Time-scales alter the inferred strength and temporal consistency of intraspecific diet specialization.

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Supplementary Material

S2. ***Summary of observational data, fitting example, and Akaike model weights.***

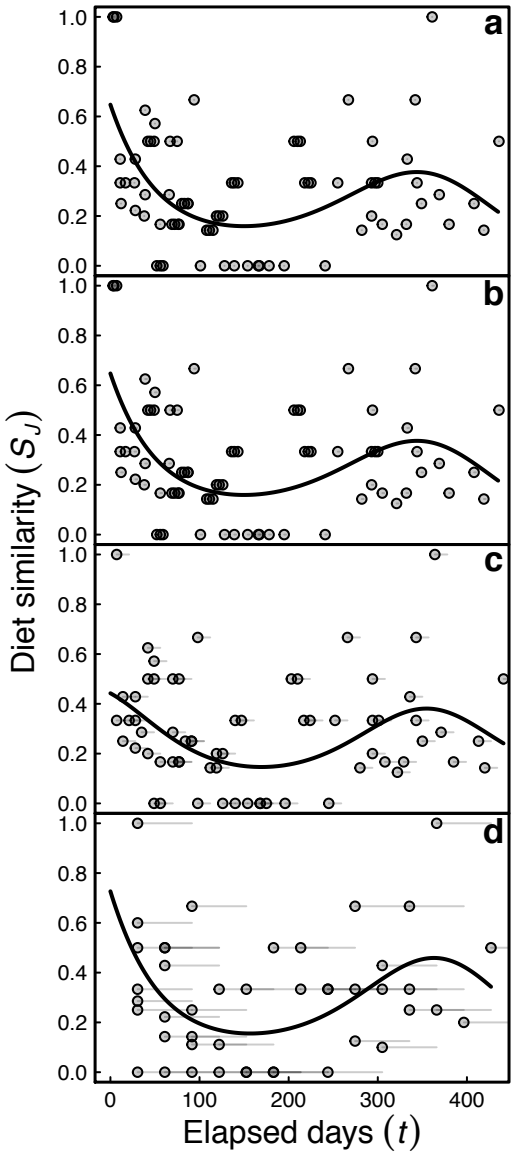

Figure S2.1. The time-dependent temporal consistency of otter diets was estimated by regressing the similarity of an individual's diet at two time-points, *S*, on the length of time elapsed between observations, *t*. Observations were time-aggregated over periods of (*a*) hours (a bout of foraging activity), (*b*) a day (multiple bouts), (*c*) a week, (*d*) a month, and a year (for individuals with sufficient data), as illustrated by individual '*N-1284-02-S*' using the classic Jaccard index of similarity, S_J. Each point reflects the number of days having elapsed between the starting dates of a pair of aggregated observations. The true number of elapsed days is encompassed by each point's corresponding line segment. The fitted curves depict the seasonal model (M3).

Table S2.1. Summary statistics of the number of feeding observations made per otter for each level of temporal aggregation.

	Bout	**Day**	**Week**	**Month**	**Year**	**Pooled**
Mean	19.6	20.6	26.5	41.3	152.5	393.6
Median	15.0	15.0	19.0	28.0	109.0	358.5
Std. dev.	17.2	18.8	25.6	43.4	146.2	166.4
Range	1-154	1-154	1-217	1-418	2-710	146-861

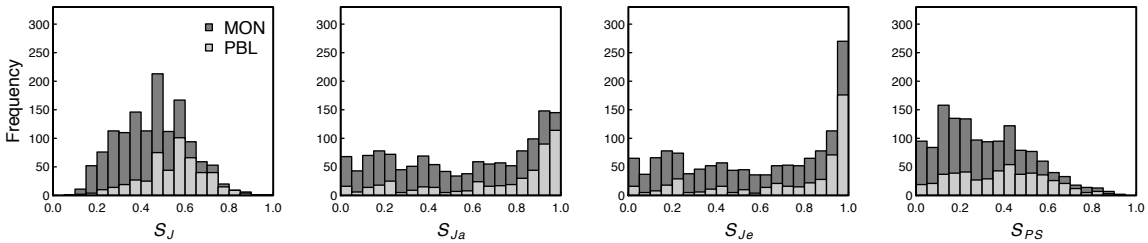

Figure S2.2. Frequency distribution of all pairwise individual-to-individual diet similarity comparisons by index.

Table S2.2. Comparisons of the performance of models M1-M4 in describing *between-individual* diet similarity as a function of the time having elapsed between sets of feeding observations and the level of temporal aggregation to which feeding observations had been aggregated. Values for each similarity index indicate dAICc scores determined with sites combined. dAICc scores of zero indicate the best-performing model for the given level of temporal aggregation. The seasonal models M3 and M4 were not fit to the annual level of aggregation.

Time-scale	Model	Similarity Index			
		S_J	S_{Ja}	S_{Je}	S_{PS}
Bout	M1	409.7	917.2	758.7	894.8
	M2	47.3	54.9	62.8	11
	M3	166.8	163.8	104.6	7.5
	M4	0	0	0	0
Day	M1	382.8	1187.4	730.1	928
	M2	20	398.9	111.1	36.9
	M3	314	0	62.7	237.9
	M4	0	231	0	0
Week	M1	231.9	345.2	271.2	651.5
	M2	167.4	0	37.2	184.1
	M3	133.3	351.2	276.8	657.5
	M4	0	0.05	0	0
Month	M1	142.8	301.1	213.6	228.2
	M2	0	56.6	27.2	0
	M3	152.1	309.4	222.1	74.5
	M4	5	0	0	218.3
Year	M1	19.9	12.2	9.2	18.6
	M2	0	0	0	0

Table S2.3. Comparisons of the performance of models M1-M4 in describing *between-individual* diet similarity as a function of the time having elapsed between sets of feeding observations and the level of temporal aggregation to which feeding observations had been aggregated. Values indicate Akaike weights derived from the dAICc scores of Table 2.2.

Time-scale	Model	Similarity Index			
		S_J	S_{Ja}	S_{Je}	S_{PS}
Bout	M1	0	0	0	0
	M2	0	0	0	0
	M3	0	0	0	0.02
	M4	1	1	1	0.97
Day	M1	0	0	0	0
	M2	0	0	0	0
	M3	0	1	0	0
	M4	1	0	1	1
Week	M1	0	0	0	0
	M2	0	0.51	0	0
	M3	0	0	0	0
	M4	1	0.49	1	1
Month	M1	0	0	0	0
	M2	0.92	0	0	1
	M3	0	0	0	0
	M4	0.08	1	1	0
Year	M1	0	0	0.01	0
	M2	1	1	0.99	1

Table S2.4. Comparisons of the performance of models M1-M4 in describing *within-individual* diet similarity as a function of the time having elapsed between sets of feeding observations and the level of temporal aggregation to which feeding observations had been aggregated. Values for each similarity index indicate dAICc scores determined with the individuals of both sites combined. Successive model sets reflect the comparison of models after the exclusion of more complex models, performed in order to increase the number of otter individuals for which the models reached convergence.

Time-scale	Model set	Model set individuals	Model	Similarity Index				Best model individuals
				S_J	S_{Ja}	S_{Je}	S_{PS}	
Bout	M1-M4	11	M1	208	386.4	373.3	391.1	-
			M2	156	291	295.3	322	-
			M3	0	0	0	0	38
			M4	2.4	30.8	7.9	30.4	-
	M1-M3	31	M1	690.3	885.4	864	905.8	-
			M2	453.4	624.1	653	657.8	-
			M3	0	0	0	0	38
	M1-M2	61	M1	299.9	315.3	264.7	297.8	-
			M2	0	0	0	0	62
	M1	73	M1	-	-	-	-	-
Day	M1-M4	14	M1	313.9	545.6	507.9	492.5	-
			M2	249.6	394.2	396.7	333.9	-
			M3	0	0	0	0	44
			M4	19.6	124.2	102.2	61.9	-
	M1-M3	35	M1	673.7	899	856.7	873.5	-
			M2	480.2	651.9	660.4	607.2	-
			M3	0	0	0	0	44
	M1-M2	60	M1	226.3	266.9	228.7	290	-
			M2	0	0	0	0	61
	M1	73	M1	-	-	-	-	-

Week	M1-M4	11	M1	130.9	237.9	225.3	240.3	-
			M2	106.1	185	183.7	209.3	-
			M3	0	0	0	6.5	35
			M4	8.9	12	1.9	0	-
	M1-M3	29	M1	314.6	451.2	439.9	488.2	-
			M2	265.5	364.2	363.5	417.4	-
			M3	0	0	0	0	35
	M1-M2	60	M1	118.2	167.1	161.4	190.7	-
			M2	0	0	0	0	62
	M1	71	M1	-	-	-	-	-
Month	M1-M4	13	M1	148.5	142.3	124.4	166.9	-
			M2	141.5	133.1	116.3	137.1	-
			M3	0	6.8	6.9	3.2	-
			M4	11.4	0	0	0	18
	M1-M3	31	M1	306.5	343.2	324	366.3	-
			M2	259.2	282.1	280.3	276.9	-
			M3	0	0	0	0	36
	M1-M2	51	M1	97.5	95.6	78.6	152.2	-
			M2	0	0	0	0	53
	M1	57	M1	-	-	-	-	-
Year	M1-M2	8	M1	3.3	11.5	15.4	0.1	-
			M2	0	0	0	0	8
	M1	9	M1	-	-	-	-	-

Table S2.5. Comparisons of the performance of models M1-M4 in describing *within-individual* diet similarity as a function of the time having elapsed between sets of feeding observations and the level of temporal aggregation to which feeding observations had been aggregated. Values indicate Akaike weights derived from the dAICc scores of Table 2.4. Successive model sets reflect the comparison of models after the exclusion of more complex models, performed in order to increase the number of otter individuals for which the models reached convergence.

Time-scale	Model set	Model set individuals	Model	Similarity Index				Best model individuals
				S_J	S_{Ja}	S_{Je}	S_{PS}	
Bout	M1-M4	11	M1	0	0	0	0	-
			M2	0	0	0	0	-
			M3	0.76	1	0.98	1	38
			M4	0.24	0	0.02	0	-
	M1-M3	31	M1	0	0	0	0	-
			M2	0	0	0	0	-
			M3	1	1	1	1	38
	M1-M2	61	M1	0	0	0	0	-
			M2	1	1	1	1	62
	M1	73	M1	-	-	-	-	-
Day	M1-M4	14	M1	0	0	0	0	-
			M2	0	0	0	0	-
			M3	1	1	1	1	44
			M4	0	0	0	0	-
	M1-M3	35	M1	0	0	0	0	-
			M2	0	0	0	0	-
			M3	1	1	1	1	44
	M1-M2	60	M1	0	0	0	0	-
			M2	1	1	1	1	61
	M1	73	M1	-	-	-	-	-

Week	M1-M4	11	M1	0	0	0	0	-
			M2	0	0	0	0	-
			M3	0.99	1	0.72	0.04	35
			M4	0.01	0	0.28	0.96	-
	M1-M3	29	M1	0	0	0	0	-
			M2	0	0	0	0	-
			M3	1	1	1	1	35
	M1-M2	60	M1	0	0	0	0	-
			M2	1	1	1	1	62
	M1	71	M1	-	-	-	-	-
Month	M1-M4	13	M1	0	0	0	0	-
			M2	0	0	0	0	-
			M3	1	0.03	0.03	0.16	-
			M4	0	0.97	0.97	0.84	18
	M1-M3	31	M1	0	0	0	0	-
			M2	0	0	0	0	-
			M3	1	1	1	1	36
	M1-M2	51	M1	0	0	0	0	-
			M2	1	1	1	1	53
	M1	57	M1	-	-	-	-	-
Year	M1-M2	8	M1	0.19	0	0	0.94	-
			M2	1	1	1	1	8
	M1	9	M1	-	-	-	-	-

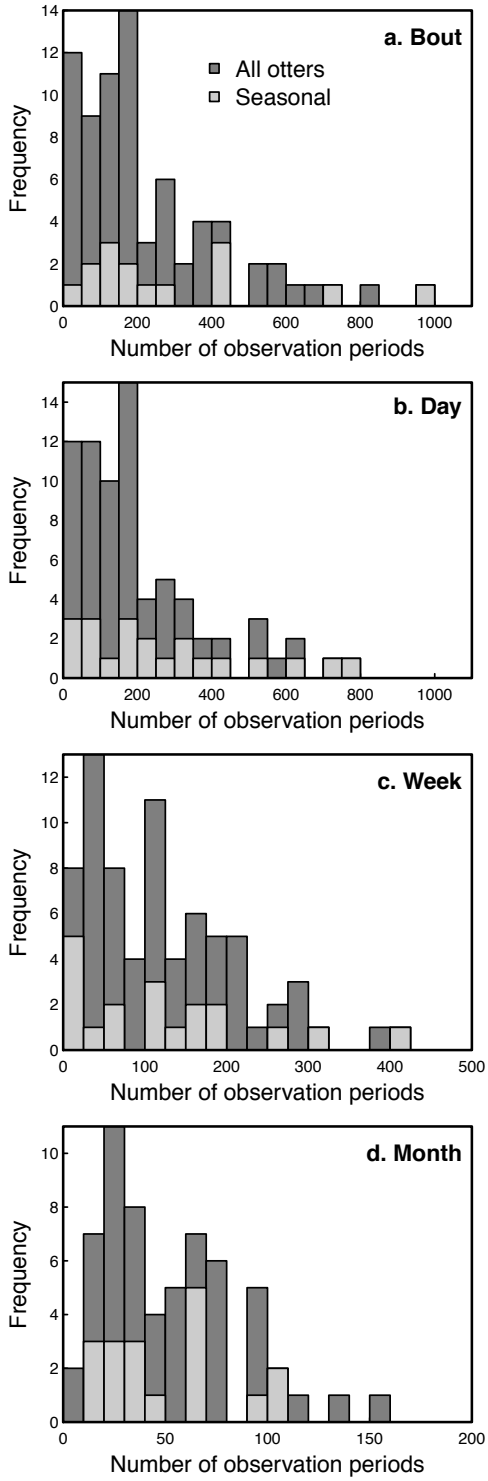

Figure S2.3. Frequencies of the total number of foraging observations, aggregated by time-scale, made by all 74 studied sea otter individuals compared to the subset of individuals for which seasonal variation in diet self-similarity was detected.

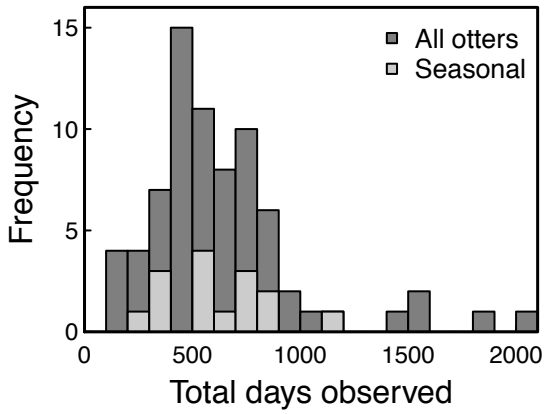

Figure S2.4. Frequency of the total number of days over which all 74 studied sea otter individuals were observed compared to the subset of individuals for which seasonal variation in diet self-similarity was detected.