



ARTICLE

# Psychological Anxiety Intervention for Young Audiences: Effectiveness Evaluation of Art Museums

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## ABSTRACT

The mental health of young people, a significant public health concern worldwide, has deteriorated during the COVID-19 pandemic. Despite the subsiding of the epidemic, the issue remains unresolved in the post-pandemic era, specifically in China. In response, numerous art museums have stepped up to provide long-term therapeutic experiences and comprehensive mental health support. While these institutions offer a variety of services and programs aimed at enhancing the psychological well-being of their visitors, a standardized method for assessing their impact is lacking. This study, therefore, employed the Generic Wellbeing Questionnaire (GWQ) as a tool to evaluate the decrease in psychological anxiety among young museum-goers post-visit. A survey was conducted among 306 young visitors aged 15–24 at the Aurora Museum in Shanghai, using the GWQ to measure and compare positive and negative affects before and after their visit. The results revealed an increase in post-visit positive affects and a decrease in negative affects compared to pre-visit levels. All items measured contributed to changes in psychological anxiety, demonstrating that museum visits can alleviate such anxiety among young audiences. Interestingly, while “alert” is considered a positive affect in Western contexts, it is found to be adverse in Chinese contexts, suggesting that it may not be an appropriate item for positive affect. The GWQ thus emerges as a potentially effective tool for evaluating interventions aimed at reducing psychological anxiety among young audiences in Chinese museums.

## KEYWORDS

Psychological anxiety; art therapy; art museum; PANAS; GWQ

## Introduction

Young people’s mental health, with about 75% of all mental health problems first occurring before the age of 25, is one of the major public health issues worldwide, and young people are often reluctant to seek psychological help from others [1]. The problem has worsened during the COVID-19 pandemic as young people have experienced higher levels of psychological anxiety and depression due to COVID-19 restrictions [2]. Even as the epidemic subsided, the problem was not fundamentally solved in the post-epidemic era. This issue is no exception in China. Anxiety has become a common mental problem among young people in Chinese

society in recent years. Moreover, in the past few years, COVID-19 has brought mental problems to the public, leading to a surge in psychological anxiety among young people.

Contemporary museums are gradually transitioning into social agents that prioritize well-being as they pursue relevance in the 21st century. With the prevalence of psychological anxiety among youth audiences, which has been exacerbated since the outbreak of COVID-19, many museums are taking the lead in offering long-term, therapeutic experiences, and comprehensive mental health support [1]. In a world marked by increasing turbulence, complexity, and instability, compounded by insecurity,



uncertainty, and unpredictable responses to the unknown, the issue of psychological anxiety among young people has grown considerably more severe. Even with the easing of the pandemic outbreak, numerous museums continue to prioritize addressing the challenge of psychological anxiety among young individuals as a crucial facet of their mission [3]. Art museums, in particular, can result in physical and emotional changes and facilitate communication and reflection, which is an informal approach to art therapy [4]. However, the issue of anxiety intervention in the museum sector faces challenges such as a lack of interdisciplinary consensus, limited exploration in specific categories, and insufficient empirical research expertise. To truly understand the power and patterns of museums in promoting mental well-being, it is crucial to engage in essential discussions about the affect on the psychological anxiety of museums.

In this study, we investigated whether visiting art museums had a mitigating effect on the psychological anxiety empirically experienced by youth audiences. Therefore, we employed the Generic Wellbeing Questionnaire (GWQ) [5] in this research to discover whether visiting an art museum could reduce psychological anxiety and improve well-being. In the meantime, we conducted a methodological exploration of the GWQ as a tool for evaluating anxiety interventions in a Chinese art museum.

## Literature Review

### *Museum as a social agent for wellbeing*

Museums have evolved into more than just repositories of cultural relics and strive to be social engines and cultural representatives in the 21st century [6]. In addition to the traditional roles of researching, collecting, conserving, interpreting, and exhibiting, museums are embracing social inclusiveness and working towards the well-being of all people [7]. Museums play a significant role in addressing social issues to build on their long-standing commitment to public service, especially for health care [8].

Recognizing the interconnectedness of physical and mental health, museums have great potential to create new roles, initiate new dialogues, and inspire new hope in well-being [9]. AAM has highlighted ten areas of museum contributions to healthcare: Alzheimer's, mental health, nutrition and wellness, and more [10]. Despite the progress, one of the biggest challenges lies in understanding, displaying, and clarifying museums' value and role in well-being [11]. British health reform emphasizes the need for museums to actively cooperate with the medical system to reduce health inequality, improve public health education and raise national health awareness [12].

### *Museum as an ideal field for art therapy*

Considering museums' social relevance and well-being effort, the future path leads to recognizing the therapeutic potential of museums [13], which develops museum art therapy as an innovative combination of art therapy and museum education.

### *Theoretical origins of art therapy*

Art therapy, emerging from psychology, materializes intentional emotions through various art forms [14]. Its origins can be traced back to Romanticism in the late 19th century and Expressionism in the early 20th century, which brought art therapy to a new level [15]. In the 1940s, art therapy gained recognition as a profession in the United Kingdom, highlighting the healing power of art [16]. An American art educator, Margaret Naumburg, insisted on using art in therapy to explore the relationship between patients and artworks [17]. Since then, art therapy has been widely employed in the treatment of physical and psychological disorders [18] on the advantages of recovery, communication, and relevance [4,19].

### *Art therapy in museums*

Art therapy has expanded beyond traditional settings into community and cultural institutions, reshaping the practice paradigms [20]. Museum art therapy, which integrates art appreciation, creation, and interpretation into the museum experience, has become a powerful tool for promoting well-being [4,21,22]. A variety of museum art therapy programs have been launched for diverse populations, including the elderly [23], hospitalized children [24], rebellious adolescents and their families [25], autistic children [26] and visually impaired people [27]. Jiang [28] conducted an international panoramic review of museum art therapy research, dividing it into three phases: start-up (before 2010), full-scale development (2011 to 2017), and deepening research (2018 to present). The growing field of museum therapy takes a collaborative effort from multidisciplinary professionals, including art therapists, educators, curators, teaching artists, and researchers [22,27].

### *Therapeutic impacts and factors of museums*

Museum therapy programs demonstrate the curative potential of museums [29]. Through supporting the physical, mental, emotional, and social well-being [23,30,31], museum therapy has therapeutic impacts on cognitive behavior, emotional support, and social interaction [21,26,32]. Moreover, visitors are motivated to seek new knowledge through past experiences and share thoughts and feelings with others [33], which gives rise to learning, self-expression, and community building in a visitor-focused manner [34,35], thereby fulfilling the humanistic mission of museums.

Meanwhile, a few studies have been conducted to explore the therapeutic factors for the further extension of healing impacts. The factors of museum therapy can be divided into two categories: physical factors, containing environment, building boundaries (size, lighting, temperature, circulation), display content (collection properties, objects, and images), and sensory experience [9,36]; and psychological factors, including the leisure atmosphere [37], educational function [29] and sense of aesthetic and empathy [38].

### *Museum as an intervention for post-pandemic anxiety*

Anxiety has become a common psychological problem in contemporary Chinese society, exacerbated by the stressors of modern life [39]. Even worse, for the past several years of

COVID-19, it has spawned a series of mental health problems for the general public, resulting in the global prevalence of anxiety or post-traumatic stress disorder (PTSD) [40–42]. The root cause refers to the restrictions on social interactions and the dual physical and psychological isolation [43–45]. Therefore, social integration remains critical in anxiety prevention [46] in the aftermath of the pandemic.

Since the onset of the pandemic, museums have garnered higher satisfaction than other recreational activities [47]. As the world turns to COVID-19 closures, museums are needed now more than ever [3]. Museums have long promoted social integration at the individual, community, and social levels [48,49]. Consequently, the potential of museums as an effective intervention for anxiety is gradually gaining attention in the post-epidemic era. Apart from the therapeutic impacts, the museum has proved to be a restorative space in an emotional sense [50,51] and has a remarkable role in humanistic nourishment and social care [52,53]. For psychological anxiety, museums can reduce stress hormone levels as mental indicators [54] and enhance brain vitality [55], which alleviates anxious emotions like anger and high fear [23,56]. For intervention approaches, museums can make a big difference in well-being and happiness by communicating historical, cultural, and social information contained in the collections through professional and visual interpretation [57], thus improving positive emotions, satisfaction, experience, and meaning [31].

In conclusion, museums have transitioned to social agents for physical and mental well-being. The integration of art therapy into museums has given rise to museum art therapy, expanding the therapeutic potential of museums with cognitive, emotional, and social impacts. In the post-pandemic era, museums can play a vital role in alleviating anxious emotions and improving positive emotions referring to positive psychology. The well-being vision, therapeutic potential, and positive psychological impacts empower museums to reduce anxiety levels, making them valuable assets for individuals and communities seeking mental well-being.

The relationship between museums and well-being has received widespread attention and has rapidly developed in recent years, while few museums and studies in China have focused on the interventional impact of psychological anxiety. The research gaps mainly stem from a need for systematization, segmentation, and specialization.

Firstly, there is a need to systematically explore the application and implementation of museum therapy for anxiety prevention in Chinese museums. This exploration aims to understand the progress and prospects of Chinese museums in reducing anxiety and promoting mental health.

Secondly, the therapeutic impact of museums on anxiety varies in populations and contexts, which need discussing by situation. Due to the direct correlation with art therapy, art museums may play a more significant role in anxiety intervention than other museums. Additionally, the degree of psychological anxiety and the intervention affect are closely related to demographic variables such as age, gender, occupation, and psychological and developmental variables.

It is worth noting that the average anxiety level among youth aged 15–34 is higher than that of other age groups in adulthood [58], making youth audiences the target audience for museum intervention on anxiety.

Thirdly, there is a need to enhance the specialization of research in museums and interdisciplinary studies. Currently, there is a lack of consensus regarding the role of museums in anxiety intervention, primarily due to a lack of professionalism in the existing studies. It is essential to conduct empirical studies supported by scientific theories and methods to explore the outcomes and impacts of museum interventions on psychological anxiety. By investigating the effectiveness and mechanisms of museum therapy, we can further develop a promising perspective on its contribution to mental health.

Overall, addressing the research gaps through systematic exploration, specific discussions, and specialized empirical study will contribute to a better understanding of the interventional potential of museums in reducing anxiety and promoting well-being.

### Research Design

While museums have traditionally focused on gathering feedback from visitors about their expectation, satisfaction with staff and facilities, and likelihood of revisit, there has been a recent shift towards prioritizing the well-being of their audiences. As a result, many museums have begun to offer services aimed at enhancing the health and well-being of their visitors. This has created an urgent need for the development of evaluation tools that can accurately measure the impact of these initiatives on visitors' psychological health and well-being.

The Positive and Negative Affect Schedule (PANAS) was developed by Watson et al. in 1988 [59]. It is a self-report questionnaire that includes 20 items, 10 reflecting positive affects (active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, and strong) and 10 for negative affects (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid). Both positive and negative affects are rated by a 5-point Likert scale.

The PANAS is widely used in evaluating psychological health and well-being. Many studies have shown that PANAS is frequently used as a research tool in group studies but can be employed with individuals [60]. The PANAS can also be used in museums for evaluating visitors' psychological anxiety. However, Thompson argued that the PANAS was too long which could be time-consuming to administer, and some of its items overlapped and were redundant [61]. Thomson et al. further developed a Generic Wellbeing Questionnaire (GWQ) that included both five positive (active, alert, enthusiastic, excited, and inspired) and five negative emotions (distressed, irritable, nervous, scared, and upset) with a measure of happiness together in 2014. Their research finding showed that the 10-item PANAS was approximately as effective as the original PANAS as these ten affects were accountable for 80% of the pre-session to post-session changes in psychological well-being [5]. The GWQ is a set of scales used to measure levels of well-being

arising from participation in visiting museums. It is designed to help museum professionals assess the impact on the psychological well-being of their visitors. Therefore, the GWQ is more suitable for museums to measure the psychological anxiety of young people [62].

As anxiety became a major issue in Chinese post COVID-19 era, this research aimed to discover whether viewing art in museums could reduce psychological anxiety and improve well-being. The GWQ, developed by Thomson et al., was employed in this research (Table 1).

TABLE 1

The positive and negative affects of the generic wellbeing questionnaire

PA items	NA items
Active	Distressed
Alert	Irritable
Enthusiastic	Nervous
Excited	Scared
Inspired	Upset
Happy	Unhappy

Given the need for segmented research, this study further subdivided the population into 15–24 year olds around the impact of museums' anxiety interventions for young audiences. On the one hand, psychological studies have confirmed that anxiety interventions are most effective for groups before the age of 25 [1], and on the other hand, teenagers and young adults between the ages of 15–34 are often the primary target audience for museum art therapy and interventions [58]. From both research and practice perspectives, young audiences aged 15–24 are the appropriate samples, which can lay the foundation for the methodological significance of the evaluation.

### Conducting the Research

Shanghai boasts a considerable number of art museums. As of 2022, the roster of art museums in Shanghai totals 100. The Aurora Museum in Shanghai, established in 2013, specializes in the collection and exhibition of ancient Chinese artifacts, actively advancing the study of these historical treasures. Renowned for its commitment to promoting Chinese culture and its contributions to social welfare, the Aurora Museum has secured a prominent position within the realm of Shanghai art museums.

A questionnaire survey of 306 young audiences aged 15–24 at the Aurora Museum in Shanghai was conducted to measure and compare the pre-visit and post-visit PA and NA of the GWQ. The instrument of the GWQ was employed for measuring the positive and negative affect of emotions with a measure of happiness together. The visitors were asked with a 5-point Likert scale from strongly agree to strongly disagree on 12 questions. In addition, demographic variables such as age, gender, education,

occupation, and region of the sample, as well as psychographic variables such as prior visits to museums, satisfaction, recommendation and revisit were also covered in the pre-and post-visit questionnaires.

During this survey, two interviewers were employed and trained to assist the researchers in conducting interviews. The questionnaires were administered equally at the entrance and exit of five exhibitions in the Aurora Museum, including Ancient Pottery Figures, Ancient Jade, Blue & white Porcelains, Jade Design, and Buddhist Sculptures. To focus on the impact of museum exhibition on visitors' anxiety, the survey locations did not involve any cultural and creative or dining areas, excluding leisure distractions other than exhibitions. The rule that the administrator remained stationary while the visitors were mobile was strictly followed. Visitors aged 15–24 were interviewed upon entering and leaving the exhibitions. The interviewers did not avoid certain types of visitors to reduce bias. If the visitors were unwilling to accept the interview, the next person would be asked to fill in the questionnaire. Fieldwork was carried out on weekdays and weekends over seven weeks, from 24th March to 12th May 2023.

In the next section, the researchers report the findings of the study undertaken in the Aurora Museum in Shanghai to show the outcome of the PA and NA scores of the GWQ.

### Results

#### Demographics of samples

Of the 306 young audience aged 15–24 who were randomized, there were more females (70.6%) than males (29.4%). In terms of the education level, the majority had a university/college degree (69.2%), followed by postgraduate or above (25.9%), senior high (3.3%), and junior high or below (1.6%) in decreasing order of magnitude. The demographic characteristics of the study samples are shown in Table 2.

TABLE 2

Demographics of samples

Characteristic	Overall, N = 306
<b>Gender</b>	
Male	90 (29.4%)
Female	216 (70.6%)
<b>Age group</b>	
15–19	44 (14.5%)
20–24	260 (85.5%)
<b>Education level</b>	
Junior high or below	5 (1.6%)
Senior high	10 (3.3%)
University/College	211 (69.2%)
Postgraduate or above	79 (25.9%)
<b>Occupation</b>	
Student	204 (67.3%)
Party and government organizations	3 (1.0%)

(Continued)

Characteristic	Overall, N = 306
Enterprise and institutions	60 (19.8%)
Self-employed	36 (11.9%)
<b>Place of residence</b>	
Shanghai	145 (48.0%)
Jiangsu Province	28 (9.6%)
Outside Jiangsu Province	128 (42.4%)

#### Analysis of PA and NA of GWQ

The GWQ was undertaken using the varimax rotation procedure to delineate the underlying dimensions of PA and NA. Each factor had an eigenvalue of more than one and high alpha coefficients. Two factors explained 61.201% of the variance. The NA explained 33.835% and PA 27.366% (Table 3). Interestingly, in the Western context, the affect "alert" was generally a PA; however, it was a NA in the Chinese context in this research, indicating that the alert was not a suitable PA item. Thus, the alert item was deleted in the following statistics analysis.

The results of the paired samples statistics about the pre- and post-visit PA and NA of GWQ are presented in Table 4, and the paired samples' test is in Table 5. There is a statistically significant difference in the mean assessments between the PA and NA of pre- and post-visit. The post-visit PA was evaluated higher than the pre-visit PA, whereas

TABLE 4

Pairs	No	Mean	Std dev	S.E. mean
PA pre	300	3.47	0.699	0.040
PA post	300	3.81	0.647	0.374
NA pre	300	1.68	0.606	0.350
NA post	300	1.46	0.522	0.301

the post-visit NA was evaluated lower in terms of the pre-visit NA. Art therapy in museums is generally considered suitable for mental health and well-being. The findings prove that museum visits can reduce young audiences' psychological anxiety. On average, the post-visit PA scores increased by 10%, and NA scores reduced by 13%. It shows that visiting art museums can reduce psychological anxiety effectively.

The research calculated mean scores and standard deviations of 11 PA and NA items of GWQ in the pre- and post-visit (Tables 6 and 7) and plotted respectively the PA and NA of GWQ (Figs. 1 and 2) using data from young audiences who completed the questionnaire. There was a statistically significant difference between the pre- and post-visit scores for all 11 PA and NA items. Five items of the PA of GWQ contributed 4% or higher (happy = 9%, excited = 4%, active = 8%, enthusiastic = 4%, inspired = 24%),

TABLE 3

Factor analysis results of Generic Wellbeing Questionnaire (GWQ)

Items	Factor1 NA	Factor2 PA	Communality	Cronbach's $\alpha$
Nervous	0.818		0.677	0.865
Irritable	0.807		0.657	
Scared	0.806		0.670	
Upset	0.798		0.674	
Distressed	0.769		0.593	
Unhappy	0.756		0.609	
<u>Alert</u>	0.504		0.307	
Active		0.860	0.741	0.846
Enthusiastic		0.845	0.716	
Excited		0.819	0.670	
Happy		0.763	0.610	
Inspired		0.644	0.421	
Eigen value	4.060	3.284		
Explained variance by factors (%)	33.835	27.366		
Total variance explained		61.201		
KMO measure of sampling adequacy		0.844		
Bartlett's test of sphericity		0.000		
Cronbach's $\alpha$		0.724		

TABLE 5

## The paired samples' test

Pairs	Paired differences							
	Mean	Std dev	S.E. mean	95% Confidence interval of the difference		t value	df	Sig (2 tailed)
				Lower	Upper			
PA pre-post	-0.334	0.669	0.386	-0.410	-0.258	-8.651	299	0.000
NA pre-post	0.218	0.567	0.033	0.154	0.283	6.672	299	0.000

TABLE 6

## The paired samples' statistics of PA and NA items

Pairs	No	Mean	Std dev	S.E. mean
PA				
Happy	pre	302	3.65	0.809
	post	302	3.95	0.728
Excited	pre	302	3.52	0.861
	post	302	3.66	0.859
Active	pre	301	3.47	0.835
	post	301	3.74	0.796
Enthusiastic	pre	301	3.40	0.887
	post	301	3.54	0.858
Inspired	pre	302	3.35	1.029
	post	302	4.14	0.776
NA				
Nervous	pre	302	1.86	0.871
	post	302	1.46	0.618
Distressed	pre	301	1.84	0.791
	post	301	1.63	0.767
Irritable	pre	302	1.74	0.764
	post	302	1.50	0.695
Upset	pre	302	1.57	0.715
	post	302	1.41	0.714
Unhappy	pre	302	1.55	0.679
	post	302	1.34	0.583
Scared	pre	301	1.52	0.686
	post	301	1.41	0.675

TABLE 7

## The paired samples' test of PA and NA items

Pairs	Paired differences								
	Mean	Std dev	S.E. mean	95% Confidence interval of the difference		t value	df	Sig (2 tailed)	
				Lower	Upper				
PA	Happy pre-post	-0.308	0.848	0.049	-0.404	-0.212	-6.312	301	0.000
	Excited pre-post	-0.139	0.904	0.052	-0.241	-0.037	-2.673	301	0.008
	Active pre-post	-0.269	0.870	0.05	-0.368	-1.70	-5.365	300	0.000

(Continued)

**Table 7 (continued)**

Pairs	Paired differences								
	Mean	Std dev	S.E. mean	95% Confidence interval of the difference		t value	df	Sig (2 tailed)	
				Lower	Upper				
Enthusiastic pre-post	-0.140	0.887	0.051	0.051	-0.240	-0.039	-2.729	300	0.007
Inspired pre-post	-0.785	1.208	0.069	0.069	-0.922	-0.648	-11.293	301	0.000
NA Nervous pre-post	0.401	0.856	0.049	0.049	0.304	0.498	8.135	301	0.000
Distressed pre-post	0.216	0.922	0.053	0.053	0.111	0.321	4.064	300	0.000
Irritable pre-post	0.242	0.834	0.048	0.048	0.147	0.336	5.037	301	0.000
Upset pre-post	0.159	0.844	0.049	0.049	0.063	0.255	3.273	301	0.001
Unhappy pre-post	0.205	0.714	0.041	0.041	0.124	0.286	5.000	301	0.000
Scared pre-post	0.116	0.781	0.045	0.045	0.028	0.205	2.583	300	0.000

whereas the remaining six items of the NA of GWQ contributed -7% or lower (nervous = -22%, distressed = -12%, irritable = -14%, upset = -11%, unhappy = -14%, scared = -7%).

The ANOVA analysis was also conducted for comparisons of the GWQ according to gender, age group, education, occupation, and time spent at the museum. According to Tables 8 and 9, there was a statistically significant difference in the mean scores of post-visit PA, with the female score significantly higher than the male score. Meanwhile, statistically significant differences existed between different age groups in the pre and post-visit PA, as well as the pre-visit NA. The data indicates that the 20-24 age group generally exhibits a higher level of anxiety.

Because no statistical significance is observed between educational background, occupation, and time spent in the art museum, other results of the ANOVA analysis are not presented in detail here.

**Discussion**

Although it is generally believed that visiting art museums is beneficial for mental health and well-being [62], there is

**TABLE 8**

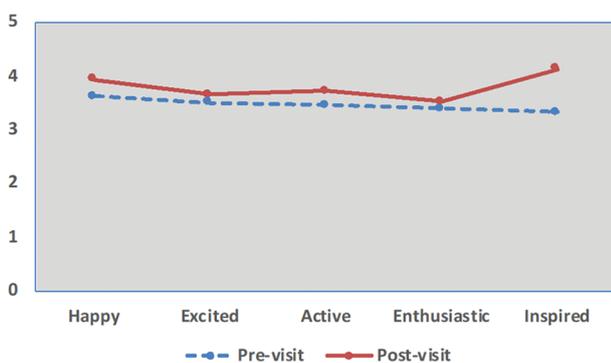
*t*-test results for gender

	Gender	No	Mean	Std dev	t	df	p
PA pre	Male	90	3.367	0.608	-1.723	304	0.086
	Female	216	3.517	0.727			
PA post	Male	88	3.648	0.623	-2.794	298	0.006
	Female	212	3.875	0.647			
NA pre	Male	90	1.783	0.617	1.855	304	0.065
	Female	216	1.644	0.594			
NA post	Male	89	1.523	0.550	1.337	298	0.182
	Female	211	1.434	0.508			

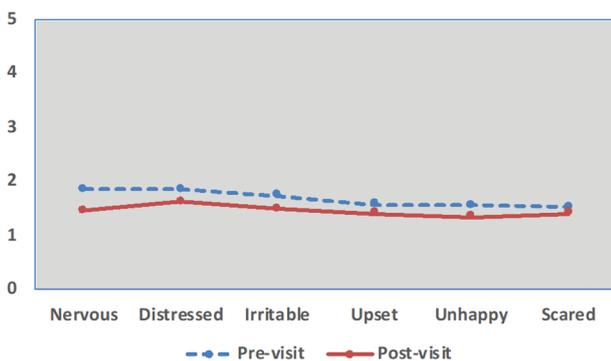
**TABLE 9**

*t*-test results for age groups 15-19 and 20-24

	Age group	No	Mean	Std dev	t	df	p
PA pre	15-19	44	3.791	0.686	3.340	302	0.001
	20-24	260	3.417	0.687			
PA post	15-19	44	3.996	0.648	2.081	296	0.038
	20-24	254	3.776	0.6442			
NA pre	15-19	44	1.496	0.520	-2.260	302	0.025
	20-24	260	1.717	0.612			
NA post	15-19	43	1.392	0.545	-0.920	296	0.358
	20-24	255	1.471	0.518			



**FIGURE 1.** Mean scores for the PA of GWQ.



**FIGURE 2.** Mean scores for the NA of GWQ.

little empirical research providing reliable evidence. This study interviewed 306 young people aged 15 to 24 and showed that there were significant differences in both positive affect (PA) and negative affect (NA) after visiting the Aurora Museum in Shanghai. These findings provide strong evidence of the potential of visiting art museums to promote mental health and well-being.

The Generic Wellbeing Questionnaire (GWQ), originating from the Positive and Negative Affect Schedule (PANAS), is a psychological self-report questionnaire used to measure an individual's emotional state. It encompasses two broad dimensions of affect: positive affect (PA) and negative affect (NA). The relationship between both affective dimensions and anxiety can vary depending on individual differences, context, and the specific type of anxiety. However, there is a general association wherein anxiety is often linked with lower levels of positive affect and higher levels of negative affect. To be more specific, low levels of positive affect (PA) and high levels of negative affect (NA) can contribute to and exacerbate anxiety symptoms, while high levels of positive affect (PA) and low levels of negative affect (NA) can intervene and alleviate anxiety.

As for a methodological framework of psychological anxiety intervention of art museums, the Positive and Negative Affect Schedule (PANAS) is the most widely used scale for assessing positive and negative affects [58]. Nevertheless, many researchers believed that 20 items for assessing the PA and NA could be time-consuming to manage and that some affects overlap, causing research difficulties [61]. Therefore, this study applied the Generic Wellbeing Questionnaire (GWQ), developed by Thomson and Chatterjee, as an appropriate research tool to measure the reduction of psychological anxiety after visiting an art museum [5].

The research calculated mean scores of 11 PA and NA items of GWQ in the pre-visit and post-visit. The findings indicate that the positive affects and negative affects of GWQ are statistically significant between the pre-visit and post-visit. Five items of the PA contributed 4% or higher, whereas the remaining six items of the NA contributed -7% or lower. It shows that visiting an art museum can reduce young audiences' psychological anxiety, benefiting the mental health and psychological well-being of young people. Regarding museum exhibitions as the interventional approach, the GWQ should be administered pre-visit and post-visit to assess changes in emotional states. This before-and-after comparison allows for an evaluation of the intervention's effectiveness in altering affective states, potentially reducing negative affect (associated with anxiety), and increasing positive affect as depicted in the survey. Such an evaluation of anxiety intervention can promote the museum's therapeutic potential in an effective manner.

Therefore, the GWQ can serve as a valuable tool for evaluating psychological anxiety intervention for young audiences in art museums. In this research, the GWQ was used to establish a baseline emotional state among young audiences aged 15–24, which helps researchers and museum educators understand the initial levels of positive and negative affect on the target audiences in relation to anxiety.

According to the empirical study, it proves that the GWQ can provide a quantifiable measure of how much museums impact the emotional well-being of young audiences.

In some studies on psychopathology, negative affect (NA) is often identified as a crucial element in anxiety, serving as a bridge between stress and risk behaviors such as substance misuse and smoking. During the COVID-19 pandemic, it has been demonstrated that art therapy can effectively mitigate NA in the short term [63]. This research further substantiates that museum visits can significantly alleviate NA. Particularly in instances of psychosocial stress, art therapy exhibits a beneficial impact on mental health. Therefore, negative affect can be considered a key indicator for assessing the outcomes of art therapy in the future. In this study, the post-visit PA scores increased by 10%, and the post-visit NA scores reduced by 13%. It shows that NA tends to be a good indicator for evaluating young audiences' psychological anxiety.

Some studies show that the degree of psychological anxiety is closely linked to gender, age, educational background, occupation, and time spent in art participation [63]. In this research, however, only gender and age group have statistical significance. Surprisingly, there was no statistically significant difference between time spent in the museum and level of anxiety. It indicates that even a short visit to an art museum has a significant effect on reducing psychological anxiety.

Finally, during the COVID-19 pandemic lockdown, many international museums shared their collections online free of charge. Online participation also contributes to reducing anxiety [1]. Therefore, whether participating in physical or online cultural or art activities, they all have an impact on promoting psychological health and well-being.

At the methodological level, the results illustrate the semantic difference of the GWQ as a quantitative evaluation tool. In the Western context, the item "alert" primarily signifies a negative affect of nervousness, which is one of the symptoms of anxiety. However, in the Chinese context, this item refers to active and quick thinking, which, according to audience interviews, tends to be regarded as a positive affect. Due to the misunderstanding of positive and negative affects from an international perspective, the item "alert" has been excluded from this research, and caution should be exercised when applying it in the evaluation of anxiety interventions in art museums.

Additionally, comparative studies can be conducted based on the GWQ to further analyze the effectiveness of various intervention factors, strategies, or approaches in art museums. When we emphasize museum exhibitions as the primary factor, it has been verified that ancient Chinese art exhibitions have a significant and effective impact on anxiety intervention for young audiences. Assessing both positive and negative affect, as measured by the GWQ, can provide valuable insights into an individual's emotional state and how it may relate to their experience of anxiety. However, it is crucial to consider other factors, such as individual, group, and regional differences, when examining this relationship in greater detail. For example, it can be used by other museums in China to enhance visitor experience and assess museum impact on mental health and

well-being. In the future, the effectiveness difference between museum-based interventions of anxiety on young audiences in China and the west remains to be explored.

### Limitation

One limitation of the research needs to be addressed here. Young audiences answered the pre-visit and post-visit PA and NA of the GWQ within a relatively short interval of about two hours. Despite the methodological meaning and implementation feasibility of the GWQ survey, the interpretation of the impact of museum anxiety interventions remained at a quantitative level, limiting in-depth analysis of the influencing factors. In the future, qualitative interviews and longitudinal research need to be taken into account. Moreover, different museum programs and activities, such as online museums, should be evaluated as potentially interventive approaches and strategies.

### Conclusion

The functions of modern museums are not only to collect, preserve, interpret, and display objects of artistic, cultural, historical, or scientific significance for the education of the general public but also to play an essential role in solving social problems, establishing their commitment to public service, social inclusion, and well-being of all. Engagement with culture and art is widely recognized as being beneficial for mental health and well-being. Despite the therapeutic effort of art museums to improve their audiences' psychological health and well-being, there is no standardized method for measuring the impact on audiences.

Meanwhile, museums are striving to expand their audience base and challenge traditional cultural approaches, the development of resources through co-production directly links these efforts to engage more diverse users with efforts to promote health and well-being more broadly. Many researches showed that about three-quarters of all mental health problems first happened before the age of 25. Despite this, individuals between the ages of 15 and 24 are the least likely to seek assistance. Against this background, museum sector needs to take action on the issue.

In the past, museums normally asked audiences about their satisfaction with the staff and premises rather than their well-being experience. However, in recent years, many museums have begun to offer programs aimed at improving the health and well-being of their audiences. Although visiting art museums may be beneficial for mental health, there is currently a lack of research on the impact of art museum visits on the psychological anxiety of young people in China. Consequently, there is a critical need for an evaluation tool to measure psychological health.

In the research, we examined whether visiting art museums had a mitigating affect on the mental anxiety empirically experienced by young audiences. The Generic Wellbeing Questionnaire was used in this research to uncover whether visiting an art museum can reduce psychological anxiety and improve well-being. This quantitative study provided compelling evidence to support the notion that visiting art museums can have a positive

impact on the mental health of young people who are experiencing psychological anxiety. Therefore, the GWQ can be used, at the methodological level, for the effectiveness evaluation of psychological anxiety interventions in young visitors after visiting art museum exhibitions. The potential of museums as a solution to psychological anxiety is increasingly being recognized in the post-pandemic era. Museums can reduce anxiety and alleviate fear and other negative emotions among young people, promoting the well-being and happiness of their audiences. Based on this research finding, we suggest that it can be meaningful to conduct a comparative study with young people in the western population in the future.

The research finding also suggests that there is potential in reaching young people, who are reluctant to seek help, through arts and culture, contributing to our understanding of the links between the cultural and health sectors. In the post-pandemic era, more effort is needed to explore how museums can support young people and connect with other types of support for well-being.

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