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PROMOTING WELL-BEING IN THE MUSEUM: THE ASBA PROJECT RESEARCH PROTOCOL

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Abstract: The ASBA (Anxiety, Stress, Brain-friendly Museum, Approach) project aims to assess a group of methodologies (Mindfulness, Art Therapy, VTS, and Green Art) that can be offered by both art and science museums to valorize their collections and improve visitors' well-being. It also tries to involve audiences that are not familiar with museums.
This project has been developed based on a research protocol approved by the Ethics Committee of the University of Milano-Bicocca. This paper describes the experimental design of the study which involves the methods listed above, assessed in two different environments: a fine arts museum and a scientific museum. The construct of well-being is operationalized as a state of anxiety. So, the main measure that is used to test the effect of the procedures is the change in the state of anxiety measured through the State Anxiety Inventory (SAI). As an exploratory variable, the participants' electrocortical profile is also recorded through the use of a wearable, wireless BCI.

Keywords: Art psychology, Art therapy, Mindfulness, well-being, Anxiety, Art Museums, Science Museums, ASBA project

Introduction

The modern museum plays a key role in society. It does not only conserve the cultural heritage of a community, but is also a place that fosters cognitive, emotional, and social learning (McSweeney and Kavanagh 2016). The particular cognitive and physical architecture of a museum, with its multiple and heterogenous stimuli distributed in spaces designed to allow visitors to focus instead of being distracted by thoughts and extraneous stimuli, suggests that visiting a museum can be instructive and healthy as well: a place to learn, to entertain and to feel better (Lackoi, Patsou, and Chatterjee 2016). That's why a

number of studies around the world are testing the hypothesis that museums can help people to cope with stress and anxiety (Clow and Fredhoi 2006; Binnie 2010; Ander et al. 2011; Camic and Chatterjee 2013; Mangione 2018; Mastandrea et al. 2019; Coolman et al. 2020). This task seems particularly important in a critical period like the post-pandemic one (Chan et al. 2023; Wei, Zhong, and Gao 2023).

The museum context is also a promoter of Life Skills development and strengthening as already defined by the World Health Organization (Division of Mental Health 1994). This terminology refers to all those skills that should be learned to relate to others and to deal with the problems, pressures, and stresses of everyday life. The lack of these socio-emotional skills, particularly in young people, can provoke negative and risky behavior in response to stress.

Life skills can be grouped into emotional, relational, and cognitive areas. Many studies have demonstrated the value of the arts in learning by adopting pedagogical, cognitive, emotional, and experiential strategies. This value is highlighted by the report of the European section of the WHO (Fancourt and Finn 2019), which presents the results of a group of studies regarding using the arts in the care sector and their positive impact on neurological and cognitive rehabilitation.

Different strategies and methods, such as Visual Thinking Strategies and Mindfulness, can be used for the promotion of learning processes and stress relief. The Visual Thinking Strategies (VTS; Yenawine 2013) allow the participant to activate a process of developing skills and learning by using any kind of objects collected in different types of museums (e.g., fine art museums, natural history museums, and archaeology sites; Ferrara et al. 2022). Other practices such as Mindfulness (Kabat-Zinn 2003) applied in the museum environment improve emotional development and self-awareness similar to Life Skills. Taken together, the scientific evidence already available strongly suggests that museums can play an important role in helping people cope with stress.

According to the American Psychological Association, stress is the physiological and psychological response to internal or external stressors. It involves changes that affect almost every system in the body, affecting the way people feel and behave. By causing these mind-body changes, stress directly contributes to psychological and physiological disorders and illness, reducing the quality of life. Anxiety, on the other hand, is an emotion characterized by apprehension and somatic symptoms of tension in which an individual anticipates imminent danger, catastrophe, or misfortune. The body often mobilizes to cope with the perceived threat: muscles become tense, breathing is faster, and the heart beats faster.

Levels of psychosocial distress in society are generally significant, as evidenced by the widespread use of prescribed antidepressants and days of work lost due to stress and anxiety (Mattiuzzi, Sanchis-Gomar, and Lippi 2022). The Covid-19 pandemic has further exacerbated this condition (Daniali, Martinussen, and Flaten 2023). It is absolutely normal

to experience a wide range of emotions when dealing with a global threat. However, active involvement in creative and cultural activities may offer important benefits, such as promoting well-being, quality of life, and health as already stated in classical studies (Bygren, Konlaan, and Johansson 1996; Konlaan, Bygren, and Johansson 2000) and more recent contributions (e.g., Chatterjee 2015)).

As of 2018, Canadian family physicians can prescribe a visit to museums to improve physical and mental well-being. Recently, Belgium launched a three-month pilot experiment based on the Canadian example. Brussels doctors are prescribing museum visits to treat COVID-19 stress and anxiety, involving five museums and one hospital.

However, the main difficulty museums face is to provide the necessary activities to relieve stress and anxiety once visitors arrive. We cannot be sure that museum visitors will be able to connect with and benefit from museum objects without specific guidance. Though several museum-based studies on populations with specific needs are available (NML 2012; Todd et al. 2017; Marianetti et al. 2021), currently, there are no specific protocols directed at treating stress in museums for non-clinical populations. The various studies that are available in the literature present often clear limitations related to the sample size (e.g., Binnie 2010) or specific procedure used, not always compatible with the normal activities of a museum. Thus, though we have evidence and theories about the role of museums in promoting health and well-being, specific and validated protocols and practices for a general population are not generally shared and ready to use by a single museum.

To go beyond the limitation of the available studies, we have developed the ASBA project (Anxiety, Stress, Brain-friendly Museum Approach (Banzi et al. 2023), which was approved by the Ethics Committee of the Bicocca University (Milan, Italy). The idea is to assess a group of methodologies (Mindfulness, Art Therapy, Visual Thinking Strategies, and Green Art) that can be offered by museums to valorize their collections and improve visitors' well-being. It also aims to include audiences that are not familiar with museums.

The goal of the ASBA project is to treat the problem with a new line of intervention: The brain-friendly museum (BFM) approach (Banzi 2022). It is based on respect for the cognitive processes and emotions of human beings, as well as the protection, preservation, dissemination, and appreciation of our tangible and intangible heritage for education, study cultural enrichment, and entertainment.

The BFM approach encourages collaboration among experts from different fields and is mainly based on psychological and neuroscientific theories. It aims to improve the quality of the museum experience and, at the same time, mental well-being. So, on the one hand, it aims to put the museum at the center of a certain community's life, configuring it as a socio-cognitive space through which to have enriching experiences from many perspectives (O'Neill 2010). On the other, it wants to harness the inherent "power" of art and culture on the human mind as well as on relative health (Kaplan, Bardwell, and Slakter 1993).

The ASBA project focuses on stress and anxiety and is a concrete application of the BFM approach to the museum environment for the benefit of visitors. The initiative is aimed at citizens, not suffering from pathological anxiety, and who wish to engage in cultural experiences that can have a positive effect on emotions and well-being (Fancourt 2017). The goal is not to try to diagnose or treat visitors who have anxiety problems. Rather, the project aims to be a practical aid for museums interested in wellness-related activities. For this reason, it proposes more than one strategy to allow museums and people to choose the method that best suits them.

One of these methods (the Green-Art method, a strategy based on the combination of cultural heritage and nature) is completely original, while the others are well known (e.g., mindfulness) but not fully tested and standardized for a specific application in museums. Each method will be tested in two types of museums a fine arts museum and a science museum. This way it will be possible to test if the museum itself and not the aesthetic experience can help cope with stress and to evaluate if specific personal characteristics fit better with one or the other context concerning well-being issues.

Each session of the five strategies consists of three phases: a first assessment phase (pre), the treatment, based on one of the techniques described below, and a post-treatment assessment, which also integrates interaction with experts from the museum concerned.

The methodologies involved in the ASBA project do not require specific knowledge about the institutions and their collections. The positive sensations experienced during a specific session may encourage them to repeat this experience and thus start visiting museums regularly. The inclusion of these audiences is a pivotal aspect of the educational mission.

The museum and its objects are a central part of the project. Since the museum is not a gym that can be used as a pleasant space for physical activities, the project has developed procedures for each methodology which include a specific slot of time dedicated to explaining the displayed artifacts. The treatments are carried out in front of the museum objects. As soon as the participant, involved in the experiments refers to an object, the museum staff can provide useful information regarding the topic mentioned by visitors.

Methods

Objectives and research hypotheses

Project main objective: to validate the museum environment as a socio-cognitive space for promoting well-being. In this way, we aim to show how a museum can be considered a privileged place where people can learn to take care of oneself both from philosophical and psychological perspectives.

Specific objectives:

1- To adapt and standardize some psychological techniques designed to increase psychological well-being within an art museum setting
2- To adapt and standardize some psychological techniques designed to increase psychological well-being within a science museum environment
3- To study the feasibility of the aforementioned techniques through a controlled mixed-design study. The feasibility study is primarily aimed at testing all standardized procedures and collecting both quantitative and qualitative data about the experience
4- To assess the short-term effect of the aforementioned techniques on participants' perceived well-being
5- To adapt the Visual Thinking Strategies to the science museum context.

The Experimental design of the study involves 5 different treatments (mindfulness, art therapy, VTS, Art-Up, and Green Art). Each treatment will be implemented in the two environments, except for the Art-Up method which will be only conducted in an art museum. Thus, 9 separate groups of participants are planned. The main variable will be measured before and after each treatment, according to a within-subject methodology. This will provide an opportunity for cross-sectional comparison between groups, thus determining a mixed within/between design.

The construct of well-being is operationalized as a state of anxiety. So, the main measure that will be used to test the effect of the procedures will be the change of state anxiety measured through the State Anxiety Inventory (SAI) before and after treatment.
As an exploratory variable for the development of future studies, the participants' electrocortical profile will also be recorded through the use of a wearable, wireless BCI (Brain Computer Interface) for measuring electrocortical activity during treatment, which will be applied to a single participant following a random numerical extraction procedure.

Treatments

MINDFULNESS. Kabat-Zinn (2003) defined mindfulness as the awareness that arises from paying attention, on purpose, in the present moment, and non-judgmentally. By focusing on the breath, the idea is to cultivate attention on the body and mind as it is moment to moment, and so help with pain, both physical and emotional. It is empirically supported as an effective intervention in a wide range of clinical disorders, including chronic pain, anxiety disorders, depression, substance abuse, and borderline personality disorder.
VISUAL THINKING STRATEGIES (VTS). VTS is a learning method developed by Philip Yenawine (2013), Director of Education at MoMA (New York) from 1983-93, and cognitive psychologist Abigail Housen. The VTS method consists of a group discussion, led by a facilitator, in front of a museum object. It is a process of construction of the meaning of the work, which is activated by asking three questions. The VTS method improves self-esteem,

develops problem-solving, critical thinking, the ability to work in a team, and social skills also reducing social anxiety related to educational contexts (Housen and Yenawine 2000).
ART THERAPY. Art therapy is based on the use of artistic activities (e.g., painting). The process of making art is a healing experience; it offers the opportunity to express oneself spontaneously. It can lead to personal fulfillment, emotional repair, and transformation (Gilroy 2006). Objects made in art therapy are seen as a non-verbal means of communication to develop new insights, solve conflicts and problems, and formulate new perceptions to achieve positive change, growth, and rehabilitation. Art is not a therapeutic tool but a means to cope with emotional issues that can be confusing and distressing and it can be easily and conveniently adapted to the museum setting (Salom 2011).
GREEN ART. A STRATEGY BASED ON THE COMBINATION OF NATURE AND CULTURE. There is solid evidence that contact with nature improves human health, including mood benefits. Walking in forest environments – which is a popular practice in Japan called shinrin-yoku – promotes lower concentrations of cortisol, lower pulse rate, lower blood pressure, greater parasympathetic nerve activity, and lower sympathetic nerve activity than do city environments (Thompson et al. 2012). The positive effect of nature on human beings can be combined with the beneficial stimuli coming from the cultural heritage displayed in a museum. Naturally, this experimental method can be adopted only by museums, which are near /in a park or a garden.

Participants

Since this is a research area that is still rather under-studied, there is little previous research on which to base sample size calculations. The few studies in the literature have rather small samples. However, the sample size was determined by considering state anxiety measured by the state STAI scale (SAI) as the key dependent variable. Several studies on large samples of healthy subjects report a mean SAI of about 38.5 and a standard deviation of 10.9. The study aims to demonstrate the ability of the techniques used to reduce the level of initial state anxiety by at least 20 percent compared to no change expected in the control group.
Using a two-tailed t-test with a significance level (alpha) of 0.05, a sample size of 32 participants for each group will achieve 80% power in detecting a 20% reduction in anxiety level as measured by the SAI. Anticipating the possibility that not all participants will conclude the study correctly, we set the sample size for each sample at 35.

Inclusion criteria

- Age ≥18 years;
- To accept the conditions and sign the informed consent.

Exclusion criteria

- Presence of a current diagnosis of psychiatric disorders or neurological condition;
- Presence of an uncorrected visual or hearing impairment;
- Presence of another medical condition that adversely affects the activities to be performed (e.g., impairment of limb movement);
- Insufficient language skills to understand verbal deliverables and interact with presenters and peers;
- Previous experience (more than 3 months of practice) with the technique for which the reservation was made.

Instruments

As mentioned, the main instrument is the State Anxiety Inventory (State STAI), which measures anxiety as well as the general level of distress. However, some scales aiming to assess other individual and trait dimensions of participants are also administered.

1) State-Trait Anxiety Inventory. The State and Trait Anxiety Inventory (S.T.A.I.; Spielberg, Gorsuch, and Lushene 1970), is the most widely used instrument in the scientific literature for the psychometric measurement of anxiety. The theory of state and trait anxiety, which distinguishes between current (here-and-now) anxiety and anxious reaction as a personality trait, now appears to be supported by both clinical evidence and numerous experimental studies. It has also proved operationally useful in interpreting numerous pictures of neurotic or psychosomatic pathology and in making predictions about normal or pathological behavior.

On a practical level, the brevity of the questionnaire and language use makes it easy to use in informal contexts. It can also be understood even by subjects with a relatively low cultural level showing flexibility and good reliability. The possibility of having an immediate and rapid measure of state anxiety makes the instrument particularly useful for the assessment of changes in anxiety under conditions of natural or experimentally induced stress at close intervals.

The measure State and Trait Anxiety separate scales are used consisting of 20 statements each, where subjects are asked to refer their answer to the present time (state) or general life (trait). The internal consistency of the scale ranges from .86 to .95, while test-retest reliability ranges from .65 to .75 over a 2-month interval.

2) Perceived Stress Scale. The Perceived Stress Scale (PSS; Cohen 1988) is the most widely used psychological instrument for measuring the perception of stress.
It is a measure of the degree to which situations in a person's life are rated as stressful. The items were constructed to intercept the degree to which people responding to the test find their lives unpredictable, uncontrollable, or overburdened. The scale also contains a series of direct questions about current levels of perceived stress. The PSS is designed for use in general population samples with an educational level of at least junior high school. The items are easy to understand, and the response alternatives are easy to understand. In addition, the questions are general and thus are free from content specific to some subpopulations. The PSS questions are about feelings and thoughts related to the past month. For each item, people are asked to indicate how often they felt a certain way.

3) Big-five questionnaire (10 items version). The Italian version of BFI-10 (Guido et al. 2015) is a shortened version consisting of 10 items of the well-known BFI-44 questionnaire14, which has 44 items. The subject is asked to indicate the degree of agreement on a scale ranging from 1 ("I do not agree at all") to 5 ("I completely agree"). This questionnaire was developed to provide information about personality in an extremely short time. The BFI-10 allows the 5 personality traits to be assessed through only two items per dimension (introversion-extraversion; neuroticism-emotional stability; low/high conscientiousness; low/high agreeableness; closeness/openness to experience). Previous research has clearly shown that the BFI-10 possesses psychometric properties that are comparable in size and structure to those of the BFI in its standard version.

4) Visual analogical scales (VAS). VAS are widely used as they are easy to administer. A VAS is graphically presented as a line at the ends of which are descriptions corresponding to the lowest and highest level concerning a given psychological dimension. They constitute a useful tool for quickly measuring subjective experiences (Ahearn 1997). In the present version, participants are asked to indicate how they are feeling at present, giving the level of intensity of 5 emotional states on a scale from 1 (emotion absent) to 10 (intense emotion). The states assessed are stress, mental clarity, happiness, calmness, and restless condition.

5) Brain-Computer Interface (BCI). The BCI, being a simplified version of medical EEG equipment, allows brain rhythms to be detected, recorded, and analyzed in real time. BCI devices are widely used in research because of their high accuracy, comparable to medical EEG, and also because of their low cost and high portability. Because they are completely non-invasive, they have the advantage of keeping the user comfortable to have ample freedom of movement in the experimental setting. BCI devices are capable of recording different brain frequencies, grouped into rhythms by the frequency range to which they belong: alpha waves (7 Hz -14 Hz) associated with meditation, relaxation, and contemplation; beta rhythms (14 Hz -30 Hz), related to attention, active thinking, and concentration; the delta band (3 Hz -7 Hz), typical of deep sleep, but also present in complex cognitive patterns during wakefulness: theta rhythm (4 Hz -7 Hz), generally

related to emotional involvement; gamma rhythm (30 Hz -80 Hz), which is related to the cognitive interpretation of multisensory signals and focused attention.

The BCI used in the present study will be the Brain sensing headband MUSE headband version 2 (InteraXon), a Bluetooth device equipped with four sensor electrodes (two frontal and two temporal), a cardiovascular dynamics sensor, a gyroscope, and three reference electrodes. The ergonomic shape (a headband with ear supports), lightweight, and lack of wires make it a particularly suitable tool for research involving its use during complex tasks that require concentration as well as interaction with others.

Within the present study, EEG data collection will aim to assess the feasibility of using BCI tools to estimate the emotional state of participants. It represents, therefore, a secondary variable that will allow the collection of useful data for the development of future targeted research.

Experimental design

The study involves 4 different treatments (mindfulness, art therapy, VTS, and Green Art). Each treatment will be implemented in two environments: an art museum and a science museum. Thus, 9 separate groups of participants are planned. The main variable will be measured before and after each treatment, according to a within-subject methodology. In addition, the VTS treatment will be used as a control treatment for the other conditions. VTS is not validated as an anxiety treatment nor does it aim to produce relaxation, being primarily aimed at supporting the development of cognitive skills, especially in one-shot treatment as in the present study. VTS, therefore, represents an ideal control condition, since it uses the same environments and setting as the other procedures, engaging participants in meaningful activities. Thus, it will be possible to evaluate the effectiveness of the individual techniques placed in the museum setting and at the same time assess the weight of the museum environment on anxiety reduction. Cross-sectional comparisons between groups will be then possible, thus determining a mixed within/between design. Our results, in terms of change in the level of state anxiety, would be then compared with the values obtained by applying the same techniques by the same professionals in canonical settings.

Procedure

Each participant is required to sign the appropriate informed consent, which will present all the methodologically and deontologically necessary information to carry out a bioethically correct experimental procedure. Thus, all measures and procedures will be described, and the characteristics of the settings will be detailed. Indeed, it is essential that

the participant does not find himself disoriented but knows exactly what to expect. The characteristics of the museum environments that will be used as experimental settings should therefore be described. The artistic or scientific nature is made very clear, as well as the peculiarities of the artifacts and environments that will be used. It is crucial not to create uncomfortable states or violate participants' values or expectations, also following the Declaration of Helsinki on human experimentation.

If the participant, after reading the informed consent with the detailed description of the experimental procedure, signs it and the criteria for participation are met, they can continue with the completion of the trait questionnaire. This procedure must be completed at least 1 day before the treatment.

The participant is then provided with all information about the place and date of the study. On the day of treatment, participants are welcomed to a comfortable room inside the museum where pre-treatment state questionnaires are filled out with the support of a researcher, who can answer any question while ensuring maximum standardization of the procedure. It is important at this stage to sterilize communication in order not to include confounding factors in the procedure.

In the treatment phase, in parallel with the professional's proposal, an intervention by a museum conservator is envisaged. This intervention is part of the research, so it is standardized in terms of timing and is implemented with the utmost care, to avoid situations of discomfort, upset, or the elicitation of positive or negative emotions of such intensity as to invalidate data collection. It is important to remember that the experimental setting is different from a teaching setting or any other setting that may be implemented within the museum and that priority should always be given to data collection. If there are additional requests or needs from the participants, a short debriefing may be arranged after the post-experience questionnaires.

Participants then move to the treatment room, where the specific procedure is carried out according to a standardized time scan. This room is selected by the research team in accordance with the museum staff to fit both experimental and organizational issues. At the end of the treatment, participants return to the compiling room where the post-treatment state questionnaires are completed.

Conclusion

The role of museums within society is rapidly changing. The missions traditionally associated with museums such as preserving cultural heritage and disseminating it now face new challenges. First, educational aspects are becoming more extensive, diverse, and advanced also considering the museum setting as a privileged place where to foster critical and creative thoughts (Hein 2000; Sala, Vanutelli, and Lucchiari 2019). Second, the role that museums can play to promote the well-being of individuals and communities is

increasingly emerging (Brown and Mairesse 2018; Cuypers et al. 2012). The ASBA project intends to validate some methods already used and tested in different settings in the museum context as well. In this way, it is intended to provide operators with a set of practices that are well defined in terms of procedure and validated in terms of feasibility and effectiveness to positive impact on anxiety and perceived stress. Furthermore, the aforementioned practices will be evaluated within both an art museum and a science museum. Indeed, the museum should be considered a meaningful place that, in its complexity and not in the particularism of a single artwork, can generate beneficial cognitive, emotional, and social effects (Putland 2008; Mangione 2018). It is our belief, moreover, that not only the dissemination of such activities can promote people's health, but also the health of museums will benefit, thanks to the ability to include more and more people among its visitors. Finally, a relevant aspect of the project lies in the interaction between wellness and education. As much as the museum can be considered a privileged place to take care of oneself, regardless of the type of museum and individual knowledge, it is also true that to make the most of this potential, it is necessary to contribute to people's education, to give them the tools and the skills to fully take advantage of the beneficial potential of museum environments and the artifacts contained therein. In this sense, the museum can implement a virtuous circle between well-being and cultural growth (Banzi 2022; Zollinger 2021).

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Conflict of Interest

The author declares that there is no conflict of interest.

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