Supporting Information. Uiterwaal, S.F., and J.P. DeLong. 2020. Functional responses are maximized at intermediate temperatures. Ecology.

Appendix S1

Figure S1. Histogram of handling time estimates from the FoRAGE database. We chose 1e-6 (vertical line) as the cut-off value. Handling times shorter than this value were removed from our handling time analyses in an effort to ensure that our models focused on well-identified times.

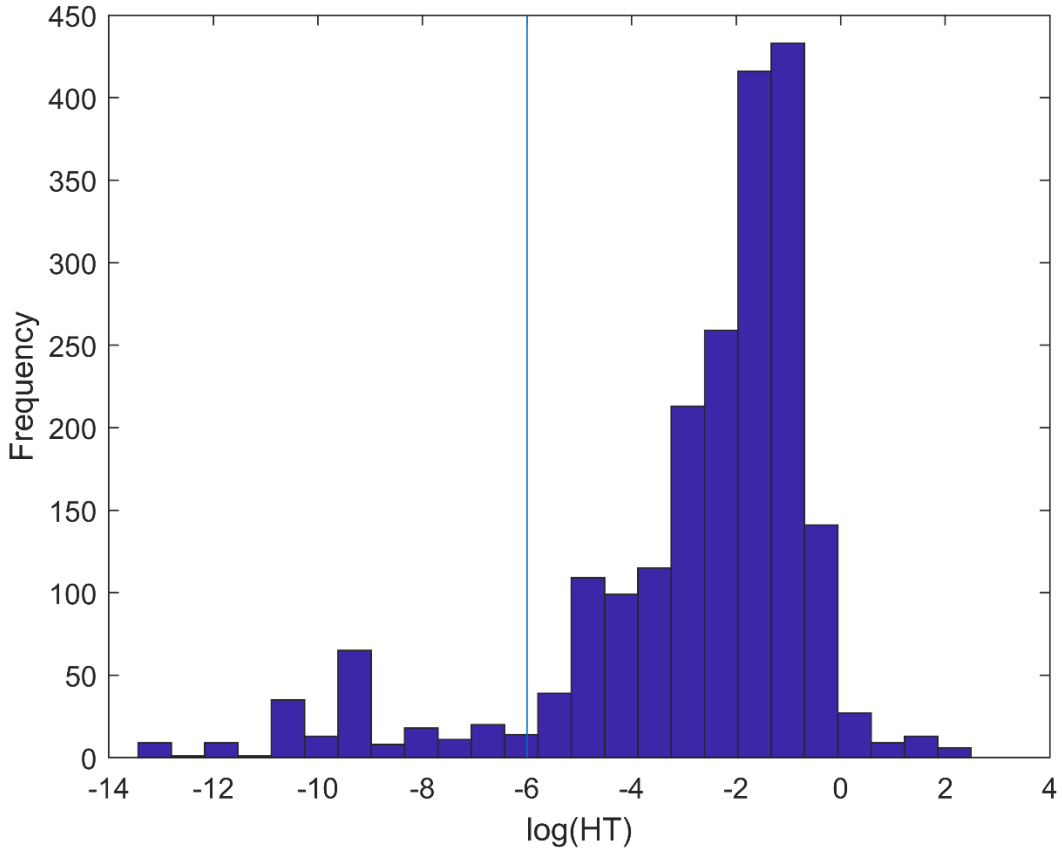

Table S1. AIC comparison of linear models for handling time (h) for all functional responses and without type III functional responses. The optimum model is bolded and variations of this model (either without a random taxon effect or with a mass ratio) are indicated with asterisks. CM: Consumer mass. RM: Resource mass. AS: Arena size. Dim: Dimensionality. Ratio: Consumer:resource mass ratio. LL: Log likelihood.

	All functional responses			Type III functional responses excluded		
Model	**ΔAIC**	**AIC**	**LL**	**ΔAIC**	**AIC**	**LL**
$\ln(h) \sim \text{Temp}^2 + \ln(\text{CM}) + \ln(\text{RM}) + \text{Dim} + \ln(\text{AS}) + (1\|\text{Taxon})$	**0**	**5329**	**-2655**	0	2987	-1485
$\ln(h) \sim \text{Temp} + \ln(\text{CM}) + \ln(\text{RM}) + \text{Dim} + \ln(\text{AS}) + (1\|\text{Taxon})$	-16	5345	-2664	-7	2994	-1489
$\ln(h) \sim \text{Temp}^2 + \ln(\text{RM}) + \text{Dim} + \ln(\text{AS}) + (1\|\text{Taxon})$	-480	5809	-2897	-303	3290	-1634
$\ln(h) \sim \text{Temp} + \ln(\text{RM}) + \text{Dim} + \ln(\text{AS}) + (1\|\text{Taxon})$	-504	5833	-2910	-312	3299	-1640
$\ln(h) \sim \text{Temp}^2 + \ln(\text{CM}) + \text{Dim} + \ln(\text{AS}) + (1\|\text{Taxon})$	-1144	6473	-3229	-656	3643	-1814
$\ln(h) \sim \text{Temp} + \ln(\text{CM}) + \text{Dim} + \ln(\text{AS}) + (1\|\text{Taxon})$	-1182	6511	-3249	-678	3665	-1825
$\ln(h) \sim \text{Temp}^2 + \ln(\text{CM}) + \ln(\text{RM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-9	5338	-2661	-3	2990	-1487
$\ln(h) \sim \text{Temp} + \ln(\text{CM}) + \ln(\text{RM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-28	5357	-2671	-12	2999	-1493
$\ln(h) \sim \text{Temp}^2 + \ln(\text{CM}) + \ln(\text{RM}) + \text{Dim} + (1\|\text{Taxon})$	-632	5961	-2973	-336	3323	-1653
$\ln(h) \sim \text{Temp} + \ln(\text{CM}) + \ln(\text{RM}) + \text{Dim} + (1\|\text{Taxon})$	-651	5980	-2983	-345	3332	-1659
$\ln(h) \sim \text{Temp}^2 + \text{Dim} + \ln(\text{AS}) + (1\|\text{Taxon})$	-1704	7033	-3510	-1017	4004	-1992
$\ln(h) \sim \text{Temp} + \text{Dim} + \ln(\text{AS}) + (1\|\text{Taxon})$	-1741	7070	-3529	-1040	4027	-2004
$\ln(h) \sim \text{Temp}^2 + \ln(\text{RM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-483	5812	-2899	-304	3291	-1636
$\ln(h) \sim \text{Temp} + \ln(\text{RM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-508	5837	-2913	-316	3303	-1643
$\ln(h) \sim \text{Temp}^2 + \ln(\text{RM}) + \text{Dim} + (1\|\text{Taxon})$	-1167	6496	-3241	-659	3646	-1813
$\ln(h) \sim \text{Temp} + \ln(\text{RM}) + \text{Dim} + (1\|\text{Taxon})$	-1189	6518	-3253	-670	3657	-1820
$\ln(h) \sim \text{Temp}^2 + \ln(\text{CM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-1144	6473	-3229	-654	3641	-1814
$\ln(h) \sim \text{Temp} + \ln(\text{CM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-1183	6512	-3250	-676	3663	-1826
$\ln(h) \sim \text{Temp}^2 + \ln(\text{CM}) + \text{Dim} + (1\|\text{Taxon})$	-1901	7230	-3608	-1052	4039	-2013
$\ln(h) \sim \text{Temp} + \ln(\text{CM}) + \text{Dim} + (1\|\text{Taxon})$	-1940	7269	-3629	-1073	4060	-2024
$\ln(h) \sim \text{Temp}^2 + \ln(\text{CM}) + \ln(\text{RM}) + (1\|\text{Taxon})$	-648	5977	-2982	-341	3328	-1657
$\ln(h) \sim \text{Temp} + \ln(\text{CM}) + \ln(\text{RM}) + (1\|\text{Taxon})$	-670	5999	-2994	-353	3340	-1664
$\ln(h) \sim \text{Temp}^2 + \ln(\text{AS}) + (1\|\text{Taxon})$	-1705	7034	-3511	-1016	4003	-1992
$\ln(h) \sim \text{Temp} + \ln(\text{AS}) + (1\|\text{Taxon})$	-1744	7073	-3531	-1039	4026	-2005
$\ln(h) \sim \text{Temp}^2 + \text{Dim} + (1\|\text{Taxon})$	-2488	7817	-3903	-1422	4409	-2195
$\ln(h) \sim \text{Temp} + \text{Dim} + (1\|\text{Taxon})$	-2528	7857	-3924	-1446	4433	-2209
$\ln(h) \sim \text{Temp}^2 + \ln(\text{RM}) + (1\|\text{Taxon})$	-1176	6505	-3246	-663	3650	-1816

$\ln(h) \sim \text{Temp} + \ln(\text{RM}) + (1\|\text{Taxon})$	-1200	6529	-3260	-676	3663	-1824
$\ln(h) \sim \text{Temp}^2 + \ln(\text{CM}) + (1\|\text{Taxon})$	-1905	7234	-3611	-1051	4038	-2013
$\ln(h) \sim \text{Temp} + \ln(\text{CM}) + (1\|\text{Taxon})$	-1945	7274	-3632	-1074	4061	-2025
$\ln(h) \sim \text{Temp}^2 + (1\|\text{Taxon})$	-2494	7823	-3907	-1422	4409	-2196
$\ln(h) \sim \text{Temp} + (1\|\text{Taxon})$	-2508	7837	-3929	-1449	4436	-2211
$*\ln(h) \sim \text{Temp}^2 + \ln(\text{CM}) + \ln(\text{RM}) + \text{Dim} + \ln(\text{AS})$	-142	5471	-2727	-86	3073	-1529
$*\ln(h) \sim \text{Temp}^2 + \ln(\text{Ratio}) + \text{Dim} + \ln(\text{AS}) + (1\|\text{Taxon})$	-11	5340	-2662	-5	2992	-1488

Table S2. AIC comparison of linear models for space clearance rate (a) for each dimensionality for all functional responses and without type III functional responses. The optimum models are bolded and variations of these models (either without a random taxon effect, with a mass ratio, or with residuals from an arena size-consumer mass regression) are indicated with asterisks. CM: Consumer mass. RM: Resource mass. AS: Arena size. Ratio: Consumer:resource mass ratio. LL: Log likelihood.

		All functional responses			**Type III functional responses excluded**		
Dim	**Model**	**ΔAIC**	**AIC**	**LL**	**ΔAIC**	**AIC**	**LL**
2D	**$\ln(a) \sim \text{Temp}^2 + \ln(\text{CM}) + \ln(\text{RM}) + \ln(\text{AS}) + (1\|\text{Taxon})$**	**0**	**1308**	**-645**	0	764	-374
	$\ln(a) \sim \text{Temp} + \ln(\text{CM}) + \ln(\text{RM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-11	1319	-653	-15	779	-382
	$\ln(a) \sim \text{Temp}^2 + \ln(\text{RM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-79	1387	-686	-40	804	-395
	$\ln(a) \sim \text{Temp} + \ln(\text{RM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-90	1398	-693	-55	819	-403
	$\ln(a) \sim \text{Temp}^2 + \ln(\text{CM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-260	1568	-777	-140	904	-445
	$\ln(a) \sim \text{Temp} + \ln(\text{CM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-267	1575	-781	-149	913	-450
	$\ln(a) \sim \text{Temp}^2 + \ln(\text{CM}) + \ln(\text{RM}) + (1\|\text{Taxon})$	-801	2109	-1048	-467	1231	-609
	$\ln(a) \sim \text{Temp} + \ln(\text{CM}) + \ln(\text{RM}) + (1\|\text{Taxon})$	-800	2108	-1048	-468	1232	-610
	$\ln(a) \sim \text{Temp}^2 + \ln(\text{AS}) + (1\|\text{Taxon})$	-458	1766	-877	-205	969	-478
	$\ln(a) \sim \text{Temp} + \ln(\text{AS}) + (1\|\text{Taxon})$	-463	1771	-881	-214	978	-484
	$\ln(a) \sim \text{Temp}^2 + \ln(\text{RM}) + (1\|\text{Taxon})$	-900	2208	-1098	-515	1279	-634
	$\ln(a) \sim \text{Temp} + \ln(\text{RM}) + (1\|\text{Taxon})$	-899	2207	-1098	-517	1281	-635
	$\ln(a) \sim \text{Temp}^2 + \ln(\text{CM}) + (1\|\text{Taxon})$	-1212	2520	-1254	-678	1442	-715
	$\ln(a) \sim \text{Temp} + \ln(\text{CM}) + (1\|\text{Taxon})$	-1210	2518	-1254	-676	1440	-715
	$\ln(a) \sim \text{Temp}^2 + (1\|\text{Taxon})$	-1494	2802	-1396	-806	1570	-780
	$\ln(a) \sim \text{Temp} + (1\|\text{Taxon})$	-1492	2800	-1396	-804	1568	-780

	*ln(a) ~ Temp^2 + ln(CM) + ln(RM) + ln(AS)	-177	1485	-735	-97	861	-424
	*ln(a) ~ Temp^2 + ln(Ratio) + ln(AS) + (1|Taxon)	-1	1309	-648	-4	768	-377
	*ln(a) ~ Temp^2 + Residuals + ln(RM) + ln(AS) + (1|Taxon)	0	1308	-646	0	764	-374
	ln(a) ~ Temp^2 + ln(CM) + ln(RM) + ln(AS) + (1|Taxon)	**0**	**599**	**-292**	0	312.6	-148
	ln(a) ~ Temp + ln(CM) + ln(RM) + ln(AS) + (1|Taxon)	-20	619	-303	-13	326	-156
	ln(a) ~ Temp^2 + ln(RM) + ln(AS) + (1|Taxon)	-94	693	-340	-47	360	-173
	ln(a) ~ Temp + ln(RM) + ln(AS) + (1|Taxon)	-112	711	-349	-60	373	-181
	ln(a) ~ Temp^2 + ln(CM) + ln(AS) + (1|Taxon)	-79	678	-332	-29	342	-164
	ln(a) ~ Temp + ln(CM) + ln(AS) + (1|Taxon)	97	696	-342	-43	356	-172
	ln(a) ~ Temp^2 + ln(CM) + ln(RM) + (1|Taxon)	-283	882	-434	-129	442	-214
	ln(a) ~ Temp + ln(CM) + ln(RM) + (1|Taxon)	-282	881	-435	-132	445	-217
	ln(a) ~ Temp^2 + ln(AS) + (1|Taxon)	-196	795	-392	-88	401	-194
2.5D	ln(a) ~ Temp + ln(AS) + (1|Taxon)	-210	809	-399	-99	412	-201
	ln(a) ~ Temp^2 + ln(RM) + (1|Taxon)	-406	1005	-497	-199	512	-250
	ln(a) ~ Temp + ln(RM) + (1|Taxon)	-404	1003	-497	-199	512	-251
	ln(a) ~ Temp^2 + ln(CM) + (1|Taxon)	-403	1002	-495	-163	476	-232
	ln(a) ~ Temp + ln(CM) + (1|Taxon)	-403	1002	-496	-166	479	-235
	ln(a) ~ Temp^2 + (1|Taxon)	-558	1157	-574	-246	559	-275
	ln(a) ~ Temp + (1|Taxon)	-557	1156	-574	-247	560	-276
	*ln(a) ~ Temp^2 + ln(CM) + ln(RM) + ln(AS)	-10	609	-298	2	310.6	-148
	*ln(a) ~ Temp^2 + ln(Ratio) + ln(AS) + (1|Taxon)	-10	609	-298	1.7	310.9	-148
	*ln(a) ~ Temp^2 + Residuals + ln(RM) + ln(AS) + (1|Taxon)	-1	600	-292	0	312.6	-148
	ln(a) ~ Temp^2 + ln(CM) + ln(RM) + ln(AS) + (1|Taxon)	**0**	**3342**	**-1663**	0	1771	-877
	ln(a) ~ Temp + ln(CM) + ln(RM) + ln(AS) + (1|Taxon)	-5	3347	-1667	-11	1782	-884
	ln(a) ~ Temp^2 + ln(RM) + ln(AS) + (1|Taxon)	-427	3769	-1878	-245	2016	-998
	ln(a) ~ Temp + ln(RM) + ln(AS) + (1|Taxon)	-448	3790	-1889	-269	2040	-1012
	ln(a) ~ Temp^2 + ln(CM) + ln(AS) + (1|Taxon)	-636	3978	-1982	-430	2201	-1094
3D	ln(a) ~ Temp + ln(CM) + ln(AS) + (1|Taxon)	-655	3997	-1993	-454	2225	-1107
	ln(a) ~ Temp^2 + ln(CM) + ln(RM) + (1|Taxon)	-371	3713	-1849	-187	1958	-972
	ln(a) ~ Temp + ln(CM) + ln(RM) + (1|Taxon)	-372	3714	-1851	-195	1966	-977
	ln(a) ~ Temp^2 + ln(AS) + (1|Taxon)	-1214	4556	-2272	-773	2544	-1263
	ln(a) ~ Temp + ln(AS) + (1|Taxon)	-1240	4582	-2286	-801	2572	-1279
	ln(a) ~ Temp^2 + ln(RM) + (1|Taxon)	-982	4324	-2156	-563	2334	-1158

$\ln(a) \sim \text{Temp} + \ln(\text{RM}) + (1\|\text{Taxon})$	-1000	4342	-2166	-587	2358	-1171
$\ln(a) \sim \text{Temp}^2 + \ln(\text{CM}) + (1\|\text{Taxon})$	-1126	4468	-2228	-677	2448	-1218
$\ln(a) \sim \text{Temp} + \ln(\text{CM}) + (1\|\text{Taxon})$	-1143	4485	-2237	-705	2476	-1233
$\ln(a) \sim \text{Temp}^2 + (1\|\text{Taxon})$	-1937	5279	-2635	-1185	2956	-1470
$\ln(a) \sim \text{Temp} + (1\|\text{Taxon})$	-1964	5306	-2649	-1228	2999	-1493
*$\ln(a) \sim \text{Temp}^2 + \ln(\text{CM}) + \ln(\text{RM}) + \ln(\text{AS})$	-194	3536	-1761	-81	1852	-919
*$\ln(a) \sim \text{Temp}^2 + \ln(\text{Ratio}) + \ln(\text{AS}) + (1\|\text{Taxon})$	-261	3603	-1794	-117	1888	-937
*$\ln(a) \sim \text{Temp}^2 + \text{Residuals} + \ln(\text{RM}) + \ln(\text{AS}) + (1\|\text{Taxon})$	1	3343	-1663	0	1771	-877

Table S3. Results for the best linear models for space clearance rate modified to include residuals from an arena size-consumer mass regression (Residuals) instead of consumer mass for 2D, 2.5D, and 3D functional responses. RM = resource mass and AS = arena size.

Dim	Term	Estimate	SE	*t*	*p*-value
2D	Intercept	-8.6	1.06	-818	<0.001
	Temperature^2	-0.003	0.001	-3.67	<0.001
	Temperature	0.10	0.03	3.04	0.002
	Residuals	0.05	0.03	1.92	0.056
	ln(RM)	-0.005	0.02	-0.02	0.982
	ln(AS)	1.05	0.05	19.29	<0.001
2.5D	Intercept	-16.28	1.21	-13.46	<0.001
	Temperature^2	-0.01	0.002	-4.91	<0.001
	Temperature	0.53	0.08	6.34	<0.001
	Residuals	-0.10	0.07	-1.52	0.131
	ln(RM)	-0.14	0.06	-2.47	0.015
	ln(AS)	0.68	0.06	11.39	<0.001
3D	Intercept	-19.32	1.22	-15.87	<0.001
	Temperature^2	-0.01	0.002	-2.52	0.012
	Temperature	0.32	0.08	3.78	<0.001
	Residuals	0.54	0.04	14.25	<0.001
	ln(RM)	0.05	0.03	1.69	0.092
	ln(AS)	1.16	0.07	17.04	<0.001

Table S4. Number of functional responses in each taxon for the taxon-inclusive handling time model (Figure 3). CM: Consumer mass. RM: Resource mass.

Taxon	Number of Functional Responses		
	Temp	CM	RM
Ciliate	38	41	41
Fish	334	331	315
Dinoflagellate	38	38	38
Rotifer	21	28	24
Ctenophore	14	19	19
Cnidarian	32	33	32
Crustacean	289	312	285
Arachnid	242	245	196
Insect	614	612	614

Table S5. Number of functional responses in each taxon for the taxon-inclusive space clearance rate model (Figure 4). CM: Consumer mass. RM: Resource mass.

Dim	Taxon	Number of Functional Responses		
		Temp	CM	RM
3D	Ciliate	39	42	42
	Fish	333	336	314
	Dinoflagellate	40	40	40
	Arachnid	14	14	14
	Rotifer	26	33	29
	Ctenophore	19	26	26
	Cnidarian	35	36	35
	Insect	184	190	167
	Crustacean	249	268	255
2.5D	Arachnid	39	43	45
	Crustacean	56	54	52
	Insect	131	134	134
2D	Fish	16	18	18
	Crustacean	23	35	17
	Arachnid	209	213	165
	Insect	344	331	344