

“Who Run the World?”

Gender and the Social Network of R&B/Hip Hop Collaboration from 2012-2020

Supplemental Materials

Part 1. Comparison of collaborating and non-collaborating artists

Table S1. Artist-level descriptive statistics by collaboration history

	Collaborating artists	Non-collaborating artists	
Women	20.07%	23.44%	
Grammy Winners	27.11%	17.19%	
Grammy Nominees (with No Wins)	28.87%	15.63%	*
Years Active	14.82 (8.54)	12.56 (8.64)	

Notes: *significant difference between collaborating and non-collaborating artists using a two sample t-test at $p < 0.05$. Standard deviations are in parentheses.

Part 2. Supplemental analyses of the collaboration network before and after the rise of the #MeToo movement

To begin to consider whether the gender-related processes that defined the R&B/hip hop collaboration network changed over time, I estimated an additional set of ERGMs that consider two distinct panels of the R&B/hip hop collaboration network (see Tables S2 and S3). The first panel occurs before the exogenous shock of the #MeToo movement (2012-2016), and the second focuses on the years after the movement received widespread attention (2017-2020). All ERGMs are parameterized in the same manner as those presented in the manuscript. However, there are some key exceptions. ERGMs estimated on the pre-#MeToo panel only consider Grammy awards and nominations made by the end of 2016 and all artists' tenure in the music industry as of 2016. Like the models presented in the manuscript, ERGMs estimated on the post-#MeToo data consider Grammy awards and nominations made by the end of 2020 and all artists' tenure in the music industry as of 2020.

Table S2. ERGM results for 2012-2016 (pre-#MeToo) R&B/hip hop collaboration network

	Model 1			Model 2			Model 3		
	Coef.	SE		Coef.	SE		Coef.	SE	
<i>Structural Attributes</i>									
Edges	-7.347	(0.313)	***	-7.903	(0.344)	***	-7.354	(0.313)	***
GW Degree	2.439	(0.387)	***	2.416	(0.391)	***	2.535	(0.331)	***
GWESP	2.026	(0.120)	***	2.027	(0.119)	***	2.029	(0.120)	***
<i>Individual Attributes</i>									
Woman	-0.515	(0.117)	***				-0.712	(0.114)	***
Grammy Winner	0.539	(0.108)	***	0.539	(0.109)	***	0.543	(0.113)	***
Winner × Woman							-0.039	(0.202)	
Grammy Nominee	0.594	(0.010)	***	0.596	(0.103)	***	0.565	(0.105)	***
Nominee × Woman							0.390	(0.150)	**
Years Active	0.059	(0.016)	***	0.058	(0.017)	***	0.061	(0.016)	***
Years Active Squared	-0.002	(0.000)	***	-0.002	(0.000)	***	-0.002	(0.000)	***
<i>Dyadic Attributes</i>									
Both Men				0.577	(0.124)	***			
Both Women				-0.123	(0.360)				
AIC	2790			2790			2789		
BIC	2774			2860			2867		

Notes: ** $p < 0.01$, *** $p < 0.001$. SE refers to standard error.

Table S3. ERGM results for 2017-2020 (post-#MeToo) R&B/hip hop collaboration network

	Model 1			Model 2			Model 3		
	Coef.	SE		Coef.	SE		Coef.	SE	
<i>Structural Attributes</i>									
Edges	-6.561	(0.301)	***	-6.613	(0.314)	***	-6.548	(0.315)	***
GW Degree	1.879	(0.403)	***	1.858	(0.404)	***	1.925	(0.420)	***
GWESP	1.846	(0.116)	***	1.840	(0.119)	***	1.846	(0.118)	***
<i>Individual Attributes</i>									
Woman	-0.031	(0.089)					-0.107	(0.301)	
Grammy Winner	0.355	(0.097)	***	0.348	(0.098)	***	0.383	(0.103)	***
Winner × Woman							-0.212	(0.373)	
Grammy Nominee	0.358	(0.092)	***	0.351	(0.092)	***	0.326	(0.100)	**
Nominee × Woman							0.199	(0.320)	
Years Active	0.048	(0.018)	**	0.048	(0.018)	**	0.047	(0.019)	*
Years Active Squared	-0.002	(0.001)	**	-0.001	(0.001)	**	-0.002	(0.001)	**
<i>Dyadic Attributes</i>									
Both Men				0.084	(0.106)				
Both Women				0.232	(0.369)				
AIC	2494			2496			2496		
BIC	2554			2564			2571		

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SE refers to standard error.

Part 3. ERGM Diagnostics

Below I present a series of convergence diagnostics and goodness of fit statistics for the ERGMs presented in the manuscript in Table 3. Following Hunter et al. (2008), I consider each model's convergence and goodness of fit by comparing the networks generated from the ERGMs with the observed network's (1) degree distribution, (2) minimum geodesic distance distribution, (3) edgewise shared partner distribution, and (4) triad census (see Figures S1-S3). To assess the risk of multicollinearity across the three models, I also present the correlations between all include variables (see Tables S4-S6). Although the ERGMs tend to underestimate the number of edgewise shared partners – particularly at higher values – all models fit the observed network relatively well. Most parameters are modestly correlated. When there are occasional exceptions to this trend, they are to be expected (e.g., the relatively high correlation between years active and years active squared).

Reference

Hunter, David R., Mark S. Handcock, Carter T. Butts, Steven M. Goodreau, and Martina Morris. 2008. “ergm: A Package to Fit, Simulate, and Diagnose Exponential-Family Models for Networks.” *Journal of Statistical Software* 24(3): 1-29.

Figure S1. Goodness of fit summary for Model 1

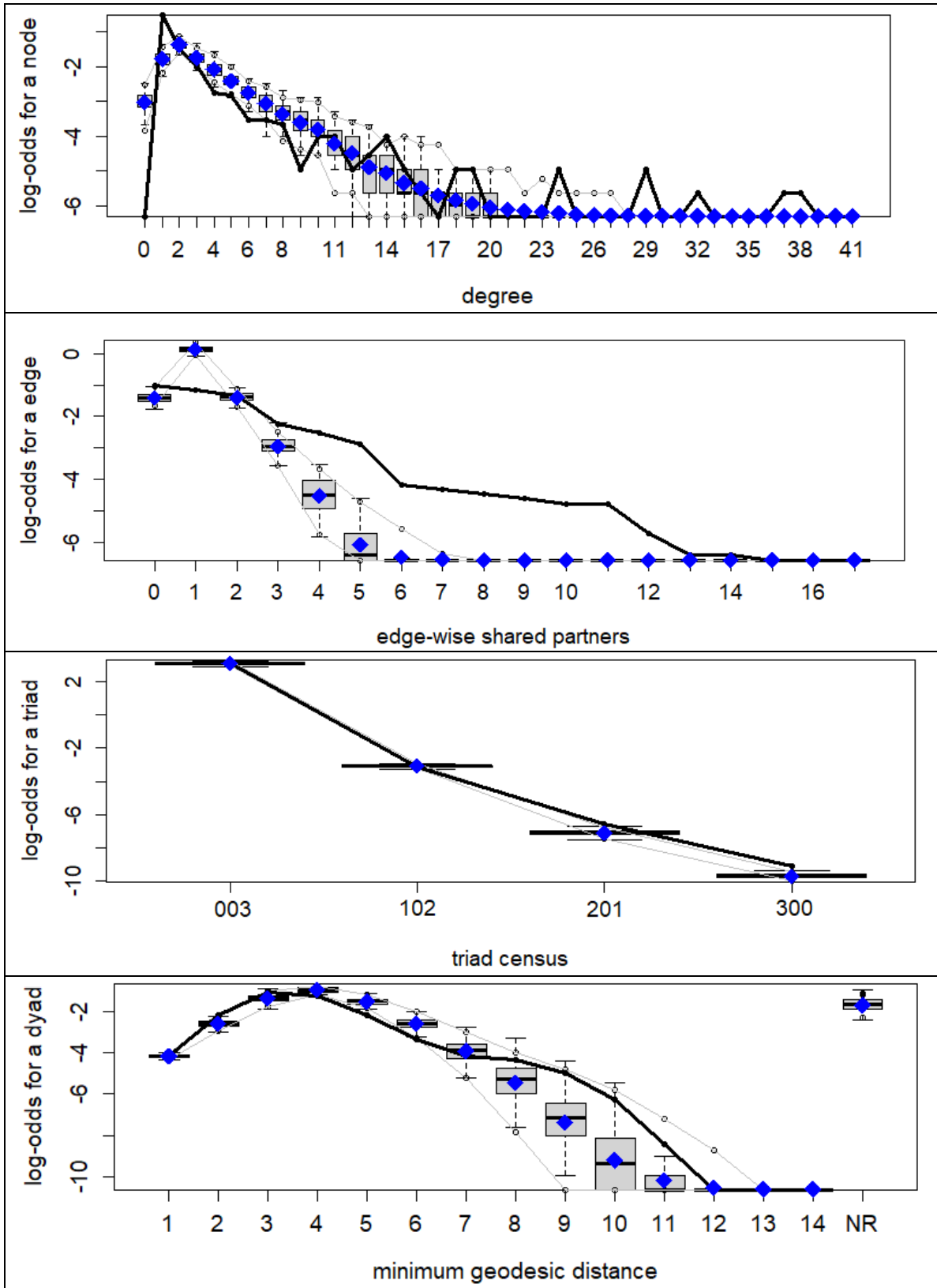


Figure S2. Goodness of fit summary for Model 2

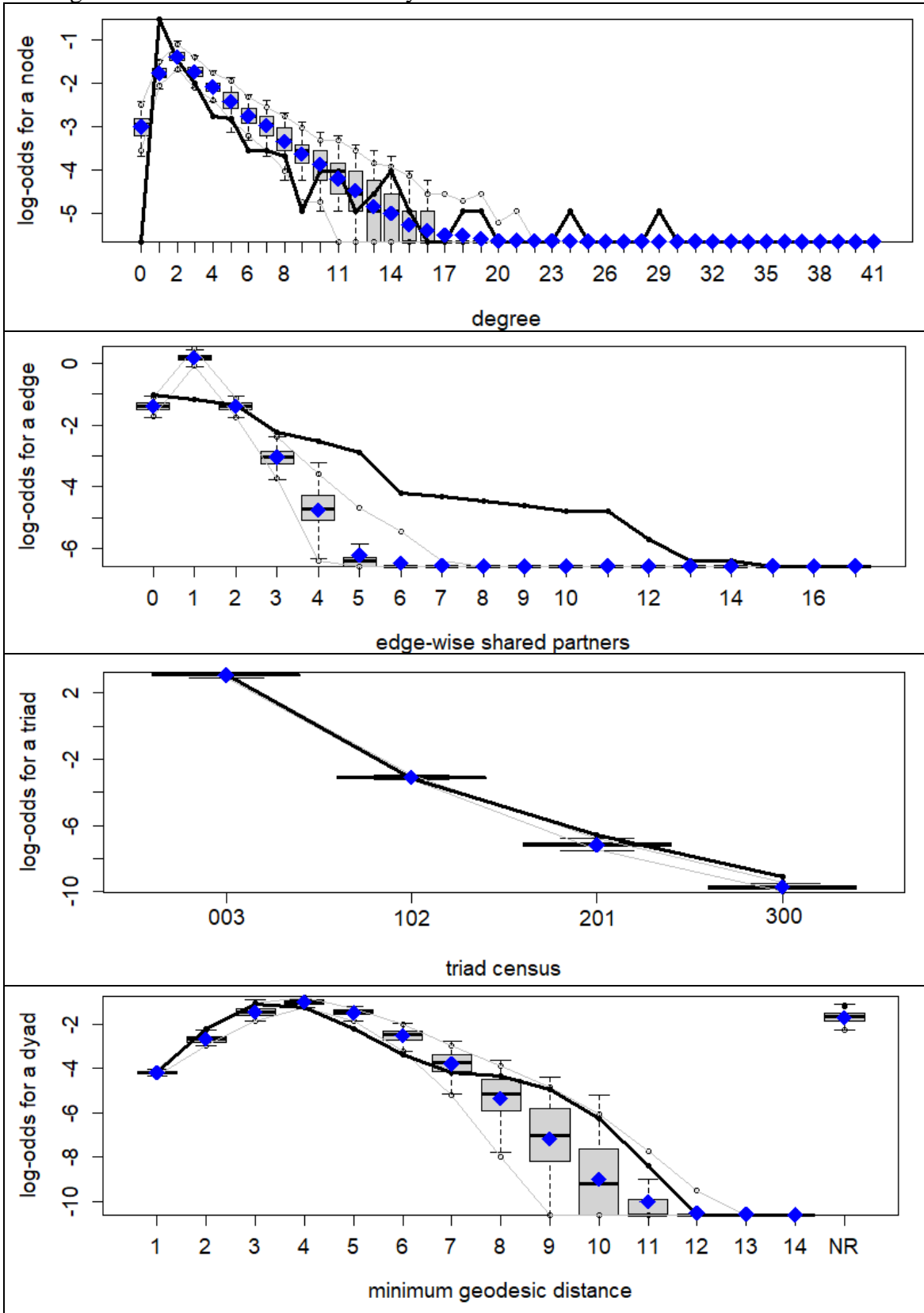


Figure S3. Goodness of fit summary for Model 3

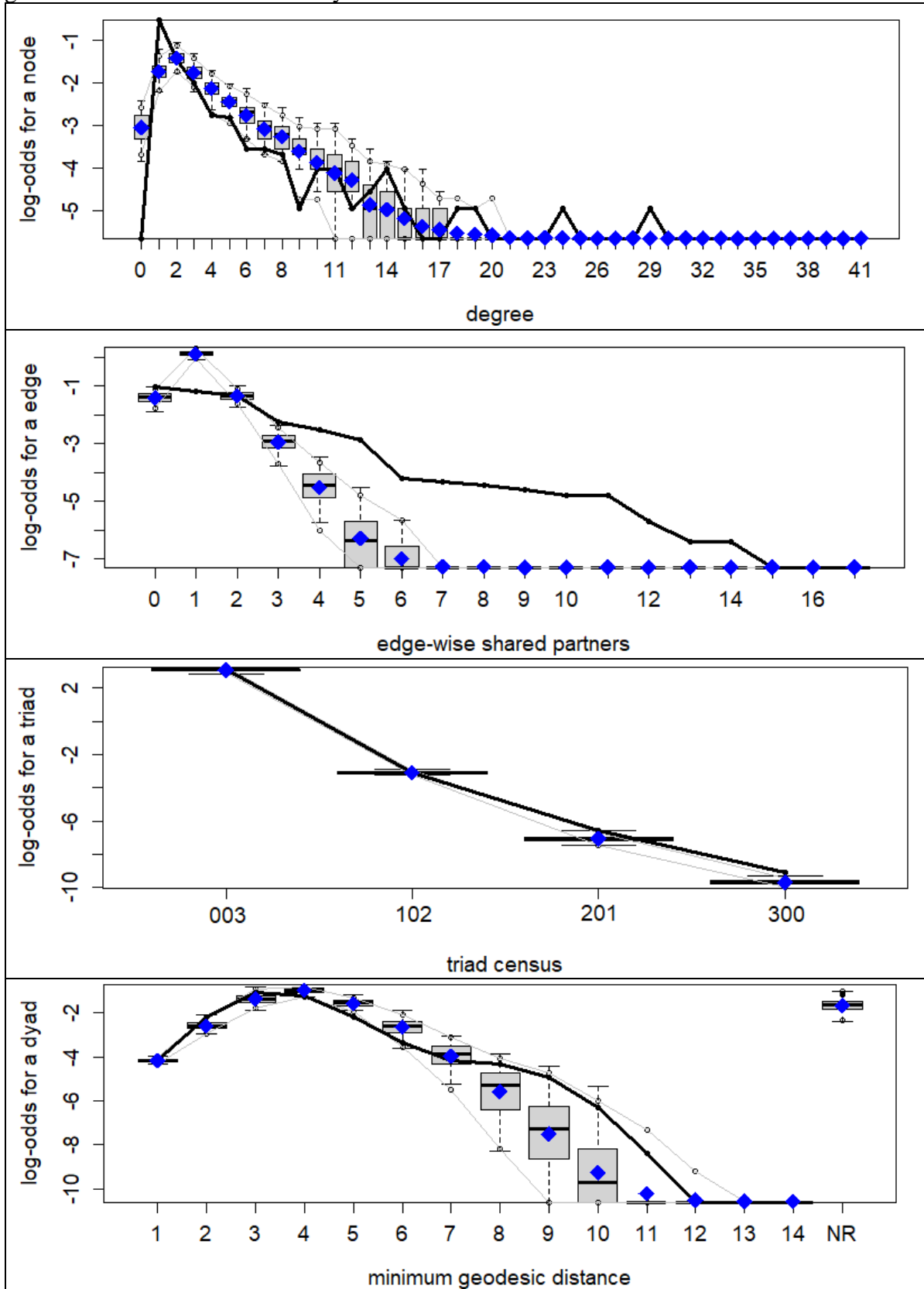


Table S4. Correlation matrix for Model 1

	Woman	Grammy win.	Grammy nom.	Years active	Years active sq.	GWESP	GW degree
Woman	1.00						
Grammy winner	.44	1.00					
Grammy nom.	.43	.55	1.00				
Years active	.50	.88	.83	1.00			
Years active sq.	.47	.86	.77	.98	1.00		
GWESP	.48	.85	.86	.96	.91	1.00	
GW degree	.41	.37	.35	.47	.44	.44	1.00

Table S5. Correlation matrix for Model 2

	Both men	Both women	Grammy win.	Grammy nom.	Years active	Years active sq.	GWESP	GW degree
Both men	1.00							
Both women	.02	1.00						
Grammy winner	.81	.12	1.00					
Grammy nom.	.83	.13	.55	1.00				
Years active	.92	.15	.87	.83	1.00			
Years active sq.	.87	.15	.85	.76	.98	1.00		
GWESP	.94	.12	.84	.86	.96	.90	1.00	
GW degree	.43	.19	.37	.38	.48	.46	.45	1.00

Table S6. Correlation matrix for Model 3

	Woman	Grammy win.	Grammy nom.	Woman × Win	Woman × Nom.	Years active	Years active sq.	GWESP	GW degree
Woman	1.00								
Grammy winner	.41	1.00							
Grammy nom.	.52	.55	1.00						
Woman × Winner	.49	.32	.15	1.00					
Woman × Nom.	.86	.32	.54	.09	1.00				
Years active	.53	.88	.82	.26	.46	1.00			
Years active sq.	.50	.85	.76	.26	.43	.98	1.00		
GWESP	.51	.85	.85	.24	.46	.96	.90	1.00	
GW degree	.38	.35	.33	.27	.21	.44	.42	.41	1.00