

Prospects for Furthering the Study of Museum Bathing: A Review of the International Research Literature Based on a Scoping Review by Law et al.

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Abstract: As Japan rushes toward a super-aging society, efforts are underway in various fields to increase citizens' healthy life expectancy. In this context, the effects of culture and the arts on health and well-being have been discussed in terms of their subjective evaluation (e.g., "it feels good somehow"), but there are few examples of the demonstration of such effects through objective evaluation. In particular, initiatives to conduct research on the relaxation effect of museum visits ("museum bathing") have only just begun. In this article, I undertake a review of the scholarly literature concerning the study of museum bathing in Japan and around the world in order to promote an "awareness of the evidence" and "improve quality of life" for future empirical research as indicated by the World Health Organization (WHO). Through this process, common issues facing the integration of research methods and experimental procedures based on physiological and psychological measurements have become clear, suggesting the need for the further accumulation of scientific data on this basis.

Keywords: Museum bathing, relaxation effect, stress reduction, physiological measurement, psychological measurement

1. Introduction

With the prospect of what has come to be known as the "2025 Problem" in which the baby boomers will reach the age of 75 or older by 2025, and the "2042 Problem" in which the number of people aged 65 years or older is expected to exceed 39 million by 2042, Japan is coming face to face the challenges of a super-aging society.¹ In this context, extending the healthy life expectancy of the elderly is thought to be a key to solving these problems.

In 2018, the Council for Cultural Affairs, in its report "1st Basic Plan on the Promotion of Culture and the Arts,"² proposed that "museums, art museums, libraries, and similar facilities serve in a wide range of roles, including as bases not only for the preservation, transmission, creation, exchange, and dissemination of culture and the arts, [...] should also seek to play a role as venues for solving various social problems through collaborations with educational institutions, welfare organizations, medical care organizations and other concerned bodies."

¹ Ministry of Internal Affairs and Communications (MIC) Press Kit (2020). Tōkei topikku nanbā 126 Tōkei kara mita wagakuni no kōrei-sha [Statistics Topics No. 126: Japan's elderly from a statistical perspective].

Retrieved from <https://www.stat.go.jp/data/topics/pdf/topics126.pdf> (in Japanese).

² Council for Cultural Affairs (2018), Bunka geijutsu suishin kihon keikaku (dai 1-ki) ni tsuite (tōshin) [Report "1st Basic Plan on the Promotion of Culture and the Arts"]. Retrieved from https://www.bunka.go.jp/seisaku/bunkashingikai/sokai/suishinkihon_01/pdf/r1403859_01.pdf (in Japanese).

Museums have been described as places that people visit for “intellectual stimulation, learning, and enjoyment,” to explore their collections by engaging all of their senses. Yet perhaps we might also say that the creation of a new value for museums as “places of health” is getting underway.

At the international level, initiatives to extend healthy life expectancy for the elderly and encourage the collaboration of museums and art museums with medical and welfare organizations are already being addressed in Scotland. Eight museums located in the southern Scottish city of Glasgow (namely the Riverside Museum, Gallery of Modern Art, Kelvingrove Art Gallery and Museum, St Mungo Museum of Religious Life and Art, Scotland Street School Museum, The People’s Palace, Glasgow Museums Resource Centre, and Kelvin Hall) have come together to promote the development of programs not only for the elderly themselves, but also for their families and caregivers, to encourage the idea and practice of “Aging Well” on the part of elderly living in the community.³

Given that the movement to regard museums as “places of health” in this way is already underway both in Japan and at the international level, I propose to undertake the further exploration of this global trend.

2. From Sensation to Science: Moving beyond “It feels good somehow”

2.1. A Canadian initiative to “write prescriptions for museum visits”

In Canada, an initiative launched in November 2018 to “write prescriptions for museum visits” as a supplemental therapy to promote patient recovery became the first of its kind in the world.⁴ The Musée des beaux-arts de Montréal (Montreal Museum of Fine Arts: MMFA), Canada’s oldest art museum (which opened in 1860), and Médecins francophones du Canada (MFdC) are working together so that patients with various physical and mental health problems and their family members will be able to gain free admission to the museum in order to enjoy the health benefits of art and culture. (As of 2021, the usual admission fee is \$24 CAD for those aged 31 and over, \$16 for those aged 21 to 30, and free for individuals aged 20 and under). Physicians are allowed to issue up to 50 prescriptions. In previous trials, it has been shown that the release of dopamine (the “pleasure hormone”) is comparable to that of physical exercise and can help relieve chronic pain, depression, stress, and anxiety, among other symptoms. An Education and Wellness Division team, including a full-time art therapist, has been formed at the museum to work with physicians, university researchers and hospital personnel to develop art programs. Currently, projects are underway that are geared to a variety of audiences, including individuals with eating disorders like anorexia and bulimia, people facing with developmental and intellectual challenges, breast cancer patients, people suffering from mental health issues, and elderly with dementia.⁵

³ (1) Retrieved from <https://www.glasgowlife.org.uk/museums/glasgow-museums-ageing-well-programmes>; (2) <https://www.glasgowlife.org.uk/media/6463/careworkers2.pdf>

⁴ Daniel Grant (2018). Can Going to a Museum Help Your Heart Condition? In a New Trial, Doctors Are Prescribing Art, Retrieved from <https://observer.com/2018/11/doctors-prescribe-art-montreal-heart-condition-asthma-cancer/>

⁵ Montreal Museum of Fine Arts home page/ MMFA-MFdC Museum Prescriptions: Museum Visits Prescribed by Doctors, Retrieved from <https://www.mbam.qc.ca/en/news/museum-prescriptions/>

2.2. WHO asks, “What is the evidence on the role of the arts in improving health and well-being?”

In this connection, the World Health Organization (WHO) Regional Office for Europe compiled a report in November 2019 entitled “What is the evidence on the role of the arts in improving health and well-being?”⁶

The theme of the report deals with the relationship between health and the arts, broadly defined to include fine art, music, literature, theater, and film. While the health effects of art have been recognized to some extent, primarily in Europe, over the past twenty years, the existence of an evidential basis for this has not always been fully acknowledged. This is to say, in other words, that most evaluations were subjective, along the lines of “I find looking at paintings to be emotionally soothing” and “I find going to live concerts to be invigorating.”

Therefore, researchers conducted a survey of the medical literature pertaining to the arts, consisting of upwards of 3,000 papers published in English and Russian between January 2000 and May 2019. Based on this examination, the effects and other impacts of the arts were divided into two categories – “illness prevention and health promotion” and “disease management and treatment” – which were then used to papers containing evidence that met certain criteria.

Included within this literature, for example, are studies showing that music has the effect of reducing high blood pressure stemming from illnesses like diabetes and hypertension, and also that drawing can help children deal with grief, depression, and post-traumatic stress disorder (PTSD). Then, by proposing the following four aspects as a logic model linking the arts with health, the report urged evidential awareness and quality-of-life improvement in support of future empirical research – in other words, a leap from “sensation to science.”

- (1) Psychological aspects (e.g., improved sense of self-efficacy, coping, and emotional regulation)
- (2) Physiological aspects (e.g., lower stress hormone response, enhanced immune function, enhanced cardiovascular reactivity)
- (3) Social aspects (e.g., reduced loneliness and isolation, enhanced social support, improved social behaviors)
- (4) Behavioral aspects (e.g., increased exercise, adoption of healthier behaviors, skills development)

3. Empirical Research Linking Museums with Health

3.1. Initial empirical studies in the international context

In museums, as well, one often hears people say that they find a certain solace in looking at paintings, or that they feel relaxed in such spacious art museum spaces. Nevertheless, these are subjective evaluations, and when I was awarded a FY2020 Basic Research Grant from Kyushu Sangyo University to develop a project “Toward Solutions to the 2025 Problem: Research into the Prevention of Dementia among Elderly Persons Using Museum-Based Reminiscence Therapy and Drawing and Musical Behavior,” I began to wonder about what methods there might be in terms of indicators for evaluating objective effectiveness.

When I began to sift through at the national and international literature on this topic, I came across a 2006 paper by Angela Clow of the University of Westminster in the UK.

⁶ Retrieved from <https://www.euro.who.int/en/publications/abstracts/what-is-the-evidence-on-the-role-of-the-arts-in-improving-health-and-well-being-a-scoping-review-2019>

As a physiological measurement, a (non-invasive) cortisol test was administered to workers in the City of London before and after viewing artworks in an art gallery over their lunch breaks. Clow found that cortisol levels were quite high at the time of their visits, but that these values returned to baseline after viewing artworks for 35 to 40 minutes. She reported that simply viewing artworks for a short period of time during the lunch break can help to alleviate stress (Clow 2006).⁷

This was arguably the first published paper anywhere in the world involving an empirical trial to demonstrate a link between museums and health.

3.2. Initial empirical studies in Japan

In fact, however, an empirical trial had been conducted in Japan even earlier, in 2001.

This study consisted of physiological and psychological measurements that were administered to visitors to three different exhibitions held at the Menard Art Museum in Komaki City, Aichi Prefecture, sponsored by Nippon Menard Cosmetic Co., Ltd.

A report of this trial was delivered at the 14th Annual Meeting of the Japanese Association of Health Psychology, which was hosted by Tohoku Gakuin University on November 3–4, 2001. Details of the report are available online at the website of the Menard Art Museum.⁸

According to the report, the exhibitions involved in the trial (and the number of participants who attended each) are as follows:

- (1) “Chagall Lithograph,” an exhibition of 94 lithographs by Marc Chagall (43 participants)
- (2) “Women in the Streets of Paris,” an exhibition of 71 works by Picasso, Matisse, Lautrec, Yuzo Saeki, Tsuguharu Fujita, and others (30 participants)
- (3) “Secrets of the Masterpieces III: Japanese-style Painting and Handicrafts,” 65 works by Korin Ogata, Taikan Yokoyama, Yukihiko Yasuda, Kenkichi Tomimoto, Tatsuoaki Kuroda, and others (31 participants)

For the trial, physiological measurements (cortisol test) were performed for all exhibitions, but psychological measurements (multidimensional mood scale and VAS) were carried out only in the third session.

As a result, it was found that (1) in the physiological measurements, cortisol levels decreased after viewing the exhibition in all exhibitions, and (2) in the psychological measurements, stress, mental strain, and physical strain decreased on the VAS, and only depression, anxiety, fatigue, and hostility decreased on the multidimensional mood scale. It was reported that visiting art museums has healing effects both physiologically and psychologically.

Hence, we can see how evidence of the effectiveness of art appreciation in maintaining health and reducing stress was beginning to accumulate both in Japan and at the international level.

In the last issue of this journal, on the basis of this worldwide body of empirical research, I proposed the notion of “museum bathing” (i.e., as the activity of making use of the healing effects of

⁷ Angela Clow with Catherine Fredhoi (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*, Volume 3 Issue 2 May.

⁸ Retrieved from <https://museum.menard.co.jp/outline/healing.html> (in Japanese).

museum visits to promote health and prevent illness) as an activity linking museums with health.⁹ Then, after being awarded a FY2021 Grant-in-Aid for Scientific Research (C) for “A Study on the Relaxation Effect of Museums in Aging Society” (Project No.: 21K01004), I continued my search of the literature using search terms such as “art,” “museum,” “stress,” “cortisol,” and “amylase” with a view to furthering the study of museum bathing.

In the course of this review, it became clear to me that the most urgent challenge facing the field is the integration of research methods. Particular that needed to be controlled for included the environment of the museum or art gallery in which works were viewed (e.g., the size of exhibition halls), viewing methods, the number and content of art works, participants individual characteristics, and the method and timing of measurements conducted before and after the gallery visit. In the next section, I want to draw attention to a recent paper by Law et al. (2021),¹⁰ which I believe was the first to point this out.

4. Law et al.’s Survey of the Literature on “Linking Museums and Health”

Mikaela Law and her colleagues at the University of Auckland in New Zealand assembled many empirical research papers on the theme of how viewing visual artworks affects stress outcomes, asking in other words whether physiological and psychological responses to the visual appreciation of art have a positive effect on human health and well-being (Law et al. 2021). By analyzing the respective research methodologies of these papers, Law and her colleagues have sought to correct the gap in research methods pointed out in the WHO report.¹¹

In the view that sharing research methodologies is an important condition for the development of future research, below, I would like to summarize the perspective adopted by the scoping review presented by Law et al.

4.1. Overview of the literature review

4.1.1. Data sources and review methodology

As data sources, Medline, Embase, APA PsycINFO, Cochrane CENTRAL, Scopus, Google Scholar, Google, ProQuest Theses and Dissertations Database, APA PsycExtra and Opengrey.eu were used to conduct a literature search, limited to articles published in English.

Law et al. employed a relatively new form of literature review known as a *scoping review*. The importance of this method is particularly prominent in the medical field, where knowledge, techniques, and information are updated rapidly. Occupying an intermediate position between the *narrative review* and the *systematic review*, the scoping review endeavors to cast a wide net over the

⁹ Ogata Izumi (2021), Hakubutsukan yoku ni yoru rirakkusu kōka no kenshō [A verification of the relaxation effect derived from museum bathing]. *Chiiki kyōsō gakkaiishi* [Journal of Collaborative Regional Development] No. 6: 55–72; Retrieved from http://repository.kyusan-u.ac.jp/dspace/bitstream/11178/8117/1/chiikivol.6_04.pdf (in Japanese).

¹⁰ Mikaela Law, Nikita Karulkar, and Elizabeth Broadbent (2021), Evidence for the effects of viewing visual artworks on stress outcomes: A scoping review, *BMJ Open*.

¹¹ See note 6.

relevant literature in order to provide a comprehensive survey of current research while also identifying the extent to which research has yet to be conducted.

4.1.2. Methods of artistic engagement and targeted works of visual art

Modes of engagement with the arts are divided into active and passive participation. Active participation involves creating art and personally directing the creation of art, including art therapy. Passive participation, on the other hand, involves behaviors such as viewing works of art or listening to explanations. I should note that this study focuses on the viewing of visual artworks, and as such excludes the literature on active participation. Visual artworks, moreover, were defined as paintings, drawings, prints, photographs, digital artwork, and sculptures. Sculptures are included here because although Law et al. note that the targeted artwork was defined as “two-dimensional artistic works made primarily for their aesthetics, rather than any functional purpose,” in the Japanese case, three-dimensional works of art may be included on the basis that these can also be craft works created for aesthetic purposes.

4.1.3. Certain questions in the literature review and the number of papers extracted

This literature review was carried out to investigate the following research question: “what research has been conducted on the effects of viewing visual artworks on stress outcomes in any populations and settings?” The investigation sought to answer the following six questions:

- (1) What populations and settings were studied?
- (2) What study methodologies were used?
- (3) What stress outcomes were measured?
- (4) What type and content of artworks were viewed?
- (5) What was the duration of the artwork viewing and how many artworks were viewed?
- (6) Did the studies show changes in the stress outcomes?

Based on these questions, Law and her colleagues conducted a scoping review that initially extracted 3,882 candidate articles which were then narrowed down to a final sample of 14 articles.

4.2. Research methodology criteria in the 14 extracted references

- (1) Settings: 6 studies were conducted in art galleries or museums, 3 in laboratories, 4 in hospitals, and 1 in an elderly person’s home.
- (2) Participants: 3 studies involved students, 5 involved workers or other healthy members of the general public, 1 concerned elderly people living with dementia, 1 concerned elderly women, and 4 involved other populations not listed above.
- (3) Measuring methods: Indicators for physiological measurements included blood pressure, heart rate, and skin conductance, as well as salivary biomarkers (e.g., cortisol, amylase, and interleukin 6). In some papers, physiological and psychological measurements were not necessarily combined as a set.
- (4) Blinding: This is a device used in medical fields, where as a means of preventing bias, the nature of assigned treatments is not divulged to the individuals involved in clinical experiments, including physicians as well as participants. However, in the context of the

appreciation of visual art, it is not feasible to conduct blinded experiments since the artworks in question are located in specific art spaces.

- (5) Type of artworks: Most of the works involved in the studies were original paintings. Some studies also involved digital and poster reproductions of these artworks.
- (6) Content of artworks: In most cases, exhibitions were viewed in an exhibition hall containing a mixed variety of figurative and abstract paintings.
- (7) Duration of artwork viewing: Durations varied from five minutes to extended periods of time. No study investigated whether changing the duration of exposure to artworks affected stress outcomes.
- (8) Quantity of artworks: In most studies, the precise amount of artwork viewed was not divulged.
- (9) Viewing directions: In most studies, specific viewing instructions were not explicitly stated.

In the next section, I would like to focus on four articles that I feel are relevant to the future development of the study of museum bathing, each of which has been scientifically validated by both physiological and psychological measurements and is restricted in terms of setting to art galleries, museums, or art museums, rather than laboratories. Together with one of my own articles and two newly identified articles, I review seven articles in total.

5. An Introduction to the Relevant International Research Literature on Museum Bathing

5.1. Trial experiment at the Kunstmuseum St. Gallen, Switzerland

From a research article by a Swiss-German team led by Wolfgang Tschacher from the University of Bern (Switzerland).¹²

- (1) Setting: Kunstmuseum St. Gallen, near Lake Constance in eastern Switzerland¹³ (opened in 2012; the building itself dates from 1877).
- (2) Participants: Inclusion criteria were as follows: At least 18 years of age, not member of a visitor group or school class, not engaged in a guided tour of the museum, and fluency in German or English. The study period lasted two months, from June to August 2009, during which data was collected for 517 participants. However, usable data was only collected for 373 individuals (65% women, mean age 47.4).
- (3) Pre- and post-viewing assembly point, measurement setting: Not specified.
- (4) Viewing method: Participants took in an exhibition entitled “11:1(+3) = Elf Sammlungen für ein Museum [11:1(+3) = Eleven collections for one museum]” (February 7 to August 16, 2009) while moving freely through seven museum halls over an area of approximately 380 m².
- (5) Quantity and type of works viewed: 76 works of modern and contemporary art.

¹² Wolfgang Tschacher, Steven Greenwood, Volker Kirchberg, Stéphanie Wintzerith, Karen van den Berg, and Martin Tröndle (2012). Physiological correlates of aesthetic perception of artworks in a museum. *Psychology of Aesthetics, Creativity, and the Arts*, 6–1, 96–103

¹³ Retrieved from <https://www.kunstmuseumsg.ch/en/kunstmuseum/about-the-museum>

- (6) Content of artworks: A wide variety of works, ranging from paintings by Claude Monet (France; 1840–1926), Edvard Munch (Norway; 1863–1944), Ferdinand Hodler (Switzerland; 1853–1918), and Le Corbusier (Switzerland/France; 1887–1965) to drawings by Paul Klee (Switzerland; 1879–1940) to abstract works by Max Bill (Switzerland/Germany; 1908–1994), Günther Uecker (Germany; 1930–) and Yves Klein (France; 1928–1962) to “pop” works by Andy Warhol (USA; 1928–1987) and James Rosenquist (USA; 1933–2017), as well as conceptual works by On Kawara (Japan; 1932–2014).
- (7) Duration of artwork viewing: On average, participants spent 28 minutes in the exhibition.
- (8) Viewing directions: Not specified.
- (9) Measuring methods: Both physiological and psychological measurements were implemented.
 - Physiological measurements: Data was collected using an electronic sensor glove that recorded physiological data and motor activity as participants viewed art in the exhibition halls.
 - Psychological measurements: After viewing, participants were prompted to recall up to six different artworks in order to assess their subjective aesthetic experience.

The questionnaire consisted of 19 items (with 5-point scales each) covering emotions evoked by an artwork (e.g., joyful, sad, angry, frightening, surprising), aesthetic valuations of an artwork (e.g., beautiful, touching, artistically well done, eminent), and the viewer’s general appraisal of an artwork (e.g., dominant, activating, positive, appropriately hung, suitable for gallery context, renown of artist). These responses were used to assess the beauty of the artwork.

- (10) Measurement outcomes: Physiological measurement of heart rate variability (HRV) increased while viewing artworks that were deemed beautiful, high quality and surprising/humorous. Skin conductance variability increased, and heart rate decreased while viewing more dominant artworks (i.e., those experienced as dominant and stimulating by the viewer).
- (11) Limitations of the study: Not specified.

5.2. Trial experiment at the Castle of Rivoli Contemporary Art Museum in Turin, Italy

From a research article by a team led by Francesca Siri at the University of Parma (Italy).¹⁴

- (1) Setting: The Castle of Rivoli’s Contemporary Art Museum in Turin (Torino), Italy (opened in 1984).¹⁵
- (2) Participants: Sixty healthy volunteers took part in the study (mean age 36.35 years).
- (3) Pre- and post-viewing assembly point, measurement setting: A quiet room in the museum.
- (4) Viewing method: A visit to the Castle of Rivoli’s Contemporary Art Museum Exhibit “L’emozione dei COLORI nell’arte [The Emotion of Colors in Art]” (March 14–July 23,

¹⁴ Francesca Siri, Francesca Ferroni, Martina Ardizzi, Anna Kolesnikova, Marcella Beccaria, Barbara Rocci, Carolyn Christov-Bakargiev, and Vittorio Gallese (2018). Behavioral and autonomic responses to real and digital reproductions of works of art. *Progress in Brain Research*. 237: 201-221

¹⁵ Retrieved from <https://www.castellodirivoli.org>

- 2017). The experimenter chose two works of abstract art, by Lucio Fontana (1899–1968) and Eugenie Paultre (1979–), respectively, and digital reproductions of the same (i.e., two reproductions of real abstract works) for viewing in a quiet room in the museum (the “experimental room”) while seated in a chair.
- (5) Quantity and type of works viewed: 2 real works of abstract arts and 2 digital reproductions of the same. The digital reproductions were viewed on two separate monitors.
 - (6) Content of artworks: Works by Lucio Fontana (1956, blue, red, and yellow glass stones on a yellow canvas) and Eugenie Paultre (2016; Paultre teaches at the Sorbonne University in France, and is active as a painter, poet, and philosopher). She is considered a master of color. Her work in the exhibition features warm and cold colors running vertically in thin linear bands.
 - (7) Duration of artwork viewing: Each artwork was shown for 144 seconds in a random order.
 - (8) Viewing directions: Participants were asked to move from the room where they completed a questionnaire to the experimental room. They were not told that some of the works were reproductions. Upon entering the experimental room, the two real abstract works and their respective digital reproductions were positioned on a white wall. Participants were instructed to sit a chair that was provided.
 - (9) Measuring methods: A questionnaire was completed prior to viewing, physiological measurements were implemented while viewing, and psychological measurements were implemented after viewing.
 - Questionnaire: In a different room from the experimental room, subjects completed a questionnaire intended to measure their empathic traits, immersive tendencies, and art expertise.
 - Physiological measurement: Participants were moved to the experimental room and asked to sit in a chair, where a resting baseline ECG was recorded for 144 seconds. After viewing the artworks, their ECG was recorded for another 144 seconds as a recovery baseline.
 - Psychological measurement: After viewing the artwork, participants completed a VAS questionnaire. Questions were presented on a monitor in front of them. Such questions included “How artistically beautiful is this image?”, “How emotionally intense is this image?”, “How much movement do you perceive?”, “How intense is this color?”, and “How strongly do you want to touch this image?”.
 - (10) Measurement outcomes: Significant differences in VAS and heart rate were observed when viewing the two real artworks, but there were no differences in heart rate when viewing the two digital reproductions. There were also no differences between the real artworks and digital reproductions in terms of “color intensity,” “movement,” or “aesthetic value.” There were also no differences in HRV.
 - (11) Limitations of the study: Siri et al. note that the study involved only a small number of works (i.e., two pieces). They also point out that although the subjects were volunteers, they were all people living in the vicinity of the museum that responded to public announcements posted on the museum website and advertised in local newspapers, so it is possible that they were people who were generally interested in the abstract art targeted by the study.

5.3. Trial experiment at Italy's Vicoforte Sanctuary

From a research article by a team led by Enzo Grossi at the Villa Santa Maria Institute (Italy).¹⁶

- (1) Setting: The Vicoforte Sanctuary in Piedmont, northwestern Italy¹⁷ (construction of which began in 1596; vaulted ceiling constructed in 1731 and completed in 1733. The sanctuary boasts one of the world's largest elliptical vaulted ceilings [measuring 37.15 m on its major axis, 24.80 m on its minor axis, and with a height of 16.60 m], with frescoes on the ceiling and walls. It was designated a national treasure in 1880).
- (2) Participants: Took part in a visit session held in May 2016. A total of 100 volunteers living in the vicinity of the sanctuary were divided into seven groups. Three groups visited the sanctuary in the morning and four groups in the afternoon. Participants ranged in age from 19 to 81 years and took part on a voluntary basis (49% female, 51% male, all in good health). The average level of educational attainment was quite high by national standards, with 42% university graduates and a large proportion belonging to white-collar occupations.
- (3) Pre- and post-viewing assembly point, measurement setting: Not specified.
- (4) Viewing method: Each group led by a facilitator viewed frescoes on a guided tour of the vault.
- (5) Quantity and type of works viewed: Religious paintings from the mid-eighteenth century.
- (6) Content of artworks: "Madonna and Child" frescoes on the ceiling and walls.
- (7) Duration of artwork viewing: The visit lasted approximately 2 hours. Visitors climbed about 200 steps to view the frescoes on the ceiling and walls.
- (8) Viewing directions: Participants were given an explanation of the history of the church and frescoes beforehand. A guide accompanied them during their tour.
- (9) Measuring methods: Effects were evaluated based on physiological and psychological measurements conducted prior to the visit.
 - Physiological measurement: Saliva samples were collected before the ascent to the vault and after the descent to measure cortisol as a stress marker.
 - Psychological measurement: VAS (conducted twice: once the evening before the viewing and again 30 minutes after the viewing)
 - Measurement of subjective well-being: Preliminary survey
 - Survey of cultural participation (Jazz music concerts, Classical music concerts, Opera/ballet, Theatre, Museums, Rock concerts, Disco dance clubbing, Art exhibitions, Sport games, Movies, as well as number of novels and poetry books read in the last year, and Social activity and Local community events participation in the last year): Preliminary survey
- (10) Measurement outcomes:
 - Measurement of subjective well-being: Lower than average for Italians.
 - Survey of cultural participation: Lower than average for Italians.

¹⁶ Enzo Grossi, Giorgio Tavano Blessi, Pier Luigi Sacco (2019). Magic Moments: Determinants of Stress Relief and Subjective Wellbeing from Visiting a Cultural Heritage Site, *Cult Med Psychiatry*, 43, 4-24

¹⁷ Retrieved from <https://www.santuariodivicoforte.it>

- Physiological measurement: Cortisol levels were found to be reduced by up to 60% after the visit.
 - Psychological measurement: Changes in VAS showed that 90% of the subjects registered a significant improvement in health (i.e., felt better) after the experience.
- (11) Limitations of the study: Grossi et al. noted that since the participants in this study were biased towards a higher level of educational attainment than the national average, future comparisons with groups with a lower-level educational attainment will be needed.

5.4. Trial experiment at the Schaulager, a museum run by the Laurenz Foundation, Switzerland

From a research article by a team led by Luisa Krauss at the University of Basel (Switzerland).¹⁸

- (1) Setting: The Schaulager, a museum operated by the Laurenz Foundation in Basel, a city on the Rhine in mid-western Switzerland (opened in 2003).¹⁹
- (2) Participants: 75 students from the Faculty of Psychology at the University of Basel (17 males; mean age 21.8 years).
- (3) Pre- and post-viewing assembly point, measurement setting: Not specified.
- (4) Viewing method: A visit to the “Future Present” exhibition held at the Schaulager (June 13, 2015–Jan 31, 2016). Six exhibited works of Flemish expressionism (by a group of artists inspired by cubism and German expressionism who created their works around the 1920s and 1930s in Belgium, characterized by strong colors and bold compositions) (Six of the ten works exhibited in the first exhibition hall). Subjects were randomly assigned to one of two groups, one of which previously read descriptive information about the works (i.e., information describing the depicted content, colors, and other factual information) (n=38) and one that previously read elaborative information about the works (i.e., information describing the historical background and deeper meaning of the works) (n=37).
- (5) Quantity and type of works viewed: Six Flemish expressionist paintings of various sizes exhibited at the “Future Present” exhibition.
- (6) Content of artworks: One or more people appear in each of six works. (i) Works strongly influenced by cubism: Gustaaf de Smet’s (1877–1943) *La Ville* (1926–1927, 135.5 x 121 cm) and Frits van den Berghe’s (1883–1939) *Vacances* (1924–1925, 159 x 120.5 cm); (ii) works with intense use of color: Floris Jaspers’s (1889–1965) *Sur un gouffre rouge un désir tremble* (1926, 78.5 x 65 cm), Frits van den Berghe’s (1883–1939) *Le pique-nique* (1924–1926, 120.9 x 140.4 cm), James Ensor’s (1860–1949) *Les masques intrigués* (1930, 50.5 x 61.5 cm), Edgard Tytgat’s (1879–1957) *Les premiers amours de Rébecca* (1931, no size listed). Note that an online prestudy was conducted for the selection of the six works. A total of 91 participants (18 men), average age 30.34 years, mainly well-educated (96% professional education or university students), rated 18 abstract and representational paintings based on

¹⁸ Luisa Krauss, Celine Ott, Klaus Opwis, Andrea Meyer, and Jens Gaab (2021). Impact of contextualizing information on aesthetic experience and psychophysiological responses to art in a museum: A naturalistic randomized controlled trial, *Psychology of Aesthetics, Creativity, and the Arts*, 15–3, 505–516

¹⁹ Retrieved from <https://schaulager.org>

their aesthetic experience, art perception, and familiarity (“I know the artist of this artwork,” “I know this artwork”).

- (7) Duration of artwork viewing: Not specified.
- (8) Viewing directions: Participants were divided into two groups, each of which received either descriptive or elaborative information. Participants were given a clipboard with the titles of the works, the descriptive or elaborative information, and a floor plan of the first exhibition hall with the order in which the paintings were to be viewed. After reviewing the material, participants were invited to view the first exhibition hall at their leisure.
- (9) Measuring methods: Subjective evaluation, physiological measurement, and psychological measurement were conducted, using a separate calm room.
 - Evaluation of subjective aesthetic experience: After viewing the paintings, participants were asked to rate them using five items: “The picture is thought-provoking,” “The picture touches me emotionally,” “I find the picture to be interesting,” “I understand the meaning of the picture,” and “The picture triggers a sense of ambiguity within me.”
 - Physiological measurement: Participants wore a portable BioNomadix Logger during the viewing to measure heart rate, HRV, and skin conductance.
 - Psychological measurement: N/A
- (10) Measurement outcomes: No significant differences in heart rate, HRV, or skin conductance were observed between the two groups. However, heart rate decreased while skin conductance and HRV increased during viewing in both groups compared to baseline. No differences were observed in the participants’ aesthetic experience based on their receiving descriptive or elaborative information.
- (11) Limitations of the study: Krauss et al. highlight the characteristic nature of museums, pointing out the ever-present possibility of crossing paths with other visitors, as well as the fact that participants may not always be able to follow the viewing order in the first exhibition hall as instructed. They also note that the BioNomadix Logger used for the physiological measurements and the electrodes that participants wore on their hands and chests may have affected their natural viewing behaviors.

5.5. Trial experiment at the National Gallery of Modern Art in Rome, Italy

From a research article by a team led by Stefano Mastandrea at Roma Tre University (Italy).²⁰

- (1) Setting: National Gallery of Modern Art, Rome (opened in 1863).²¹ This is a national museum specializing in modern and contemporary art, located north of Rome’s Villa Borghese.
- (2) Participants: A total of 77 students (females = 64; mean age = 22.5) with no training in the arts volunteered for the study. The purpose of the experiment was not explained in advance, but only on the day. Participants were randomly (in the order of their arrival) assigned to one

²⁰ Stefano Mastandrea, Fridanna Maricchiolo, Giuseppe Carrus, Ilaria Giovannelli, Valentina Giuliani & Daniele Berardi (2019). Visits to figurative art museums may lower blood pressure and stress, *Arts & Health*, 11:2, 123-132

²¹ Retrieved from <https://lagallerianazionale.com>

of three groups according to the museum halls to be visited: 23 to figurative art (landscapes, portraits, architecture, etc.), 23 to modern art (abstract, expressionist, and informal art paintings, three-dimensional geometrical sculptures, contemporary art installations, etc.) and 21 to the museum offices. Participants assembled in front of the museum and entered through the back entrance into a quiet room in the museum.

- (3) Pre- and post-viewing assembly point, measurement setting: A quiet room in the museum.
- (4) Viewing method: After a preliminary physiological measurement, participants proceeded to their respective destinations, i.e., in Group 1 to view figurative art works and in Group 2 to view modern art works.
- (5) Quantity and type of works viewed: Aside from the description of “figurative art” and “modern art,” no specific mention was made of details such as quantity or type.
- (6) Content of artworks: Aside from the description of “figurative art” and “modern art,” no specific mention was made of details such as names of artists or titles of works.
- (7) Duration of artwork viewing: Viewing time for groups 1 and 2 was 5 minutes.
- (8) Viewing directions: No specific instructions for viewing the exhibition were given, although the participants were escorted from the quiet room to the exhibition halls.
- (9) Measuring methods: Both physiological and psychological measurements were taken.
 - Physiological measurement: Participants entered the museum through the back entrance and were led to a quiet room to prevent them from seeing any artwork and museum halls before the experiment.

In the first stage, blood pressure and heart rate were measured using an automatic sphygmomanometer (Omron HEM-780, Automatic Blood Pressure Monitor) with participants seated (back against the back of a chair). For each subject, two measurements were taken alternately on both arms (right and left), with the second measurement taken two minutes after the first.

For Group 1 (figurative artworks) and Group 2 (modern artworks), measurements were taken before and after viewing the artworks. For Group 3 (museum offices), measurements were taken before and after the visit.
 - Psychological measurement: After the second physiological measurement, all participants were asked to self-score how well they “liked” their visit to the museum (on a 5-point scale).
- (10) Measurement outcomes: Systolic blood pressure was found to have decreased in all groups. However, this reduction was only significant in Group 1 (figurative artworks). Heart rate was also observed to decrease in all three groups, but there were no significant differences between groups. No correlation was found between systolic blood pressure and the degree of “liking” in any of the three groups.
- (11) Limitations of the study: Mastandrea et al. point out that the sizes of the groups: 23 (figurative artworks), 23 (modern artworks) and 21 (museum offices) represent a small sample size.

5.6. Trial experiment at the Bellevue Arts Museum, USA

A master's thesis by Kristina Ter-Kazarian, University of Washington Graduate School (Seattle, Washington State, USA).²² The research methods and experimental procedures were adapted from Angela Clow (2006).²³

- (1) Setting: The Bellevue Arts Museum (opened in 1947)²⁴ east of Seattle (Washington State, USA). The museum focuses on art, craft, and design.
- (2) Participants: A total of 31 individuals (21 women) working near the museum were recruited in advance and visited the museum on their lunch break. Participants were taken to a quiet room in the museum, where they were briefed on the experimental procedure (Step 1) and then asked to give a saliva sample and complete a questionnaire in Step 2. Participants arrived at the museum separately during their lunch break, and Step 2 was completed between 12:40 and 14:40. This second step took 7 to 10 minutes to complete. In Step 3, participants were asked to visit the exhibition halls at their leisure for 35 to 40 minutes. In Step 4, the final step, participants gave a second saliva sample and completed a second questionnaire.
- (3) Pre- and post-viewing assembly point, measurement setting: A quiet room in the museum.
- (4) Viewing method: Participants spent 35 to 40 minutes wandering the exhibition halls at will.
- (5) Quantity and type of works viewed: Not specified.
- (6) Content of artworks: Not specified.
- (7) Duration of artwork viewing: 35 to 40 minutes.
- (8) Viewing directions: Participants were instructed to visit the exhibition halls at their leisure for 35 to 40 minutes.
- (9) Measuring methods: Both physiological and psychological measurements were taken.
 - Physiological measurement: Cortisol levels in the saliva were measured before and after viewing.
 - Psychological measurement: Stress and arousal were evaluated using a self-reported questionnaire before and after viewing. A questionnaire was administered using the Cox Mackay Stress Arousal Checklist.²⁵ On the checklist, 34 mood-describing adjectives (19 stress adjectives and 15 arousal adjectives) were listed vertically in the following order (Tense, Relaxed, Vigorous, Restful, Active, Passive, Worried, Energetic, Drowsy, Bothered, Lively, Dejected, Comfortable, Distressed, Cheerful, Peaceful, Activated, Tired, Idle, Up-tight, Alert, Uneasy, Stimulated, Aroused, Somnolent, Fearful, Apprehensive, Contented, Jittery, Sluggish, Pleasant, Sleepy, Nervous, Calm) on the left-hand side of a table. Participants were asked to rate their subjective experience by checking one of four checkboxes on the right of each word (Definitely feel, Feel slightly, Do not understand / cannot decide, Definitely do not feel).

²² Retrieved from

https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/45657/TerKazarian_washington_02500_21485.pdf?sequence=2&isAllowed=y

²³ See note 7.

²⁴ Retrieved from <https://www.bellevuearts.org>

²⁵ See note 22, pp. 71-72.

- (10) Measurement outcomes: Self-reported stress was found to have decreased by 72% after the museum visit. Arousal also decreased by 28%. Salivary cortisol levels before and after viewing were unchanged in both men and women. The museum experience increased visitors' feelings of pleasantness, happiness, and enjoyment and decreased their sense of wakefulness, alertness, and tension.
- (11) Limitations of the study: Ter-Kazarian notes that she did not establish a control group for her study and speculates that a group of people who did not leave the workplace during their lunch break might be used as such.

5.7. Trial experiment at museums in Japan, including the Fukuoka Art Museum, Fukuoka City Archaeological Center, Kyushu Historical Museum, Kurume City Art Museum, and Dazaifu Fureai Museum

From an article published by Ogata in the previous issue of this journal.²⁶

- (1) Setting: Twelve museums and art galleries specialized variously in fields such as history, art, archaeology, and folklore, all located in Fukuoka Prefecture (participating facilities included the Fukuoka Art Museum, Fukuoka City Archaeological Center, Kyushu Historical Museum, Kurume City Art Museum, Dazaifu Fureai Museum, and the Museum of Kyushu Sangyo University).
- (2) Participants: A total of 168 individuals ranging in age from 20 to 79. Participants met in the training rooms of each venue, where they were briefed on the experimental procedure (Step 1).

This was followed by physiological measurements (blood pressure, pulse rate, and salivary amylase) and psychological measurements using a VAS (Visual Analog Scale) as a self-evaluation of physical condition and a POMS (Profile of Mood States) questionnaire (Step 2). This took 20 minutes on average. Participants then spent 60 to 90 minutes taking in the exhibition halls at the day's venue at will (Step 3), after which the same physiological and psychological measurements were performed a second time in the training rooms (Step 4).
- (3) Pre- and post-viewing assembly point, measurement setting: While not specified, it can be assumed from the photographs that a quiet room was provided.
- (4) Viewing method: A visit to the permanent exhibition at each museum.
- (5) Quantity and type of works viewed: Not specified.
- (6) Content of artworks: Not specified.
- (7) Duration of artwork viewing: 30 minutes on average.
- (8) Viewing directions: None in particular; Participants were instructed to observe the exhibits at their leisure for approximately 30 minutes.
- (9) Measuring methods: Both physiological and psychological measurements were taken.
 - Physiological measurement: Blood pressure and pulse rate measurement (using an Omron Blood Pressure Monitor [Wrist Type] HEM-6121), salivary amylase measurement (using a salivary amylase monitor manufactured by Nipro Corporation).

²⁶ See note 9.

- Psychological measurement: VAS, POMS 2® (the Japanese translation of the Profile of Mood States, second edition, published by Kaneko Shobo)
- (10) Measurement outcomes: In POMS, the “Tension-Anxiety” measure was found to decrease, and the “Vigor-Activity” measure was found to increase in connection with folklore and fine arts museums. In VAS, the “Anxiety” measure was found to decrease and “Refreshment” to increase in connection with fine arts, archaeology, and folklore museums. Mean diastolic blood pressure, systolic blood pressure, and pulse rate remained more or less unchanged. However, systolic blood pressure was observed to decrease among women in their sixties and seventies who participated on several occasions, before and after visits in connection with zoological, history, and art-related facilities and museums. Individual differences sometimes arose.
- (11) Limitations of the study: While study in question was conducted in 12 venues, with a cumulative total of 168 participants, this means that there were only about a dozen participants in each venue, and I note in the article that the lack of data is undeniable. I also note that mismatches and individual differences in psychological and physiological measurements sometimes arise due to extrinsic factors such as the type of museum and climate, as well as intrinsic factors like personality and other attributes.

6. Conclusion: Prospects for the Further Development of the Study of Museum Bathing

In this review, we have looked at the pertinent Japanese and international literature with a view to advancing the prospects for the study of museum bathing (the activity of making use of the healing effects of museum visits to promote health and prevent illness). A summary of the research designs and methodologies, as well as the main stress evaluation results, is provided below in Table 1. Overall, the results suggest that viewing artworks in museums and art galleries does have an impact in terms of stress reduction and a relaxation effect.

Taken in combination with a report by Fancourt and Steptoe of the University of London (UK) (2019)²⁷ indicating that individuals who had many opportunities to view the arts had a significantly lower mortality rate than those who did not at all, this shows the potential of museum bathing to contribute to community well-being.

On the other hand, from the fact that the number of studies on museum bathing remains small, both in Japan and overseas, it was also found that research methods and experimental procedures on psychological and physiological effects have yet to be standardized.

One noteworthy area in terms of the research on the psychological and physiological effects are the research methods and experimental procedures that have been developed in connection with forest

²⁷ Daisy Fancourt and Andrew Steptoe (2019). The art of life and death: 14 year follow-up analyses of associations between arts engagement and mortality in the English Longitudinal Study of Ageing, *BMJ*2019.

²⁸ Morimoto Kanehisa, Miyazaki Yoshifumi, and Hirano Hideki, eds. (2006). *Shinrin igaku* [Forest Medicine]. Tokyo: Asakura Publishing (in Japanese)

bathing,²⁸ a field of study that emerged in the 1990s. Between 2005 and 2015, a series of experiments were conducted in 62 forests across Japan, ranging from Hokkaido to Okinawa.

The basic procedure of these experiments involves forming units of 10 to 12 participants, dividing them into two groups, and then having each spend about 15 minutes walking and sitting in the forest and the city, respectively, alternating this over two days. Also, as psychological evaluations before and after sitting and walking, the experimenter administers the Japanese version of POMS2, VAS (a mood profile test), and a 13-stage scale test on senses of “comfort, tranquility, and nature” (Impression Evaluation Method by Space [IEMS] using the semantic differential [SD] method), followed by physiological evaluations testing for indicators such as blood pressure, pulse, salivary amylase, and cortisol.

In the future study of museum bathing, which will be carried out in various museums and art galleries, it will likewise be necessary to integrate research methods and experimental procedures by increasing the number of experiments conducted in the field.

In particular, with regard to the limitations of studies identified in the various papers (including the evaluation of the sense of well-being brought about by the setting and content of artwork in different types of museum, experiments on the length of time spent viewing artworks, research on individual differences, methods for setting experimental and control groups, and continuous experiments involving the same group in different museum types), it will be necessary to continue to elaborate and refine research methods by conducting a series of field experiments to accumulate scientific data.

In order to address the 2025 Problem and 2042 Problem that Japan imminently faces as an aging society, university-based researchers, medical care and welfare institutions, and governments must come together to solve these challenges. To that end, I intend to continue to advance the study of museum bathing so that museums can begin to function as “sites of social prescription,” which is to say health stations for citizens.

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Table 1-1: Research Design and Methods, with a Summary of Main Stress Evaluation Results

(Articles published between 2001 and 2019; partially revised based on note 10 with new additions)

No.	Year of publication	Country	Author/Organization	Note	Research design and methods	Main stress evaluation results
1	2001	Japan	Menard Art Museum	8	A physiological measurement (salivary cortisol levels) and psychological measurements (multidimensional mood scale and VAS) were administered to a total of 104 visitors before and after viewing artworks at three different exhibitions held at the Menard Art Museum in the Japanese city of Komaki City in Aichi Prefecture (founded in 1987).	Cortisol levels after viewing the exhibition were found to have decreased for all three exhibitions. The multidimensional mood scale, which was administered only on the third session, showed a decrease only in depression, anxiety, fatigue, and hostility, while the VAS indicated decreases in stress, mental strain, and physical strain.
2	2006	UK	Clow and Fredhoi	7	Self-reported evaluations of stress and arousal and measurements of salivary cortisol levels were taken during lunchtime visits to the Guildhall Art Gallery (opened in 1886) among London City workers (25 in total, mean age 33.6 years). Subjects were free to explore the gallery at will for 35-40 minutes in order to examine changes before and after their visit.	Average levels of cortisol and self-report stress were significantly reduced by the visit, while levels of arousal were unchanged.
3	2012	Switzerland	Tschacher <i>et al</i>	12	Visitors to the Kunstmuseum St. Gallen (opened in 2012), near Lake Constance in eastern Switzerland, were monitored using an electronic sensor glove that recorded physiological data and physical activity as they wandered through seven exhibition halls (over a total area of 380 m ²) and viewed 76 works of art. After viewing the artworks, visitors gave an aesthetic evaluation of the art. Over a period of two months, data was collected for a total of 373 people (65% female, mean age 47.4 years) who spent an average of 28 minutes at the exhibition.	Heart rate variability (HRV) increased while viewing artworks considered “beautiful,” “high quality” or “surprising/humorous.” Skin conductance variability (SCV) increased and heart rate decreased while viewing works regarded as having more dominance (i.e., those that the viewer found “dominant” and “stimulating”).
4	2018	Italy	Siri <i>et al</i>	14	An investigation of the effects of viewing two real works of abstract art and digital reproductions of the same two works in a quiet room (i.e., experimental room) at the Castle of Rivoli’s Contemporary Art Museum in Turin, Italy (opened in 1984). A total of 60 healthy volunteers (mean age 36.35 years) viewed the two works of art in a	The results indicated significant differences in VAS and heart rate after viewing the two real works of art, but no difference in heart rate after viewing the two digital reproductions. Nor were there any differences between the real objects and the digital

					random order (each piece presented for 144 seconds) while cardiovascular variables were continuously measured by electrocardiogram. After viewing the works, participants completed the VAS-scale sheet as a psychological measurement.	reproductions in terms of physiological measures. There were also no differences in terms of HRV.
5	2019	Italy	Grossi <i>et al</i>	16	At the Vicoforte Sanctuary in Piedmont, north-west Italy (Construction began in the 1500s. It has one of the largest elliptical vaulted domes in the world and is decorated with frescos on its ceiling and walls including a fresco depicting a Madonna and Child), measurements were taken of participants' salivary cortisol levels before and after a visit, together with VAS measurements the night before and 30 minutes after the visit. Visits lasted approximately 2 hours. Participants consisted of 100 healthy individuals (49% female) living in the vicinity of the sanctuary.	Cortisol levels after the visit were found to be reduced by up to 60%. In the VAS measurements, 90% of subjects reported feeling better after leaving the sanctuary than prior to their visit.
6	2019	Italy	Mastandrea <i>et al</i>	20	A total of 77 students (mean age 22.5 years, 64 women) with no training in the arts visited the National Gallery of Modern Art in Rome (opened in 1863) and were randomly assigned to spend 5 minutes visiting either the halls containing figurative art (landscapes, portraits, architecture, etc.), the halls containing modern art (abstract, expressionist and informal art paintings, three-dimensional geometrical sculptures and contemporary art installations), or, as a control condition, the museum's administrative offices. Blood pressure and heart rate were measured before and after the visit.	Systolic blood pressure was found to have decreased in all groups, but this decrease was only significant in the group that visited the figurative art gallery. While heart rate was also found to have decreased in all three groups, no significant differences were observed between groups.
7	2020	USA	Kristina Ter-Kazarian	22	Self-reported evaluations of stress and arousal and measurements of salivary cortisol levels were taken before and after visits to an exhibition at the Bellevue Arts Museum (opened in 1947, the museum specializes in art, craft, and design) in eastern Seattle, Washington State, USA by 31 local workers (21 women) during their lunch hour. Participants were asked to explore the gallery at will for 35-40 minutes. The research methodology was adapted from Clow (2006).	Self-reported stress was found to be reduced by 72%, and arousal reduced by 28%. Salivary cortisol levels were unchanged before and after viewing in both men and women.

Table 1-2: Research Design and Methods, with a Summary of Main Stress Evaluation Results

(Articles published between 2020 and 2021; partially revised based on note 10 with new additions)

8	2021	Switzerland	Krauss <i>et al</i>	18	<p>At the Schaulager, a museum operated by the Laurenz Foundation in Basel, Switzerland (opened in 2003), heart rate and skin conductance were continuously measured while participants viewed six Flemish expressionist artworks in the museum.</p> <p>Participants were randomly assigned either descriptive information about the works (describing them in declarative terms) or elaborative information about the works (which contextualized their background and deeper meaning). The participants, who consisted of 75 students (mean age 21.8 years, 17 males), were recruited through the Faculty of Psychology at the University of Basel.</p>	<p>No significant differences in heart rate, HRV or skin conductance were found between the two groups. However, in both groups, heart rate was observed to decrease and skin conductance and HRV to increase after the viewing of the artworks, relative to the baseline measurements.</p>
9	2021	Japan	Ogata Izumi	9	<p>Psychological measurements (POMS, VAS) and physiological measurements (blood pressure, pulse rate, and salivary amylase) were taken before and after visits to various types of 12 museums and art galleries in Fukuoka Prefecture, including facilities specializing in history, art, archaeology, and folklore (participating facilities included the Fukuoka Art Museum, Fukuoka City Archaeological Center, Kyushu Historical Museum, Kurume City Art Museum, Dazaifu Fureai Museum, and the Museum of Kyushu Sangyo University, among others). The study involved a total of 168 participants. Visits to museums lasted between 60 and 90 minutes.</p>	<p>POMS decreased on the “Tension-Anxiety” scale and increased on the “Vigor-Activity” scale in museums specializing in folklore and the fine arts. VAS scores decreased with respect to “Anxiety” and increased with respect to “Refreshment” in museums specializing in the fine arts, archaeology, and folklore. Mean diastolic blood pressure, systolic blood pressure and pulse rate remained largely unchanged. However, a drop in systolic blood pressure was observed among women in their sixties and seventies who participated on multiple occasions after visits to animal, history, and art-related facilities. There were also differences at the individual level.</p>