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Cultural Evolution of Human Beauty Standards

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Extended Abstract

Beauty standards shape self-perception, health behaviors, and cultural norms. Media and fashion are key arbiters of these standards, yet system-level, longitudinal evidence has been limited. We assemble 791,285 records spanning 25 years of magazine covers, advertising campaigns, runway shows, and editorials, with linked anthropometrics, visible traits, national origin, and imagery. Our central analytic object is a *bipartite collaboration network* linking models to brands/magazines. From this network we derive a prestige hierarchy (via centrality-based tiering) and study how representational change diffuses along collaboration ties.

Network approach. We construct a model–entity bipartite graph and compute node centralities to stratify brands and magazines into ordered tiers (top, middle, lower). This hierarchy aligns with expert knowledge and enables diffusion analyses, difference-in-differences (DiD) designs with network-defined treatment, and event studies aligned to policy timing. The network lens asks two questions: (i) *Who* moves first? (ii) *How* does representational change spread?

Industry-wide trends. Variance in anthropometric measures increases by 73.4% over the period, while central tendencies for height, bust, waist, hips, and Relative Fat Mass (RFM) remain flat—evidence of growing tolerance for tail cases without shifting the modal physique. The apparent diversification is driven by a small fraction of outliers (principally plus-size models); the effective spectrum of model body types still corresponds to $< 0.01\%$ of the US female population. Intersectional analysis shows these outliers are $2.57\times$ more likely to be from ethnic-minority groups, concentrating multiple axes of "diversity" within the same bodies.

Diffusion from network hubs. Top-tier (high-centrality) brands and magazines adopt visible-trait and body-size diversity earlier and slightly more strongly, with mid- and lower-tiers following on short lags—consistent with diffusion outward from central hubs. Geography and phenotypes diversify (declining shares of blonde hair/blue eyes; rising contributions from Sub-Saharan Africa, East/South Asia), yet the core physique remains unchanged.

Causal shock along network-defined treatment. Using the network to mark treatment exposure, we evaluate the 2017 Kering–LVMH Charter (and contemporaneous French regulations) via DiD with year fixed effects. Treated brands show a clear and sustained increase in RFM relative to controls (baseline effect $+2.323$ RFM units; 95% CI: 1.963–2.683), with event-study estimates indicating no detectable pre-trends and persistent post-policy gains.

Population benchmarking. Relative to US women aged 16–29 (NHANES 2021–2023), US-based female models center around $\sim$18.6% RFM versus $\sim$38.1% in the population, a $\sim$20 percentage point gap that has remained stably large for two decades. Joint PCA underscores this separation, with waist/hips loading on the primary axis and height on the secondary.

Implications. The cultural evolution of beauty standards emerges as a *networked* process: influential hubs initiate change that diffuses through collaboration ties, expanding variation at the margins while leaving the center intact. Diversity gains are real but concentrated, often borne by intersectional minorities. Our network framework unifies description (who changes and when), mechanism (diffusion through ties), and policy impact (network-defined treatment), offering a scalable template for studying representation beyond fashion.

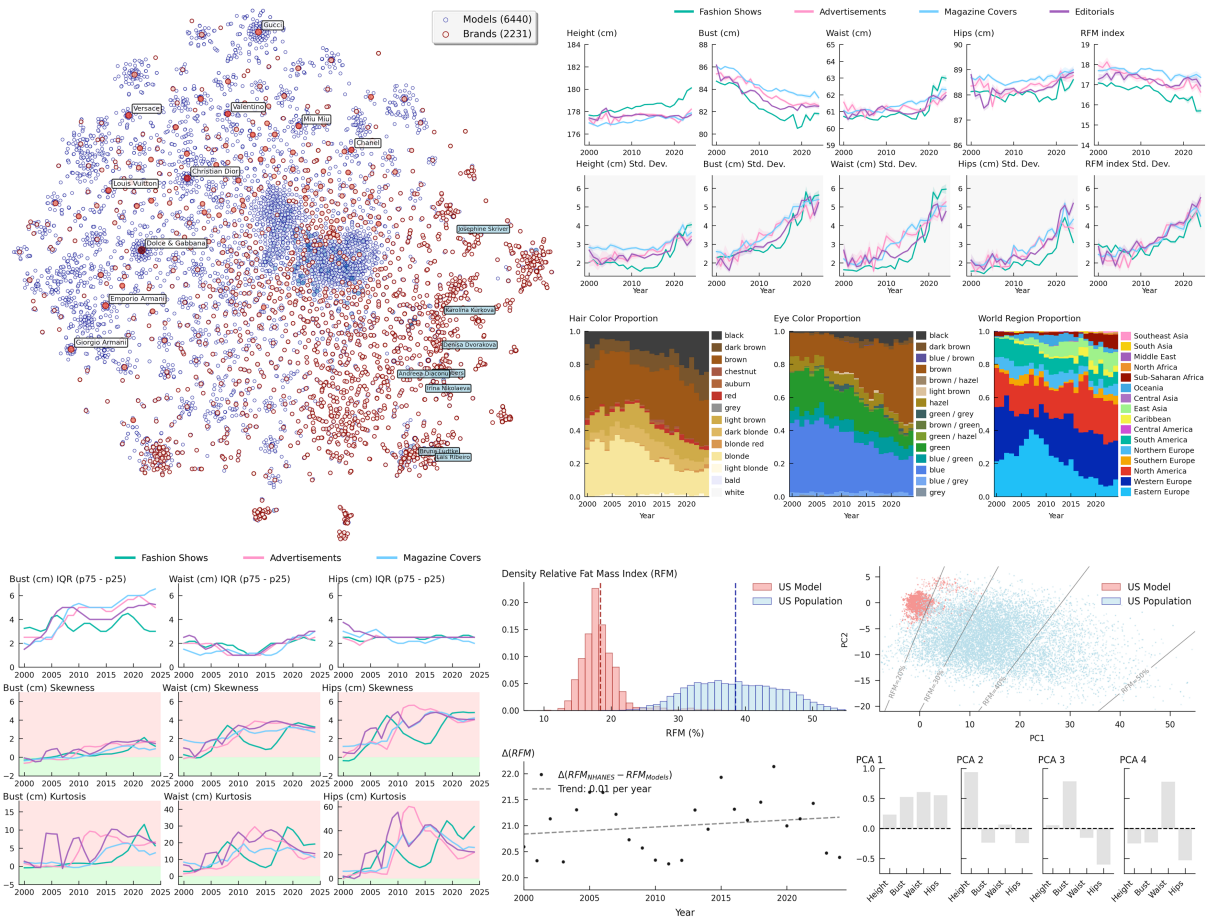

Figure 1: **Bipartite network schematic.** Models (left) connect to brands/magazines (right). High-centrality hubs (darker nodes) adopt diversity earlier, with diffusion to lower-centrality neighbors along collaboration ties.

Figure 2: **Network, traits, and population benchmarking.** **(a)** Bipartite collaboration network linking models (blue) to brands/magazines (red); annotated nodes highlight high-centrality hubs. **(b)** Means of height, bust, waist, hips, and Relative Fat Mass (RFM) by work type (fashion shows, advertisements, magazine covers, editorials). **(c)** Standard deviations for these measures showing rising variability over time. **(d)** Stacked proportions of hair colors, **(e)** eye colors, and **(f)** world regions of origin, indicating diversification of visible traits and geography. **(g)** Interquartile ranges (IQR) for bust, waist, and hips showing stable central mass. **(h)** Skewness and **(i)** kurtosis for bust, waist, and hips, evidencing heavier right tails over time. **(j)** RFM density for US-based female models versus US women (NHANES 2021–2023), showing minimal overlap. **(k)** Annual gap ΔRFM (population minus models) with fitted trend, indicating persistent ∼20 p.p. separation. **(l)** Joint PCA: scatter of models and population (PC1–PC2) and corresponding loadings, with waist/hips dominating PC1 and height PC2.