

Trauma-related dissociation as a factor affecting musicians' memory for music: Some possible solutions

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Abstract

An investigation of the influence of trauma on musicians revealed concentration and memory problems as two of the most common symptoms hampering the performance of affected individuals. In many instances where the causes of these problems were related to trauma sequelae, these could clearly be linked to dissociative symptoms. The following sequence of topics is discussed: the nature of memory function in the musician; optimal performance and focus; trauma and dissociation and the resultant ways in which it interferes with memory. The effects of trauma on the unconscious mind, nature of associations, working memory, as well as similarity of states of optimal concentration and pathological dissociation are discussed to enhance understanding of how trauma sequelae can, theoretically, negatively affect musicians' memory. Observations of teachers as gleaned from an extensive qualitative research survey, including that of students as well as teachers' self-reports, are discussed, and narratives of three musicians participating as case studies explicated and compared to the literature. In the search for effective solutions, promising intervention strategies are identified. These include Eye Movement Desensitization and Reprogramming, Eye Movement Integration, hypnosis, body therapies, and the role of movement. Some suggestions for further research are made.

Key words: associations, dissociation, flashbacks, memory, musicians, sensory perception, trauma

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Introduction

Handling the demands of complex mental processing of musical material is essential for any musician. The requirement of highly developed memory skills applies most evidently to performers, but also to music teachers, researchers and composers.

Regardless of whether a performance is done entirely 'from memory'¹, processes that require highly specialized memory skills are involved in

any form of musical activity. The possibility of memory failure is a common cause of anxiety amongst musicians. Therefore it is not surprising that many musicians will go to great lengths to attain what they believe to be the best method

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1. The phrase 'performance from memory' refers to playing a music instrument or singing in public without sheet music. This practice is conventional amongst especially professional pianists and singers, as well as amongst some other instrumentalists.

of preparation as well as the optimal mental and physical states to maximize the chances of achieving secure performances. The authors of this paper regard adequate preparation as the most important prerequisite for successful performance. Yet they postulate that not all other aspects impacting on performance quality are fully understood. This article explores trauma-related dissociation, identified as a factor contributing to memory problems in an extensive study about the influence of trauma on musicians (Swart, 2009). Memory difficulties experienced by participants in this study included examples of these on stage, during practice and lessons, as well as temporary amnesia for music due to severe trauma.

In what follows, a few characteristics of the nature of memory function in the musician are discussed before exploring the complex ways in which trauma can influence memory for music.

Aims

The aim of this article is to shed light on the impact of trauma on aspects of musicians' music-making, particularly on its effects on memory during music performance and study. Effects on musicians' memory are considered, explicated and discussed in the light of the rapidly expanding body of knowledge about factors involved in the trauma response, most notably that of dissociation. A further aim of this article is to increase awareness of possible effective therapeutic intervention strategies among performers and teachers.

Methodology

This study presents research findings that formed part of a larger study – a qualitative research survey on the influence of trauma on musicians (Swart, 2009). Ashworth (2003, p. 4) proposes that behind each different approach to qualitative psychology is “a concern with human experience

in its richness”. He further states that some qualitative researchers attempt to describe a person's experience within the realm of what they term the personal ‘lifeworld’, all facets of which may be specific but share universal features (Ashworth, 2003, p. 4, 23).

The study is also exploratory in nature. According to Marczyk, De Matteo, and Festinger (2005, p. 151), naturalistic observation is useful for exploratory purposes. As regards this study, the wealth of existing literature on the subject of trauma, as well as personal accounts of musicians who have experienced trauma, strengthens its empirical roots.

Questionnaires were sent to music teachers as well as healthcare professionals who indicated that they have worked with musicians, and case studies were conducted. The results relevant to the effects of trauma on memory are extracted and presented in this paper. This constitutes responses of teachers to the questionnaires, self-reports of teachers, as well as three of the case studies in which information was given about the effects of trauma on memory. Possible therapeutic solutions that featured most prominently in the research survey were selected and discussed.

This paper reflects the same approach as that of Swart's (2009) investigation of the effects of trauma on musicians, but narrows the scope to effects on memory specifically. As orientation to the topic, relevant concepts are explicated and discussed in light of a literature survey.

Memory function in the musician

The exact nature of memory for music is not completely understood. Many writers stress the importance of involving all memory systems, namely visual, acoustic/aural, kinaesthetic, motoric and analytical, in the memorization of music (see for example, Sándor, 1981, pp. 192-197; Ahrens & Atkinson, 1955, pp. 80-83). Jensen (1996, p. 205) categorizes retrieval systems

slightly differently, namely as categorical/semantic, procedural, contextual/episodic and sensory and synaesthetic² memory. Regardless of categorisation, encoding and retrieval could be influenced if any one or more of the memory systems are affected by dissociation.

Corsini (2002, p. 581) defines memory firstly as the “[a]bility to revive past experience, based on the mental processes of learning or registration, retention, recall or retrieval, and recognition; the total body of remembered experience” and secondly as “[a] specific past experience recalled”. For instance, at a given point in time a musician can be playing a piece of music ‘from memory’ – in other words, be recalling the music – while many other pieces may be stored in memory, available for future recall. The degree of accuracy of recall may vary depending on the solidity of consolidation processes and the relative recency of past revision of material, but the music is indeed stored and available for retrieval.

In order for learning to take place, alterations in synaptic connectivity are necessary. Thus learning requires plasticity and leads to change in cortical maps. Memory of learnt material constitutes the stabilization and maintenance of these changes over time – short-term memory resulting from functional change, and long-term memory from anatomical change (LeDoux, 2002, p. 134; Kandel, 2006, p. 218). Music performance requires both short-term and long-term memories. When performing, all technical passages as well as interpretative aspects have to be executed in real time. This could be described as time-based sequential memory. The relentless expectations that previously consolidated material be exactly rendered distinguish memory required of

performing artists from memory for other kinds of previously learnt information. This may be the reason why changes in and interference with short-term memory (also referred to as ‘working memory’) are more noticeable in the performing arts than in other occupations. Such interference is in many cases the result of concentration deficits due to trauma.

Both implicit and explicit memory are required for learning and performing. Scaer (2005, p. 38) defines explicit or declarative memory as memory utilized in the “specific process of conscious learning” and distinguishes between episodic (used to guide our immediate activities) and semantic (for learning or gathering information) declarative memory. Implicit/non-declarative/procedural memory is intrinsically unconscious, is employed to acquire sensorimotor skills, and is reflected in many aspects of outward behaviour and inner life (Scaer, 2005, p. 40; LeDoux, 2002, p. 116). In music, what was learned by using declarative memory later becomes automatic – in other words, part of procedural memory. However, a musician is conscious of and can perhaps later recall many or even most aspects of the performance that were previously contained in working memory (also known as short-term memory).

A basic knowledge of memory systems is important to facilitate an understanding of how memory for music and memory of trauma could mutually influence (or interfere with) each other. It will be seen that emotion, emotional reactions, memory and associations are integral aspects of the experience of traumatic encounters.

Optimal performance and focus

The hallmark of successful artists, performers, sportspeople and other categories of high functioning individuals is their capacity for focused states of attention. These states of optimal concentration are necessary in order to function at high levels and are described by

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2. Synaesthesia is defined by Corsini (2002, p. 972) as “[a]n experience in which stimulation of one sensory modality also arouses sensations in another; for example, words or sounds (and sometimes tastes and odors) may be experienced as colors. Musical notes may yield specific colors. Or numbers are experienced as sounds.”

many writers. One of the noted and often quoted authors in this area is Mihaly Csikszentmihalyi. Farmer (1999), for instance, uses a description of this state by Csikszentmihalyi that is applicable to musicians:

Csikszentmihalyi accounted for this feeling of being consciously outside of the creation as due to the psychological limits of consciousness, that at higher levels of consciousness the more mundane aspects become subconscious in order to restrict conscious attention to the number of items it can manage. So a pianist described not noticing the room, his hands, the keys, the score, but rather being conscious of only "being one with the music and expressing emotion". (Farmer, 1999, p. 1)

Van der Hart, Nijenhuis, Steele, and Browne (2004, pp. 906-908) limit the concept of dissociation to structural dividedness of the personality. It is important to note that psychological absorption, defined as "total attention that involves a full commitment of available perceptual, motoric, imaginative and ideational resources to a unified representation of the attentional object" (Decker, 2004, p. 2), is a related but non-dissociative phenomenon. Decker (2004, p. 4) argues that dissociative ability could be a personality trait that assists people in surviving traumas, while on the other hand helping untraumatized people to excel. Musicians themselves refer to music's capability to induce quasi-hypnotic states. Fleisher remarked (2004, p. 2): "The two Bach pieces, to me, are like mantra music. They serve to get us into the 'zone'." Gorrie (2009, pp. 22-26) refers to this heightened state of awareness when performing as 'playing in the zone' and explains that it is attained when the ideal level of performance arousal is attained. This state is important for performing musicians. However, there are factors that can negatively impact states of optimal concentration. Unresolved trauma is but one causative factor. Later in this article the question will be addressed how heightened attention and the pathological dissociative state

could interfere with each other and increase the possibility of flashbacks for the traumatized musician.

Dissociation and trauma

The term 'trauma' originates from the Greek *trauma* ("wound"). Peichl (2007b, p. 23) defines trauma as a toxic condition, a mixture of intense anxiety, absolute helplessness and a loss of control³. Traumatic experience constitutes an event/events, leaving an imprint that remains unresolved and continues to cause negative effects in the sensory, emotional and cognitive systems. It is associated with helplessness and a sense of loss of control over parts of one's mind, including that of identity, memory and consciousness (Spiegel, 2008; Beaulieu, 2003, p. 28; Levine, 1997, pp. 128-129).

Dissociation, commonly employed as a psychological defence mechanism to mentally survive devastating events, is linked with the freeze response. The risk for this is greatest when the victim is unable to fight or flee – reactions first described by Walter Cannon in 1929 (Cannon, 1929, pp. 195-197; Bracha, Ralston, Matsukawa, Matsunaga and Williams, 2004, p. 448). Nevertheless, Van der Hart *et al.* (2004, p. 909) come to the conclusion that structural dissociation should be more aptly considered not so much as a defence, but rather as a deficit resulting from a lack of integrative capacity.

Scaer (2005, p. 177) defines dissociation as "a subjective experience, a continuum of abnormal perceptions and behaviours that occur in people subjected to a traumatic event or even to an intense period of stress". A block occurs between the amygdala and hippocampus, which causes the resulting disruption of

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3. In Peichl's own words (2007b, p. 23): "Trauma, so wissen wir, ist ein toxischer Zustand, eine Mischung aus Todesangst, absoluter Hilflosigkeit und Kontrollverlust."

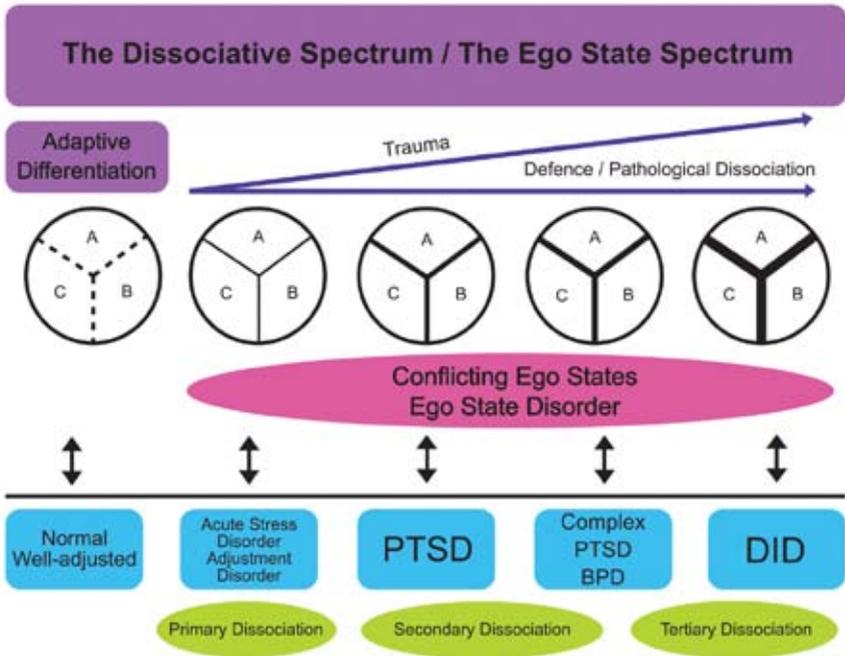


Figure 1: The Dissociative Spectrum as assimilated by Hartman (2009b) from the work of Peichl (2007a, p. 162), Nijenhuis et al. (2004) and Watkins & Watkins (1997, p. 32)

consciousness, memory, identity, and perception of the environment, potentially altering any of these states and functions (Scaer, 2005, p. 177; Huopainen, 2002, p. 103). Van der Hart et al. (2004, p. 906) view it as "a lack of integration among psychobiological systems that constitute personality". This is maintained by integrative deficits and phobic avoidance that can have psychoform and/or somatoform components.

Dissociation exists on a continuum, ranging from adaptive differentiation to pathological dissociation. Hartman (2009b) synthesized the models of Peichl (2007a, p. 162), Nijenhuis, van der Hart, and Steele (2004), and Watkins and Watkins (1997, p. 32) into a representation of the

spectrum of dissociation (Figure 1).

Nijenhuis et al. (2004) describe structural dissociation of the personality from primary through secondary to tertiary dissociation. This model holds that primary structural dissociation is characteristic of acute stress disorder (ASD) and simple post-traumatic stress disorder (PTSD). Unable to integrate the traumatic experience into his or her everyday experiences, the individual splits off parts of the traumatic experience from the mainstream of consciousness. Symptoms such as flashbacks, nightmares, intrusive thoughts and partial amnesia may then occur. Secondary dissociation becomes evident in the manifestation of disorders such as PTSD. Hartman

(2009b) notes that secondary dissociation is a manifestation of either a smaller or wider range of defensive subsystems (referred to as ego-states) that were not sufficiently integrated. Often associated with childhood trauma, symptoms can include out-of-body experiences, changed perception of time and pain, re-experiencing of traumatic memories, or responding to cues that are salient reminders of recalled events. Tertiary structural dissociation is associated with dissociative identity disorder (DID). This does not necessarily occur during trauma, but may emerge when inescapable aspects of daily life become associated with complex past trauma experiences (Hartman, 2009b; Nijenhuis *et al.*, 2004).

Dissociation can play an important role in the manifestation of various forms of attention deficit and concentration problems that can be observed by teachers in their students – and perhaps not adequately understood, such as where intrusive memories are concerned. Throughout his book, Scaer (2005) illustrates that the manifestation of dissociation can be multifaceted, including physical and mental symptoms and ranging from normal adaptive dissociation to personality disorders and psychosomatic symptoms. Fourie (2009) points out that according to Levine's model (1992, pp. 85-108), dissociation can be a "fragmentation of different dimensions of experience" as well as "over-association or over-coupling where experiences are joined together in manners that cannot be integrated" (Fourie, 2009, p. 19).

From data obtained during doctoral research (Swart 2009), the authors have come to the conclusion that those aspects of the trauma response which involve dissociative phenomena can have the most profound impact on musicians.

Trauma sequelae as factors negatively affecting memory

Roth and Friedman (1998, p. 12) postulate that traumatic memories may differ from 'ordinary'

memories: sensory overload occurs and overwhelming traumatic events cannot be fully and meaningfully processed and integrated without proper intervention and assistance. Potential differences include more pronounced activation of implicit and explicit memories and elevations of stress hormones accompanying such experience, causing traumatic memories to become more deeply engrained in neural pathways than ordinary memories. However, they (Roth & Friedman, 1998, p. 12) also attest that in cases of extreme levels of arousal a number of mechanisms, including dissociation and state-dependant learning, may interfere with encoding. This greatly increases the probability that a traumatic event, although belonging to the past, will continue to influence an individual and his or her music-making. Deeply engrained memories open the possibility for stronger associations to be formed between more benign events reminiscent of the original trauma and memories of the trauma itself.

Traumatic memories can continue to haunt individuals in primarily two ways, avoidance and re-experiencing, both of which can be described as dissociative in nature and can alter memory. In the *Diagnostic and statistical manual of mental disorders (DSM IV-TR, APA, 2000, p. 468)* the former is described as efforts to avoid thoughts, feelings, people, places, etc. associated with the trauma. When, as a method of self-protection, dissociation is used as a coping mechanism, the consequences can be serious for the musician and both emotional expression and memory function could be affected. The full extent of its influence – also applicable to musicians – is underlined by Van der Hart *et al.*'s (2004, p. 910) assertion (which, they admit, runs contrary to most of the literature), that, once the personality is structurally divided, no part thereof can be described as non-dissociated. On closer investigation it would appear that dissociation is the primary causative factor of trauma-related memory difficulties in musicians.

The unconscious mind

It is the role of the unconscious⁴ mind to protect us from danger, keep us alive and store and process everything that we experience with our five senses (Gray, 2009). Hartman (2009a) describes the unconscious mind as the core of the personality, the deep self and 'inner fountain of resources', communication received from which includes phenomena such as 'gut feelings' and the 'sixth sense'. When certain parts of a piece of music for any reason become associated with a traumatic event, the unconscious mind may want to avoid re-experiencing such a threatening situation and escape by means of a flight reaction. Under these circumstances it is possible for a freeze response to cause the experience commonly known as 'striking a blank' on stage, or for dissociation from feelings to occur, leading to 'automatic playing' (performance devoid of emotion).

Other factors, such as the fear of public performance and associated criticism, could also cause sudden blanking of memory. A particularly important factor for sensitive individuals is their awareness that others whom they might associate with their trauma, such as parents or teachers, are present in the audience. Southcott and Simmons (2008, p. 32) indeed identified the performer's perception of the audience as particularly significant in determining levels of performance anxiety. Maladaptive as a memory slip might seem, it could in some cases be an effort of the unconscious mind to protect the individual against perceived danger.

Associations

Association can trigger recall in normal everyday memory tasks, memory for music as

well as memory of trauma. Cady, Harris, and Knappenberger (2008, p. 157) conclude that music is a valuable cue to evoke autobiographical memory. Their findings were not related to trauma *per se*, but they rated degrees to which music brought back feeling and participants felt emotional in response to these recollections. In addition, Houston and Haddock (2007, p. 201) have found a link between mood and memory for music, postulating that whilst in a mood similar to that of the music, melodies were better recalled. Any triggered associations with trauma can lead to dissociation in a susceptible individual. Osborne and Kenny (2008, p. 447) found that aversive performance incidents play a role in the development of some music performance anxiety disorders through forming negative associations. In the same vein, it could be argued that any association of traumatic incidents to the practice and performance of music could have a similar effect.

Regarding integration of sensory information and associations formed, particularly pertaining to fear reactions, LeDoux (2002, p. 229) explains the processes involved as follows: "[W]orking memory integrates sensory information about the immediately present physical stimulus with memories from past experiences with such stimuli and with the current emotional consequences of those stimuli."

While this article is mainly concerned with memory, the association between memory and emotion needs to be acknowledged. Emotions/affects/feelings involved in music processing can stimulate memory function and *vice versa*, whilst avoiding the recollection of either can have the opposite result, affecting recall and ultimately musical performance and expression. Levitin writes about the importance of connections in the brain's involvement with music (Levitin, 2006, p. 192):

It involves a precision choreography of neurochemical release and uptake between logical prediction systems and emotional

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4. Term in some sources used interchangeably with subconscious mind, defined by Corsini (2002, p. 956) as "[a]n aspect of the mind not in immediate awareness, but which affects behavior, and is available to consciousness under a variety of circumstances."

reward systems. When we love a piece of music, it reminds us of other music we heard, and it activates memory traces of emotional times in our lives.

Throughout Cutting's book *Memory Slips* (1997) it is clear how pieces of music can become associated with life events in musicians' minds. Her accounts of playing pieces from Schumann's *Kinderszenen* for her fellow patients while she was hospitalized for the treatment of trauma are a moving statement of the personal nature of memories associated with a piece, and the value attached to particular music by listeners. The emotional meaning she derived from the particular situation served to help her remember the pieces although she had not practised in a long time.

Another example of how memory of events and dates could give rise to new meanings becoming associated with abstract music for the individual performer or listener is Stein's (2007, p. 452) explanation for Wladyslaw Szpilman's decision to play Chopin's posthumous Nocturne in C-sharp minor when asked to present proof of his occupation to a German WWII guard who eventually helped him to survive (Szpilman, 1999, p. 22, 217). Apart from the obvious restrictions of choice due to his physical condition at the time and lack of practice, Stein proposes that Szpilman's motivation for choosing the abovementioned Nocturne could have constituted a "reparative act, the attempted continuation of a life-giving dialogue that had been precipitously and catastrophically interrupted" (Stein, 2007, p. 452). Szpilman himself summarized the situation as follows (1999, pp. 177-178): "So this time, for a change, I had to buy my life by playing the piano!"

Most associations are first made at the unconscious level, requiring insight and analysis as the only route for the musician to arrive at an understanding of the mechanisms involved, their meanings, and finding better ways to handle effects of and interference caused by past trauma.

The effects of trauma on working memory

Neurobiological research underscores Jean-Martin Charcot's hypothesis that traumatic experiences impair the brain's ability to process emotions (Huopainen, 2002, p. 103). It follows that impaired ability to process emotions will inevitably have a negative effect on musicians for whom an integral part of their job is processing and communicating diverse emotions. In this, working memory plays an important role. Abnormalities in the functioning of brain networks associated with working memory were illustrated by Weber, Clark, McFarlane, Moores, Morris and Egan (2005) in patients with PTSD. They (2005, p. 41) linked these abnormalities to common PTSD symptoms and demonstrated that, even when presented with trauma-neutral words, patients experienced difficulty attending to new information and integrating this into working memory. As working memory is crucial for musicians both whilst practising and during performance, its abnormal functioning could have far-reaching effects.

Revisiting memories is one way of working through and integrating traumatic experience. In the aftermath of trauma, this may be a higher priority for the brain than integrating newly learned material which is acquired under less threatening conditions than the event that is higher up on its list of survival priorities. If the brain's priority is working through trauma, integrating, understanding or changing a traumatic situation, this could obviously hamper and interfere with working memory involved in the processing of music and the consolidation of learned information.

Cutting's autobiographical portrait, *Memory Slips* (1997), is a personal testimony of a way in which traumatic memories can interfere with performance on stage. She experienced severe incest during childhood and adolescence, perpetrated by her father while she received no protection from her mother (Cutting, 1997, p. 14). Her account of what she calls the fourth type

of memory slip, the type she does not tell her students about, is highly relevant to this article. She describes this as “when one memory slips, another intrudes, and you don't find your way back for a very long time” (1997, p. 6).

Concentration and attention, closely linked to working memory skills, are of the utmost importance to performers. Bartlett (1996, p. 178) refers to differences in the ability of individuals to remember, identifying stimuli that compete for attention as an important factor causing difficulties in sustaining attention. He further elaborates that during a stressful performance situation, competition exists between internally created stimuli (generated by what he calls the “involuntary autonomic nervous system”) and the task of retrieving stored information. As mentioned before, a momentary lapse in concentration during music performance can have a more immediately observable impact than in most other professions and could be precipitated by numerous factors, including traumatic stress.

Similarity of states of optimal concentration and pathological dissociation

Some traumatic memories may be retrieved only when a person is in the same state as when the memories were initially encoded. Roth and Friedman (1998, p. 13) refer to this as “state-dependent learning”. Perry (1999, p. 15) writes: “Indeed, it is likely that many ‘states’ of distress are activated by accessing state or affect memories without any clear cognitive or narrative associations to a specific trauma or experience.” Again it is seen that by accessing the same affect as that experienced during trauma, residues of and associations with distressing memories can be unwittingly activated. When a musician performs, the brain is in a hyper-aroused state and adrenaline is coursing through the veins. This is closer to the state in which traumatic memories were encoded than to the normal state. If

instead of entering the optimal concentration zone (related to the dissociative state yet a non-dissociative phenomenon) the musician enters a pathological dissociative state on stage, memory and emotion disintegrate. The chances of unwanted flashbacks are elevated, particularly during performance, but can potentially also cause interference during practice. This effect is more pronounced in individuals with PTSD, which is a chronic condition with positive and negative dissociative symptoms (memories are constantly either being suppressed or re-experienced). This is a physiological brain response and has nothing to do with failure to obtain optimal focus. However, it should still be seen in the light that increased arousal during performance is normal and, if channelled correctly, should facilitate optimal ability in the normal individual.

Various types of trauma and the effects of resulting dissociation on memory function are described in the case study examples below. Instances of complete recovery, partial recovery, and recovery-in-progress were encountered.

Identified instances of trauma affecting memory

A qualitative research survey was done amongst music teachers and healthcare professionals as part of Swart's (2009) study about the influence of trauma on musicians. Teachers' responses about ways in which they observed trauma influencing the memory of students include comments about memory lapses, hampered capacity for concentration, shortened attention span or wandering attention, extreme unpredictability during performances, making repeated mistakes and vulnerability to distractions. Some teachers working with students who were previously disadvantaged due to coming from a background affected by family living under the Apartheid regime⁵ identified concentration difficulties,

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5. Apartheid: the oppressive system of racial segregation prevailing in South Africa before 1994.

frequent breakdowns during performance, lower achievement levels and poor concentration. Others observed that the most noticeable effects were seen in students from dysfunctional homes. One such teacher stated that in cases where interference was caused by dysfunctional family set-ups which were not temporary, stable or optimal performance was never witnessed.

Some teachers specifically wrote that memory is negatively influenced not only during performance, but also during practice and in lessons. A piano teacher wrote that one of her students suffered from a “camera flash memory” on stage during a national competition, blanking memory. Other teachers respectively stated that traumatized students exhibited many memory lapses caused by interrupted thoughts, that extra tension leads to memory lapses and that “parasitic thoughts break down concentration”. A student who had not previously experienced memory difficulties had unexpected lapses during a recital: the teacher only learnt of the trauma after the performance. A minority of teachers were of the opinion that trauma had no effect on memory.

An important comparison was made by a teacher who observed that traumatized students often have many memory lapses while – provided they are of average or above average intellectual ability – those from stable, loving and disciplined homes seldom suffer from emotional or mental incompetence.

Trauma interfered by leading to poor memory and repeated lapses during the same performance. Teachers noticed that interference in the form of emotional flashbacks is more prevalent during stressful situations such as Eisteddfod/competition performances, hampering concentration with the possibility of memory lapses. Such observations support the hypothesis that performing states which are by their nature similar to those during which traumatic memories were encoded are likely to activate recall of traumatic material

due to association. The literature supports the observations regarding concentration problems and attention deficit reported by teachers as witnessed in traumatized students. In writing about the diseases of trauma, Scaer (2001, p. 13) states: “Fluctuating symptoms of cognitive impairment especially related to attention and memory would be common in many of these conditions.”

Teachers’ self-observations in connection with problems related to memory for music include struggling to focus and concentrate when playing from memory, as well as playing that “was full of memory lapses”. In total, four teachers mentioned memory problems experienced in the aftermath of traumatic experience. This excludes the overwhelming number who mentioned problems related to the functioning of accurate memory retrieval and the functioning of working memory such as concentration problems and inaccurate playing. One teacher described experiencing memory and/or technical problems during performance, paired with a concurrent deepening of musical expression, understanding and sensitivity.

An interesting observation was made by a teacher who struggled to play from memory while also losing the natural and flowing qualities of playing, stating that during this time she “played very mechanically”. A possible interpretation of such a scenario is that mechanical playing is due to emotional numbing which then adversely affects being ‘fully present’. This can cause concentration slips, which in turn lead to memory difficulties. Emotional numbing is closely associated with PTSD, in turn closely associated with changes in the normal functioning of memory. In many instances, trauma’s effects on concentration can be at the root of memory problems. This includes the dissociative nature of intrusive re-experiencing and the splitting off of feelings.

While the focus here is on memory, it was also evident that trauma affected various – and

in severe cases most – aspects of people's lives. Traumatic experiences of a female organist in her fifties who holds a Master's degree in Music participating as case study (Swart, 2009, pp. 151-154) include being married to a violently abusive husband for over thirty years, an incident involving the arrest of her husband, as well as various losses. She mentioned intrusive thoughts – memories of words and arguments – as a cause of interference whilst performing, leading to impaired recall. Since organ playing is mostly done from the score and not from memory, other related aspects that were affected are also highlighted here. A significant distinction was noted between the effects of abuse by her husband and the effects of losses. The former trauma resulted in dissociative symptoms manifesting as concentration deficits and intrusive thoughts, while in contrast, the latter led to a deepening of affect in her playing. This was clearly audible and observed by herself as well as others, and illustrated repeatedly throughout her life. She received brief psychotherapeutic intervention for trauma. Her very stable and happy childhood was identified as the reason for her apparent resilience when traumatized in later life. The latter observation is consistent with Scaer's (2005, p. 262) contention that prior childhood trauma is the most important predictor of dissociation when confronted with subsequent life trauma (compare to Participant 2 as referred to hereafter).

The organist reports her pianist daughter saying that under the influence of a violently abusive father it became impossible for her to memorize new music. Case study participant 1 (for the purposes of this article, numbered differently than the usage of "Participant A, B, etc." in Swart, 2009, pp. 154-157) also related circumstances harrowed by abuse in which memorization became laborious. Participant 2, a pianist in her forties who used to perform but currently teaches full-time and holds a Master's degree in music in addition to various licentiates,

survived incest perpetrated by a parent spanning more than a decade. Additional traumatic experiences include various losses, smash and grab incidents, motor vehicle accidents resulting in whiplash, back injuries and concussion. The clinical scales of the *Trauma symptom inventory* (TSI, Briere, 2005) identified, amongst others, very high levels of depression and dissociative symptomatology. Victimization, emotional blackmail and the fear of punishment and violence by her abuser ensured that she would not talk out. Trauma caused severe anxiety before and during performance. Like the daughter of the organist, she battled to concentrate whilst memorizing music. In addition, she frequently had memory lapses under stress. She attributes this to sensory overload. The extent of sensory perception becomes important in such survivors of severe trauma who, prior to intervention, cannot be expected to be fully integrated. Van der Hart *et al.* (2004, p. 907) explain that no such individuals possess the breadth of consciousness that can exist in the fully integrated individual, and which is of the utmost importance to high-level performers.

Participant 2 found psychotherapeutic treatment incorporating aspects of cognitive behavioural therapy (CBT) and attending a depression and anxiety support group very helpful. During her early treatment various inaccurate diagnoses were made, even leading to unnecessary treatment with anti-psychotic medication affecting memory on various levels. After an accurate diagnosis was made, additional time elapsed before stabilizing on medication which worked and did not have these side-effects. Marked improvements in memory and decrease in dissociative symptoms were experienced; however, treatment already spanned a number of years and is still in progress.

Temporary amnesia due to traumatic circumstances was reported by a conductor who is currently enjoying a successful international career, hereafter referred to as Participant 3

(Swart, 2009, pp. 159-163). Following a motor vehicle accident, he describes an out-of-body experience during which he noticed aspects of the environment that were impossible to observe from the position in which he lay. This experience so intrigued him that he later called eye witnesses for confirmation about these details. For him this experience raised many questions. He was paralysed for three months – he even says that his thinking patterns had frozen. His memory for music was severely affected: the moment he heard music it would “evaporate” again. There was ‘not one single melody’ in his head. In his quest to regain his memory, he used drumming as a means to attain integration and that he subsequently recovered his memory to the extent that neither his professional functioning nor the *Trauma Symptom Inventory* (Briere, 2005) showed any remaining adverse symptoms.

Drumming, described by the conductor as an activity during which “every part of your body, every limb is making a sound”, played an integral role in his recovery. It felt as if he immediately “came to life” when initially playing drums. For the first time after the accident, his body and brain started to move and respond to what he was hearing. Within weeks after starting drumming, all functions returned, including being able to remember scores learnt previously. He actually played the rhythms of music by Mozart and Bach on the drums to enable him to connect melodies to the rhythm again. He reported expansion of right-brain activity due to his use of drumming in his own recovery process. This helped his perceptive skills as well as interpersonal and communication skills. Altenmüller (2004, p. 6) states that musicians generally process rhythms and metre in the right side of the brain, while the opposite hemisphere seems to be involved in the processing of rhythm by non-musicians. Since this participant experienced post-accident pain that had no physical explanation, it could be argued that the pain itself was a somatoform dissociative symptom associated with the

memory of the impact of the accident and that drumming assisted in resolving such dissociation. While the pain necessitated administration of morphine, this was not needed during periods when he was playing drums. It can be concluded that music assisted in integrative function and also had beneficial anxiolytic effects. The value of anxiolytic properties of music is also noted in the literature by others such as Spintge (1991, p. 65). It is noteworthy that in this case music’s role in re-integration as well as in relieving pain appears to confirm that music can be effective in resolving different aspects of trauma-related dissociative manifestations (amnesia representing negative symptoms and pain positive symptoms).

When an individual performer is identified as having been exposed to trauma and signs of dissociation are detected, the type of dissociative mechanisms (positive or negative, psychoform or somatoform) and extent of the structural dissociation of the personality should be ascertained and steps taken for this to be addressed. Interventions sought should be aimed at minimizing the negative impact of the maladaptive response and assisting the musician to achieve integration.

Possible therapeutic solutions

After exploring ways in which trauma-related dissociation can affect memory in musicians it is important to identify possible solutions to the problem. It is clear that more detailed research is needed, but effective ways of resolving dissociation identified in the literature survey and by participants in Swart’s (2009) study are briefly discussed here.

Overview of techniques useful for resolving dissociation

There are many intervention strategies available for the treatment of trauma sequelae. While well-known treatments such as pharmacological

intervention and CBT can be of great value, this paper focuses on those treatments that specifically address dissociative symptoms. Techniques to resolve dissociation include Nijenhuis's action-oriented three-phase approach (Van der Hart, Nijenhuis, & Steele, 2006) and Levine's method of transformation and renegotiation, by accessing memories through the felt sense, which he calls Somatic Experiencing (SE) (Levine, 2005 and 1997). Scaer (2005, pp. 265-7) recommends the use of touch (including acupressure and craniosacral techniques) and induced movement (including drawing, sculpting and dancing). In her work with five female adult survivors of childhood sexual abuse, Fourie (2009, pp. 100, 120-121, 372) found that hypnotherapy – in itself a dissociative phenomenon – can play a very important role in resolving dissociation. This includes using hypnosis to access, re-associate, integrate and resolve traumatic material. On the other hand, music therapists often employ means of controlled re-enactment of the traumatic encounter, providing clients with opportunities to assert their own influence in the situation (Sutton 2002, p. 31). This aids in diminishing feelings of helplessness and can play a role in resolving the 'freeze' response. The importance of social support and restorative experiences should not be underestimated, as Van der Hart *et al.* (2004, p. 911) warn that structural dissociation can be partially maintained by lack thereof.

A form of movement that was identified by Swart (2009) as being potentially helpful to traumatized musicians is Dalcroze Eurhythmics. Participant 3 also identified drumming as having played a central role in his healing process, as briefly discussed in the previous section.

EMDR and EMI

Originally developed by Francine Shapiro, Eye Movement Desensitization and Reprocessing (EMDR) is an effective psychotherapeutic

intervention strategy for the treatment of a range of trauma symptoms, including post-traumatic anger (Winkel, 2007, p. 19). The *EMDR Institute* (2004) explains that this is an information processing therapy using an eight-phase approach. Fast lateral movements are used, similar to those encountered in rapid eye movement (REM) sleep. This technique helps to eliminate emotional distress associated with traumatic memories and it can obtain comprehensive results within a brief period of time.

According to Brenner (2004, pp. 253-254), newer research on EMDR shows that inter-hemispheric stimulation is responsible for its integrative effect. Indeed, Amendolia (1998, p. 1) states that EMDR transfers data from the right cortical hemisphere to the left hemisphere. Emotionally charged information from the right hemisphere can then be analyzed and integrated by the cognitive function of the left hemisphere. Winkel (2007, p. 19) identifies EMDR as being a therapeutically efficient intervention strategy for reducing post traumatic anger, underlining its multi-faceted effectiveness.

While EMDR utilizes rapid eye movements, Eye Movement Integration (EMI) uses smooth pursuit eye movements (SPEM) in multiple directions (Beaulieu n.d., p. 8), guided by slower hand movements. This technique helps the client's brain to form linkages between traumatic memories and more adaptive information. In addition, it facilitates access to emotional memories retained in implicit memory. Beaulieu (2003, pp. 69-113) explains how eye movements relate to brain function, cognition, and memory, noting how guided eye movements facilitated by a therapist can lead to the integration of traumatic memories. Beaulieu (2003, p. 25) regards EMI as an effective mode of intervention for distressing and repetitive memories of any kind that impact adversely in any area of a person's life, regardless of how such memories manifest their influence.

Hypnosis

Amendolia (1998, p. 1) describes hypnosis as structured dissociation and states that the goal of Ericksonian hypnotherapy is to recontextualize the memory, the effect of fear, and physiological hyperarousal. O'Brien (2004) explains that Milton Erickson (1901-1980) used suggestion and post-hypnotic suggestion to tap into people's inner consciousness where they can access their own resources to improve the quality of their lives. The Ericksonian perspective on trauma emphasizes the innate tendency of the organism to heal itself and views flashbacks and recurrent dreams as attempts to problem-solve that can be better facilitated by the use of hypnosis (Amendolia, 1998, p. 1). Van der Hart and Spiegel (1993, p. 199) assert that for treatment with hypnosis to be successful, all aspects, including the physical sensations experienced during the trauma, must be integrated. They caution that without cognitive integration of affective memories and enhanced control over memories, treatment can reinforce trauma instead of aiding symptoms to subside. Hartman (2009c) notes that, while hypnosis is a state of relaxation, it is simultaneously a state of focused attention.

Body therapies and the role of movement

A high rate of success in the treatment of trauma is claimed by advocates of 'body therapies'. The two most relevant as emerged from the research are discussed here, namely Levine's Somatic Experiencing (SE) and Dalcroze Eurhythmics. SE is a naturalistic approach to the healing of trauma, an intervention specifically developed for trauma victims. Levine (2009) describes SE as follows:

Therapeutically this "instinct to heal" and self-regulate is engaged through the awareness of body sensations that contradict those of paralysis and helplessness, and which restore resilience, equilibrium and wholeness.

His theory is based on the premise that healing is achieved by accessing trauma-induced

feelings and thoughts through the felt sense and resolving them through letting them take their natural course (Levine, 1997, p. 128). Therefore SE addresses all bodily dissociation.

Levine (1997, p. 128) explains that healing will begin when a person can trust the arousal cycle and (again) become able to flow with it. He advocates that the healing process requires becoming aware of physical and mental signs of arousal, acknowledging them, letting them peak and thereafter diminish and resolve. To the authors of this article it is obvious that to facilitate this it will be necessary that such individuals create 'dress rehearsals' to allow them adequate time for the completion of this perhaps unpredictable process. In addition, both psychoform as well as somatoform aspects of dissociation would need to be addressed. When this process is completed, individuals may find that they are more frequently able to perform at their optimal level. Levine calls this "flow": this is not unlike the "flow" experience described earlier by Csikszentmihalyi.

Dalcroze Eurhythmics was developed by Emile Jaques-Dalcroze (1865-1950). *Dalcroze Australia* (2009) describes this method as based on the assumption that the human body is the source of all musical ideas and provides a concrete approach to abstract music. This source states that it is specifically for music students and incorporates Eurhythmics ("Good Rhythm"), Solfège (the study of pitch) and Improvisation (presenting musical ideas instantaneously). In response to teaching that did not succeed in giving students a living experience of music, Dalcroze set out to develop his system that coordinates music with bodily movements (Spencer, 2009).

Dalcroze developed his method with the aim of cultivating musicianship skills and not with any therapeutic goals in mind. However, it is possible that incorporating music and movement may have the additional benefits of integrating the 'whole person', of 'centering', reducing stress in

trauma victims (pointed out by respondents to the research survey) or of reaching unconscious emotional responses (as described by Peters, 1987, p. 129). She (1987, p. 129) states that activities centered on movement to music can reach the level of unconscious emotional response and aid therapists to help clients in whom emotional expression is hampered. She suggests that Dalcroze Eurhythmics can be useful in clinical settings where music therapists operate.

Future directions

While this article was written from both a musical and psychological perspective, additional areas are now highlighted in which further research by the disciplines of neuroscience and psychology/psychiatry would be most beneficial to enhance understanding of the manifestation of dissociative phenomena in musicians and its impact on memory:

- Numerous authors mention changes in hippocampal volume associated with trauma and especially with complex trauma. Such changes have implications for limiting a person's capacity to encode, store and retrieve memories and manage associated emotions, and have been linked to dissociation (eg. Spiegel, 2008; Scaer 2005, p. 75; Bremner 2002, pp. 60-62; Robertson, 1999, p. 236). The authors of this article can only speculate on what particular influence decreased hippocampal volume could have on the various components of musicians' memory for music.
- For an estimation of the extent of dissociative symptoms responsible for memory lapses during performance, extensive questioning and perhaps even scanning would be required to gain insight into exactly what occurs in the brain and thoughts of musicians thus affected (during performance).
- Weber *et al.* (2005, p. 41) illustrated abnormalities in the functioning of working

memory in patients with PTSD, specifically implicating changes in verbal processing. The extent to which such abnormalities are relevant to the functioning of memory processes of musicians and their specific trauma responses should be investigated, perhaps with specific focus on affected singers.

- Bartlett (1996, p. 178) states that researchers have moved their attention to examining voluntary cognitive activity in their search for reasons why memory breaks down, since interference caused by the involuntary nervous system is now better understood than previously. The authors would suggest that, although the role that the autonomic nervous system plays in memory breakdowns may seem obvious, it is still worth investigating the extent of alterations in the normal functioning of the autonomic nervous system due to unresolved trauma as a factor contributing to memory and concentration breakdown as well as to the effect fear has on memory.

Conclusion

An imperative need has been identified for further investigation into the influence of trauma on musicians and others in the creative arts. The research on which this article is based served to confirm from the perspective of most of the participating musicians that when Levine (2005, p. 83) states that "[t]raumatic experiences are an unavoidable fact of life", he is echoed by many others, including musicians and music teachers.

In addition to specifically musical aspects, taking the general complexity of the human brain, sensory perception, associations, and positive as well as negative (traumatic) experience into account, it is evident that there may be hidden factors affecting the quality of music performance and memory for music. An understanding of the phenomenon of dissociation is central, as it can so profoundly affect performing artists. Any art form is in

itself a representation of experience. It is thus vitally important for musicians to understand how traumatic experience is processed and dealt with, as well as what its long-term effects are, in order for this not to hamper optimal performance. On the positive side, the research identified promising intervention strategies and solutions.

Andrzej Szpilman eloquently writes in the foreword to his father's book (Szpilman, 1999, p. 7) that in Poland his father would be described as "a man in whom music lives". From this it can be inferred that something as significant as traumatic experience(s) encountered in life surely also affect other important aspects of people's 'personhood' or 'selfhood'. Not only are trauma and music integral to human existence and important realities thereof and therein, but they can impact each other in remarkable ways. These include music's capacity of expressing what is difficult to formulate in words, as well as its role in facilitating healing.

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