

WebTable 1. Complete output for multigroup structural equation model

Dataset	Response	Predictor	Estimate	SE	z value	P
Complete	γ -variability	Synchrony	0.193	0.016	11.712	0.000
	γ -variability	$\bar{\alpha}$ -variability	1.124	0.017	65.034	0.000
	Synchrony	β -diversity	-0.485	0.024	-20.337	0.000
	Synchrony	$\bar{\alpha}$ -richness	-1.136	0.041	-27.985	0.000
	Synchrony	Spatial scale	-0.026	0.021	-1.219	0.223
	Synchrony	γ -richness	0.367	0.045	8.171	0.000
	Synchrony	ED	0.852	0.024	36.238	0.000
	$\bar{\alpha}$ -variability	$\bar{\alpha}$ -richness	-0.451	0.053	-8.429	0.000
	$\bar{\alpha}$ -variability	ED	-0.308	0.039	-7.895	0.000
	β -diversity	ED	0.163	0.031	5.208	0.000
	β -diversity	Spatial scale	0.235	0.021	11.265	0.000
	β -diversity	γ -richness	0.416	0.032	13.188	0.000
	γ -richness	ED	0.678	0.023	29.174	0.000
	γ -richness	Spatial scale	-0.036	0.021	-1.664	0.096
	$\bar{\alpha}$ -richness	γ -richness	0.852	0.014	61.635	0.000
	$\bar{\alpha}$ -richness	$\bar{\alpha}$ -variability	-0.086	0.018	-4.715	0.000
	ED	Spatial scale	0.268	0.029	9.150	0.000
	Upper Chesapeake Bay	γ -variability	Synchrony	0.518	0.051	10.141
γ -variability		$\bar{\alpha}$ -variability	0.240	0.038	6.253	0.000
Synchrony		β -diversity	-0.006	0.073	-0.083	0.934
Synchrony		$\bar{\alpha}$ -richness	0.046	0.108	0.422	0.673
Synchrony		Spatial scale	-0.690	0.032	-21.402	0.000
Synchrony		γ -richness	0.071	0.100	0.707	0.480
Synchrony		ED	0.286	0.034	8.317	0.000
$\bar{\alpha}$ -variability		$\bar{\alpha}$ -richness	-0.209	0.182	-1.151	0.250
$\bar{\alpha}$ -variability		ED	-0.322	0.047	-6.925	0.000
β -diversity		ED	0.006	0.045	0.131	0.896
β -diversity		Spatial scale	-0.006	0.046	-0.123	0.902
β -diversity		γ -richness	0.402	0.045	8.977	0.000
γ -richness		ED	-0.057	0.050	-1.151	0.250
γ -richness		Spatial scale	0.107	0.050	2.170	0.030
$\bar{\alpha}$ -richness		γ -richness	0.624	0.038	16.225	0.000
$\bar{\alpha}$ -richness		$\bar{\alpha}$ -variability	0.041	0.122	0.333	0.739
ED		Spatial scale	0.239	0.047	5.062	0.000
Lower Chesapeake Bay		γ -variability	Synchrony	-0.406	0.044	-9.307
	γ -variability	$\bar{\alpha}$ -variability	0.704	0.045	15.714	0.000
	Synchrony	β -diversity	-0.040	0.062	-0.648	0.517
	Synchrony	$\bar{\alpha}$ -richness	0.189	0.110	1.719	0.086
	Synchrony	Spatial scale	-0.404	0.062	-6.505	0.000
	Synchrony	γ -richness	-0.130	0.091	-1.428	0.153
	Synchrony	ED	-0.138	0.062	-2.223	0.026
	$\bar{\alpha}$ -variability	$\bar{\alpha}$ -richness	0.443	0.500	0.885	0.376
	$\bar{\alpha}$ -variability	ED	0.130	0.077	1.676	0.094
	β -diversity	ED	0.040	0.068	0.593	0.553
	β -diversity	Spatial scale	-0.069	0.069	-1.009	0.313
	β -diversity	γ -richness	0.078	0.069	1.140	0.254
	γ -richness	ED	0.037	0.068	0.549	0.583

	γ -richness	Spatial scale	0.144	0.064	2.229	0.026
	$\bar{\alpha}$ -richness	γ -richness	0.548	0.089	6.181	0.000
	$\bar{\alpha}$ -richness	$\bar{\alpha}$ -variability	-0.275	0.344	-0.799	0.424
	ED	Spatial scale	-0.035	0.068	-0.514	0.607
Stream fish	γ -variability	Synchrony	0.017	0.060	0.279	0.780
	γ -variability	$\bar{\alpha}$ -variability	1.263	0.051	24.978	0.000
	Synchrony	β -diversity	-0.129	0.028	-4.642	0.000
	Synchrony	$\bar{\alpha}$ -richness	-0.875	0.064	-13.727	0.000
	Synchrony	Spatial scale	0.171	0.025	6.734	0.000
	Synchrony	γ -richness	-0.262	0.053	-4.920	0.000
	Synchrony	ED	0.380	0.024	15.736	0.000
	$\bar{\alpha}$ -variability	$\bar{\alpha}$ -richness	-0.585	0.066	-8.865	0.000
	$\bar{\alpha}$ -variability	ED	-0.284	0.053	-5.386	0.000
	β -diversity	ED	0.261	0.042	6.241	0.000
	β -diversity	Spatial scale	0.695	0.034	20.396	0.000
	β -diversity	γ -richness	-0.138	0.044	-3.126	0.002
	γ -richness	ED	0.622	0.034	18.545	0.000
	γ -richness	Spatial scale	-0.213	0.033	-6.432	0.000
	$\bar{\alpha}$ -richness	γ -richness	0.779	0.017	45.751	0.000
	$\bar{\alpha}$ -richness	$\bar{\alpha}$ -variability	-0.060	0.021	-2.924	0.003
	ED	Spatial scale	-0.266	0.044	-6.100	0.000
AZ terrestrial arthropods	γ -variability	Synchrony	0.599	0.112	5.340	0.000
	γ -variability	$\bar{\alpha}$ -variability	0.372	0.118	3.151	0.002
	Synchrony	β -diversity	0.205	0.070	2.947	0.003
	Synchrony	$\bar{\alpha}$ -richness	0.044	0.072	0.622	0.534
	Synchrony	Spatial scale	0.115	0.059	1.960	0.050
	Synchrony	γ -richness	-1.010	0.068	-14.839	0.000
	Synchrony	ED	-0.189	0.048	-3.951	0.000
	$\bar{\alpha}$ -variability	$\bar{\alpha}$ -richness	-0.813	0.400	-2.033	0.042
	$\bar{\alpha}$ -variability	ED	0.106	0.098	1.075	0.282
	β -diversity	ED	0.122	0.054	2.274	0.023
	β -diversity	Spatial scale	-0.310	0.066	-4.696	0.000
	β -diversity	γ -richness	0.822	0.063	12.990	0.000
	γ -richness	ED	0.243	0.078	3.107	0.002
	γ -richness	Spatial scale	0.372	0.075	4.951	0.000
	$\bar{\alpha}$ -richness	γ -richness	0.786	0.131	5.991	0.000
	$\bar{\alpha}$ -richness	$\bar{\alpha}$ -variability	0.269	0.317	0.850	0.395
	ED	Spatial scale	0.621	0.061	10.204	0.000

Notes: estimates are standardized. AZ = Arizona; ED = environmental dissimilarity; SE = standard error.