

# Quantifying Systemic Gender Inequality in Visual Art

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## Extended Abstract

From disparities in the number of exhibiting artists to auction opportunities, there is overwhelming evidence of women's under-representation in art, rooted in a complex and largely unknown interplay between gender, artistic performance and institutional practices[3, 1, 4]. Here we explore the exhibitions and auction sales of 65,768 contemporary artists in 20,389 institutions, confirming systemic gender differences in the artist population, exhibitions and auctions. We introduce a statistical test for the gender preference of an institution based on their exhibition history, allowing us to categorize art institutions into one of the three categories: *man-preferred* institutions or *woman-preferred* institutions, whose proportion of exhibitions featuring women artists is significantly smaller or larger than the null hypothesis; and *gender-neutral* institutions, whose proportion of women and men artists is statistically indistinguishable from the null hypothesis. Under the gender-neutral criteria that hypothesizes institutions' exhibitions mirror the population gender composition, 27.81% institutions are man-preferred and 18.60% institutions are woman-preferred (Fig. 1a). In contrast, under the gender-balanced criteria which assumes gender parity in representation, 67.04% institutions are man-preferred and only 2.63% institutions are woman-preferred (Fig. 1b). Under both criteria, the fraction of man-preferred institutions increases with the institutional prestige[2], while the fraction of woman-preferred institutions decreases (Fig. 1a,b).

To offer an overview of the distribution of institutional inequality across the whole institutional space, in Fig. 1d we show the art institution network, whose nodes are the museums and galleries, connected to each other if they exhibit, in a statistically significant number, the same artists. The emergence of clusters dense in blue or red nodes is evidence of inequality-based assortativity, indicating that institutions with comparable degrees of inequality tend to be connected to each other, often exhibiting the same artists. To quantify this, we calculate the percentage of weighted outgoing links to institutions with each gender representation inequality under the gender-neutral criteria. We find that man-preferred institutions connect to other man-preferred institutions much more than would be expected by chance, 34.1% compared to the random baseline of 27.81%. Similarly, woman-preferred institutions connect to other woman-preferred institutions much more than would be expected by chance, 28.8% compared to the random baseline of 18.60%.

Finally, we build a logistic regression model to predict an artist's access to the auction market, finding that co-exhibition gender, capturing the gender inequality of the institutions that an artist exhibits has a higher influence on auction access than the artist's gender. Interestingly, the odds ratio for co-exhibition woman is 0.43, indicating that the probability an artist labeled as co-exhibition woman is 0.43 times that of a co-exhibition man. This difference in magnitude suggests that co-exhibition gender has a much stronger impact on the access to the secondary market than the artists' gender. To see the impact of this difference, consider a comparison between artist A introduced above, who is co-exhibition man and artist C, fully matched to artist A but with a co-exhibition woman designation: while artist A has a 0.53 probability of transitioning to the auction market, artist C has a transition probability of only 0.31. Overall, we find that the gender-preference of institutions embracing an artist's work is a stronger indicator

of the likelihood that an artist will transition to the auction market than the gender of the artist, capturing an institutionally driven gender premium for men. These results help unveil and quantify the institutional forces that contribute to the persistent gender imbalance in the art world.

## References

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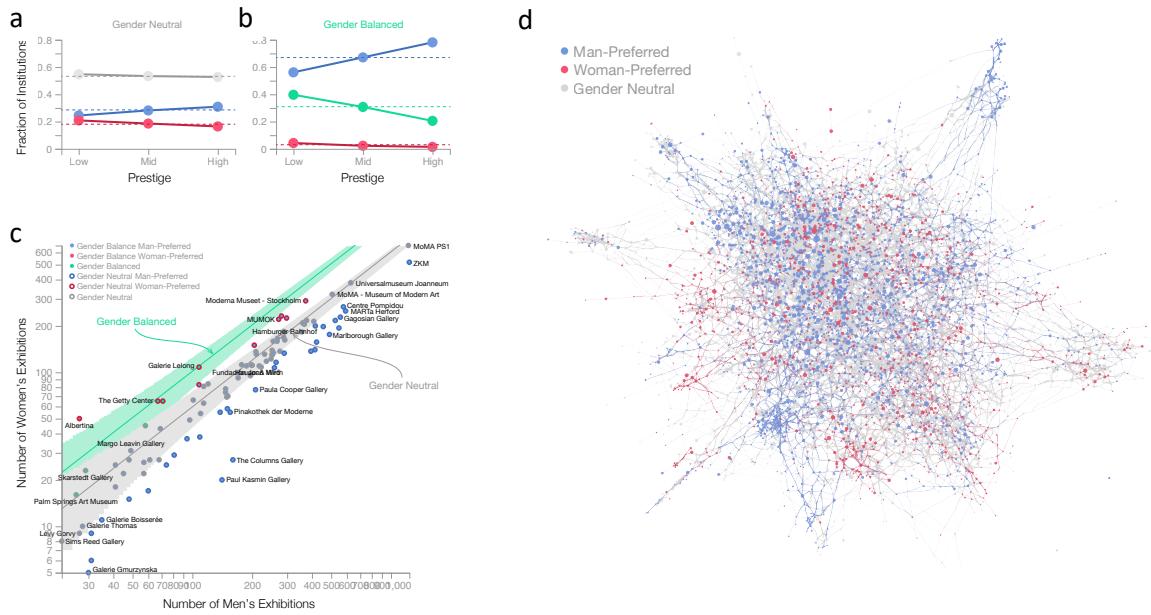


Figure 1: Portion of man-preferred, woman-preferred, gender-neutral or balanced institutions of different institution prestige under the **(a)** gender-neutral and **(b)** gender-balanced criteria. **(c)** Number of men and women exhibitions of top institutions by prestige. The gray shading shows the gender-neutral area and green shading shows gender-balance area. **(d)** Institutional Co-exhibition Network. Each node is an art institution colored by the institutional gender preference under the gender-neutral criteria.