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Musical Performance Anxiety (MPA)

Sérgio de Figueiredo Rocha

Abstract

The musical practice is an extremely complex activity that involves a series of cognitive abilities and functions, among them are hearing, memory, motor coordination, attention, affection, mathematical calculation, and the association of all of these concomitantly, including situations of public exposure. Because of this, musical performance is particularly susceptible to anxiety symptoms. Musical performance anxiety (MPA) is defined as an experience of persistent and distressing apprehension and/or real prejudice of the performance abilities in a public context in an unjustifiable degree given the individual musical aptitude and preparation level. It prevails more commonly on the female gender in a 3:1 proportion and affects about 20% of the professional musicians. In the present chapter, its main etiologies and psychic mechanisms, evaluation instruments, as well as the current therapeutic strategies available will be presented.

Keywords: performance anxiety, musical performance anxiety, musicians, perceived causes, psychological intervention, drug therapies, optimal performance

1. Introduction

The musical practice is an extremely complex activity that involves a series of cognitive abilities and functions, among them are hearing, memory, motor coordination, attention, affection, mathematical calculation, and the association of all of these concomitantly, including situations of public exposure [1]. Because of this, musical performance is particularly susceptible to anxiety symptoms.

Anxiety in itself is, up to a certain point, something favorable to the performance [2], since it helps the performer to perceive what favors him and disregard what could hinder his performance. After a certain point, anxiety starts to influence negatively the musical performance efficiency, according to the Yerkes-Dodson curve (**Figure 1**).

Musical performance anxiety (MPA) is a term that encompasses many dimensions and started being described in 1990. It is the experience of a persistent and distressing apprehension and/or real prejudice of the performance abilities in a public context in an unjustifiable degree given the individual musical aptitude and preparation level [3].

In the musical environment, MPA has been called as “stage fright” although MPA encompasses something much bigger than that [4]. The reason is that MPA has three axes that complement each other in terms of subjective manifestations of this picture.

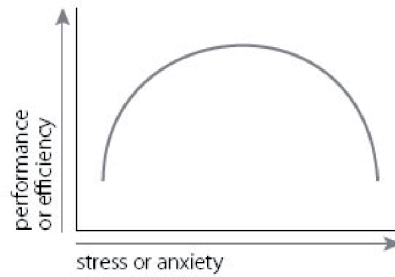


Figure 1.
The Yerkes-Dodson curve.

Performance anxiety affects equally music professional and students. There is a prevalence of around 18% [5]. The main reported symptoms are concentration decrease, tachycardia, tremor, sweating, and xerostomia, which are severe enough to negatively impact on the performance level [5, 6].

In the Diagnostic and Statistical Manual of Mental Disorders, 5th edition, or DSM-5, social anxiety disorder (SAD) is highlighted, in which the subject feels fear or anxiety in social interaction situations when he worries about the possibility of coming to be evaluated by the public [4].

In the present chapter, general aspects of MPA, its possible etiologies, its occurrence in the diverse age groups, the instruments of evaluation, and, at last, the therapeutic approaches will be approached.

2. MPA pathogenesis, susceptibility, and vulnerability

MPA is a complex phenomenon caused by the interaction of many factors, including genetics, environmental stimuli and individual experience, emotions, cognitions, and personal behavior.

Factors like age, gender, the kind of musical instrument, musical background, musical perception, perfectionism, and emotions compose the group of personal variables that can interfere more or less on the MPA levels [4, 7].

Although MPA can begin in childhood, the literary data are conflicting. While some studies suggest that in this age group there are no significant differences between the genders [8], others point out that there are significant differences in many parameters (physiological, cognitive, behavioral, and subjective perception) [9]. For example, the girls tend to show an anticipatory anxiety and also during the performance, while the boys only show anxiety during the performance. This profile seems to present itself gradually even more unfavorable to the female gender as age advances [10]. These data indicate that women are significantly less confident and more anxious and show less self-efficacy (attitude) in contexts such as jazz improvising learning. In women over 45 years old, the MPA prevalence is even bigger and can achieve up to 60% depending on the context [11]. However, there is a great relation between MPA and age increase among susceptible individuals, independently of the gender.

The way in which each individual processes his beliefs about the performance situation and how he perceives the way his somatic anxiety reactions affect his performance. This behavior is related to perfectionism. Perfectionism, a personality valence, is a complex and multidimensional construction that goes beyond the simple search for perfection. It concerns the fight for unreal self-imposed patterns, a fixed mentality, high levels of self-criticism, or expectation of high patterns of performance by a third party. This distorted expectation about one's own performance ends up influencing negatively self-confidence, and this, ultimately, can sabotage the performance quality.

Another important aspect that has been studied is the public impact over the performer [6]. In situations where the musicians are being judged in some kind of competition or selection, there is a significantly bigger incidence of symptoms such as tachycardia and anxiety observed compared to situations that do not involve judgment.

The three causes of MPA most commonly cited by musicians are pressure from self, excessive arousal, and inadequate preparation for performance [12]. Beyond personal impressions there seems to be a combination between genetic vulnerability and the learning environment [4, 7]. This learning environment is the result that builds a psychic pattern confrontation of the performance situations. This building is the sum of the situations that involve familiar experiences with teachers, colleagues, tests, and performances.

The *Barlow* model seems to be the most consecrated among the MPA scholars. It consists of an integrated group of three vulnerabilities: biological (genetics, endocrine, etc.) and psychological, that is, referring to the subject psychic formation and more specific psychological issues in which the environmental stimuli are processed according to the patterns learned by the individual [5, 13–15].

The psychological vulnerabilities are structured by elements like affection, cognition and its processing, attention, and personality traits [13, 15]. All these elements are processed together. For example, when attention is deviated from the performance priority objects, it can sabotage its own efficiency. The hyper-focus in a determined aspect of the performance can, equally, cause the performer to lose a systemic view of what is being presented.

The previous musical experiences and other experiences related to anxiety involved in personal and professional histories are also important in the MPA genesis [4].

Therefore, the most vulnerable profile to MPA can be identified. The subject that feels anxious only in the presence of the public and in front of them has unrealistic beliefs about his own potential is the most specific profile. This characteristic was also described in the DSM-5 new edition which “seems to represent a distinct subgroup of social anxiety disorder in etiology terms, initial age, physiological response, and treatment [16].

3. MPA in children and adolescents

Since the first childhood (up to 7 years old), MPA is rarely manifested, differently from adults/elderly ones [17]. On the contrary, children tend to show others their “feats” in a pleasurable way. The question is that this same subject, some years later, starts to develop a behavior opposite to this, avoiding to a maximum his own exposure to whoever it is.

The main factors that lead to this change in attitude are the innate temper, the trace of anxiety, the broadening of the integrated capacity of cognition, the auto-reflexive function, and the accumulation of the anxiogenic interpersonal experiences. The conjunction of these factors contributes for the formation of beliefs and emotions during performance in the adolescence [18].

The emotions that emerge in moments that precede the performance are positive as well as negatives. This occurrence of joint affections in general is uncomfortable. Therefore there is the need to work on recognizing this emotion/affection so that afterwards, there is a control of this situation. However, the reception given by the parents, teachers, and more experienced colleagues is fundamental for a better processing of these beliefs on behalf of the younger musicians, especially preadolescents.

It was observed that the students who started the musical practice after 7 years of age showed higher anxiety scores when compared to those who started at the age of 7 or less [19]. This has direct implications in the preventive strategies against MPA among children and adolescents. These strategies should privilege the recreation and in every opportunity minimize the negative aspects of the performance; in other words, the occurrence of some mistakes in the face of countless right ones does not matter.

4. MPA evaluation instruments

Currently, about 20 instruments validated in the English language¹ to evaluate MPA are available [3]. The majority of these scales is generic, that is, they are not specific for an instrument, although some are. There is the Piano Performance Anxiety Scale and the Stage Fright Rating Scale (specific for string musicians). Many of them are adaptations of the already existing scales for anxiety evaluation. These scales are aimed at the musicians' adult population. The *K-MPAI* and *PerfAIM* scales will be highlighted as follows.

The *K-MPAI* is the MPA evaluation instrument that has more validations for other idioms in the world [20]. Its original version had 26 items, and the most recent one, published in 2009, has 40 items. The *Appel's Personal Report of Confidence as a Performer* (PRCP) and the *Performance Anxiety Inventory* (PAI) structured themselves having as their referential the three components of the *Barlow Theory* [3]; in other words, such scales encompass physiologic, cognitive, and behavioral aspects. In *K-MPAI* the people interviewed use a *Likert*-type scale of 7 points to answer each question, where zero represents no observed anxiety symptom and 6 represents extremely high levels of anxiety. Therefore, the score can vary from zero (Ø) to 240 points. A search to find a cutoff point has been made; however, the cut-off point concerning each test criteria vary, suggesting that the *K-MPAI* cutoff point depends on the clinical interest of each patient [20].

Another validated scale in 2011 was the *PerfAIM* [21]. The *PerfAIM* comprise 58 declarations divided into 34 items and 24 subitems. The possible scores vary from 58 to 290. Due to the normal standard distribution, the scale author suggested that the scores between 100 and 205 corresponded to the MPA normality band under stressful situations, whereas values above these are associated to extreme cases which would demand more attention. Besides, this reference interval can help to establish a level of comparison among the subjects, independently of the sample.

The *K-MPAI-A* is the correlative to *K-MPAI* for adolescents from 12 to 19 years old [8]. Despite being an instrument aimed at young ones in this age group, it was applied in other studies including 7-year-old children. Such as the version for the adult population, its structure also encompasses the physical, behavioral, and cognitive aspects; however, there are only 15 questions. The fulfilling scheme follows the *K-MPAI* for adults, so it is also the *Likert* type.

The main contribution of these scales is the assistance of the subjects and, together with other approach strategies, the structure of a continuous segmented project and, if necessary, subject treatment.

5. MPA management, treatments, and approach strategies

The MPA involves, in general, combined strategies. These strategies can be divided in therapies, medicinal intervention, and other approaches. The first

¹ Some of them are validated in more than 20 languages.

published studies that investigated the MPA non-pharmacological treatments are dated from the beginning of the 1980s, while the pharmacological studies started in the late 1960s decade [14].

5.1 Therapies

Among the therapeutic interventions, the main strategies pointed out in the literature are behavioral therapy, cognitive therapy, cognitive-behavioral therapy [14, 22–25], hypnosis [24–26], and, more recently, the Acceptance and Commitment Therapy (ACT) [27].

The cognitive and behavioral therapies have as their main objective to approach emotions and dysfunctional behaviors. The interest is in accessing thought patterns that form themselves and become more and more disabling if not treated. Therefore, these therapies aim at a change of faulty thought styles and their consequent inadequate behaviors [25].

The desensitizing process present in the cognitive-behavioral therapy allows, through guided images, the scene that generates anxiety to be gradually transformed in something more adaptive that does not involve anxiety. The reason is that learned answers can be substituted by more adaptive behaviors [25].

Hypnosis or hypnotherapy consists in inducing the patient to a state of sleepiness, easing the access to issues that involve the problems of nonadaptive behavior or dysfunctional thoughts. This access would allow an awareness to begin a change process in the way the subject deals with situations that generate MPA [25].

The Acceptance and Commitment Therapy is one of the most recent therapies of the *third wave* in which the dialectical behavioral therapy, the metacognitive therapy, and the depression therapy based on mindfulness are also part of it [27]. The focus of this therapy is the promotion of full attention and someone's emotional suffering acceptance instead of the symptom domain or control as in the conventional cognitive behavioral therapies.

5.2 Strategies and complementary therapies

Besides the classic therapies, there are MPA complementary control strategies. Among them expressive arts therapy (in which one is exposed to virtual reality [images] and music therapy), yoga, meditation, the Alexander technique, biofeedback, neurofeedback, and transcranial stimulation [23, 25] can be mentioned.

Image-guided therapy consists of employing internal images of the subjects to reveal and access internal conflicts that possibly relate themselves to the MPA genesis. This method is used frequently in sports performance [25, 28]. For this kind of strategy, the results show MPA level reduction, discomfort improvement, increase of self-confidence, and decrease of heart rate [23].

Music therapy, in turn, promotes a better musical and musicality perception and decreases the stress like distractibility [25].

There are few studies about the yoga impact on MPA [23]. In the few available studies, improvements of the MPA indicators, including humor, sleep and osteoarticular disturbances, and stress, were observed.

There are still no evidences that meditation alone can, in some unquestionable way, contribute to decrease the MPA indicators [23]. The few available studies only raise questions that speculate that meditation can be related to an improvement in some parameters such as heart rate.

The Alexander technique consists of closely observing the individual's attitude and, in the musical practice sphere, trying to check the more accurate possible causes of tension in the performer's body. Therefore, this technique can relieve

muscle tensions and contribute to decrease the factors that impact, directly or indirectly, the MPA levels [29].

Biofeedback has been used for about 70 years in the experimental psychology and neurology fields [30]. It is a technique to accurately measure some organic data such as brain waves, heart rate, respiratory rate, muscle activity, and skin temperature. The main objective of this technique is to provide learning of the self-control of these functions. Thus, biofeedback can be part of a strategy to treat anxiety since it contributes to control part of the symptoms which are part of MPA. It is usually associated with other strategies [30, 31].

Neurofeedback is a kind of biofeedback that teaches individuals the self-control of brain functions, measuring the brain waves and providing a feedback signal. Neurofeedback usually does not provide an audio and/or video feedback. Positive or negative feedback is produced for desired goals or undesirable brain activities, respectively [32]. There are seven kinds of feedback, two of which are indicated for anxiety treatment, which makes this technique potentially suitable for treating MPA. The more frequent neurofeedback used is the frequency/power neurofeedback. It is used to alter the amplitude or velocity of specific brain waves in specific brain areas to treat TDAH, anxiety, and insomnia. This technique usually includes the use of two to four surface electrodes, sometimes called neurofeedback. There is a second modality called low energy neurofeedback system (LENS) which provides weak electromagnetic signal to alter brain waves on the patient while he is motionless and with his eyes closed. This kind of feedback has been used to treat traumatic brain injuries, TDAH, insomnia, fibromyalgia, restless legs syndrome, anxiety, depression, and irritability [33].

About 25% of the cases that involve anxiety are not responsive to conventional therapies and the psychopharmacological resources. The transcranial magnetic stimulation (TMS) is a noninvasive method created in 1985 [34]. TMS is based on the Faraday Law—electromagnetic induction—through which the electric activity of the brain tissue can be influenced by the magnetic field, therefore inducing an electrical current that depolarizes the neurons. In this context, TMS in its repetitive form, that is, rTMS, can modulate the cortical excitability besides the stimulation period in itself, originating its potential application as a clinical treatment for a variety of neurological and psychiatric disturbances, like the anxiety one [34, 35].

Other two noninvasive strategies of low cost are the physical activity and induction of the flow state. The regular physical activity, especially the aerobics modality, provides a decrease in anxiety levels [36, 37]. The literature data are robust in demonstrating the beneficial effect of the physical activity on anxiety scenarios. There are data which demonstrate that this evidence also applies to MPA [36].

On the other hand, the “flow state” is a state of awareness of the hyper-focus in which irrelevant details and intrusive thoughts about the performance are eliminated, resulting in the subject being fuller in the final activity which is the musical performance. In this context it would be a complete absorption in a determined task with enhanced performance skills [15, 26]. There seems to be an inverse relation between the flow state and MPA [38]. From this relation a facilitator model was built for the flow state based on three factors: subject preparation, qualification of the teachers to deal with this focus, and the building of the flow experience [15]. These three axes are linked among themselves and necessarily need to access some valences such as learning/preparation that involves well-being, creativity, motivation, and musical skill mobilization [15, 26, 38].

5.3 Pharmacotherapy

MPA is limited to a determined situation that usually occurs on stage. Therefore, to do a medicament intervention, one must consider the need of using psychotropic

or not. This will depend on, to a large extent, the frequency the subject is exposed to this situation and, certainly, its intensity.

Another important aspect is that the isolated use of drugs does not contribute for a change in the performer's attitude towards MPA. In this regard, the combined treatments involving countless psychotherapy alternatives and complementary therapies are highly recommended [25].

In the musical environment, the two most used drug types for the acute MPA treatment are the beta-blockers, mainly represented by the propranolol and benzodiazepines (BDZ) which have as their principal representatives alprazolam, diazepam, and bromazepam.

The use of BDZ is controversial. If, on the one hand, it has a relatively fast and well-tolerated beginning action, on the other hand, its long-term use can cause a dependency syndrome, becoming tolerant to the doses, which tends to cause an abusive and uncontrolled use [39]. Besides, the fact that they can cause sleepiness can compromise, in an important way, the musical performance. Therefore, the use of this drug must be very careful so that one uses the minimum possible.

In the cases where there is a prolonged and inadvertent use of these anxiolytic classes, employing combined strategies as a gradual discontinuation of the drug, followed by psychotherapeutic accompaniment and regular orientations about the collateral effects and commitment of the cognitive functions, is recommended.

The BDZ are usually prescribed in association with antidepressive drugs (these will be approached further on). The best answer rates are around the sixth week of use [40]. The average daily doses found in the literature are, respectively, clonazepam 2.4 mg/day, bromazepam 21 mg/day, and alprazolam 4.2 mg/day.

The beta-blockers are very efficient in the containment of somatic symptoms, mainly the tremors and muscle tension; however, they do not have any action on the cognitive and behavioral symptoms [41].

Considering the most severe cases, there is always the possibility of comorbidity with other anxiety situations. This issue will be approached in the next topic.

The majority of the literary review studies about the strategies to handle MPA do not include psychotropic use [23]. However, basing on the recommendation that combined strategies are more efficient and considering that in the most severe cases the use of drugs will be necessary, one can, for example, adopt protocols to treat a social phobia [42] which, besides being a disorder of the common anxiety, is a situation that has the closest conceptual relations to MPA.

The psychotropic of the first-line choice are the selective serotonin reuptake inhibitors and dual serotonin-norepinephrine reuptake inhibitors (SNRIs) due to their efficacy and tolerability profile. The nonselective monoamine oxidase inhibitor, phenelzine, can be stronger than these two drug classes, but, due to its potential to interact with food and drugs, its use should be restricted to patients that do not respond to selective serotonin reuptake inhibitors or serotonin-noradrenaline reuptake inhibitors [40].

The initial alternatives include duloxetine, buspirone, hydroxyzine, pregabalin, or bupropion, in this order. If the response is unsatisfactory, the second recommendation is to try a different SSRI. If the answer to the second SSRI is unsatisfactory, the recommendation is to try a serotonin-norepinephrine reuptake inhibitor [43]. Other alternatives for SSRIs and SNRIs for patients resistant or intolerant to the treatment include tricyclic antidepressants, second generation of antipsychotics, and valproic acid.

There is less information available about the ideal treatment duration, although it has been observed that individuals who abandoned the treatment with less than 12–20 weeks have shown more relapses compared to the ones who continued making regular use of the medication [40–44]. The existing data suggest that it is

reasonable to keep the treatment for at least 3 to 6 months after the situation has been stabilized, and this period can be even longer depending on the severity and individual characteristics of each subject [44].

In this context, other classes of drugs could be employed; however, there are no systematic reviews whose focus is the social phobia treatment. Nevertheless, the treatment protocols of other anxiety situations, such as generalized anxiety, can be considered. In this regard the following classes can be cited: (1) anticonvulsant drugs such as pregabalin for at least 24 weeks and (2) atypical antipsychotic of controlled release such as quetiapine, which reduce the chance of an anxiety upsurge [42]. Pregabalin, alternatively, can be employed in monotherapy in daily doses between 450 and 600 mg and is recommended as a first-choice agent for the social anxiety disorder [45]. Its beginning action is on the first week, and, in general, it shows less collateral effects than the BDZs.

Other still very recent pharmacotherapies can be cited as the use of botulinum toxin (BT) and cannabidiol. Recent studies indicate that the botulinum toxin injection on the glabella reduces the amygdala response with antidepressive effects [46]. If the BT effect in humor is, in part, due to the decrease in negative emotions in general, it is reasonable to suppose that other psychiatric disorders, such as social anxiety disorder, where negative emotions are highlighted, can respond to the BT glabellar injection.

Regarding cannabidiol, there is a growing evidence of studies in humans and animals that indicate this compound, the principal non-psychotomimetic phytocannabinoids present in *Cannabis sativa*, as an option to alleviate the anxiety in paradigms assessing fear. More recently, the effects of cannabidiol on learned fear have been investigated in clinical studies with relevance for clinical application in phobias [47]. In such studies the evidence shows that cannabidiol can be a useful option to treat social anxiety [48].

More recently the anxiolytic effect of melatonin was shown [49]. Melatonin is a hormone secreted by the pineal gland during the night. The melatonin receptors (MT2) seem to relate with mechanisms of decrease in anxiety levels. Besides, there is evidence that melatonin can stimulate the dopaminergic synthesis in the hippocampus, which contributes to suppress the induced stress behavior [50].

5.4 MPA prevention

Preventing MPA means to employ strategies in which the most vulnerable subjects can have access to a context in more favorable environments. Such strategies can be applied to the beginners as well as the professionals.

The learning/preparation process should involve well-being, creativity, motivation, and musical ability mobilization [15, 26, 38]. It is necessary to simulate the negative scenarios so that such situations can be trained in an imaginary way as well as a real one.

The exposition situation cannot be something new or unexpected for the performer. The oriented and repeated experience in stage situations allows the performer to become familiar with potentially anxiogenic stimuli. As these stimuli are faced without prejudice for the subject integrity, new situations must be created in order to develop handling and competence abilities to deal with them. This process needs to be regular and with a weekly frequency so that the situations can be assimilated and issues, such as attitude and creativity, can become part of a defense arsenal for each individual facing anxiogenic “scenes.” There are many music graduation courses that structure activities of this nature, called performance workshop.

From the pharmacological strategies' point of view, it is important to detect the procedure as early as possible in the most severe cases, which have indication to use psycho-medicines.

5.5 MPA monitoring strategies

The early MPA detection is fundamental for a program of strategies for the subject's monitoring. The differentiated attention towards these individuals must include monitoring with screening tests, individual care, and the structuring of an activity plan that includes the gradual practice of public exposure.

The forming of vulnerable individual groups contributes for each one of them to perceive that their distresses are not exclusive or a rarity. The group can act as a facilitator of an encouraging experience.

The pedagogical, therapeutic, and medical dimensions must be shared. Each context requires that other dimension be known, even for creating a sharing environment where each one of the knowledge can intervene in determined situations. Thus, the pedagogical dimension needs to be in agreement with the therapeutic strategies, and the medical interventions need to know the context of the musical performance, the specificities and discomfort of each musician, as well as their routines and technical requirements [51].

6. Comorbidities

There are not many studies about comorbidities in MPA. The literature results indicate that the specific phobia, generalized anxiety disorder, panic disorder with/without agoraphobia, and major depression disorder (but not dysthymia) are the common comorbidities [3, 52].

Furthermore, one third of the subjects that show severe MPA also show a generalized anxiety disorder. There are studies that point to a prevalence of a 19 and 20% comorbidity of social phobia and depression, respectively [53]. This social phobia prevalence among musicians is about 10 times more prevalent than the general population.

On the other hand, more recent studies indicate that the generalized anxiety disorder is the strongest MPA predictor among all major DSM-5 anxiety types [54].

There is a model that proposes three MPA subtypes: MPA1, which is a variety restricted to the focus on the performance itself; MPA2, which establishes connections between (and with) social anxiety/social anxiety disorder; and MPA3 which establishes close relations with other nosologies in the anxiety spectrum such as panic disorder with or without depression [3, 55]. These relations configure a potential MPA worsening as other disorders manifest themselves, in a way that MPA will not necessarily convert itself in another anxiety disorder or establish a comorbidity but there is this potential.

7. Conclusion

These data indicate that MPA is complex and multifactorial. Probably the first symptoms are of an early start. Consequently, there is the importance of spreading the information about MPA, especially in the family level and the school/academic environment, contexts where the future professional musicians are formed.

Preventively, in the family environment as well as in the schools, one must build relationships that privilege the well-being, motivation, and reception of psychic distresses.

MPA has a worrying prevalence of about 20% among the professional musicians. This number can mean some million subjects! The preventive strategies, the qualitative and quantitative evaluation, and the management of the already installed situations are of utmost importance.

Currently there are countless strategies to approach MPA. They go from the traditional psychotherapy strategies (cognitive, behavioral, and cognitive-behavioral therapies) to the pharmacological resources. New approaches signal a new outlook in this area with the therapeutic use of cannabidiol, melatonin, botulinum toxin, neurofeedback, and transcranial stimulation.

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Conflicts of interest

The author declares that there are no conflicts of interest.

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