

Cross-cultural Aesthetics: Aesthetic Contextualism and Ingroup Bias

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Abstract: Almost every culture engages actively with the arts. Here, we explored how contextual information about content, artist, and technique impacts aesthetic experience. Contextual information increased aesthetic ratings for artworks in Indian and Northern American participants, especially in people more open to experience, and Northern American participants with low art experience. Contextual information reduced the ingroup bias for artworks, suggesting exposure to art may be a potential vehicle to mitigate prejudice against unfamiliar cultures. Similarities and differences in the routes to broader valuations of liking and beauty point to both anthropological universals and cultural specifics of the aesthetic experience.

Keywords: art, culture, ingroup bias, aesthetics, context

Introduction

The arts are one of humanity's most vital concerns, constituting an intrinsic part of how people live in the world. Most, if not all, cultures and societies engage actively with the arts – people sing, dance, design, narrate and listen to stories, and put on performances (Bamford, 2009). The arts reflect people and their social, cultural, and political dynamics and allow us to communicate beyond the boundaries of country and culture (Darda & Cross, 2022). Does this socio-cultural embedding influence how peoples across the world create and evaluate art?

Philosophers have debated whether art has an inherent representational, expressive, or formal quality that makes it valuable independent of its cultural, social, moral or historical circumstances, or whether art is always embedded in its context which determines the interpretation of and engagement with art (Levinson, 2007). Research in the psychology of aesthetics and arts support aesthetic *contextualism* – aesthetic engagement of the viewer is influenced by contextual factors such as where one engages with an artwork (e.g., online or in a museum), the artwork's title, or the sociocultural content depicted in the artwork (Pelowski et al., 2017; Belke et al., 2010; Darda & Cross, 2022; Darda, Christensen, & Chatterjee, 2023). Beyond the artwork, several contextual factors associated with the viewer (also referred to as individual differences) influence aesthetic experience. These include personality traits such as how open people are to experiences, their background, culture, memories or associations, and their art experience, expertise, and knowledge (Pelowski et al., 2017; Bullot & Reber, 2013).

Previous work supporting aesthetic contextualism, however, had a *western* focus, with studies exploring primarily American/European art in Northern American and Western European populations, with limited focus on other cultures (Che et al., 2018). Such an approach limits our knowledge and understanding of a universal perspective of aesthetic experience (Matsumoto & Juang, 2003). With growing acknowledgement that almost 80% of research in psychology more broadly is

done on only 20% of the world's population (Henrich, 2010), recent studies in empirical aesthetics have begun to focus on art and viewers from different cultures, and how culture might interact to generate an aesthetic experience for different populations (e.g., Bao et al., 2016; Yang et al., 2019; Darda et al., 2023; Darda & Cross, 2022; Darda & Cross, 2023; Darda & Chatterjee, 2023; Trawinski et al., 2021).

Previous work in the field suggests a preference for art from one's own culture compared to another (Bao et al., 2016; Darda et al., 2023; but see Darda & Cross, 2022). One explanation for such a preference is the process of enculturation. For example, research on music suggests that listeners internalise the characteristics distinguishing musical styles and cultures, and immersion within their sonic surrounds shapes their musical preferences (Campbell, 2011; Pearce, 2018). An alternative but not necessarily contrasting explanation is that of group bias (typically in-group favouritism and out-group dislike). In day-to-day lives, people show in-group biases by expressing favouritism for members of their own race, culture, sex, or ethnicity (e.g., Bernstein et al., 2007; Kubota et al., 2012; Rudman & Goodwin, 2004). Similarly, in the current context, an ingroup bias refers to a phenomenon wherein individuals show a preference for art from their own culture compared to another (Bao et al., 2016; Darda et al., 2023; but see Darda & Cross, 2022). Indeed, it is possible that enculturation or cultural experience underlies this group bias. It is also possible that the ingroup preference might manifest because of a sense of cultural closeness or belonging with the artist or artwork, and/or viewers might use cultural identity as an art appreciation heuristic to make aesthetic judgements (Mastandrea & Umiltà, 2021; Darda, Christensen, & Chatterjee, 2023).

How malleable is this ingroup bias for art? Studies show that individuals with higher art experience (as measured by the art experience questionnaire (AEQ), Chatterjee et al., 2010) tend to have a lower (or negligible) ingroup bias for artworks compared to those with lower art experience, suggesting art experience might play a role in reducing our ingroup biases (Darda & Cross, 2022; Darda, Christensen, & Chatterjee, 2023). A recent study from our lab found that contextual information by way of semantic text associated with an artwork about its content, the artist, or the artist's technique influenced the aesthetic experience of Northern American participants, especially those who had lower art experience and were more open to experience (Darda & Chatterjee, 2023). Participants' ratings of liking and beauty were higher, and ratings of complexity were lower when contextual information about an artwork was provided compared to when no information was provided. This contextual information also reduced the ingroup bias – Northern American participants' ratings of liking for Indian paintings (compared to European/American paintings) increased after reading contextual information about the paintings (compared to when no information was provided about the paintings).

While these studies point toward the existence of an ingroup bias and its modulation by art experience or contextual information, the effect sizes reported are generally small. One reason for this could be the multifaceted nature of aesthetic ratings. In most studies, participants are asked to rate artworks on a Likert scale of 1 to 5 on how much they like the artwork, or how interesting it is. Yet liking something because one feels a sense of cultural closeness with the artwork or liking something because one finds the artwork exotic are different processes that may not be reflected when participants are asked to only rate on how much they *like* a painting. Thus, different routes to broader valuations such as liking might exist and vary across cultures for artworks belonging to different cultures. To explore how these routes are similar or different, we included 'impact-on-viewer' terms derived from Christensen et al. (2023) that might predict broader valuations such as liking. These 11 impact terms reflect the cognitive and affective effects artworks can have on viewers (what the artwork makes you think or feel) – angry, calm, compassionate, challenged, edified, enlightened, enraptured, inspired, interested, pleasure, and upset.

Our goal in the current study is three-fold:

- (1) To extend previous work on the influence of context in a non-western population, by exploring whether contextual information about the content, artist, and technique, and viewers' art experience and openness to experience influence aesthetic ratings for Indian participants,
- (2) To explore whether contextual information modulates the ingroup bias by influencing aesthetic ratings for artworks belonging to another culture compared to one's own, and
- (3) To investigate whether Indian and Northern American populations have different routes to broader valuations such as liking and beauty when viewing Indian and European/American artworks.

We used data from Northern American participants from a previous study (Darda & Chatterjee, 2023) and combined it with new data from Indian participants in this study. We hypothesize that ingroup bias is contextually modulated and predict that context will reduce ingroup aesthetic ratings in Indian and Northern American participants. We further hypothesize that there are many routes to liking and predict that Indian and Northern American participants' ratings of liking might be affected by different factors for Indian and European/American artworks. More specifically, we predict:

- (1) 1a. Like Northern American participants (Darda & Chatterjee, 2023), contextual information about the content, artist, and technique will influence aesthetic ratings for Indian participants such that contextual information (compared to no information) will enhance liking and beauty and decrease ratings of complexity in Indian participants. 1b. The effect of contextual information will be higher in participants with lower art experience and higher openness to experience.
- (2) 2a. Indian and Northern American participants will show an ingroup bias such that Indian participants will like and find more beautiful Indian artworks compared to European/American artworks, and Northern American participants will like and find more beautiful European/American artworks compared to Indian artworks. 2b. The ingroup bias will be modulated by art experience such that those with less art experience will show a higher ingroup bias. 2c. The ingroup bias will be further modulated by contextual information such that the ingroup bias will be lower when contextual information is provided about an artwork compared to when no information is provided.
- (3) Finally, aesthetic impact ratings (as derived from Christensen et al., 2023) will predict ratings of liking differently for Indian and European/American artworks for Indian and Northern American participants.

Method

Open Science Statement

We report how the sample size was determined, all data exclusions, and all measures used in the study (Simmons et al., 2011; 2012). Data pre-processing, statistical analyses, and data visualisations were performed using R (v 4.1.2, R Core Team, 2018). Data analyses were preregistered on the Open Science Framework (<https://osf.io/w8ck2>). Mixed effects model analyses were executed using the *lme4* package (v.1.1-28). Post-hoc tests were executed using the *emmeans* package (v.1.7.2). We used an alpha of 0.05 to make inferences and controlled for multiple comparisons using Tukey-HSD.

Data Availability Statement

Following open science initiatives (Munafò et al., 2017), all raw data and stimuli are available online for other researchers to pursue alternative questions of interest (<https://osf.io/qj65x/>).

Stimuli generation

Stimuli included 16 images of representational artworks by various Indian and European/American artists (see supplementary material for details). The 16 artworks were drawn from a larger set of 36 artworks used by our lab in a previous study (Darda et al., 2023; Darda & Chatterjee, 2023). The 36 artworks were normed on ratings of motion, balance, saturation, warmth, depth, and complexity on a Likert scale from 1 (low) to 7 (high). We divided these 36 artworks into four groups (for more details, see Darda & Chatterjee, 2023) with similar ratings of motion, balance, saturation, warmth, depth, and complexity. We further chose 4 artworks from each subset that included two artworks by Indian and two artworks by European/American artists across a variety of artistic styles and content. Thus, the four subsets of artworks (4 artworks per subset, 2 Indian, 2 European/American) used did not differ significantly in mean ratings of motion, balance, saturation, warmth, depth, and complexity (Table 1). Artworks from subset 1 were not preceded by any contextual information. Each artwork from subset 2, 3, and 4 was preceded by information about the content, artist, and technique respectively (see Tasks and procedure below for more details).

Ratings	Subset 1 (N=4) Mean (SD)	Subset 2 (N=4) Mean (SD)	Subset 3 (N=4) Mean (SD)	Subset 4 (N=4) Mean (SD)
Motion	5.11 [0.26]	5.00 [0.39]	5.06 [0.42]	4.98 [0.52]
Depth	5.27 [0.18]	5.26 [0.09]	5.32 [0.11]	5.21 [0.13]
Saturation	5.09 [0.35]	5.01 [0.23]	5.27 [0.27]	5.11 [0.22]
Complexity	5.33 [0.14]	5.07 [0.24]	5.30 [0.14]	5.15 [0.08]
Warmth	5.20 [0.27]	5.11 [0.17]	5.26 [0.23]	5.17 [0.28]
Balance	5.29 [0.20]	5.33 [0.16]	5.33 [0.12]	5.27 [0.26]
<i>Contextual information</i>	No information	Information about the content	Information about the artist	Information about the technique

Table 1. Mean ratings of motion, depth, saturation, warmth, balance, and complexity across the three subsets of paintings. *N* = number of paintings, *SD* = standard deviation.

Sample size justification

An *a priori* power analysis (details in Darda & Chatterjee, 2023) suggested that with *N*=200 people, we had more than 80% power to detect an effect of contextual information (with four levels: no information, content information, artist information, technique information). We were able to recruit *N*=198 Northern American participants and *N*=125 Indian participants. With Northern American and Indian participants combined, we have sufficient power to detect the main effect of contextual information, but not the interaction effects. Therefore, findings from the interaction terms are suggestive, and not confirmatory.

Participants

Participants of Northern American origin (and residing in Northern America) were recruited on Amazon Mechanical Turk (MTurk), participants of Indian origin (and residing in India) were recruited by advertising on social media. Four hundred and thirty-six American participants and 361 Indian participants started the experiment, and 380 American and 334 Indian participants completed it. As pre-registered, participants were excluded if they did not pass our attention checks (*N*=182 Americans, *N*=201 Indians, see the Tasks and Procedure section below for details on the attention checks), or were 2 standard deviations above or below the mean time taken to complete

the experiment (N=12 Americans, N=8 Indians). The high number of exclusions is due to the online nature of this study and the strict attention check questions we had to ensure good data quality. The final sample of participants included 198 American participants (96 men, 98 women, 1 non-binary; Mean_{age} = 39.41, SD_{age} = 11.28) and 125 Indian participants (51 men, 69 women, 2 non-binary; Mean_{age} = 24.60, SD_{age} = 5.97). Table S1 reports all participant demographics. Participants provided informed consent, and all study procedures were approved by the University of Pennsylvania IRB. All research was conducted in accordance with the Declaration of Helsinki.

Tasks and procedure

Participants completed a rating task, followed by questionnaires that assessed their art experience and openness to experience, with demographic questions at the end. Art experience was assessed using the Art Experience Questionnaire (AEQ; Chatterjee et al., 2010), and openness to experience was assessed using an Openness to Experience scale (OE) used in a previous study from our lab (Darda & Chatterjee, 2023). The 38-item openness to experience scale was derived from a total of 68 items based on the NEO-PI-3 (Costa & McCrae, 2010) and the Big Five Aspects Scale (BFAS; DeYoung et al., 2007; for more details, see Darda & Chatterjee, 2023).

In the rating task, participants viewed a total of 16 images of representational artworks by Indian and European/American artists, but were not explicitly told whether artworks were by Indian or European/American artists. Participants rated each artwork on the following variables:

Liking; how much do you like this painting? [1=do not like at all, 5=like it very much]

Beauty; how beautiful do you find the painting? [1=not at all beautiful, 5=very beautiful]

Complexity; how complex do you think the painting is? [1=very simple, 5=very complex]

Participants also rated each artwork on 11 ‘impact on viewer’ dimensions on a Likert scale from 1 (not at all) to 5 (a great deal) derived from a taxonomy describing qualities of artworks, and the cognitive and affective effects artworks can have on viewers (Christensen et al., 2022). These eleven impact terms were preceded by the statement ‘this artwork made me think or feel...’ and included: *angry, calm, compassionate, challenged, edified, enlightened, enraptured, interested, inspired, pleasure, and upset*. The order in which ratings were presented was randomized across participants. As each artwork was rated on a total of 14 dimensions, we used only 16 artworks in the experiment to avoid fatigue effects in our participants. As we found similar results for our main dependent variables (liking, beauty, complexity) and the aesthetic impact terms, we present results from only the main dependent variables for our pre-registered linear mixed effects models in the main paper. The results for the aesthetic impact terms can be found in the supplementary material.

The rating task was divided into four blocks. No contextual information was presented before any artworks from subset 1. Each artwork from subset 2 was preceded by information about the content of the artwork, each artwork from subset 3 was preceded by information about the artist, and each artwork from subset 4 was preceded by information about the technique used by the artist. The order in which these blocks were presented was randomized across participants. Content information was either descriptive or elaborative (one Indian and one Anglo European artwork was preceded by descriptive content information, and the other Indian and Anglo European artwork was preceded by elaborative content information). Descriptive information included describing objects or colours or low-level features in the artwork, whereas elaborative information expanded more on what the artwork depicted (see Box 1). Each piece of information was followed by an attention check question to ensure participants were paying attention to and reading the information presented to them before rating the artwork. Participants who had less than 90% accuracy on the attention check questions were excluded from the analyses. The entire experiment took around 30 minutes for most participants (Mean_{duration} = 31.50, SD_{duration} = 18.56), and participants were paid \$4 (Northern American participants) or Rs. 350 (Indian participants) as compensation.

<u>Example Artwork</u>	<u>Type of Contextual Information</u>
<p data-bbox="152 233 426 272">An artwork from subset 1</p> 	<p data-bbox="701 388 1048 421">No contextual information provided</p>
<p data-bbox="152 479 426 575">An artwork from subset 2 with 'descriptive' content information</p> 	<p data-bbox="450 589 1201 763">This painting by John Sloan shows the interiors of McSorley's bar, one of New York's oldest bars, with its clientele standing at the bar. It depicts several working-class customers drinking around a wooden bar along with the bartender. The background is lined with paintings and other relics and objects. Dark and muted tones dominate the painting, brightened only by flesh tones, highlights of white and yellow, and dabs of orange and red.</p> <p data-bbox="450 763 1201 821">Attention check: McSorley's bar is in which city? (Options: New York, Philadelphia, Boston, Washington DC)</p>
<p data-bbox="152 788 426 884">An artwork from subset 2 with 'elaborative' content information</p> 	<p data-bbox="450 871 1201 1074">This painting portrays an allegorical meeting between the artist with his patron. It is an interpretation of two mutually interested and interdependent characters who represent two different social classes and two different but interrelated roles in society. The patron's status is portrayed by his demeanour and manservant. The artist on the right, is powerfully erect, with his head held high. The artist, whose role it is to wander and have no settled place in society is presented as equal to the man of wealth and social position.</p> <p data-bbox="450 1074 1201 1132">Attention check: Who is the meeting with? (Options: the artist and the patron, two random strangers, the dog and its manservant, the artist and his muse)</p>
<p data-bbox="152 1097 426 1174">An artwork from subset 3 with artist information</p> 	<p data-bbox="450 1168 1201 1367">This painting is by artist S. Elayaraja, whose paintings became world renowned for his realistic depiction of Tamilian women, their culture, tradition, and lifestyle. Born in 1979 in a small village in the South of India, Elayaraja was the youngest of eleven children. He drew inspiration from his experiences in a large family and made it part of his identity. He obtained Bachelor and Master of Fine Arts degrees from Kumbakonam and Chennai respectively, specializing in oil paintings, water colours, knife painting, and print making and photography.</p> <p data-bbox="450 1367 1201 1425">Attention check: What is the name of the artist you just read about? (Options: S Elayaraja, SS Rajamouli, Raja Ravi Verma, Swathi Thirunal)</p>
<p data-bbox="152 1406 426 1464">An artwork from subset 4 with technique information</p> 	<p data-bbox="450 1450 1201 1624">Louis Janmot's paintings are a transition between romanticism and symbolism artistic styles, and the flawless finish is combined with a sense of mysticism. He had a preference for symmetry and repetition in his paintings and had a lot in common with pre-Raphaelite paintings in terms of content, colour, design, and emphasis on flowers and nature. He applied a design of well-defined contours, simple and dry colours, and a realism in presentation to his paintings.</p> <p data-bbox="450 1624 1201 1682">Attention check: Louis Janmot's paintings have a sense of ——— in them. (Options: mysticism, abstract expressionism, cubism, nihilism)</p>

Box 1. Example artwork and types of contextual information associated with it. All images used in this box are free from copyright restrictions. Image is taken from Darda & Chatterjee, 2023.

Data analysis

In Darda & Chatterjee (2023), we found that contextual information influenced aesthetic engagement of representational artworks in Northern American participants. This aesthetic engagement manifested as changes in ratings of liking, beauty, and complexity, but only in participants with less art experience and those who were more open to experience. Therefore, as preregistered, in this experiment, first, we aimed to replicate these findings in Indian participants (H1a, H1b).

For Indian participants only, for each of our main dependent variables (ratings of liking, beauty, and complexity), we ran two linear mixed effects models – one with the interaction between art experience and contextual information as a fixed effect (*artexp model*), and another with the interaction between openness to experience and contextual information as a fixed effect (*openexp model*) with by-subject and by-item random effects. In previous work, when we included both art experience and openness to experience in the same model, we did not find meaningful differences. Therefore, we chose to pre-register and run separate models (instead of including a three-way interaction of openness to experience, contextual information, and art experience) to keep our model structure simple and allow us more power to detect our effects of interest.

Both art experience and openness to experience were added as categorical variables. To do this, we centered AEQ and OE scores. Participants with centered AEQ scores above 0 were categorized as ‘high art experience’ and those with centered AEQ scores below 0 were categorized as ‘low art experience’ participants. Similarly, participants with centered OE scores above 0 were categorized as ‘high openness’ and those with centered OE scores below 0 were categorized as ‘low openness.’ Results were similar both when art experience and openness to experience were used as categorical variable (high experience and low experience; high openness and low openness) or when added to the model as a continuous variable (centered AEQ or OE scores). Art experience and openness to experience were coded with ‘high art experience’ and ‘high openness’ coded as 0.5 and ‘low art experience’ and ‘low openness’ coded as -0.5.

The categorical variable of contextual information was coded using a simple coding style where every other level is compared to the reference level. No contextual information was used as the reference level, and each of the other levels (content information, artist information, technique information) were compared to the reference level separately. To control for effects of demographic variables, art experience, or openness to experience (OE), we further added age, education, total AEQ score (for the *openexp* model), and total OE score (for the *artexp* model) as fixed effects to the model. All continuous variables were centered to the mean by subtracting the mean from every value of the variable.

The final models used were:

Model artexp <- rating ~ 1 + contextual information*art experience + age + education + openness to experience + 1/sid + 1/itemno

Model openexp <- rating ~ 1 + contextual information*openness to experience + age + education + art experience + 1/sid + 1/itemno

As preregistered, to explore the ingroup bias (H2a), we ran a linear mixed effects model with the interaction between participant culture (Indian, Northern American) and artwork culture (Indian, American/European) as a fixed effect and by-subject and by-item random effects. The categorical variables of participant culture and artwork culture were coded as 0.5 for Indian participants and artworks of Indian origin, and -0.5 for Northern American participants and artworks of American/European origin.

Model ingroup <- Rating ~ 1 + artwork culture*participant culture + age + education + art experience + openness to experience + 1/sid + 1/item

Next, to probe the influence of art experience on the ingroup bias (H2b), we added art experience to the *ingroup model*:

Model ingroup_artexp <- Rating ~ 1 + artwork culture*participant culture*art experience + age + education + openness to experience + 1/sid + 1/item

Finally, to probe whether contextual information influences the ingroup bias (H2c), we ran the following linear mixed effects model separately for participants with lower art experience and participants with higher art experience:

Model ingroup_context <- Rating ~ 1 + artwork culture*participant culture*contextual information + age + education + openness to experience + 1/sid + 1/item

Contextual information for the *ingroup_context* model was coded as -0.5 for the ‘no information’ condition and 0.5 for all other types of contextual information combined.

Finally, as preregistered as an exploratory analysis (H3), to explore different routes to broader valuations such as beauty and liking, we had preregistered models separately for Indian and Northern American participants for Indian and European/American artworks. However, we decided to run a more stringent test to explore different routes to broader valuations that would allow us to compare directly between Indian and European/American artworks separately for Indian and American participants by including the interaction between each impact term and artwork culture. Therefore, we ran the following models in the current paper:

Model Indian_routes (for Indian participants only) <- beauty/liking ~ 1 + angry*artwork culture + calm*artwork culture + compassionate*artwork culture + challenging*artwork culture + edified*artwork culture + enraptured*artwork culture + enlightened*artwork culture + inspired*artwork culture + interested*artwork culture + pleasure*artwork culture + upset*artwork culture + 1/sid + 1/itemno

Model American_routes (for American participants only) <- beauty/liking ~ 1 + angry*artwork culture + calm*artwork culture + compassionate*artwork culture + challenging*artwork culture + edified*artwork culture + enraptured*artwork culture + enlightened*artwork culture + inspired*artwork culture + interested*artwork culture + pleasure*artwork culture + upset*artwork culture + 1/sid + 1/itemno

For completeness, we report these models in the main paper and the preregistered models in the supplementary materials.

Results

The impact of contextual information (and its modulation by art experience and openness to experience) in Indian participants.

For the *art_experience* model, results showed that the interaction between art experience and different types of information did not predict ratings of liking, beauty, and complexity (all $p > 0.10$) except for the interaction between technique information and art experience that marginally predicted ratings of beauty ($\beta = -0.21$, $p = 0.075$). Content information predicted ratings of complexity ($\beta = -0.33$, $p = 0.015$), with higher ratings of complexity when no information was presented compared to when content information was presented. Artist information predicted ratings of liking, and marginally predicted ratings of beauty and complexity, with higher ratings of beauty and liking and lower ratings of complexity when artist information was presented compared to when no information was presented (liking: $\beta = 0.50$, $p = 0.011$; beauty: $\beta = 0.39$, $p = 0.054$; complexity: $\beta = -0.24$, $p = 0.075$). Openness to experience predicted ratings of complexity, with higher openness predicting higher ratings of complexity ($\beta = 0.21$, $p = 0.004$) and marginally predicted ratings of beauty, with higher openness predicting higher ratings of beauty ($\beta = 0.10$, $p = 0.068$). No other main effects

or interactions were significant (see Supplementary Table 2). None of the contrasts were significant in post-hoc tests when correcting for multiple comparisons. The models explained 3.1% of the variance for liking, 3.9% for beauty, and 4.9% for complexity ratings.

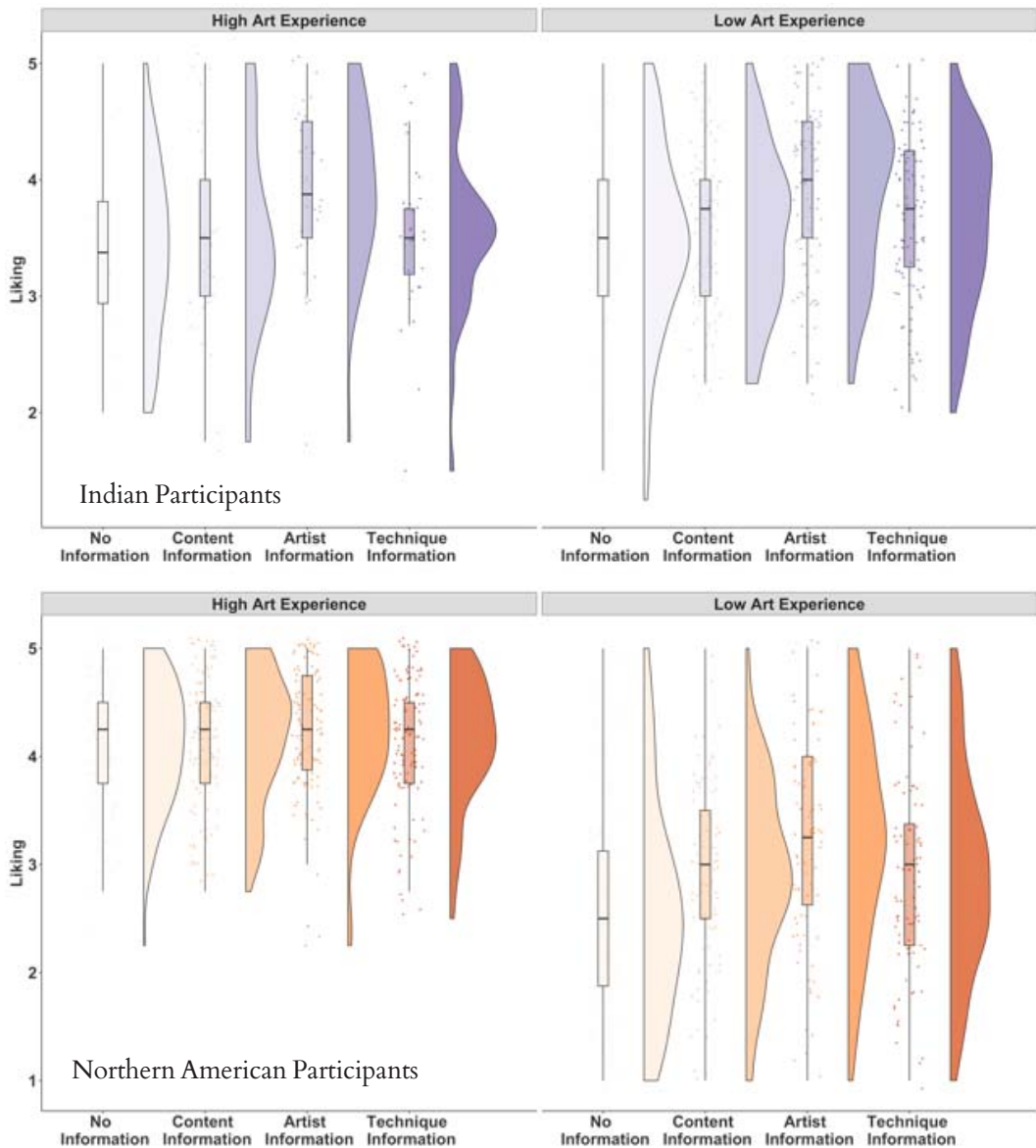


Figure 1. The effect of contextual information and its modulation by art experience on liking ratings in Northern American and Indian participants. For Indian participants, content predicted ratings of complexity, and artist information predicted ratings of liking; there was no modulation of art experience. For Northern American participants, information about content, technique, and artist predicted ratings of liking only in participants with low art experience.

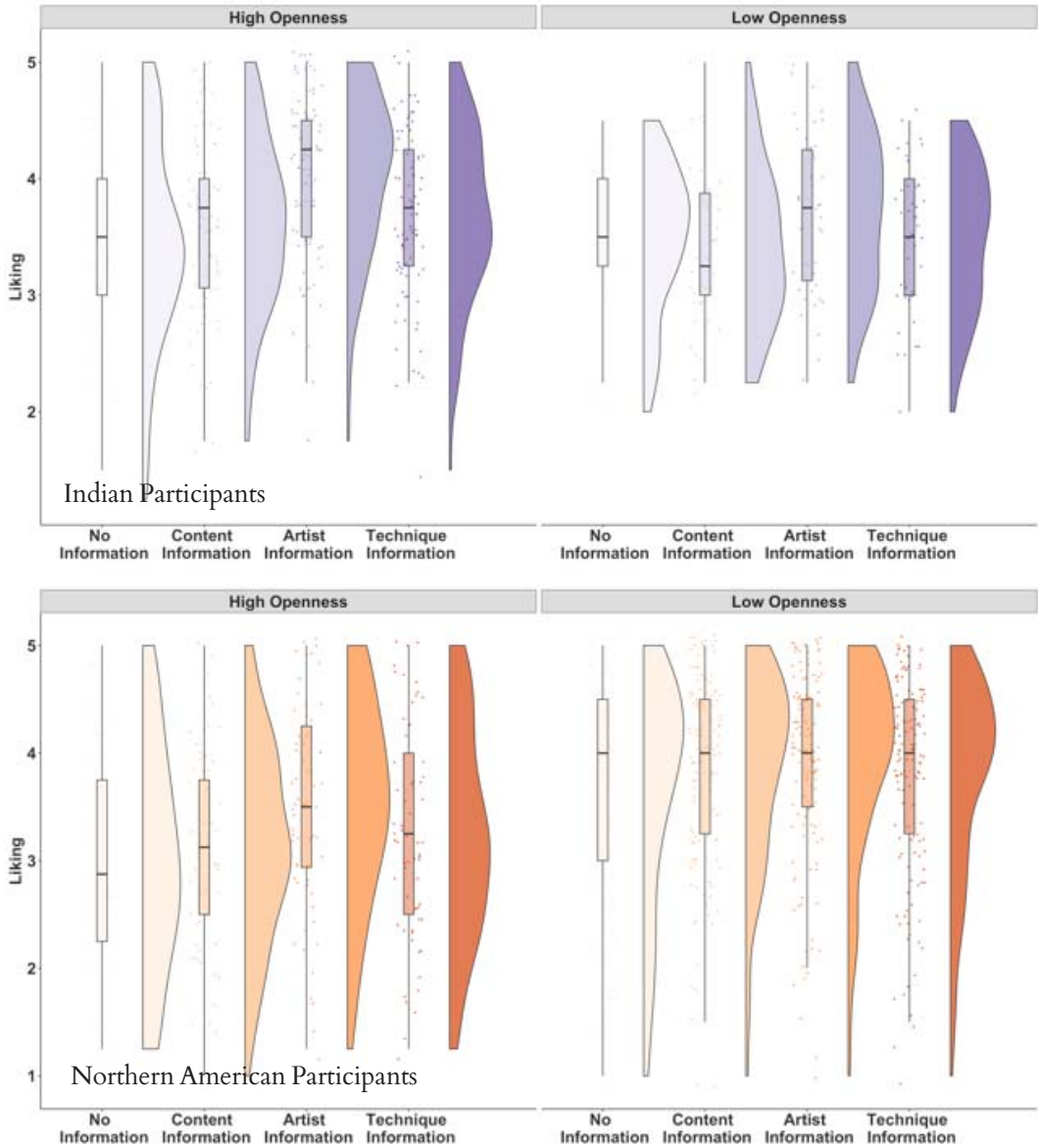


Figure 2. The effect of contextual information and its modulation by openness to experience for liking ratings in Indian and American participants. Both Northern American and Indian participants with higher openness to experience tended to like artworks more when artist information was presented.

For the *openness_experience* model, the interaction between content, artist, and technique information, and openness to experience significantly predicted ratings of liking and beauty (content: liking: $\beta = 0.25$, $p=0.034$; beauty: $\beta = 0.35$, $p=0.001$, artist: liking: $\beta = 0.38$, $p=0.002$; beauty: $\beta = 0.39$, $p<.001$, technique: liking: $\beta = 0.25$, $p=0.033$; beauty: $\beta = 0.40$, $p<.001$) and the interaction between openness to experience, and artist and technique information marginally predicted ratings of complexity (artist: complexity: $\beta = 0.22$, $p=0.061$, technique: complexity: $\beta = 0.22$, $p = 0.071$). Openness to experience positively predicted ratings of complexity ($\beta = 0.33$, $p = 0.039$). Content information compared to no information predicted ratings of complexity ($\beta = -0.36$, $p = 0.006$), artist information predicted ratings of liking and marginally predicted ratings of beauty and complexity (liking: $\beta = 0.42$, $p = 0.029$, beauty: $\beta = 0.35$, $p = 0.080$, complexity: $\beta = -0.24$, $p = 0.071$). No other main effects or interactions were significant (see Table S3). The models explained 3.7% of the variance for liking, 4.6% for beauty, and 6.3% for complexity ratings.

Post-hoc tests suggested (after correcting for multiple comparisons) a marginal effect such that participants liked artworks more when artist information was presented to them compared to no information, but only in participants with high openness to experience (estimate = -0.61 , $SE = 0.22$, 95% CI $[-1.23, 0.01]$, $p = 0.055$). No other contrasts or comparisons were significant when correcting for multiple comparisons in post-hoc tests.

Ingroup bias in aesthetic appreciation, and its modulation by art experience.

For the ingroup model, the interaction between participant culture and artwork culture significantly predicted ratings of liking and beauty, but not complexity (liking: $\beta = 0.30$, $p<.001$, beauty: $\beta = 0.30$, $p<.001$, complexity: $\beta = 0.06$, $p = 0.205$). Art experience positively predicted liking, beauty, and complexity ratings (liking: $\beta = 0.46$, $p<.001$, beauty: $\beta = 0.41$, $p<.001$, complexity: $\beta = 0.29$, $p<.001$). Openness to experience positively predicted ratings of complexity (complexity: $\beta = 0.11$, $p = 0.026$) and education marginally positively predicted ratings of beauty (beauty: $\beta = 0.07$, $p<.070$). The main effect of participant culture predicted ratings of liking and beauty (liking: $\beta = 0.33$, $p=.001$, beauty: $\beta = 0.37$, $p<.001$). No other main effects or interactions were significant (see Table S4). The models explained 14.4% of the variance for liking, 12.9% for beauty, and 6.0% for complexity ratings.

Post-hoc tests suggested that overall, Indian participants had higher liking and beauty ratings compared to American participants (liking: estimate = -0.33 , $SE=0.10$, 95% CI $[-0.535, -0.13]$, $p=0.001$, beauty: estimate = -0.37 , $SE = 0.10$, 95% CI $[-0.56, -0.175]$, $p<.001$). Post-hoc tests for the interaction suggested Indian participants rated Indian artworks higher on liking and beauty compared to American participants (liking: estimate = -0.48 , $SE = 0.11$, 95% CI $[-0.75, -0.21]$, $p<.001$; beauty: estimate = -0.52 , $SE = 0.10$, 95% CI $[-0.77, -0.26]$, $p<.001$). No other comparisons were significant when correcting for multiple comparisons.

For the *ingroup_artexp* model, the three-way interaction of participant culture, artwork culture and art experience predicted ratings of liking, beauty, and complexity (liking: $\beta = -0.23$, $p=0.030$, beauty: $\beta = -0.28$, $p=.006$, complexity: $\beta = -0.25$, $p=.014$). The two way interaction of artwork culture and participant culture predicted ratings of liking and beauty (liking: $\beta = 0.34$, $p<.001$, beauty: $\beta = 0.30$, $p<.001$, complexity: $\beta = 0.07$, $p=0.163$), the two way interaction of participant culture and art experience predicted ratings of liking, beauty, and complexity (liking: $\beta = -1.45$, $p<.001$, beauty: $\beta = -1.27$, $p<.001$, complexity: $\beta = -0.76$, $p<.001$), and the two way interaction of artwork culture and art experience predicted ratings liking and complexity, and marginally predicted ratings of beauty (liking: $\beta = 0.21$, $p<.001$, beauty: $\beta = 0.09$, $p=.066$, complexity: $\beta = 0.12$, $p=.020$). The main effect of art experience positively predicted ratings of liking, beauty, and complexity (liking: $\beta = 0.64$, $p<.001$, beauty: $\beta = 0.58$, $p<.001$, complexity: $\beta = 0.40$, $p<.001$). The models explained 19.0% of the variance for liking, 17.1% for beauty, and 6.6% for complexity ratings (see Table S5).

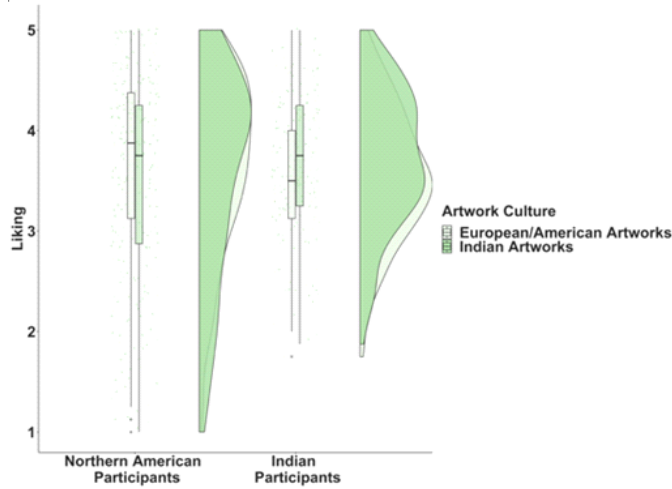


Figure 3. The ingroup bias in Indian and Northern American participants. Indian participants liked Indian artworks more than European/American artworks.

Post-hoc tests suggested that for liking ratings, American participants (but only those with lower art experience) liked European/American artworks more than Indian artworks (estimate = 0.31, SE = 0.12, 95% CI [0.08, 0.55], $p=.008$). Indian participants with higher art experience marginally liked Indian artworks more than European/American artworks (estimate = -0.23, SE = 0.13, 95% CI [-0.50, 0.03], $p=.079$). For beauty ratings, American participants with lower art experience found (marginally) European/American artworks more beautiful than Indian artworks (estimate = -0.23, SE = 0.12, 95% CI [-0.02, 0.44], $p = .073$), and Indian participants with lower art experience found (marginally) Indian artworks more beautiful than European/American artworks (estimate = -0.23, SE = 0.12, 95% CI [-0.46, 0.003], $p=.053$). For complexity ratings, only American participants with lower art experience rated European/American artworks higher on complexity than Indian artworks (estimate = 0.25, SE = 0.086, 95% CI [0.08, 0.42], $p=.003$). No other comparisons were statistically significant.

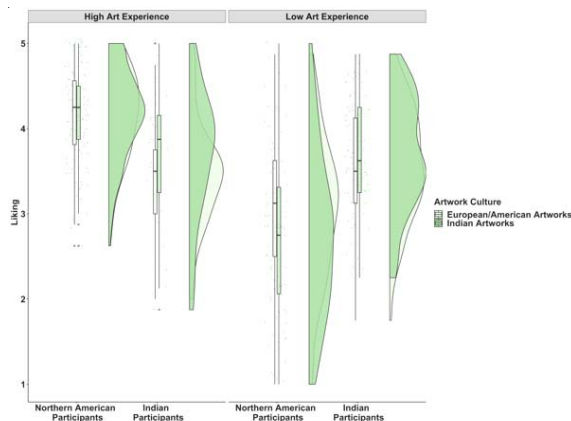


Figure 4. The modulation of the ingroup bias by art experience. Northern American participants with lower art experience showed an ingroup bias.

The impact of contextual information on the ingroup bias

We preregistered separate models for participants with high and low art experience. However, as we did not find many differences in both groups (and we did not have power to perform a four-way interaction to statistically compare between participants with high and low experience), we decided to run the *ingroup_context* for all participants. Results for the separate models are reported in the supplementary material.

For the *ingroup_context* model, the interaction between participant culture, artwork culture, and contextual information predicted ratings of beauty and liking but not complexity (liking: $\beta = -0.45$, $p < .001$; beauty: $\beta = -0.23$, $p = .033$; complexity: $\beta = 0.02$, $p = .886$). The two-way interaction between participant culture and contextual information predicted ratings of complexity (complexity: $\beta = -0.12$, $p = .023$). The two-way interaction between artwork culture and participant culture continued to predict beauty and liking ratings (liking: $\beta = 0.41$, $p < .001$; beauty: $\beta = 0.35$, $p < .001$). The main effect of art experience predicted ratings of liking, beauty, and complexity (liking: $\beta = 0.46$, $p < .001$; beauty: $\beta = 0.41$, $p < .001$; complexity: $\beta = 0.29$, $p < .001$), openness to experience predicted complexity (complexity: $\beta = 0.11$, $p = .026$), contextual information predicted liking and complexity ratings (liking: $\beta = 0.24$, $p = .033$; complexity: $\beta = -0.16$, $p = .040$), and participant culture predicted liking and beauty ratings (liking: $\beta = 0.33$, $p < .001$; beauty: $\beta = 0.36$, $p < .001$). None of the other main effects and interactions were significant (see Table S6).

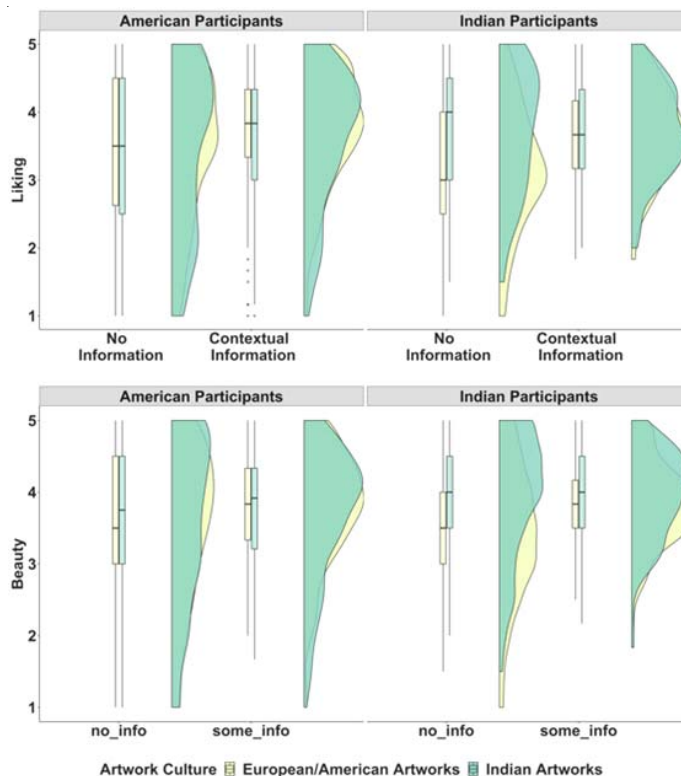


Figure 5. The modulation of the ingroup bias by contextual information for Indian and American participants. Indian participants showed higher ratings of liking after contextual information was presented for American/European artworks but not for Indian artworks. Northern American participants showed higher ratings of liking after contextual information was presented for Indian artworks but not for American/European artworks (although this was significant at our statistical threshold).

For the three-way interaction, post-hoc tests suggested that for Indian participants, contextual information increased ratings of liking and beauty for European/American artworks (liking: estimate = -0.50, SE = 0.17, 95% CI [-0.82, -0.17], $p=.003$; beauty: estimate = -0.39, SE = 0.17, 95% CI [-0.73, -0.05], $p=.024$) but not for Indian artworks. No other contrasts or comparisons were statistically significant. Figure 5 shows that for both Indian and American participants, we see that ratings of liking for artworks of the other culture were higher when contextual information was presented (although this was not significant at our statistical threshold for American participants).

Different routes to broader valuations of liking and beauty

For the *Indian_val* model, the interactions between angry ratings and artwork culture, edified ratings and artwork culture, and enlightened ratings and artwork culture marginally predicted liking ratings for Indian participants (angry: $\beta = -0.06$, $p=.095$; edified: $\beta = -0.08$, $p=.077$; enlightened: $\beta = 0.10$, $p=.054$) and the interaction between upset ratings and artwork culture predicted ratings of liking for Indian participants (upset: $\beta = -0.12$, $p=.036$). How calm ($p<.001$), compassionate ($p=.002$), enraptured ($p<.001$), inspired ($p<.001$), interested ($p<.001$), and how much pleasure ($p<.001$) Indian participants felt when viewing the artwork positively predicted ratings of all artworks. How angry Indian participants felt when viewing the artworks negatively marginally predicted ratings of all artworks marginally ($p=.053$). Post-hoc tests suggested that lower ratings of how angry participants felt predicted higher ratings of liking for European/American artworks ($p=.013$), but not Indian paintings ($p=.801$). Higher ratings of how edified Indian participants felt when viewing the artworks predicted higher ratings of liking for European/American artworks ($p=.035$) but not Indian artworks ($p=.852$). Higher ratings of how enlightened Indian participants felt when viewing the artworks predicted higher ratings of liking for Indian artworks ($p=.018$) but not European/American artworks ($p=.778$). Lower ratings for how upset participants felt marginally predicted higher ratings of liking for Indian artworks ($p=.054$) but not European/American artworks ($p=.357$).

For the *American_val* model, the interaction between how compassionate participants felt and artwork culture predicted ratings of liking for American participants ($\beta = 0.08$, $p=.025$). How calm ($p<.001$), compassionate ($p<.001$), enlightened ($p<.001$), enraptured ($p<.001$), inspired ($p<.001$), interested ($p<.001$), and how much pleasure ($p<.001$) American participants felt positively predicted ratings of how much participants liked all artworks overall. Post-hoc tests suggested that higher ratings of how much compassion American participants felt when viewing the artwork predicted higher ratings of liking but only for Indian artworks ($p<.001$) but not European/American artworks ($p=.100$).

For beauty ratings, for the *Indian_val* model, the interaction between artwork culture and interest ratings predicted ratings of beauty for Indian participants ($\beta = 0.10$, $p=.024$), and the interaction between artwork culture and compassionate ratings, and the interaction between artwork culture and upset ratings marginally predicted ratings of beauty for Indian participants (compassionate: $\beta = -0.08$, $p=.093$; upset: $\beta = -0.10$, $p=.075$). How calm ($p<.001$), challenged ($p=.026$), compassionate ($p<.001$), enraptured ($p=.021$), inspired ($p=.001$), interested ($p<.001$), and how much pleasure ($p<.001$) Indian participants felt predicted beauty ratings for all artworks. Post-hoc tests suggested that higher ratings of how much compassion Indian participants felt when viewing the artworks predicted higher ratings of how beautiful they found European/American artworks ($p<.001$) but not Indian artworks ($p=.131$). Contrasts for how upset participants felt were not statistically significant when comparing between Indian and European/American artworks. Higher ratings of how interested Indian participants were in the artwork predicted higher ratings of liking more strongly for Indian artworks ($p<.001$) compared to European/American ($p<.001$) artworks ($p=.025$).

For beauty ratings, for the *American_val* model, the interaction between artwork culture and interest ratings, and the interaction between artwork culture and upset ratings predicted ratings of

beauty for American participants (interested: $\beta = 0.14$, $p < .001$; upset: $\beta = 0.10$, $p = .016$). How calm, compassionate, enlightened, enraptured, inspired, interested, and how much pleasure participants felt (all $ps < .001$) positively predicted ratings of beauty for American participants for all artworks. Post-hoc tests suggested that higher ratings of how interested participants were in the artwork more strongly predicted higher ratings of beauty for Indian paintings ($p < .001$) compared to European/American paintings ($p < .001$) for American participants. Lower ratings of how upset American participants felt when viewing the artwork predicted higher ratings of how beautiful they found the artworks, but only for European/American artworks ($p = .034$) but not Indian artworks ($p = .240$).

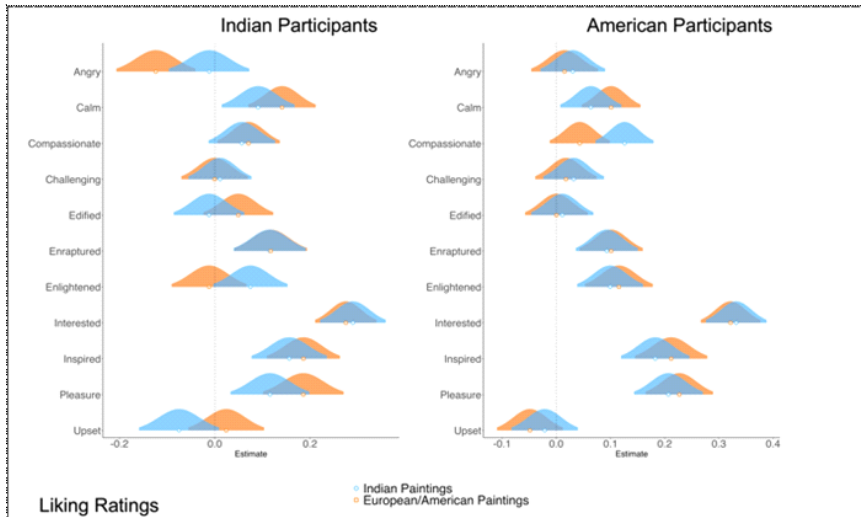


Figure 6. Different routes for Indian and European/American artworks for Indian (left) and American (right) participants for liking ratings. The X-axis denotes beta estimates for the models (separate models for Indian and European/American paintings), and Y-axis shows the predictor variables.

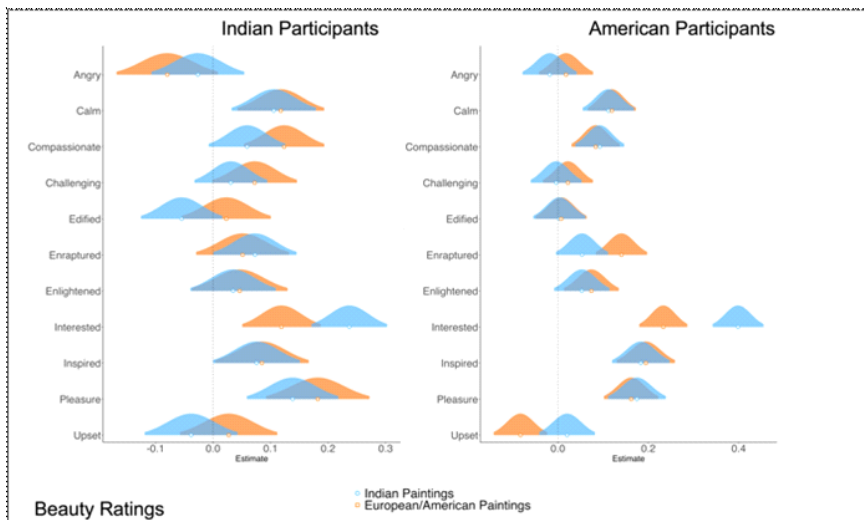


Figure 7. Different routes for Indian and European/American artworks for Indian (left) and American (right) participants for beauty ratings. The X-axis denotes beta estimates for the models (separate models for Indian and European/American paintings), and Y-axis shows the predictor variables.

General Discussion

The current study aimed to explore how contextual factors associated with the artwork and the viewer might interact to generate an aesthetic experience. Combining data from Northern American and Indian participants, and using European/American and Indian art, we explored whether contextual information such as content, artist, and technique information, and viewers' art experience and openness to experience influence aesthetic experience in Indian participants and Northern American participants (Darda & Chatterjee, 2023). We investigated the ingroup bias, and its modulation by art experience and contextual information. Finally, we explored whether routes to broader valuations of liking and beauty might differ for Indian and European/American artworks for Indian and Northern American participants.

Our results suggest that contextual factors influenced both Northern American and Indian participants, but the modulation of this effect by art experience and openness to experience differed across cultures. Contextual information reduced the ingroup bias (more so for Indian participants), and routes to broader valuations of liking and beauty showed some differences between Indian and European/American artworks for Indian and Northern American participants. Below, we evaluate each of these findings and our questions in more detail.

The impact of contextual information (and its modulation by art experience and openness to experience) in Indian participants.

In line with previous research (e.g., Leder et al., 2006; Swami, 2013) and similar to Northern American participants (Darda & Chatterjee, 2023), contextual information influenced aesthetic ratings such that ratings of liking and beauty were higher, and ratings of complexity were lower when artist-related contextual information was presented to Indian participants compared to when no information was presented. Similarly, content-related contextual information reduced ratings of complexity compared to when no information was presented to participants. Technique information did not impact aesthetic ratings. These findings are consistent with the fluency theory which suggests that ease of processing increases an artwork's appreciation and suggests that contextual information promotes greater fluency (Reber et al., 2004). The possibility that artist- and content-related information enhanced fluency for the artworks is supported by the observation of decreased complexity ratings in those conditions.

Investigations in empirical aesthetics have shown that individual variability, such as openness to experience and art experience (e.g., Leder et al., 2004; Fayn et al., 2015), also impacts aesthetic appreciation. Here, we find that Indian participants (like Northern American participants) also show an effect of contextual information modulated by openness to experience such that artist-related information influenced aesthetic ratings but only in participants with higher openness to experience. People with higher openness to experience seek novelty in artworks and therefore, (novel) information about the artwork may have a greater impact on their aesthetic experience and judgements (Fayn et al., 2015).

However, the modulation of the effect of contextual information by art experience was not found in Indian participants. Indian participants with both higher and lower art experience were influenced similarly by contextual information. These findings contradict previous research that show differences in participants with high and low art experience. Leder et al. (2004) suggest that people with higher art experience and knowledge may view artworks differently to those with lower art experience, engaging more with the style of the artwork than the information associated with it. Thus, processing fluency may already be higher in those with higher art experience and therefore they may be less influenced by contextual information.

One possible explanation for the discrepancy between Indians and Americans is the measure of art experience used. The AEQ (Chatterjee et al., 2010) and other measures used commonly in the field

to measure art knowledge or aesthetic sensitivity (Specker et al., 2018; Schlotz et al., 2020) were developed for and validated among western populations. Thus, any differences across cultures might represent the limits of these measures to generalise across cultures. The current findings are also in line with recent work in cross-cultural empirical aesthetics that also suggests differences in modulation by art experience across cultures (Darda & Cross, 2022; Darda, Christensen, & Chatterjee, 2023). An important goal for future research would be to develop and/or validate measures that can be used outside of traditionally over-represented research samples in empirical aesthetics and psychology more broadly (Golbabaei et al., 2022).

Ingroup bias in aesthetic appreciation, and its modulation by art experience and contextual information.

In line with previous research, we found an ingroup bias – Indian participants with high and low art experience preferred Indian artworks more than European/American artworks, and Northern American participants with low art experience preferred European/American artworks more than Indian artworks (Bao et al., 2016; Yang et al., 2019; Darda et al., 2023). Similar to the modulation of art experience on the effect of contextual information, we did not find a modulation of art experience on the ingroup bias in Indian participants.

For Northern American participants, a modulation by art experience is perhaps explained by the uncertainty-identity hypothesis (Mastandrea et al., 2021). This hypothesis suggests that when participants are unsure about their own identity, they might resort to using national/cultural identity as an art appreciation heuristic. That is, if participants are unsure about art and are asked to give an opinion about it, they may resort to using group identification to resolve their uncertainty and use cultural identity as an art appreciation heuristic. A discrepancy in findings for Indian participants might suggest that Indian participants, whether with lower or higher art experience, continue to use cultural identity as an art appreciation heuristic. A more likely explanation however may be that as mentioned before, art experience as measured in the Northern American context may not be similar in an Indian context. For art experience to be measured across cultures, a crosscultural approach to art and aesthetics is crucial. For instance, broadly speaking “western” models of museums and curatorial practices may differ significantly from “non-western” traditions and practices (Peers & Brown, 2007; Kreps, 2006). Future tools and measures of art experience will have to consider these cross-cultural differences.

Our results also suggested a modulation of the ingroup bias by contextual information. Indian participants showed a reduced ingroup bias when contextual information was presented compared to when no contextual information was presented. While we did not find statistically significant results for Northern American participants, there was a trend for a reduced ingroup bias in Northern American participants with lower art experience. In our previous study, however, we did find a statistically significant effect in Northern American participants, when Indian participants were not included in the model (Darda & Chatterjee, 2023). A non-significant effect in the current study, therefore, is more likely explained by the small size of the effect, and a lack of power to detect this effect (a three-way interaction) with our current sample size and number of items as opposed to the absence of an effect.

An ingroup bias and its modulation by contextual information can be explained in line with the uncertainty-identity hypothesis. When uncertainty about making an opinion is reduced (by way of providing more information), participants might resort less to using cultural identity as an art appreciation heuristic. Alternatively, increased exposure to more information about unfamiliar cultures might increase aesthetic ratings toward artwork of that culture. While the current study did not tease apart the processes underlying the ingroup bias and its modulation, future work can explore whether preference for one’s own culture emerges from cultural closeness, social identity, enculturation, or increased familiarity or exposure to the cultural content of the artwork. Nonetheless, irrespective of the underlying processes, the current findings open the possibility of how one might be able to

influence preference for creations from one's own culture compared to another, and whether this might apply to non-art contexts.

Routes to broader valuations of liking and beauty

Previous studies have used liking or beauty ratings to index art judgments. However, aesthetic experience is a multicomponent process that encompasses more than just aesthetic preference, including experiences of beauty, sublimity, and complex cognitive and emotional evaluations (Leder et al., 2004; Chatterjee & Vartanian, 2016). We used 11 impact terms that tapped into cognitive and affective evaluations, and predicted that different impacts would contribute to broader valuations of liking and beauty in Indian and Northern American participants for Indian and European/American artworks.

For example, even though liking ratings by Indian participants might be similar for Indian and European/American paintings, Indian participants might like Indian paintings because they feel a sense of cultural closeness whereas they might like European/American paintings because they are novel to them. Thus, different factors may contribute to their aesthetic experience even though ratings of how much participants like paintings from their own culture compared to another might be similar. We found both similarities and differences in the aesthetic impacts that predicted beauty and liking ratings. Similarities in which impacts contribute to liking or beauty ratings are expected given that some aspects of the aesthetic experience of artworks might be universal (Che et al., 2018; Darda & Cross, 2022). However, we also found some differences in how Indian and Northern American participants ratings of liking for Indian and European/American artworks were predicted by aesthetic impacts. Although these differences were small, they point toward differences in how artworks of different cultures might be evaluated cross-culturally.

For instance, for Indian participants, lower ratings of how upset participants felt on viewing the painting predicted higher ratings of liking for Indian artworks, but not American/European artworks. On the other hand, higher ratings of how angry Indian participants felt predicted lower ratings of liking for American/European artworks but not Indian artworks. Upset is more semantically similar to how uncomfortable or anxious people feel, while angry is similar to how threatened or offended people feel on viewing artworks (Christensen et al., 2022). People may not like to feel uncomfortable or upset by artworks that belong to their own culture which contributes to how much they like artworks from their own culture more than artworks from another culture. People's liking may also be more strongly influenced by how much they feel threatened or offended or angry by artworks from another culture, but this may not be similar for artworks from their own culture. For American participants, higher compassion ratings predicted higher liking ratings for Indian artworks but not American/European artworks, suggesting that more compassion when viewing an artwork from another culture might lead to higher liking for that artwork, but this process may not be similar for artworks from one's own culture.

These findings suggest that although people across cultures might have a *universal* aesthetic experience *per se*, the route that leads to the construction of an aesthetic experience might differ depending on cultural context. Indeed, the aesthetic triad model (Chatterjee & Vartanian, 2014) suggests that aesthetic experience is brought about by an interaction of sensory-motor, emotion-valuation, and knowledge-meaning systems in the brain. An interesting direction for future research would be to investigate how low-level visual properties of an artwork such as symmetry, brightness or contrast might contribute to the aesthetic experience of Indian and European/American artworks along with characteristics of an artwork, what viewers think or feel about the artwork (Christensen et al., 2022), and how different brain systems are engaged similarly or differently across cultures in constructing the aesthetic experience. As they stand, our results point to both anthropological universals as well as cultural specifics of human art creation and art appreciation. Art is universal as it arises from brain systems that are common across cultures, but these neural systems are flexible and dependent on

contexts and experiences, thus making art appreciation variable and diverse across cultures (Nadal & Chatterjee, 2019).

Implications

The current findings have implications for the fields of arts, empirical aesthetics, neuroaesthetics, as well as psychology more broadly. Neurocognitive models of aesthetics suggest sensory inputs combine with our emotional responses, and contextualise within our cultural backgrounds, memories, individual associations and past experiences to bring about an aesthetic experience (Chatterjee & Vartanian, 2014). Future research using neuroimaging techniques could investigate which systems are engaged when processing contextual information. For instance, it is possible that artist information may engage the knowledge-meaning systems but have little impact on visual processing (sensory-motor system) directly. Alternatively, content-related information may influence visual processing but have little impact on emotion-valuation systems.

The current findings also have implications for museum or exhibition curation and arts education. Given our findings, it seems imperative to keep in mind the curatorial background of the museum or exhibitions, as well as the viewers to which it caters (Brieber et al., 2015; Darda & Chatterjee, 2023). Further, the possibility that contextual information can reduce ingroup bias in an art context opens possibilities for the mitigation of outgroup prejudice. As the world becomes more fractured because of social, political, economic, and geostrategic factors, it is imperative to identify, mitigate, and counter these biases and prejudices. The arts have long been promoted as one medium to help us develop empathy, theory-of-mind, prosocial behaviour, and impact attitudes and outgroup prejudices (Kou et al., 2020; Dodell-Feder & Tamar, 2018; Mar & Oatley, 2008). An exciting avenue for future research would be to explore how and whether the consumption of art in context, especially unfamiliar art, can impact biases and prejudices in non-art contexts. This line of research is especially relevant and important in today's times when funding cuts for the arts are on the rise (*The Guardian*, October 2022; Micallef, 2021; State Arts Agency Revenues, 2021).

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