

Chinese Music Therapy and Clinical Music Education in Attention Deficit Hyperactivity Disorder

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RESEARCH ARTICLE

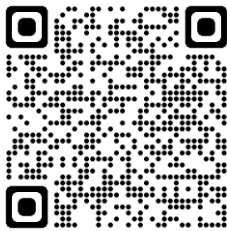
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Abstract: With an overall pooled estimate of 7.2% attention deficit hyperactivity disorder (ADHD) is considered a global psychopathological burden in the younger generation, and a prevalence of 6.4% makes it the leading mental issue in China. On the basis of comparative research and meta-synthetic construction, the present article suggests to differentiate between ADHD as a primary psychiatric disorder, ADHD-typical symptoms caused by disturbing environmental conditions, and multifaceted ADHD resembling syndromes generated by adverse developmental processes and inadequate educational facilities. This differentiation has a decisive impact on treatment modes such as (i) clinical music education, e.g. piano tuition, (ii) cultural participation and self-adjustment through arts-based cognitive behavioural therapy, (iii) avoidance of disturbing stimuli as well as music-based resilience techniques, and (iv) Chinese music therapy including sound-meditation, focused listening training, creative self-actualisation and music-based self-regulation. Interdisciplinary approaches combining music therapy and music education are discussed, alongside cross-cultural application and flexible settings, online music therapy included.

Keywords: Chinese music therapy, clinical music education, creative self-actualisation, music-based self-regulation, cultural participation

OBJECTIVES AND METHODOLOGY

The main purpose of this study was to develop and provide new music therapeutic methods to treat symptoms of attention deficit hyperactivity disorder. Although previous clinical and special educational experiences shed light on the efficacy of specific musical interventions, there are two deficiencies that motivated the present investigations.

Firstly, certain influential circles in the realm of music therapy are mainly based on general models, such as Nordoff-Robbins music therapy, which goes back to the late 1950s (Kim, 2004), or Guided Imagery and Music, a method to evoke emotions and access the unconscious (Beebe & Wyatt, 2009). These models are well-defined, but not tailored to clear diagnoses such as ADHD, hence the need for distinct music therapeutic approaches.

Secondly, standardised methods of evidence-based medicine such as randomised controlled trials (RCT) or meta-analyses of RCTs are broadly accepted means to estimate effect sizes through inferential statistics. Nonetheless, they inherently ignore correspondence-theoretical distances between the actual object and the corresponding mathematical model, a shortcoming that may considerably affect their reliability, hence the two novel parameters of coherence size and confidence range (Mastnak, 2021a).

Moreover, rigid structures of research designs such as RCTs require standardised non-complex interventions and data dimensions. Consequently, corresponding studies frequently associate intervention- and control-groups with 'liked music' and 'disliked music' or categorisations such as 'happy music', 'sad music' and 'angry music', which is – from a musicological and aesthetic perspective – far too simplistic. Although these studies may fulfill standardised requirements of evidence-based medicine, their inner inadequacy goes hand in hand with critical epistemological weaknesses, hence the likelihood of irrelevant or false results.

Neither RCTs nor meta-analyses or systematic reviews are able to inspire and generate new therapeutic interventions. Regarding that, the core of the present study is to develop new music therapeutic models for the treatment of attention deficit hyperactivity disorder and comparable symptoms and syndromes, other scientific approaches are needed, hence the choice of comparative research and deductive reasoning, alongside the principles of systemic meta-synthesis (Mastnak, 2021b).

Key principles of systemic meta-syntheses go back to in-depth analyses of the history of science and the evolution of seminal theories in psychology, psychosomatics, and medicine, which witness the power of epistemological syntheses of all sorts of ideas and discoveries and shed light on ground-breaking

concepts and innovation. Broadly speaking: great minds discovered the inner logic of data from clinical experience, subjective theories, and interdisciplinary sciences and create consistent frameworks – and this is precisely the way, systemic meta-synthesis is built.

This also explains the use of the word ‘systemic’. Given that tangible entities have their very unique characteristics, holistic truth-philosophical representation strives for a most adequate isomorphism between the actual object in the real world and its theoretical representation in the realm of science. Distinct from research on single perspectives, dimensions, or parameters, systemic meta-syntheses try to take the complexity of phenomena into account, hence the term ‘systemic’.

In general, there are two different ways to create a systemic meta-synthesis: a bottom-up and a top-down mode. In bottom-up mode studies on a given issue or thematic field are taken into account and explorative comparative processing tries to trace down general principles as well as their inner logic and coherence. This process generates hypotheses, which usually appear more robust than results of single hypothesis-generating studies.

The top-down mode starts with a given hypothesis and goes on searching for confirmatory or contradictory evidence. While the whole process reminds us of conventional hypothesis testing, the ‘timeline inversion’ makes the decisive difference: What supports or destroys the hypothesis is derived from previous studies. The advantage of this approach lies in the enormous pool of relevant data, which have to be re-evaluated though.

In addition to these two main types, the notion ‘systemic meta-synthesis’ encompasses all approaches (i) which respect epistemology and philosophy of sciences and (ii) integrate data and results from various types of studies (iii) to create a novel theory or theoretical framework. And there are basically no discipline-related limitations or apodictic exclusion criteria.

The present study combines bottom-up and top-down approaches and uses various forms of inductive and deductive reasoning to suggest two complementary findings (i) the differentiation between ADHD as a well-defined diagnosis and phenomena akin to ADHD, which suggest dynamic ADHD-typical syndromes, and (ii) distinct music therapeutic and music educational models to treat ADHD as a whole or specific pathological trait associated with ADHD.

INTRODUCTION

History of ADHD and the evolution of the diagnosis

The history of psychiatric diagnoses reads like the exiting evolution of culture and knowledge. By way of illustration,

already Babylonian and Assyrian texts discussed the phenomenon of hysteria (Trimble & Reynolds, 2016); and while the ‘blessed Fools’ of old Russia might be diagnosed with autism spectrum disorder today (cf. Happé, 1994), Joseph N. Trachtman (2008, 931) pointed out that ‘although autism existed before 1943, it was Leo Kanner who is credited with the first detailed description of autistic behavior. Before Kanner’s report, the behavior was generally known as childhood schizophrenia’. Assuming that attention disturbance and hyperactive behaviour are rather common issues, the history and even a ‘genetic archaeology’ of ADHD, which traces genetic features of the disorder back to Palaeolithic and Neolithic cultures (Esteller-Cucala et al., 2020), come into play.

The morbid alterations to which attention is subject, may all be reduced under the two following heads: First. The incapacity of attending with a necessary degree of constancy to any one object. Second. A total suspension of its effects on the brain. The incapacity of attending with a necessary degree of constancy to any one object almost always arises from an unnatural or morbid sensibility of the nerves, by which means this faculty is incessantly withdrawn from one impression to another. It may be either born with a person, or it may be the effect of accidental diseases. When born with a person it becomes evident at a very early period of life and has a very bad effect, inasmuch as it renders him incapable of attending with constancy to any one object of education. But it seldom is in so great a degree as totally to impede all instruction; and what is very fortunate, it is generally diminished with age.

Although this text reads like a contemporary essay on ADHD, it was written by Sir Alexander Crichton, a Scottish physician, who was born in Edinburgh in 1763 (cf. Palmer & Finger, 2001). In 1798, Crichton published ‘An inquiry into the nature and origin of mental derangement: comprehending a concise system of the physiology and pathology of the human mind and a history of the passions and their effects. Particularly dealing with the phenomenon of attention, he defined that ‘when any object of external sense, or of thought, occupies the mind in such a degree that a person does not receive a clear perception from any other one, he is said to attend to it’ and – regarding pathological deviations – he distinguished between two possibilities of abnormal inattention, a pathologically increased and decreased ‘sensibility of the nerves’ (Crichton 1798), a view that strikingly reminds of modern theories about specific inhibitory brain dysfunctions in ASD and ADHD (Albajara Sáenz et al., 2020).

Giving excellent insights into the evolution of the diagnosis ADHD, Klaus W. Lange et al. (2010) also involve cultural aspects, such as the famous German children's book 'Zappelphilipp' (in English 'Fidgety Phil'), written by the German physician Heinrich Hoffmann in 1844, which is nowadays also regarded as an allegory for children with ADHD. Personal note: in his early childhood the author of this article also read the book 'Zappelphilipp' and discovered his interest in hyperactive behaviour and attention deficit syndrome. Combining medical and cultural aspects is also a core feature of the Research Centre for Arts Therapies of Beijing Normal University and clearly applies to the multifaceted field of attention deficit hyperactivity disorders.

Although dealing with issues of deficient attention and hyperactive behaviour looks back on a long and enlightening history, several authors (cf. Conners, 2000) considered 'The Goulstonian Lectures', Sir George Frederic Still gave in 1902, to be the scientific starting point of the actual history of ADHD. Still described the condition as 'an abnormal defect of moral control in children and pointed out that affected children were not able to control their behaviour in a normal (age-appropriate) way, although they were still intelligent.

Precisely thirty years later, the German physicians Franz Kramer and Hans Pollnow (1932) published their findings of 'a hyperkinetic disease of infancy' [in German 'Über eine hyperkinetische Erkrankung im Kindesalter'] and described motor restlessness as a characteristic symptom of the affected children. Regarding historical perspectives, the authors emphasised that symptoms of this 'hyperkinetic disease' had already previously been observed, but not been distinguished from other diseases with similar symptoms, e.g. certain residual effects of the encephalitis lethargica epidemic.

Although in the 1950s attention deficit hyperactivity symptoms were quite well known, the American Psychiatric Association did not list ADHD in its first edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) in 1952. In 1955, the United States Food and Drug Administration (FDA) approved the psychostimulant methylphenidate (Ritalin), which became a certain, although controversially discussed standard medication to treat ADHD (Wenthur, 2016).

When the American Psychiatric Association issued the DSM-III in the 1980s, the former 'hyperkinetic impulse disorder' was changed to 'attention deficit disorder (ADD), but not ADHD, because hyperactivity was not considered a typical symptom of the disorder. Nonetheless, the DSM distinguished between two subtypes: 'ADD with hyperactivity' and 'ADD without hyperactivity'. Finally, in 1987, the revised edition of the DSM-III used the term 'attention-deficit hyperactivity disorder

(ADHD) and highlighted three necessary components: inattentiveness, impulsivity, and hyperactivity.

Soon afterward, diagnosed cases of ADHD increased significantly. As there was no plausible reason for such an escalating incidence rate, other possibilities were taken into consideration, e.g. improved means to diagnose ADHD or an enhanced general awareness of ADHD, hence more reported children with relevant symptoms. Whether environmental and socio-cultural conditions could actually increase the ADHD-incidence, still remained an important psycho-epidemiological question, which also impacts on the present article.

Today, DSM-5 criteria for ADHD comprise persistent patterns of inattention and/or hyperactivity/impulsivity that interfere with functioning or development. Typical examples are given, such as troubles holding attention on tasks or play activities, failure to finish schoolwork, chores or duties in the workplace, troubles when organising tasks and activities. or forgetfulness in daily activities. Complementary to such features of inattention, hyperactivity and impulsivity may comprise that affected children fidget with or tap hands or feet, squirm in the seat, run about, or climb in situations where it is not appropriate or are unable to play or take part in leisure activities quietly.

Prevalence

A systematic review about the global prevalence of attention deficit hyperactivity disorder (Sayal et al., 2018, 175) warns that – at least in several countries – ADHD is still underdiagnosed and untreated disorders may have a bad prognosis, occupational, private, and criminal issues included. Moreover, the authors emphasised that adequate treatment may improve long-term outcomes, which is the core purpose of our present study:

Attention-deficit hyperactivity disorder (ADHD) is a common childhood behavioural disorder. Systematic reviews indicate that the community prevalence globally is between 2% and 7%, with an average of around 5%. At least a further 5% of children have substantial difficulties with overactivity, inattention, and impulsivity that are just under the threshold to meet full diagnostic criteria for ADHD. Estimates of the administrative prevalence (clinically diagnosed or recorded) vary worldwide and have been increasing over time. However, ADHD is still relatively under-recognised and underdiagnosed in most countries, particularly in girls and older children. ADHD often persists into adulthood and is a risk factor for other mental health disorders and negative outcomes, including educational underachievement, difficulties with employment and relationships, and criminality. The timely recognition and

treatment of children with ADHD-type difficulties provide an opportunity to improve long-term outcomes.

Although our study also intends cross-cultural adaptability, its primary duty is to contribute to the improvement of mental health in the Chinese younger generation, where ADHD is regarded as a major burden and challenge. A Chinese meta-analysis (Wang et al., 2017) included sixty-seven studies with a total of 275,502 individuals estimated the overall pooled prevalence of ADHD among children and adolescents in China at 6.26%. Moreover, the authors highlighted a significant heterogeneity depending on the variables of 'geographic location' and 'source of information, a finding which particularly calls for public health equality, hence our (later) discussion of online music therapy, as well as specific music teacher training all over China to provide clinical music education for children and adolescents with ADHD in all provinces.

Clinical and educational experiences suggest a relatively high occurrence of co-morbidities, a result that is robustly substantiated by an Iranian study (Mohammadi et al., 2021, 1058). The authors' population-based survey included 30,532 children and adolescents between 6 and 18 years was designed to identify ADHD and its co-morbidities. In this study, the prevalence of ADHD was 4%, with more prevalence among boys (5.2% versus 2.7%), younger participants, urban residents, and offspring of mothers who had a history of psychiatric hospitalisation: 'Anxiety disorders (37.9%) and behavioral disorders (31%) are the most prevalent group of comorbidities, and oppositional defiant disorder (ODD) is the most prevalent comorbid disorder (26.1%). Mood disorders and anxiety disorders are more common among girls, but conduct disorder has a higher rate among boys'.

Strikingly similar to these findings, the Global Times published on the 10th of October 2021 the article 'Over 17 percent of children, adolescents suffer from mental disorders in China' referring to a nine-year epidemiological survey that showed that about 17.5 percent of children and adolescents in China suffer from mental disorders, attention deficit hyperactivity disorder (6.4%), anxiety disorder (4.7%), oppositional defiant disorder (3.6%) and major depressive disorder (2.0%) showing the highest prevalence rates. The article also cited CCTV, relating that mental health experts pointed out that primary and middle school students mainly have psychological problems such as lack of emotional stability and learning adaptation, while college students mainly show anxiety, obsessive-compulsive symptoms, and depression – and these are the main challenges of the Beijing Normal University Research Centre for Arts Therapies.

Today we are also faced with the aggravating COVID-19 conditions in Chinese children and adolescents with ADHD. A Chinese study from the Department of Medical Psychology of the Xinhua Hospital affiliated to Shanghai Jiao Tong University School of Medicine (Zhang et al., 2020) summarised:

Attention deficit hyperactivity disorder (ADHD) is one of the most frequently occurred neurobehavioral disorders among children [...], which has a negative impact on a wide range of aspects including learning ability, interpersonal relationships, self-esteem, and emotions [...] In the event of COVID-19 outbreak, schools in China are shut down and students are restricted to staying at homes. Primary and secondary schools in China open online official educational websites in order to allocate students to continue the education [...] Children with ADHD face noticeable challenges during this period. Firstly, the loss of daily routine and the lack of interpersonal and social interaction could work as potential risk factors for mental health problems or could worsen ADHD symptoms [...] Children with ADHD could not get timely and professional care from home setting. Most of the parents of these children can be assumed not to be the domain experts but are forced upon the educational responsibility in addition to handling all the children's emotional and behavioral problems 24/7. Moreover, the pandemic of COVID-19 is a serious challenge to everyone including the adults. Their worry about the situation may further exacerbate the children's psychological well-being and worsen their behavioural problems.

Already in spring 2020, the author of the present article published his meta-synthetic prospective study about the development of mental disorders caused by measures to control the pandemic (Mastnak, 2020), and a comprehensive empirical study (Ravens-Sieberer et al., 2020) proved the serious pathogenic impact of COVID-19 policies on children and adolescents in Germany. Regarding the considerable benefits of music to improve mental health and alleviate psychiatric disorders, Mastnak (2021c) integrated music education and music therapeutic approaches and suggested models to alleviate COVID-19-era associated mental issues. Collaboration with the department of the child- and youth-psychiatry of Ludwig Maximilian University of Munich (LMU) shall bring about further arts-based methods and estimate its therapeutic effects. Further cross-cultural collaboration with the BNU Research Centre for Arts Therapies is intended.

Pathogenic factors and treatment modes

ADHD is usually considered a heritable multifactorial childhood-onset neurodevelopmental disorder (Thapar & Cooper, 2016). Although various studies identified multiple genetic and non-inherited factors and showed that certain prenatal and perinatal factors increase the risk of ADHD occurrence, definite causes of this disorder still remain unknown. In the light of comparative studies, the present article suggests that music therapeutic approaches should basically take genetic, environmental, and psycho-educational conditions into consideration.

Highlighting that formal heritability of ADHD is about 80% and therefore higher than most other psychiatric diseases, a German team of researchers (Grimm et al., 2020) gave an overview of how polygenic risk scores explain different behavioural phenotypes in ADHD and how these could be used for diagnosis and therapy prediction. Daniel Geschwind and Patrick F. Sullivan (2019) referred to studies that identified, mapped, and analysed the potential biological significance of twelve 'significant risk loci' associated with ADHD, such as on the 2nd, 7th and 10th chromosomes. Although there is most probably no possibility to (directly) amend DNA structures through music, epigenetic studies on ADHD let us hypothesise possibilities (Hamza et al. 2019, 655):

In the Gene × Environment interaction model, several clinical, genetic, and molecular arguments support the epigenetic hypothesis in ADHD etiology. Environmental ADHD risk factors including toxic, nutritional factors, and stressful life events lead to changes in DNA methylation and in histone modification levels. One critical CpG site located in the promoter of the DRD4 gene exhibited a specific pattern in ADHD children. A methylome-wide exploration of DNA showed decreased methylation in the vasoactive intestinal peptide receptor 2 gene, which was not replicated by further research.

In this text, CpG (Cytosine-phosphate-Guanine) islands are DNA methylation regions in promoters known to regulate gene expression through transcriptional silencing of the corresponding gene. DNA methylation at CpG islands is crucial for gene expression and tissue-specific processes (Lim et al., 2019). DRD4 means 'Dopamine Receptor D4', a protein-coding gene. ADHD is a typical disorder associated with DRD4, which also plays a certain role in other autonomic nervous system diseases. Epigenetic studies (cf. Brigati et al., 2012) suggest that music may have a distinct impact on epigenetic mechanisms, such as listening to music as a regulator of human microRNA expression (Nair et al., 2021), hence our vision that music therapy may also influence ADHD

through epigenetic functions. In this context, recent studies point to possible links between the genetic system and environmental factors contributing to ADHD (Palladino et al. 2019, 63):

Attention-deficit/hyperactivity disorder (ADHD) is a common and highly heritable neurodevelopmental disorder. In recent years, genetic studies have revealed several risk gene variants associated with ADHD; however, these variants could only be partly replicated and are responsible for only a fraction of the whole heritability of ADHD estimated from family and twin studies. One factor that could potentially explain the 'missing heritability of ADHD is that childhood and adult or persistent ADHD could be genetically distinct subtypes, which therefore need to be analyzed separately. Another approach to identifying this missing heritability could be combining the investigation of both common and rare gene risk variants as well as polygenic risk scores. Finally, environmental factors are also thought to play an important role in the etiology of ADHD, acting either independently of the genetic background or more likely in gene-environment interactions. Environmental factors might additionally convey their influence by epigenetic mechanisms, which are relatively underexplored in ADHD.

From an integrative medical perspective, ADHD-related research and the development of appropriate therapeutic means have to take genetic, epigenetic, and environmental factors into account, as well as their mutual interaction, such as molecular mechanisms underlying the neurodevelopmental issues of ADHD (Bădescu et al., 2016). Relevant pathogenic and pathological moments cover a broad spectrum, which greatly impacts on specific medical areas and disciplines, such as obstetrics and the control of prenatal risk factors of ADHD (Sciberras et al., 2017), an issue that also touches upon Jingyi Yang's studies on pre- and perinatal music therapy (Mastnak & Yang, 2021). Identification of environmental, socio-cultural, and lifestyle factors of ADHD is still a huge challenge. An excellent Czech study (Weissenberger et al., 2017) calls for a holistic perspective and summarises:

It is argued that ADHD is best understood in a holistic and interactive context and a vast empirical literature is presented to illustrate the point: Environmental factors include stress in general as well as exposure to toxins (phthalates, bisphenol A). Social factors are illustrated by the effects of social deprivation and seduction to unhealthy lifestyles. Maternal lifestyle during pregnancy is pointed out (particularly her exposure to nicotine,

alcohol, caffeine, and drugs, even seemingly benign medications like acetaminophen), which all tend to be related to ADHD. The family environment is discussed with respect to the protective effect of (mainly authoritative and autocratic) parenting styles. Societal factors include mainly economic and political issues: income inequality and poverty (low SES is an ADHD risk factor) and a growing moral dilemma between a humanistic effort to globally spread the knowledge of ADHD and the medicalization and commercialization of the disorder. The second part of the review is devoted to ADHD-related lifestyles and resulting comorbidities (e.g., food addiction and obesity, substance abuse, electronic media dependencies, and conduct and personality disorders). Although ADHD is a neurodevelopmental disorder, its assessment and treatment are also linked to environmental, behavioral, and social factors and their interactions.

This is precisely the complex spectrum our music therapeutic approaches are dealing with. This complexity requires multimodal systemic meta-syntheses to develop arts-based therapeutic interventions – results are presented and discussed below.

Music therapy for ADHD

How to treat ADHD is a key issue and the huge variety of approaches gives an idea of its complexity, e.g. neurostimulation techniques (Wong & Zaman, 2019), mindfulness-based interventions (Schmiedeler, 2015), anthroposophic therapy (Hamre et al., 2010), or traditional Chinese medicine (Ni et al., 2014). The multitude of available therapies goes hand in hand with the question of how to select the optimal treatment. A review (Caye et al., 2019) focuses on pharmacological and non-pharmacological approaches and suggests – entirely compatible with the present article's standpoint – that individualised features of the patient should guide the selection of treatments.

Encouraged by clinical and non-clinical observations, creative abilities of individuals with ADHD as well as influences of creative activities on ADHD symptoms have become an important topic, and a Dutch study concluded (Boot et al., 2020, 1857): 'Our findings suggest that goal-directed motivation may drive the enhanced real-world creative achievements of people with ADHD. Moreover, people with ADHD may selectively engage and excel in creative domains that fit their skills and preferences'.

Creativity is widely associated with the arts and leads directly to the question of whether music has ADHD-specific

therapeutic potential. In the West there are two contrasting, sometimes even conflicting standpoints: one regards music – often in a very superficial, generalising, and advertising way – as a sort of 'sound medication', while the other emphasises the necessity of interaction between therapist and patient in music therapy. Concerning the second position, Fan Zhang et al. (2017) provided a profound review:

Music therapy may decrease the frequency of maladaptive behaviors of ADHD [...] and reduce other mental health conditions that mimic or coexist with ADHD (for example, learning disorders, ODD, CD, depression, tic disorder, adjustment disorder) [...] by providing people with "a safe, structuring and socially acceptable form in which they can express feelings which otherwise might be too overwhelming to express" [...] A music therapy program promoting autonomy and creativity may help children and adolescents to interact more appropriately with others, though it might also lead to a temporary mild increase in disruptive behavior in the classroom [...] Music therapists use a number of methods to lead to outcomes that are generally perceived to be favorable in the treatment of children with ADHD (Jackson 2003). Rickson 2006 concluded that music therapy could contribute to a reduction in a range of ADHD symptoms in the classroom and improvement in a range of developmental areas.

In contrast to these approaches, however, the present study suggests music therapeutic models that are especially designed to cope with ADHD-typical features.

Findings and Discussion

Putting the parts of the global interdisciplinary ADHD-puzzle together, we suggest – not least for methodological and therapeutic reasons – to differentiate between (i) ADHD as a genuine disorder, which is, e.g., associated with central nervous structural shape changes of the middle and superior temporal gyrus, as well as fronto-basal portions of both frontal lobes (Gehricke et al., 2017), (ii) ADHD-features as acquired and consolidated personality traits and (iii) ADHD-symptoms as a pathological response to adverse environmental and/or sociocultural conditions.

Clinical music education

Several years ago, the author of the present article suggested the term and discipline of 'clinical music education' as music education in clinical contexts. Although entirely of music-educational nature, interventions may positively impact on the course of diseases, for instance, alleviate symptoms, change a

patient's attitude towards pathological issues and compliance, or support a positive self-image and pertinent self-actualisation. By way of illustration, functional singing education in psychiatric contexts can importantly alleviate symptoms of major depression, schizophrenia, and post-traumatic stress disorders (Boning, 2019).

The Mexican piano educator Diana Ortigoza Castro (2019) studied the beneficial effects of individual piano lessons on children with ADHD and highlighted the importance of (i) the student's mental focus on music and self-efficacy in form of dynamic reinforcement loops, (ii) precisely adjusted immersion in piano-playing to control impulsivity and improve emotional lability, alongside the avoidance of sensory overload, (iii) positive musical stimulation to adjust psycho-mental energy, (iv) resource-oriented and mindful deconstruction of typical ADHD-realities and (v) music-guided improvement of self-confidence, self-consciousness, sense of reliability, tolerance, and adequate self-criticism. Moreover, she emphasised that under such piano educational conditions typical ADHD symptoms would not appear, or vanish gradually, and that achievement also improve behavioural performance in everyday life.

Self-adjustment and cultural participation

The German music educator Rahel Arbogast is specialising in elemental music and dance education for individuals with attention deficit disorders (ADD) or ADHD. In her opinion, this differentiation is important and respects different pathological phenomena and predominant symptoms.

Referring to the ADD/ADHD-specific integration of music education and music therapy, she raises the issue that clinicians and therapists mainly focus on symptom-reduction and tend to ignore the integral personality. In other words, individuals who are diagnosed with ADHD may reject this pathological labelling as the 'symptoms' referred to are not necessarily sensed as disease, but personality traits. Her viewpoints greatly involve medical philosophy and implicitly criticise the notion of a 'normal personality, which also contradicts the principles of inclusive education, particularly of inclusive music education (cf. Moscardini & Wilson, 2015). From this perspective, it is more important to enhance(music-guided) self-adjustment to the 'normal world' than to merely reduce symptoms. This approach also involves music psychoeducation (Mastnak & Tiëschky, 2017a & 2017b) and reminds of psychoeducational support of highly intelligent individuals, who experience what Western psychiatry usually calls (psychotic) hallucinations, and learn to distinguish between their actual world and the world of the others.

In this context, Rahel Arbogast also encourages alternative concert formats, alongside cultural events that allow unrestricted cultural participation, such as interactive opera arrangements. Given that classical concert formats seem to be on a certain decline and socio-cultural dynamics call for new genres, the idea of social inclusion should not be limited to education: social equality has also to respect the broad spectrum of different personality features, even if conventional diagnostic manuals call them 'pathological'.

Control of adverse stimuli

Atypical sensory profiles including both hyper- and hyposensitivity have been reported as possible core features in individuals with ADHD (Bijlenga et al., 2017): 'Sensory hypo- and hypersensitivity may be viewed as key features of adult ADHD, especially in females, regardless of any autistic symptoms. Future research should be directed at the implications of this sensory dysregulation for the understanding of the pathophysiology of (female) ADHD and on the usefulness of assessment of atypical sensory profiles in the diagnostic procedure of ADHD in adults. Moreover, Lane and Reynolds (2019) suggest sensory over-responsivity as a dimension in the diagnostic process for children with ADHD. Regarding disturbing environmental stimuli as aggravating factor in ADHD, the present article suggests the transformation of the subjective labelling of irritating cues.

Sensory hypersensitivity or hyperirritability can aggravate ADHD-typical inattentiveness, disturbed concentration, and impulsiveness. Particularly repetitive, incalculable, and uncontrollable auditory stimulation can turn into pathogenic cues, even in individuals without genuine ADHD. From the perspective of cognitive behavioural therapy (CBT), these processes are likely to generate conditioned cues that may trigger adverse reactions.

Combining CBT and imagination therapy, individuals are asked to listen to music that attracts their aesthetic attention. Once consolidated, this music-attention compound is used as a mental frame for the imagination of or exposition to disturbing cues. Both techniques create concurrent stimuli, while the patient is encouraged to use – if needed to be supported by hypnotherapeutic intervention – cognitive imaginary to gradually change the irritating nature of the adverse triggers into meaningless acoustic backgrounds. Complementary to the method of changing cue labels, fading out bothering acoustic stimuli through focused listening can increase the soothing effect, alongside sound-based psychosomatic rebalancing. Both models are described in the next section.

Music-based ADHD-self-regulation techniques

Genetic issues cause brain changes in patients with ADHD (Yadav et al., 2021), and abnormal morphological features such as reduction in cortical surface areas of children with ADHD (Dirlikov et al., 2014) are well studied. Although it seems to be impossible to amend the cortical ‘hardware’ through music, sound and rhythm are excellent means to improve neuroplasticity which might counterbalance cortical deficiencies. For instance, neuroprocessing mechanisms of music influence foetal and neonatal neuroplasticity and neurodevelopment (Chorna et al., 2019) and enhance prefrontal structural neuroplasticity after traumatic brain injury (Siponkoski et al., 2020). Broadly speaking, there are good reasons to assume that music activities have a positive impact on neural structures in individuals with ADHD.

Focal listening

In 2017 Mastnak and Köhler-Massinger conducted research on music perception to reduce stress and prevent burnout syndromes. They pointed out that only speaking about ‘listening to music’ – a term that is often used in empirical studies – is too general and may yield inadequate or erroneous results, hence the necessity to take distinct listening modes and their psychological correlates into consideration, particularly (i) focal listening and sound identity, (ii) immersion listening and deep relaxation, (iii) inner readiness to auditory stimulation of imagery, (iv) listening-induced trance, (v) music-guided expressive movement and (vi) aesthetic sound-experience. Enjoying the beauty of music beyond analytic cognition accords with anthropological phenomena of aesthetics, and study participants said that experiencing the beauty of music was incompatible with stress and conditions of burnout.

Particularly focal listening and sound identity may help individuals with ADHD to improve and control their attention, as long as the following conditions are met: (i) therapeutic settings shall be free of concurring (disturbing) stimuli, (ii) music shall be subjectively attractive and facilitate feelings of aesthetic identity, (iii) focal listening shall cover the whole spectrum between objective cognition and aesthetic self-devotion, (iv) patients determine the length of the process to avoid adverse conditioning of attention self-regulation.

Creative impulse control training

Deficient impulse control is a multifaceted issue, which occurs as a primary condition, namely impulse control disorder, as well as co-morbid symptoms, such as in Parkinson’s disease (Augustine et al., 2021) and ADHD. Movement-mind-oriented approaches, such as Yoga (Cohen et al., 2018), can have a beneficial influence on ADHD-typical symptoms – the present study particularly suggests traditional Chinese practices.

By way of illustration, the Kung Fu model ‘Five Animals’, in Chinese 五形功夫 wǔxíng gōngfū, or ‘Five Animal play’, 五禽戏 wǔqínxì, a set of Qigong exercises that dates back to the Han dynasty (202 BC – 220 AD), symbolise characteristics of the tiger, deer, bear, monkey, and crane, and involve TCM views of the five elements as well as yin-yang, hence their importance for psychosomatic equilibrium. In our ADHD model, patients not only learn elements of these traditional practices, but (i) try to discover through body-oriented self-exploration how they mirror their own inner drives and motor impulses, (ii) modify patterns according to their affective motor self, a process which merges self-recognition and creative expression, (iii) get aware of their ability to control these movements – and not to be the victim of motor-impulse outbursts, (iv) practise the movement for cardio-respiratory fitness (Mastnak, 2017), strength training and improved motor control, and (v) design and perform artistic entities which also include other media such as a vocal expression or light design; this approach also aims at self-actualisation, alongside educational motivation (cf. Neto, 2015). In short: they try to transform their previously autonomous impulsive outbursts into highly authentic creative processes, which gradually may decompose the pathological features of impulse control.

Sound meditation and inner calmness

For several years meditation techniques to improve symptoms of ADHD have gained importance (Evans et al., 2018). In this context, mindfulness-oriented meditation is considered self-regulatory training for individuals with ADHD (Santonastaso et al., 2020), and clinical as well as cost-effectiveness of meditation versus medication is discussed (Meppelink et al., 2016).

This article particularly suggests sound meditation. Either guided by one’s own voice or external sources such as Buddhist sound bowls or the traditional Chinese zither Guqin, individuals are encouraged to get familiar with deep meditation, akin to traditional Zen-practices. Particularly in integrative psychiatry and psychosomatics, Zen-meditation (Chiesa, 2009) has been used to alleviate depression, anxiety, pain, and psychological stress (Marchand, 2012), as well as a path to self-discovery, one’s unconscious included (Strick et al., 2012).

The present article considers sound meditation to be a self-controlled way to inner calmness, to get rid of disturbing thoughts and impulses, and to enhance psychosomatic rebalancing and resilience. Moreover, it shall enhance personal growth and facilitate self-transcendence. However, sound meditation is not an (entirely) operationalised method such as

techniques in heart surgery but requires an intrinsic readiness to holistic self-dedication and the discovery of inner worlds.

CONCLUSION

Although research on attention deficit hyperactivity disorders is fairly advanced, the whole phenomenon still reminds us of an incomplete puzzle. The heterogeneity of causes, mechanisms, and features of ADHD requires interdisciplinary mixed methods research, as well as epistemological open-mindedness and critical truth-theoretical reflection. This also involves the issue of whether ADHD is a consistent disease or understanding ADHD-phenomena has to take various associated pathological patterns into account.

Regarding the high prevalence of ADHD – both globally and in China – adequate measures are of urgent importance. Core issues comprise (i) the general and individual effects of interventions. The polarity between statistical and personalised medical significance also involves the problem of standardisation, i.e. to what extent each treatment has to be precisely tailored to the patient's needs, (ii) the individual acceptance of interventions, which will importantly influence sustainability, development of self-regulation techniques and positive influence on the entire personality, and (iii) feasibility and nationwide availability. This requires pertinent infrastructures, e.g. interdisciplinary networking between public health and educational bodies, as well as specific pieces of training.

Creative and particularly music-based interventions seem to be significantly beneficial, hence the suggestion of ADHD-specific models, which differ from general music therapeutic concepts, as regular components of complex treatment plans. The BNU Research Centre for Arts Therapies explicitly focuses on these topics and tries – also in cooperation with the Chinese-German music therapist Lixi Wang – to improve the lives of people with ADHD, as well as to contribute to equality in terms of medical and educational support.

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