**Well-being in the museums: The ASBA project research protocol**

Annalisa Banzi, Vittorio Sironi, Maria Elide Vanutelli, Michele Augusto Riva, Raffaella Folgieri, Vincenza Ferrara, Claudio Lucchiari

Annalisa Banzi, PhD. CESPEB-University of Milano-Bicocca, Milan, Italy
ORCID ID: 0000-0001-7296-0236

Vincenza Ferrara, Pharmacy and Medicine Faculty, Sapienza Università di Roma, Italy
ORCID ID: 0000-0001-6371-2038

Raffaella Folgieri, PhD. Department of Philosophy "Piero Martinetti", Università degli Studi di Milano, Milan, Italy.
ORCID ID: https://orcid.org/0000-0002-0589-5275

Claudio Lucchiari, PhD. Department of Philosophy "Piero Martinetti", Università degli Studi di Milano, Milan, Italy
ORCID ID: http://orcid.org/0000-0002-9452-802X

Michele Augusto Riva, MD, PhD
1 School of Medicine and Surgery, University of Milano-Bicocca, Monza, Italy
2 Occupational Health Unit, Fondazione IRCCS San Gerardo dei Tintori, Monza, Italy
ORCID ID: 0000-0001-7147-3460

Vittorio Alessandro Sironi, CESPEB-University of Milano-Bicocca, Milan, Italy

Maria Elide Vanutelli, PhD. Department of Philosophy "Piero Martinetti", Università degli Studi di Milano, Milan, Italy
ORCID ID: 0000-0001-9349-1707.

**Abstract**

The ASBA (Anxiety, Stress, Brain-friendly Museum, Approach) project aims at assessing a group of methodologies (Mindfulness, Art Therapy, VTS, Art Up, 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**

Cognitive psychology, Art therapy, Mindfulness, well-being, Art Museums, Science Museums, ASBA project

**Introduction**

In recent years, the effort of museums to promote wellness in their communities has intensified, and different strategies to achieve this goal have been tested. The initiatives are many and varied, ranging from agreements between GPs and cultural institutions to Alzheimer's projects to cooperation between hospitals and museums, to those dedicated to Art Therapy, etc.

But what is wellness? According to the American Psychological Association, it implies a feeling of happiness and fulfillment, with low levels of distress, good physical and mental health, or satisfactory quality of life. As Falk [2021] argues, museums not only make people feel good, they make them feel good in a fundamental and very emotionally rich way. These "good feelings" transcend those offered by most contemporary recreational entertainments (e.g., theme and amusement parks), which meet people's short-term expectations in their way. However, only a few have the memorability of museum experiences that meet visitors' deepest and most fundamental needs while leaving a vital and lasting impression.

We know that the levels of psychosocial distress in society are significant, and the pandemic has further exacerbated this condition. Among the main consequences generated by Covid-19 are anxiety and stress [Daniali, Martinussen, & Flaten, 2023]. The former is an emotion characterized by apprehension and somatic symptoms of tension, and the latter is the physiological or psychological response to stressors that may be internal or external; it contributes directly to psychological and physiological disorders and thus can lead to the development of disease thereby reducing the quality of life.

Researchers have long measured the impact that cultural institutions have on mental well-being. For example, Clow and Fredhoi [2006] studied the stress and arousal levels of a group of London City workers before and after a visit to the Guildhall Art Gallery during their lunch break. The researchers adopted salivary cortisol and a stress self-assessment questionnaire [Cox Mackay Stress Arousal Checklist] as measurement tools. The results showed that the average stress levels reported by the participants were significantly reduced by the visit, while arousal levels remained unchanged. The elevated cortisol concentration also normalized at the end of the museum experience.

More recent research, conducted by Thomson et al. [2018], assessed the perceived psychological well-being of a group of older adults who were involved in the Museums on Prescription initiative. The study explored the extent to which six emotions changed over time: "absorbed/abrupt," "active," "cheerful," "comforted," "enlightened," and "inspired." The researchers concluded that museums can offer useful programs to gradually improve the psychological well-being of the elderly. More generally, research showed that art and creativity can play key role in coping with stressful situations [e.g.,Vanutelli, M. E., Grieco, Comelli, & Lucchiari, 2023; Nogaj, 2020].

At present, however, there are no research protocols, specific and validated, for dealing with stress and anxiety in the museum context but only general indications or protocols that are not validated and, generally, not shared, thus not standardized.

The ASBA[1] project, where the acronym stands for Anxiety, Stress, Brain-friendly Museum, Approach (the museum ally of the brain against anxiety and stress) is based on a research protocol that has been approved by the Ethics Committee of the University of Milan-Bicocca (n.733 09/2022). The study, which

[1] The ASBA Project involves several experts thus meeting one of the criteria of the BFM approach described above: Annalisa Banzi (art historian and researcher at CESPEB), Vincenza Ferrara (art historian and lecturer at La Sapienza University), Raffaella Folgieri (engineer and lecturer at the University of Milan), Lorenza Guidotti (certified Mindfulness instructor), Claudio Lucchiari (psychologist and lecturer at the University of Milan), Michela Rolandi (certified art therapist), Vittorio Sironi (medical doctor and lecturer at the University of Milan-Bicocca), Maria Elide Vanutelli (psychologist and postdoctoral fellow at the University of Milan), and the Art Up association (https://facilitatoriartup.org/)

involves researchers and professionals with different expertise, aims to select and study activities to be practiced in museums that relieve anxiety and stress; it represents a concrete application of the Brain-Friendly Museum approach [Banzi, 2022]. This is the first research protocol that include both Art and Science in museums in a single study.

The ASBA project proposes more than one strategy to offer museums the opportunity to choose the method best suited to their needs:

1. Mindfulness [Kabat-Zinn, 2018] is the ability to bring attention to the present moment in an intentional, nonjudgmental way. By focusing on the breath, attention can be focused on the body and mind in their momentary state, thus relieving both physical and emotional pain. It has been clinically proven to be an effective intervention in a wide range of disorders (chronic pain, anxiety disorders, depression, substance abuse, borderline personality disorder, etc.).

2. Visual Thinking Strategies (VTS) [Yenawine, 2013] constitute a learning method that originated in the 1980s and is based on group discussion, led by a facilitator, in front of a museum object. It was developed in the United States by a cognitivist psychologist, Abigail Housen, and the former educational director of the New York Museum of Modern Art, Philip Yenawine. The VTS method reduces anxiety, improves self-esteem, and develops problem-solving, critical thinking, teamwork, and social skills. It can be adapted to the construction of meaning for any museum object. This method therefore also suitable for science museums [Ferrara et al., 2022]

3. Art therapy is based on the use of artistic activities (e.g., painting) for therapeutic purposes. The process of making art is a healing experience; it provides an opportunity to express oneself when verbal communication is difficult. It can lead to personal realization, revision, and transformation of one's emotional experiences. It is not a diagnostic tool but a means of dealing with emotional issues that can be confusing and distressing [Abbing et al., 2018; Gilroy, 2006].

4. Green Art is an experimental strategy based on combining the stimuli of museum heritage and nature. Several studies show how exposure or "contact" with nature (e.g., parks, forests, and beaches) is associated with improved health and well-being [White, Alcock, Grellier et al. 2019]. The method, therefore, aspires to combine the positive effect of nature with the beneficial stimuli from the cultural heritage exhibited in a museum.

The research also involves collecting and analyzing data on anxiety and stress using the Art Up method. This technique, created for use in art museums, involves a group of experts consisting of art historians, psychoanalysts, and Art Health facilitators.

Each methodology, except for Art Up, has been selected to be tested in two types of museums (an art museum and a science museum) to verify, and possibly demonstrate, that all objects can promote people's well-being and, at the same time, can be enhanced by making them discoverable, or more familiar, to visitors. In particular, the ASBA project will be initially implemented at the Modern Art Gallery (Milan, Italy) and the Museum of Natural History (Milan, Italy) starting from October 2022.

The macro-objectives of the project are the validation of the museum environment as a socio-cognitive space for well-being and the enhancement of museum collections. However, the list of the project's goals is broader:

1. Adapt and standardize within the museum context specific techniques (Mindfulness, VTS, Green Art, Art Up, and Art Therapy) designed to increase psychological well-being.

2. To study the feasibility of the mentioned techniques through a controlled mixed-design study. The feasibility study first aims to test all standardized procedures and collect qualitative data about the experience.

3. Analyze the effect of the above techniques on participants' perceived well-being.

4. Broaden museums' audiences by proposing activities that do not require any prior knowledge and that, by generating well-being, entice people to revise their possible negative judgment of the museum institution.

5. Support museums committed to contributing to the well-being of their communities by offering opportunities to develop dedicated and continuous activities.

6. Create a database that can be made available to all research centers and museums interested in improving existing activities or proposing new strategies to expand the range of museum offerings.

7. To provide tools and techniques that can be adopted in any type of museum to facilitate all cultural institutions that wish to contribute to the regeneration of their communities; the literature reports many examples of wellness-related initiatives that, however, are mostly carried out in art museums.

8. Push policymakers toward adopting a system where GPs can prescribe museum activities designed to produce wellness.

9. Create an initial catalog of dedicated mental health activities (Mindfulness, Art Therapy, VTS, and Green Art) that can be expanded and enriched shortly by further research.

10. Encourage sponsors and policymakers to evaluate museums by also considering their ability to positively affect the quality of life of citizens. A recent book by Falk [2021] addresses this issue by showing that improved well-being if properly conceptualized, can not only be defined and measured but can also be monetized.

11. Facilitate the systematic involvement of research teams with diverse expertise (psychologists, neuroscientists, engineers, etc.) who can work with museum staff to help create experiences aimed at generating visitor well-being.

12. To engage museums' personnel in activities that could extend the scope of their work and to exploit the healthy value of their workplace.

**Instruments**

The ASBA research protocol ASBA involves the use of internationally validated and standardized tests so that they can be shared with the entire community of experts working on these issues.

In particular, the State and Trait Anxiety Inventory (S.T.A.I.) by Spielberger, Gorsuch, and Lushene (1970) is the most widely used instrument in the scientific literature for the psychometric measurement of anxiety. The Perceived Stress Scale (PSS; Perceived Stress Scale; Cohen et al., 1988) is the most widely used psychological instrument for measuring stress perception. The Big-five questionnaire (BFI-10) is an abbreviated 10-item version of the better-known BFI questionnaire [Rammstedt & John, 2007], which in its original version includes 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 agree"); it was developed to provide information about personality in an extremely short time frame. The BFI-10 allows the 5 personality traits to be assessed through only two items per dimension. Previous research has clearly shown that the BFI-10 has psychometric properties that are comparable in size and structure to those of the BFI in its standard version

[Guido et al., 2015]. VAS scales are widely used as they are easy to administer. A VAS scale is graphically presented as a line at the ends of which are descriptions corresponding to the minimum and maximum levels concerning a given mood or emotion. They constitute a useful tool for quickly measuring subjective experiences [Ahearn, 1997].

The results of the questionnaires are complemented by those taken with the Brain Computer Interface (BCI), which, 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 noninvasive, they have the advantage of keeping the individual wearing them comfortable since most of them are wireless, allowing the individual to have ample freedom of movement in the experimental environment.

**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.

The participant is then provided with all information about the place and date of the study. Trait questionnaire (PSS, BFI-10 and Trait Anxiety Scale) and personal characteristics are filled in an online form before the treatment day.

On the day of treatment, participants are welcomed to a comfortable room inside the museum where pre-treatment state questionnaires (State anxiety scale) 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 to 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 (State anxiety scale and qualitative data) are completed.

**Participants**

Since this is research in an 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, it was decided to size the sample 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

Accept the conditions and sign the informed consent

*Exclusion criteria*

- Insufficient language skills to understand verbal deliverables and interact with presenters and peers.

- 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)

**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. Second, the role that museums can play to promote the well-being of individuals and communities is increasingly emerging. 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 for a 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. It is our belief, moreover, that not only the dissemination of such activities is capable of promoting 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, 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.

Future research will extend the ASBA project scope, including young people with a targeted procedure. Furthermore, a focused research activity will be dedicated to museums' personnel who spend their job time a very peculiar context and need support to exploit the related benefits.

**References**


Abbing, A., Ponstein, A., van Hooren, S., de Sonneville, L., Swaab, H., & Baars, E. (2018). The effectiveness of art therapy for anxiety in adults: A systematic review of randomised and non-randomised controlled trials. PloS one, 13(12), e0208716.

Ahearn, E. P. (1997). The use of visual analog scales in mood disorders: A critical review. Journal of psychiatric research 31, no. 5: 569-579.

Banzi, A. (2022). The Brain-friendly Museum. Using psychology and neuroscience to improve the visitor experience. London: Routledge

Banzi, A. The Brain-Friendly Museum. Using psychology and neuroscience to improve the visitors experience. London-New York: Routledge, 2023.

Clow, A. & Fredhoi, C. (2006). Normalisation of salivary cortisol levels and self-report stress by a brief lunchtime visit to an art gallery by London City workers. Journal of Holistic Healthcare. 3 (2), pp. 29-32

Cohen, S., and G. Williamson (1988) Perceived Stress in a Probability Sample of the United States. In The Social Psychology of Health, edited by Spacapan, S., and S. Oskamp, 31-67. Newbury Park, CA: Sage.

Daniali, H., Martinussen, M., & Flaten, M. A. (2023). A global meta-analysis of depression, anxiety, and stress before and during COVID-19. Health Psychology, 42(2), 124.

Falk, J.H. (2021). The Value of Museums Enhancing Societal Well-Being. Lanham: Rowman & Littlefield Publishers

Ferrara, V., M.E. Perrone, C. Mina, F.Ceccarelli, G. Olivieri, F. Fattapposta, and F. Conti, "Science and visual Arts: Binomial or Dichotomy? A Pilot study in Systemic Lupus Erythematosus patients." Lupus 31, no. 14 (2022): 1744-1749. doi:10.1177/09612033221131179

Gilroy, A. (2006). Art therapy, research and evidence-based practice. Art Therapy, Research and Evidence-based Practice, 1-192.

Guido, G., Peluso, A. M., Capestro, M., & Miglietta, M. (2015). An Italian version of the 10-item Big Five Inventory: An application to hedonic and utilitarian shopping values. Personality and Individual Differences, 76, 135-140.

https://www.actmindfully.com.au/free-stuff/free-audio/

Kabat-Zinn (2018). The Healing Power of Mindfulness: A New Way of Being. London: Piatkus

Nogaj, A. A. (2020). Emotional intelligence and strategies for coping with stress among music school students in the context of visual art and general education students. Journal of Research in Music Education, 68(1), 78-96.

Thomson, L.J., Lockyer, B., Camic, P.M. & Chatterjee, L.J. (2018). Effects of a museum-based social prescription intervention on quantitative measures of psychological well-being in older adults. Perspectives in Public Health, 138(1), 28-38

Vanutelli, M. E., Grieco, A., Comelli, E., & Lucchiari, C. (2023). A Contagious… Smile! Training Emotional Skills of Adults with Intellectual Disability in the Time of COVID-19. Education Sciences, 13(2), 149.

White, M.P., Alcock, I., Grellier, J. et al. (2019). Spending at least 120 minutes a week in nature is associated with good health and wellbeing. Sci Rep 9, 7730

Yenawine, P. (2013). Visual thinking strategies: Using art to deepen learning across school disciplines. Harvard Education Press.

**Ethical approval statement**

The ASBA research protocol has been approved by Ethics Committee of the University of Milan-Bicocca (n.733 09/2022).

**Acknowldgements**

We thank “Galleria d’Arte Moderna” and “Museo di Storia Naturale” of Milan for their vital collaboration.

**Funding**

This research was funded by the Department of Philosophy “Piero Martinetti” of the University of Milan under the Project “Departments of Excellence 2023-2027” awarded by the Ministry of University and Research (MUR)