease a person's anxiety about change and transition is to provide some kind of predictability and consistency and support them to understand what is happening and what will happen next. Some questions that it is helpful to have an answer to are:

- What is the person going to be doing and what is expected of them?
- How long will they be doing this for?
- What will they be doing next?
- When can they do something that they want to do?

Some people with autism may repeat questions or phrases. In this case they may be seeking a predictable response from you. You can also support the person by offering them plenty of time to prepare for a transition between different activities. It is better to tell the person 15, 10 and 5 minutes before you need them to start a new task, rather than expecting them to make the transition straight away.

Communication

Some people with autism struggle to communicate. This may be because they are non-verbal, have some limited ability to communicate, or they may find it difficult to communicate when they are stressed. Some individuals also have processing delays and so you may need to allow plenty of time for the person to respond.
Some people with autism take things literally. This can make them feel excluded from some conversations if they are worried that they are missing the meaning of what others are saying.

Social anxiety

People with autism can have trouble with communication and social understanding and this can make social situations very challenging and stressful. Many people with autism struggle to read body language and facial expressions which can make it difficult to understand the motives of others. This can also sometimes lead to making social mistakes which can mean that people with autism may struggle to make and keep friends.

Social rules tend to be flexible and may be applied differently throughout a person's life. For example, there are different rules for children and adults and so new rules need to be learned when a child becomes an adult. This can leave people open to bullying and abuse.

The stress of navigating the neurotypical social world can be more extreme for some, leading to social anxiety, avoidance of social situations and sometimes agoraphobia and other mental health problems.

We can support people with autism by being clear and direct with our social rules. We can also help to guide the person by explaining situations they do not understand and especially situations where they may have made an error and caused offense. We should also try to provide an escape route, which means a way for the person to get out of a situation if it becomes unbearably stressful. Some people find interacting with others extremely distressing and even painful. In this case we should not force company on them, but support them in the least intrusive way possible.

Mental health

Mental health problems seem to be more common in people with autism, and this may be in part due to the high levels of stress and anxiety that they experience. Mental health problems can also cause stress and anxiety. It is important that people with autism are supported to deal with their stress and anxiety appropriately. If you are concerned you should encourage the person to see their GP.

Possible causes of mental health problems in people with autism	
Obsessive Compulsive Disorder	Need for routine and consistency, fear of germs or contamination
Social Anxiety Disorder	Lack of understanding in social situations, repeated lack of success in past social situations
Generalised Anxiety Disorder	Excessive worrying and inability to cope appropriately with stress
Panic Disorder	Stress levels are high enough to cause regular panic attacks or episodes
Agoraphobia	Fear of sensory issues occurring or social anxiety leads to a person fearing situations where escape might be difficult
Eating Disorders	Need for routine and control over surroundings
Oppositional Defiant Disorder	Resistance to change, rigid thinking, lack of understanding of consequences or social compliance
Depression	Consistently high levels of stress and anxiety leading to a loss of hope or motivation

Behaviours of concern

People with autism generally operate at a much higher level of stress than people in the general population. Imagine the feeling of waking up on a day when you know you have a job interview. This is one way of understanding the stress that people with autism may be under, except that they experience may this every day.

This can lead to behaviours of concern. Behaviour like this should be seen as communication and you should ask yourself, what is the person getting from this? If you find a pattern in the behaviour that suggests there is a particular trigger for this person's stress then you can attempt to eradicate that to reduce the person's stress and therefore the behaviour.

Some people with autism say that their first reaction to a highly stressed situation is to feel angry. This is often anger directed towards themselves but is also frequently directed towards the person they are with or that supports them. They may feel that the person has let them down by not protecting them from the stress that they are feeling. But many of those same people also say that they react against the people they love because they know that they are safe with those people and they will not reject them for behaving in a way that helps them to cope. If somebody is particularly angry or stressed it is important to give them plenty of time to calm down and not take anything they say personally.

How to manage stress and anxiety

When supporting somebody who is stressed, keep calm and quiet. Be a consistent, safe presence to help the person with autism feel they can begin to relax. Try to avoid showing that you are worried as this may make them feel less secure and more anxious.

Give predictability and routine by writing things down. You could help them plan their time by providing a dry wipe board.

Ensure that the person you are supporting has an appropriate communication system that they are able to use it properly. This will help them to express themselves and their frustrations and anxieties.

If a person has a particular "stim" or repetitive movement that helps them to feel calm then you should support them in this. "Stimming" can be a coping mechanism and may be a sign that the person is attempting to self-soothe. If the person engages in a dangerous or inappropriate "stim", you may need to work with them to find a suitable alternative way to self-soothe.

Sometimes distraction can be a helpful technique. You may be able to remove a person from a stressful situation for long enough for them to recharge and return. It may also help for the person to listen to their favourite music or use a comfort object that they carry with them to remind them that they are safe. This may be particularly useful to help people to reduce the impact of sensory issues.

Top tips

- Preparation will allow the person to organise their thoughts, ready themselves and feel more relaxed going in to an activity and this will help them to feel more comfortable once it begins. They may be able to engage with a special interest or hobby beforehand, or arrange to do so after the activity, to reduce their stress levels.
- There are lots of apps that might help, including apps that play soothing sounds and music to reduce stress.
- Seek to reduce sensory input if it is becoming overwhelming, or provide sensory input if the person needs this.
- Remember, a person with severe anxiety or extreme stress levels is scared, not difficult. Support the person to feel safe and secure and this will help them to feel less scared.
- Stay calm.
- Keep a submissive stance and do not attempt to restrain the person, this will help them to see you are not a threat.
- Do not leave somebody unattended if they are in full meltdown, they are extremely distressed and may put themselves in danger.
- Do not try to force the person to speak or make eye contact and do not ask open-ended questions as this may cause more anxiety.
- Do not try to reason with someone who is experiencing a meltdown or tell them to calm down - this is not a possible or reasonable request.
- Do not attempt to interrupt routines or prevent "stimming" or repetitive behaviours, these show the person is attempting to self-soothe.
- Do not take anything the person says or does personally when they are extremely stressed.
- Touch should be offered but never forced.
- Once the meltdown is over, formulate a plan to prevent it from happening again. If you already had a plan, discuss what went wrong and what you might need to add.

Anxiety in autistic adults

www.autism.org.uk/anxiety

Anxiety is a real difficulty for many adults on the autism spectrum, including those with Asperger syndrome. It can affect a person psychologically and physically. This guide talks about the different ways you can manage anxiety, from keeping a diary, learning relaxation techniques, getting support from others in a similar situation, or using our Brain in Hand app.

Anxiety can happen for a range of reasons and autistic people can vary in their ability to cope with it.

Understanding emotions can be difficult. By helping someone to understand anxiety, you can help them to manage it better. Resources such as those sold by Incentive Plus as well as the Autism Research Centre's CD ROM, Mind reading, can help to support a person to recognise emotions.

Anxiety can affect both the mind and the body, and produce a range of symptoms. The psychological and physical symptoms of anxiety are closely linked and so can lead to a vicious cycle that can be difficult to break. The psychological symptoms of anxiety are:

- easily losing patience
- difficulty concentrating
- thinking constantly about the worst outcome
- difficulty sleeping
- depression
- becoming preoccupied with or obsessive about one subject.

Its physical symptoms include:

- excessive thirst
- stomach upsets

- loose bowel movements
- frequent urinating (going to the loo)
- periods of intensely pounding heart
- periods of having gas
- muscle aches
- headaches
- dizziness
- pins and needles
- tremors.

If you do experience any of these symptoms, it is important to also get medical advice to rule out other medical conditions.

Strategies for managing anxiety

Once someone understands anxiety and has identified the things and situations that make them anxious, they can then take steps to cope with the anxiety. If you are supporting an autistic person, try and be aware of what makes them anxious and how best to help them manage certain behaviours.

Keep a diary

To help someone understand anxiety, get them to understand the symptoms they display when they are anxious and to look at the causes of their anxiety. Keeping a diary in which they write about certain situations and how these make them feel may help them to understand their anxiety and manage it better.

Use the diary also to think about the physical changes linked to anxiety. An autistic person might retreat into their particular interest if they are anxious about something - use the diary to monitor this as well. Record:

- Time and date

- Situation
- How I felt
- How anxious (1 to 10)

Use an app

Our Brain in Hand app is designed to help manage anxiety. It gives easy access to personalised support from your phone, helping you to remember activities, reduce anxiety and feel supported. It come with a telephone mentor service to help you at time when you need extra support.

Meltdown prevention plan

Create an anxiety plan when someone is feeling positive about things. An anxiety plan is a list of things and situations that cause anxiety as well as solutions and strategies they can use to help them manage their anxiety levels. The plan can be adapted, depending upon how well someone understands anxiety. Here's an example:

- **Situation** – going on the bus
- **Anxiety symptoms** - heart beats fast; sweat and feel sick
- **Solution** - have stress ball in pocket, squeeze the ball and take deep breaths, listen to music.

Hear Maja Toudal, a person with Asperger syndrome, talk about 'energy accounting' - a tool she created in her daily life to help prevent her going beyond her 'stress threshold'.

Relaxation techniques

Autistic people can sometimes find it very difficult to relax. Some have a particular interest or activity they like to do because it helps them relax. If they use these to relax, it may help to build them into their daily routine. However, this interest or activity can

itself be the source of behavioural difficulties at times, especially if they're unable to follow their interest or do the activity at a particular moment.

Some people may need to be left alone for short periods of the day to help them unwind.

Physical activity can also often help to manage anxiety and release tension. Using deep breathing exercises to relax can be helpful as can activities such as yoga and Pilates, which both focus on breathing to relax. Use a visual timetable or write a list to help remind the person when they need to practice relaxation.

Any other activities that are pleasant and calming such as taking a bath, listening to relaxing music, aromatherapy, playing on a computer may also help reduce anxiety. Some people may find lights particularly soothing, especially those of a repetitive nature, such as spinning lights or bubble tubes.

You may need to encourage some adults to take part in these activities so that they can enjoy their benefits. You can do this by explaining when and where they will do the activity and what it will involve. You may have to go along with them at first and do short periods of activity to begin with.

Talking about anxiety

Some people find direct confrontation difficult. They may therefore be unable to say they don’t like certain things or situations, which will raise their anxiety levels. If they identify they are anxious, they could use a card system to let family or friends around them know how they are feeling. At first, you may need to tell them when to use the card and prompt them to use it when they do become anxious.

They could also carry a card around with them to remind themselves of what they need to do if they start getting anxious. You could also give them a stress scale that they can use whenever they find something particularly stressful.

It may help them to buy our Autism Alert card, which is the size of a credit card. They can use the card to let members of the public know that they are autistic.

Getting support from other autistic people

Personal accounts

It may help someone on the autism spectrum to read the personal accounts of other autistic people, and to see how they dealt with certain situations and managed any anxiety they experienced. A number of autistic people have written personal accounts of their experiences:

Glass half empty, glass half full: how Asperger's syndrome has changed my life by Chris Mitchell

Making sense of the unfeasible: my life journey with Asperger syndrome by Mark Fleisher

Thinking in pictures by Temple Grandin

We also produce a quarterly newsletter called the Spectrum. It is written by autistic people and includes personal accounts of having autism.

Online resources

Aspies for Freedom (AFF)

Wrong Planet

Identity First Autistic

The National Autistic People's Organisation

The resources on external websites are provided for your help and information only. They are sites maintained by other groups, organisations and individuals and are

provided in good faith. The presence of a website does not necessarily imply that the NAS endorses or supports the originator(s), nor does the absence of a group imply that the NAS does not support it, and cannot be held responsible for the quality of the information provided.

Support groups and specialist help

Going to a support group means meeting other autistic people, which can be helpful in some cases. Different support groups will offer different activities, from going on outings to discussion groups about particular topics. Some autistic people are not able to identify their anxiety or to put in place strategies to manage it on their own. A specialist or a counsellor with experience of autism may be able to help them. Visit our Autism Services Directory for information about local support groups and specialist counsellors.

Further information

Search the NAS library catalogue for relevant books and journal articles.

Quick link to this page: www.autism.org.uk/anxiety

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