

Appendix 1: Palaeodemography

The following Appendix includes all supplementary information of the Palaeodemography chapter. This includes all mortality tables on which the life expectancy curves and probability of death curves rely, the calculations of the mortality rate as well as the calculations for the index of dependence.

1 Mortality tables

Table 1 Mortality table for all individuals from the Knuedler burial complex

Mortality table of all the individuals								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
0 - 4	19	48.59	1000.00	48.59	951.41	4878.52	40200.77	40.20
5 - 9	16.5	42.20	951.41	44.35	955.65	4651.53	35322.25	37.13
10 - 14	11.5	29.41	909.21	32.35	967.65	4472.51	30670.72	33.73
15 - 19	18.5	47.31	879.80	53.78	946.22	4280.69	26198.21	29.78
20 - 24	23.4	59.85	832.48	71.89	928.11	4012.79	21917.52	26.33
25 - 29	18	46.04	772.63	59.58	940.42	3748.08	17904.73	23.17
30 - 34	30.9	79.03	726.60	108.76	891.24	3435.42	14156.65	19.48
35 - 39	37.9	96.93	647.57	149.68	850.32	2995.52	10721.23	16.56
40 - 44	40	102.30	550.64	185.79	814.21	2497.44	7725.70	14.03
45 - 49	32.6	83.38	448.34	185.97	814.03	2033.25	5228.26	11.66
50 - 54	30	76.73	364.96	210.23	789.77	1632.99	3195.01	8.75
55 - 59	46.9	119.95	288.24	416.15	583.85	1141.30	1562.02	5.42
60+	65.8	168.29	168.29	1000.00	0.00	420.72	420.72	2.50
Total	391	1000.00				40200.77		

Table 2 Mortality table for adult males from the Knuedler burial complex

Mortality table of all the adult male individuals								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
20 - 24	7.8	43.09	1000.00	43.09	956.91	4892.27	27091.16	27.09
25 - 29	9.3	51.38	956.91	53.70	946.30	4656.08	22198.90	23.20
30 - 34	17.8	98.34	905.52	108.60	891.40	4281.77	17542.82	19.37
35 - 39	22.1	122.10	807.18	151.27	848.73	3730.66	13261.05	16.43
40 - 44	23.2	128.18	685.08	187.10	812.90	3104.97	9530.39	13.91
45 - 49	20.1	111.05	556.91	199.40	800.60	2506.91	6425.41	11.54
50 - 54	17.2	95.03	445.86	213.14	786.86	1991.71	3918.51	8.79
55 - 59	25.5	140.88	350.83	401.57	598.43	1401.93	1926.80	5.49
60+	38	209.94	209.94	1000.00	0.00	524.86	524.86	2.50
Total	181	1000.00				27091.16		

Table 3 Mortality table for adult females from the Knuedler burial complex

Mortality table of all the adult female individuals								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
20 - 24	8.4	75.68	1000.00	75.68	924.32	4810.81	26072.07	26.07
25 - 29	6.5	58.56	924.32	63.35	936.65	4475.23	21261.26	23.00
30 - 34	10.8	97.30	865.77	112.38	887.62	4085.59	16786.04	19.39
35 - 39	13.5	121.62	768.47	158.26	841.74	3538.29	12700.45	16.53
40 - 44	13.6	122.52	646.85	189.42	810.58	2927.93	9162.16	14.16
45 - 49	9.4	84.68	524.32	161.51	838.49	2409.91	6234.23	11.89
50 - 54	10.3	92.79	439.64	211.07	788.93	1966.22	3824.32	8.70
55 - 59	16.5	148.65	346.85	428.57	571.43	1362.61	1858.11	5.36
60+	22	198.20	198.20	1000.00	0.00	495.50	495.50	2.50
Total	111	1000.00				26072.07		

Table 4 Mortality table for cloister burials

Mortality table of all the individuals - cloister								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
0 - 4	4	33.90	1000.00	33.90	966.10	4915.25	42610.17	42.61
5 - 9	6.5	55.08	966.10	57.02	942.98	4692.80	37694.92	39.02
10 - 14	2.5	21.19	911.02	23.26	976.74	4502.12	33002.12	36.23
15 - 19	7.5	63.56	889.83	71.43	928.57	4290.25	28500.00	32.03
20 - 24	6.5	55.08	826.27	66.67	933.33	3993.64	24209.75	29.30
25 - 29	3.3	27.97	771.19	36.26	963.74	3786.02	20216.10	26.21
30 - 34	5.8	49.15	743.22	66.13	933.87	3593.22	16430.08	22.11
35 - 39	8.8	74.58	694.07	107.45	892.55	3283.90	12836.86	18.50
40 - 44	8.8	74.58	619.49	120.38	879.62	2911.02	9552.97	15.42
45 - 49	8.5	72.03	544.92	132.19	867.81	2544.49	6641.95	12.19
50 - 54	11.6	98.31	472.88	207.89	792.11	2118.64	4097.46	8.66
55 - 59	19.6	166.10	374.58	443.44	556.56	1457.63	1978.81	5.28
60+	24.6	208.47	208.47	1000.00	0.00	521.19	521.19	2.50
Total	118	1000.00				42610.17		

Table 5 Mortality table for males from the cloister

Mortality table of all the adult male individuals - cloister								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
20 - 24	2	34.48	1000.00	34.48	965.52	4913.79	30965.52	30.97
25 - 29	1.5	25.86	965.52	26.79	973.21	4762.93	26051.72	26.98
30 - 34	3	51.72	939.66	55.05	944.95	4568.97	21288.79	22.66
35 - 39	4.8	82.76	887.93	93.20	906.80	4232.76	16719.83	18.83
40 - 44	4.8	82.76	805.17	102.78	897.22	3818.97	12487.07	15.51

45 - 49	6	103.45	722.41	143.20	856.80	3353.45	8668.10	12.00
50 - 54	7.9	136.21	618.97	220.06	779.94	2754.31	5314.66	8.59
55 - 59	12.3	212.07	482.76	439.29	560.71	1883.62	2560.34	5.30
60+	15.7	270.69	270.69	1000.00	0.00	676.72	676.72	2.50
Total	58	1000.00				30965.52		

Table 6 Mortality table for females from the cloister

Mortality table of all the adult female individuals - cloister								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
20 - 24	2.6	96.30	1000.00	96.30	903.70	4759.26	26796.30	26.80
25 - 29	1.2	44.44	903.70	49.18	950.82	4407.41	22037.04	24.39
30 - 34	2	74.07	859.26	86.21	913.79	4111.11	17629.63	20.52
35 - 39	3.2	118.52	785.19	150.94	849.06	3629.63	13518.52	17.22
40 - 44	3.1	114.81	666.67	172.22	827.78	3046.30	9888.89	14.83
45 - 49	1.6	59.26	551.85	107.38	892.62	2611.11	6842.59	12.40
50 - 54	3	111.11	492.59	225.56	774.44	2185.19	4231.48	8.59
55 - 59	4.4	162.96	381.48	427.18	572.82	1500.00	2046.30	5.36
60+	5.9	218.52	218.52	1000.00	0.00	546.30	546.30	2.50
Total	27	1000.00				26796.30		

Table 7 Mortality table for cemetery burials

Mortality table of all the individuals - cemetery								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
0 - 4	15	54.95	1000.00	54.95	945.05	4862.64	39152.01	39.15
5 - 9	10	36.63	945.05	38.76	961.24	4633.70	34289.38	36.28
10 - 14	9	32.97	908.42	36.29	963.71	4459.71	29655.68	32.65
15 - 19	11	40.29	875.46	46.03	953.97	4276.56	25195.97	28.78
20 - 24	16.9	61.90	835.16	74.12	925.88	4021.06	20919.41	25.05
25 - 29	14.7	53.85	773.26	69.64	930.36	3731.68	16898.35	21.85
30 - 34	25.2	92.31	719.41	128.31	871.69	3366.30	13166.67	18.30
35 - 39	29.1	106.59	627.11	169.98	830.02	2869.05	9800.37	15.63
40 - 44	31.2	114.29	520.51	219.56	780.44	2316.85	6931.32	13.32
45 - 49	24.1	88.28	406.23	217.31	782.69	1810.44	4614.47	11.36
50 - 54	18.3	67.03	317.95	210.83	789.17	1422.16	2804.03	8.82
55 - 59	27.3	100.00	250.92	398.54	601.46	1004.58	1381.87	5.51
60+	41.2	150.92	150.92	1000.00	0.00	377.29	377.29	2.50
Total	273	1000.00				39152.01		

Table 8 Mortality table for males from the cemetery

Mortality table of all the adult male individuals - cemetery								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
20 - 24	5.9	47.97	1000.00	47.97	952.03	4880.08	25195.12	25.20
25 - 29	7.9	64.23	952.03	67.46	932.54	4599.59	20315.04	21.34
30 - 34	14.9	121.14	887.80	136.45	863.55	4136.18	15715.45	17.70
35 - 39	17.3	140.65	766.67	183.46	816.54	3481.71	11579.27	15.10
40 - 44	18.3	148.78	626.02	237.66	762.34	2758.13	8097.56	12.94
45 - 49	14.1	114.63	477.24	240.20	759.80	2099.59	5339.43	11.19
50 - 54	9.3	75.61	362.60	208.52	791.48	1623.98	3239.84	8.93
55 - 59	13.2	107.32	286.99	373.94	626.06	1166.67	1615.85	5.63
60+	22.1	179.67	179.67	1000.00	0.00	449.19	449.19	2.50
Total	123	1000.00				25195.12		

Table 9 Mortality table for females from the cemetery

Mortality table of all the adult female individuals - cemetery								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
20 - 24	5.8	69.05	1000.00	69.05	930.95	4827.38	25839.29	25.84
25 - 29	5.3	63.10	930.95	67.77	932.23	4497.02	21011.90	22.57
30 - 34	8.8	104.76	867.86	120.71	879.29	4077.38	16514.88	19.03
35 - 39	10.3	122.62	763.10	160.69	839.31	3508.93	12437.50	16.30
40 - 44	10.5	125.00	640.48	195.17	804.83	2889.88	8928.57	13.94
45 - 49	7.8	92.86	515.48	180.14	819.86	2345.24	6038.69	11.71
50 - 54	7.3	86.90	422.62	205.63	794.37	1895.83	3693.45	8.74
55 - 59	12.1	144.05	335.71	429.08	570.92	1318.45	1797.62	5.35
60+	16.1	191.67	191.67	1000.00	0.00	479.17	479.17	2.50
Total	84	1000.00				25839.29		

Table 10 Mortality table for individuals from Layer 1

Mortality table of all the individuals of layer 1								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
0 - 4	4	25.16	1000.00	25.16	974.84	4937.11	41512.58	41.51
5 - 9	7	44.03	974.84	45.16	954.84	4764.15	36575.47	37.52
10 - 14	2	12.58	930.82	13.51	986.49	4622.64	31811.32	34.18
15 - 19	4	25.16	918.24	27.40	972.60	4528.30	27188.68	29.61
20 - 24	9	56.60	893.08	63.38	936.62	4323.90	22660.38	25.37
25 - 29	8.3	52.20	836.48	62.41	937.59	4051.89	18336.48	21.92
30 - 34	16.8	105.66	784.28	134.72	865.28	3657.23	14284.59	18.21
35 - 39	17.3	108.81	678.62	160.33	839.67	3121.07	10627.36	15.66
40 - 44	19	119.50	569.81	209.71	790.29	2550.31	7506.29	13.17
45 - 49	15.9	100.00	450.31	222.07	777.93	2001.57	4955.97	11.01

50 - 54	13.1	82.39	350.31	235.19	764.81	1545.60	2954.40	8.43
55 - 59	19.1	120.13	267.92	448.36	551.64	1039.31	1408.81	5.26
60+	23.5	147.80	147.80	1000.00	0.00	369.50	369.50	2.50
Total	159	1000.00				41512.58		

Table 11 Mortality table for males from layer 1

Mortality table of all the adult male individuals of layer 1								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
20 - 24	4.1	45.56	1000.00	45.56	954.44	4886.11	25238.89	25.24
25 - 29	5.1	56.67	954.44	59.37	940.63	4630.56	20352.78	21.32
30 - 34	12.6	140.00	897.78	155.94	844.06	4138.89	15722.22	17.51
35 - 39	12.6	140.00	757.78	184.75	815.25	3438.89	11583.33	15.29
40 - 44	12.6	140.00	617.78	226.62	773.38	2738.89	8144.44	13.18
45 - 49	9.6	106.67	477.78	223.26	776.74	2122.22	5405.56	11.31
50 - 54	8.3	92.22	371.11	248.50	751.50	1625.00	3283.33	8.85
55 - 59	7.8	86.67	278.89	310.76	689.24	1177.78	1658.33	5.95
60+	17.3	192.22	192.22	1000.00	0.00	480.56	480.56	2.50
Total	90	1000.00				25238.89		

Table 12 Mortality table for females from layer 1

Mortality table of all the adult female individuals of layer 1								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
20 - 24	2.3	60.53	1000.00	60.53	939.47	4848.68	26355.26	26.36
25 - 29	2.3	60.53	939.47	64.43	935.57	4546.05	21506.58	22.89
30 - 34	3.2	84.21	878.95	95.81	904.19	4184.21	16960.53	19.30
35 - 39	3.7	97.37	794.74	122.52	877.48	3730.26	12776.32	16.08
40 - 44	4.9	128.95	697.37	184.91	815.09	3164.47	9046.05	12.97
45 - 49	4.9	128.95	568.42	226.85	773.15	2519.74	5881.58	10.35
50 - 54	3.9	102.63	439.47	233.53	766.47	1940.79	3361.84	7.65
55 - 59	8.4	221.05	336.84	656.25	343.75	1131.58	1421.05	4.22
60+	4.4	115.79	115.79	1000.00	0.00	289.47	289.47	2.50
Total	38	1000.00				26355.26		

Table 13 Mortality table for individuals from layer 2

Mortality table of all the individuals of layer 2								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
0 - 4	15	64.66	1000.00	64.66	935.34	4838.36	39267.24	39.27
5 - 9	9.5	40.95	935.34	43.78	956.22	4574.35	34428.88	36.81
10 - 14	9.5	40.95	894.40	45.78	954.22	4369.61	29854.53	33.38
15 - 19	14.5	62.50	853.45	73.23	926.77	4110.99	25484.91	29.86

20 - 24	14.4	62.07	790.95	78.47	921.53	3799.57	21373.92	27.02
25 - 29	9.8	42.24	728.88	57.95	942.05	3538.79	17574.35	24.11
30 - 34	14.2	61.21	686.64	89.14	910.86	3280.17	14035.56	20.44
35 - 39	20.7	89.22	625.43	142.66	857.34	2904.09	10755.39	17.20
40 - 44	21.1	90.95	536.21	169.61	830.39	2453.66	7851.29	14.64
45 - 49	16.6	71.55	445.26	160.70	839.30	2047.41	5397.63	12.12
50 - 54	16.8	72.41	373.71	193.77	806.23	1687.50	3350.22	8.96
55 - 59	27.7	119.40	301.29	396.28	603.72	1207.97	1662.72	5.52
60+	42.2	181.90	181.90	1000.00	0.00	454.74	454.74	2.50
Total	232	1000.00				39267.24		

Table 14 Mortality table for males from layer 2

Mortality table of all the adult male individuals of layer 2								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
20 - 24	3.7	40.66	1000.00	40.66	959.34	4898.35	28928.57	28.93
25 - 29	4.2	46.15	959.34	48.11	951.89	4681.32	24030.22	25.05
30 - 34	5.2	57.14	913.19	62.58	937.42	4423.08	19348.90	21.19
35 - 39	9.5	104.40	856.04	121.95	878.05	4019.23	14925.82	17.44
40 - 44	10.6	116.48	751.65	154.97	845.03	3467.03	10906.59	14.51
45 - 49	10.5	115.38	635.16	181.66	818.34	2887.36	7439.56	11.71
50 - 54	8.8	96.70	519.78	186.05	813.95	2357.14	4552.20	8.76
55 - 59	17.8	195.60	423.08	462.34	537.66	1626.37	2195.05	5.19
60+	20.7	227.47	227.47	1000.00	0.00	568.68	568.68	2.50
Total	91	1000.00				28928.57		

Table 15 Mortality table for females from layer 2

Mortality table of all the adult female individuals of layer 2								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
20 - 24	6.1	83.56	1000.00	83.56	916.44	4791.10	25924.66	25.92
25 - 29	4.2	57.53	916.44	62.78	937.22	4438.36	21133.56	23.06
30 - 34	7.6	104.11	858.90	121.21	878.79	4034.25	16695.21	19.44
35 - 39	9.8	134.25	754.79	177.86	822.14	3438.36	12660.96	16.77
40 - 44	8.7	119.18	620.55	192.05	807.95	2804.79	9222.60	14.86
45 - 49	4.5	61.64	501.37	122.95	877.05	2352.74	6417.81	12.80
50 - 54	6.4	87.67	439.73	199.38	800.62	1979.45	4065.07	9.24
55 - 59	8.1	110.96	352.05	315.18	684.82	1482.88	2085.62	5.92
60+	17.6	241.10	241.10	1000.00	0.00	602.74	602.74	2.50
Total	73	1000.00				25924.66		

Table 16 New 10 year mortality table for Knuedler

Mortality table of all the individuals Knuedler								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
Infans (0-10)	35.5	90.79	1000.00	90.79	909.21	9546.04	40521.74	40.52
Juvenis (11-20)	30	76.73	909.21	84.39	915.61	8708.44	30975.70	34.07
Adultus I (21-30)	41.4	105.88	832.48	127.19	872.81	7795.40	22267.26	26.75
Adultus II (31-40)	68.8	175.96	726.60	242.17	757.83	6386.19	14471.87	19.92
Mature I (41-50)	72.6	185.68	550.64	337.20	662.80	4578.01	8085.68	14.68
Mature II (51-60)	76.9	196.68	364.96	538.89	461.11	2666.24	3507.67	9.61
Senile (60+)	65.8	168.29	168.29	1000.00	0.00	841.43	841.43	5.00
Total	391	1000.00				40521.74		

Table 17 year mortality table for St. Esprit

Mortality table of all the individuals St Esprit								
x	D _x	d _x	l _x	q _x	p _x	L _x	T _x	e _x
Infans (0-10)	25	203.25	1000.00	203.25	796.75	8983.74	32967.48	32.97
Juvenis (11-20)	12	97.56	796.75	122.45	877.55	7479.67	23983.74	30.10
Adultus I (21-30)	8	65.04	699.19	93.02	906.98	6666.67	16504.07	23.60
Adultus II (31-40)	22	178.86	634.15	282.05	717.95	5447.15	9837.40	15.51
Mature I (41-50)	35	284.55	455.28	625.00	375.00	3130.08	4390.24	9.64
Mature II (51-60)	16	130.08	170.73	761.90	238.10	1056.91	1260.16	7.38
Senile (60+)	5	40.65	40.65	1000.00	0.00	203.25	203.25	5.00
Total	123	1000.00				32967.48		

2 Mortality rate

2.1 Method

The mortality rate expresses the number of deaths relative to the whole population. Subsequently, the mortality rate is highly dependent on life expectancy, if life expectancy is high, mortality rate is low and vice versa.

Formula by Bocquet and Masset (1977):

$$m = 0.127 \frac{D_{5-14}}{D_{20+}} + 0.016 \pm 0.002$$

2.2 Results

The mortality rate for this population is 2.7%, which means 2.7 deaths per year in 100 individuals.

$$m = 0.027 \quad \pm 0.002$$

3 Index of dependence

3.1 Method

The index of dependence quantifies the amount of economically dependent groups defined as subadults between 0-14 years and seniles of 60+ years, in relation to the healthy and economically active part of the population defined as all individuals between 15-59 years of age. The index of dependence is not without critique as the model was developed for modern populations and is being applied to archaeological specimens without any adjustments or corrections (Grupe, Harbeck and McGlynn, 2015). As Grupe et al. (2015) point out, it is highly unlikely that in the medieval and postmedieval times, children over the age of 12 were still entirely dependent on their parents or family, as reportedly children entered the work force as early as 7 years old in medieval times. Nevertheless, for the sake of completeness, the index of dependence will be calculated here as well using the following formula (sourced from Grupe et al. (2015):

$$AI = \frac{\% \Sigma(0-14) + \% \Sigma(60+)}{\% \Sigma(15-59)}$$

3.2 Results

About 7 economically active individuals supply for 3 economically dependent individuals, children and/or seniles.

$$AI = \frac{28,85\%}{71,15\%} = 0.40$$

4 Accuracy tests for metrical sexing

4.1 Method

In order to securely identify the sex of those individuals lacking the sexually dimorphic morphological traits on the cranium and pelvis, metric sexing functions based on long bone (Spradley and Jantz 2011) and tarsal (Steele 1976) measurements were used. These functions are based on cut off points, meaning if the result of the function lies above the cutoff point, the individual will be classified as male and if it lies below, the individual will be classified as female. The following tables and mosaic plots show the percentage of accuracy for each function in determining sex when compared to the final morphological data.

In this study, functions for the right and left humeri, femora, tibiae, radii, fibulae and clavulae, as well as single and combined functions for the right and left calcaneus and talus were used.

4.1.1 Humerus R

Accuracy table

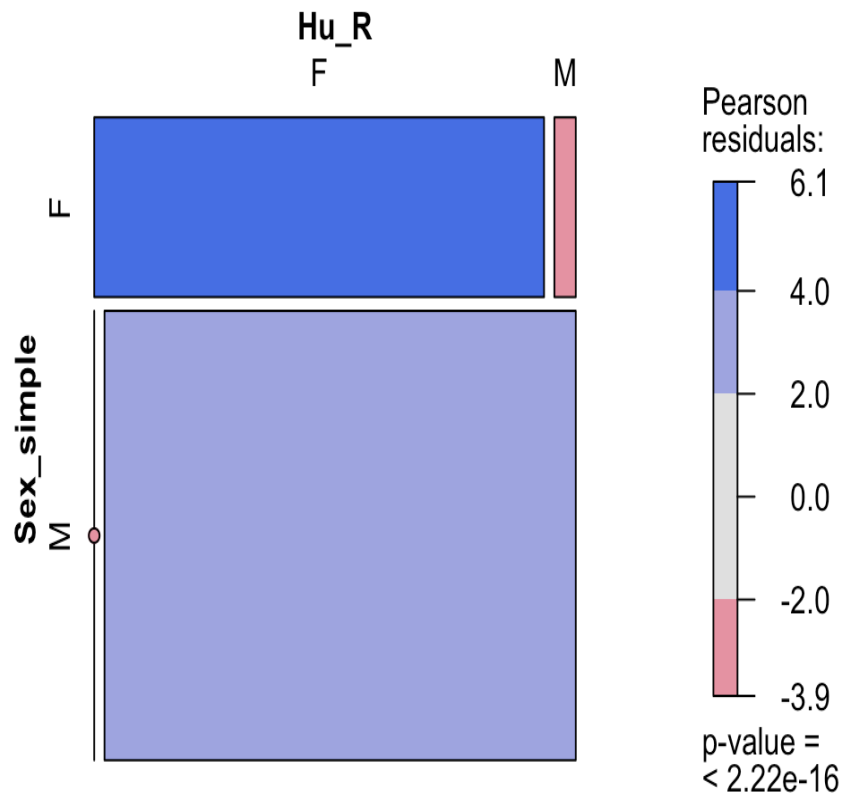
Accuracy in % for the Hu_R metric sexing function

Sex_simple/Hu_R	F	M	Total
F	21 (95.5%)	1 (4.5%)	22 (100.0%)
M	0 (0.0%)	55 (100.0%)	55 (100.0%)
Total	21 (27.3%)	56 (72.7%)	77 (100.0%)

For the right humerus, complete functions could only be generated for a total of 77 individuals, of which 22 were morphologically females and 55 males. The function classified the humeri of the females correctly in 95.5% of the cases and for males all humeri (100%) were correctly classified.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Humerus R metrical data



4.1.2 Humerus L

Accuracy table

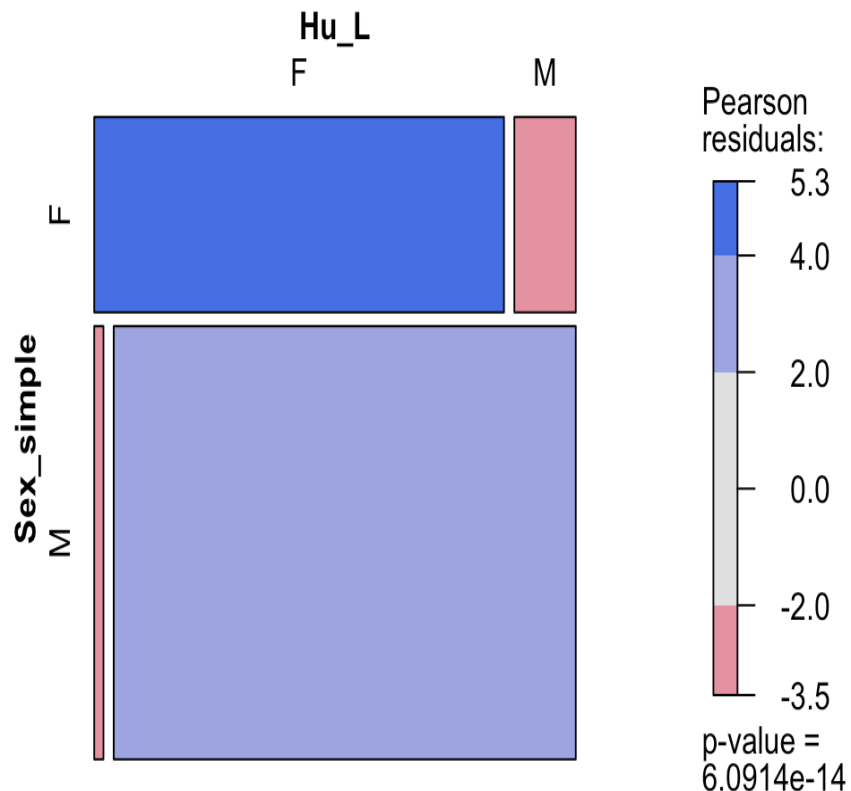
Accuracy in % for the Hu_L metric sexing function

Sex_simple/Hu_L	F	M	Total
F	20 (87.0%)	3 (13.0%)	23 (100.0%)
M	1 (2.0%)	50 (98.0%)	51 (100.0%)
Total	21 (28.4%)	53 (71.6%)	74 (100.0%)

For the left humerus, complete functions could only be generated for a total of 74 individuals, of which 23 were morphologically females and 51 males. The function classified the humeri of the females correctly in 87% and those of males in 98% of cases.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Humerus L metrical data



4.1.3 Femur R

Accuracy table

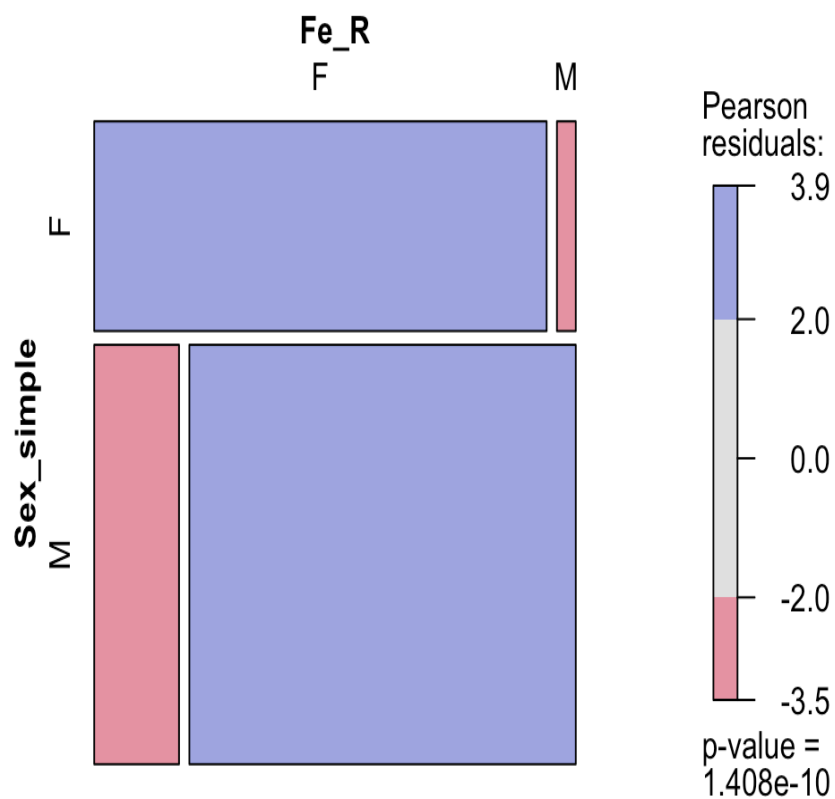
Accuracy in % for the Fe_R metric sexing function

Sex_simple/Fe_R	F	M	Total
F	24 (96.0%)	1 (4.0%)	25 (100.0%)
M	9 (18.0%)	41 (82.0%)	50 (100.0%)
Total	33 (44.0%)	42 (56.0%)	75 (100.0%)

For the right femur, complete functions could only be generated for a total of 75 individuals, of which 25 were morphologically females and 50 males. The function classified the femora of the females correctly in 96% and those of males in 82% of cases.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Femur R metrical data



4.1.4 Femur L

Accuracy table

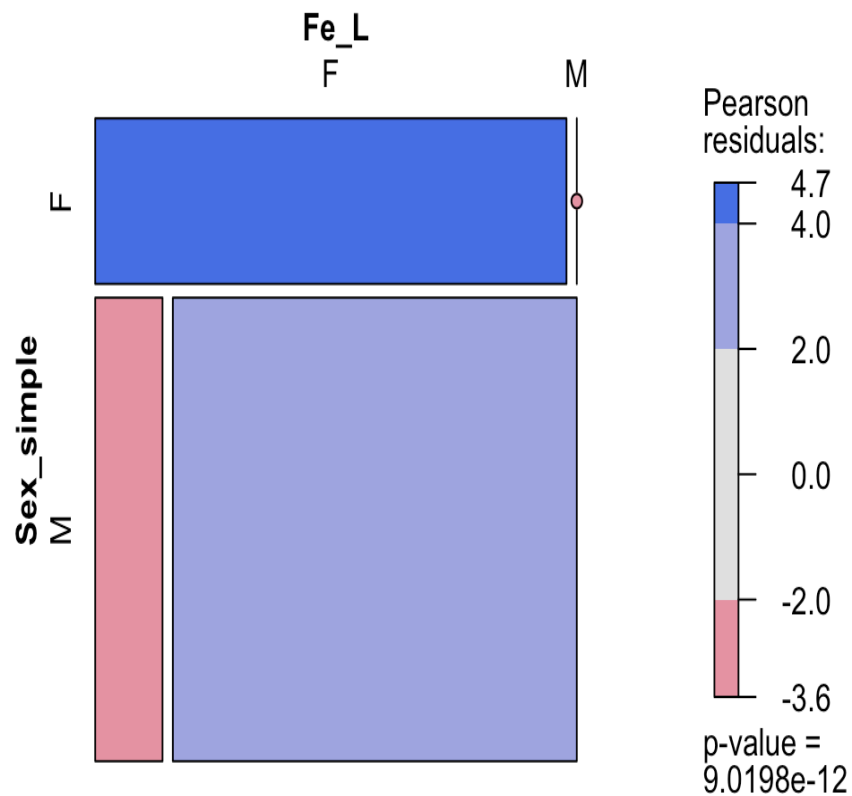
Accuracy in % for the Fe_L metric sexing function

Sex_simple/Fe_L	F	M	Total
F	20 (100.0%)	0 (0.0%)	20 (100.0%)
M	8 (14.3%)	48 (85.7%)	56 (100.0%)
Total	28 (36.8%)	48 (63.2%)	76 (100.0%)

For the left femur, complete functions could only be generated for a total of 76 individuals, of which 20 were morphologically females and 56 males. The function classified the humeri of the females correctly in 100% and those of males in 85.7% of cases.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Femur L metrical data



4.1.5 Radius R

Accuracy table

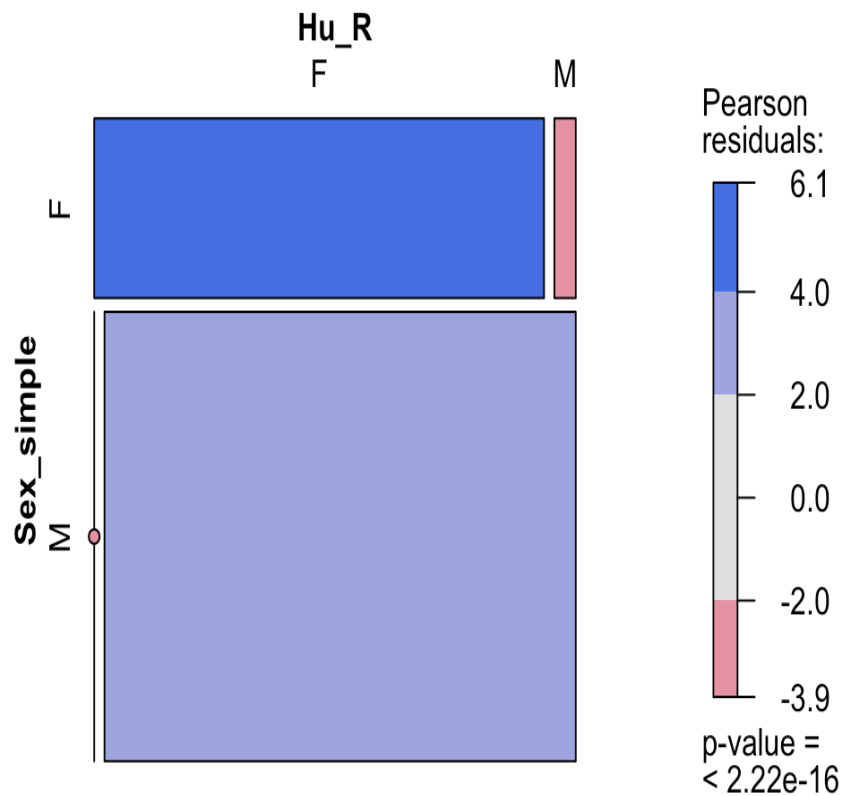
Accuracy in % for the Ra_R metric sexing function

Sex_simple/Ra_R	F	M	Total
F	38 (100.0%)	0 (0.0%)	38 (100.0%)
M	23 (29.5%)	55 (70.5%)	78 (100.0%)
Total	61 (52.6%)	55 (47.4%)	116 (100.0%)

For the right radius, complete functions could only be generated for a total of 116 individuals, of which 38 were morphologically females and 78 males. The function classified the humeri of the females correctly in 100% and those of males in 70.5% of cases.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Radius R metrical data



4.1.6 Radius L

Accuracy table

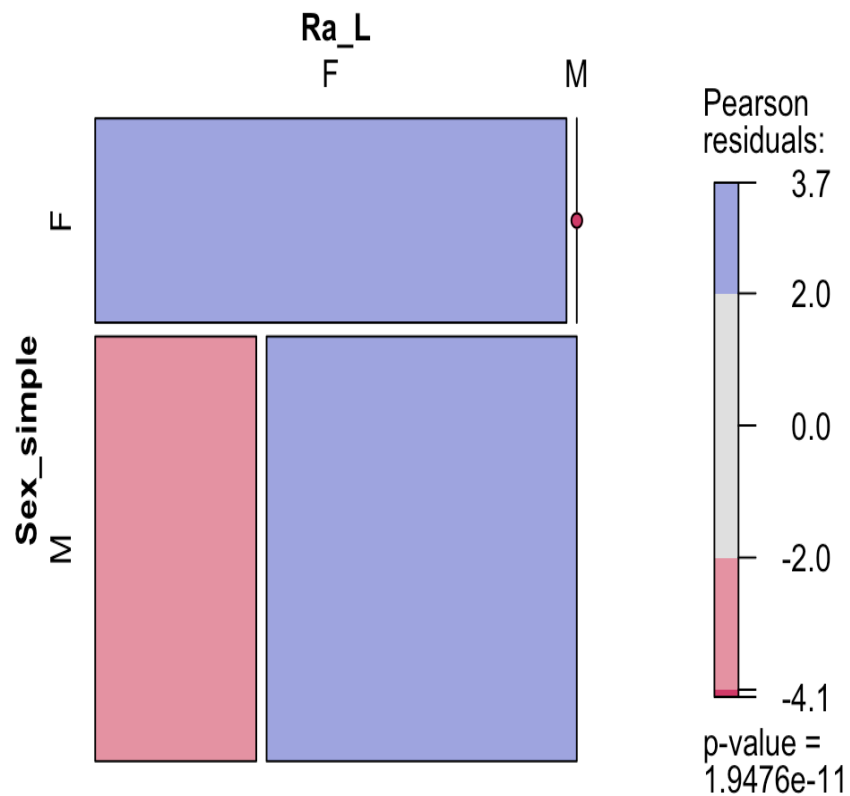
Accuracy in % for the Ra_L metric sexing function

Sex_simple/Ra_L	F	M	Total
F	38 (100.0%)	0 (0.0%)	38 (100.0%)
M	27 (34.2%)	52 (65.8%)	79 (100.0%)
Total	65 (55.6%)	52 (44.4%)	117 (100.0%)

F or the left radius, complete functions could only be generated for a total of 117 individuals, of which 38 were morphologically females and 79 males. The function classified the radii of the females correctly in 100% and those of males in 65.8% of cases.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Radius L metrical data



4.1.7 Tibia R

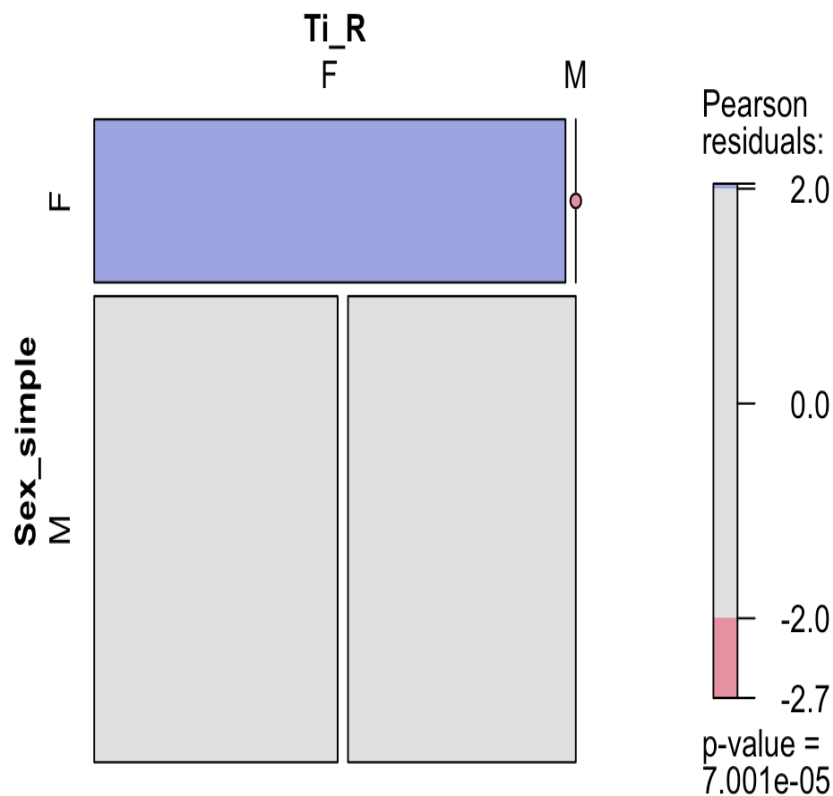
Accuracy table

Accuracy in % for the Ti_R metric sexing function

Sex_simple/Ti_R	F	M	Total
F	21 (100.0%)	0 (0.0%)	21 (100.0%)
M	31 (51.7%)	29 (48.3%)	60 (100.0%)
Total	52 (64.2%)	29 (35.8%)	81 (100.0%)

For the right tibia, complete functions could only be generated for a total of 81 individuals, of which 21 were morphologically females and 60 males. The function classified the femora of the females correctly in 100% and those of males in 48.3% of cases. Over half of the tibiae (51.7%) were wrongly classified as female. Therefore, based on the tibial discriminant function alone, an individual can only securely be classified as Male, if the function lies above the cut off point. If the value lies below, the individual could be female but there is an over 50% chance, that the individual could have been male. Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Tibia R metrical data



4.1.8 Tibia L

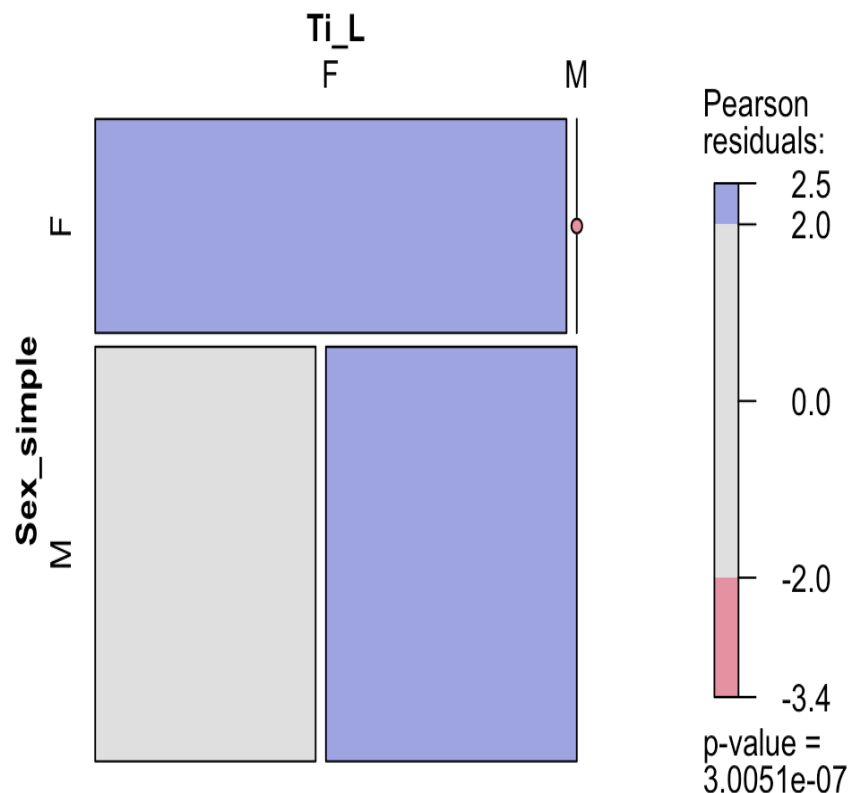
Accuracy table

Accuracy in % for the Ti_L metric sexing function

Sex_simple/Ti_L	F	M	Total
F	32 (100.0%)	0 (0.0%)	32 (100.0%)
M	29 (46.8%)	33 (53.2%)	62 (100.0%)
Total	61 (64.9%)	33 (35.1%)	94 (100.0%)

For the left tibia, complete functions could only be generated for a total of 94 individuals, of which 32 were morphologically females and 62 males. The function classified the femora of the females correctly in 100% and those of males in 53.2% of cases. Nearly half of the tibiae (46.8%) were wrongly classified as female. Therefore, based on the tibial discriminant function alone, an individual can only securely be classified as male, if the function lies above the cut off point. If the value lies below, the individual could be female but there is an nearly 50% chance, that the individual could have been male. Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Tibia L metrical data



4.1.9 Fibula R

Accuracy table

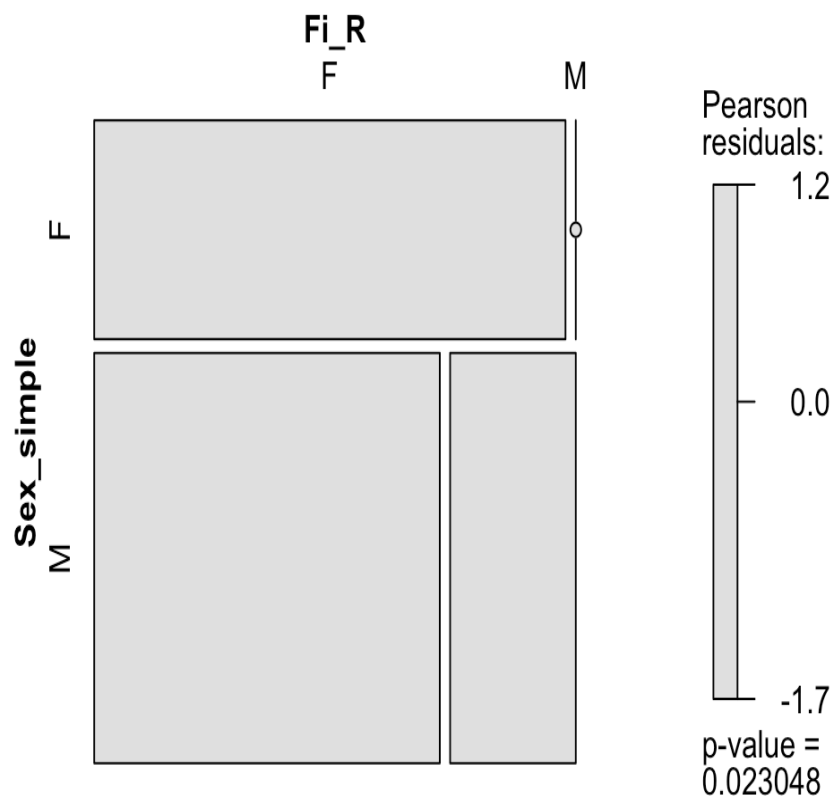
Accuracy in % for the Fi_R metric sexing function

Sex_simple/Fi_R	F	M	Total
F	16 (100.0%)	0 (0.0%)	16 (100.0%)
M	22 (73.3%)	8 (26.7%)	30 (100.0%)
Total	38 (82.6%)	8 (17.4%)	46 (100.0%)

For the right fibula, complete functions could only be generated for a total of 46 individuals, of which 16 were morphologically females and 30 males. The function classified the fibulae of the females correctly in 100% and those of males in only 26.7% of cases. 73.3% of fibulae were wrongly classified as female. Therefore, relying only on the fibular discriminant function, an individual can only be securely classified as Male if the function lies above the cut off value. If it lies below, there is a 73.3% chance that the individual might not be female but male.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Fibula R metrical data



4.1.10 Fibula L

Accuracy table

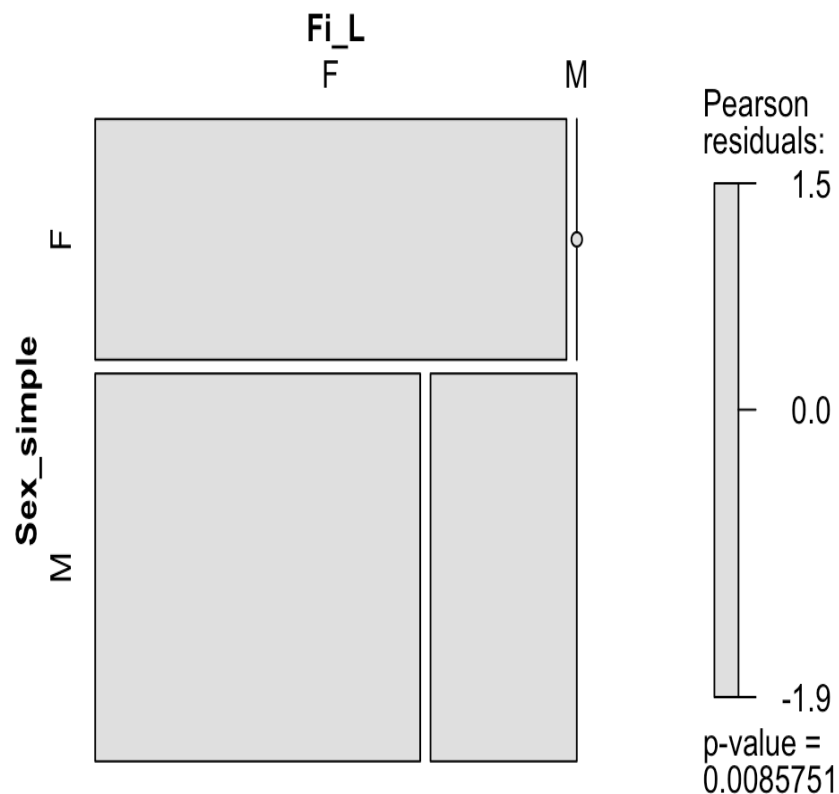
Accuracy in % for the Fi_L metric sexing function

Sex_simple/Fi_L	F	M	Total
F	18 (100.0%)	0 (0.0%)	18 (100.0%)
M	20 (69.0%)	9 (31.0%)	29 (100.0%)
Total	38 (80.9%)	9 (19.1%)	47 (100.0%)

For the left fibula, complete functions could only be generated for a total of 47 individuals, of which 18 were morphologically females and 29 males. The function classified the fibulae of the females correctly in 100% and those of males in only 31% of cases. 69% of fibulae were wrongly classified as female. Therefore, relying only on the fibular discriminant function, an individual can only be securely classified as Male if the function lies above the cut off value. If it lies below, there is a 73.3% chance that the individual might not be female but male.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Fibula L metrical data



4.1.11 Clavicula R

Accuracy table

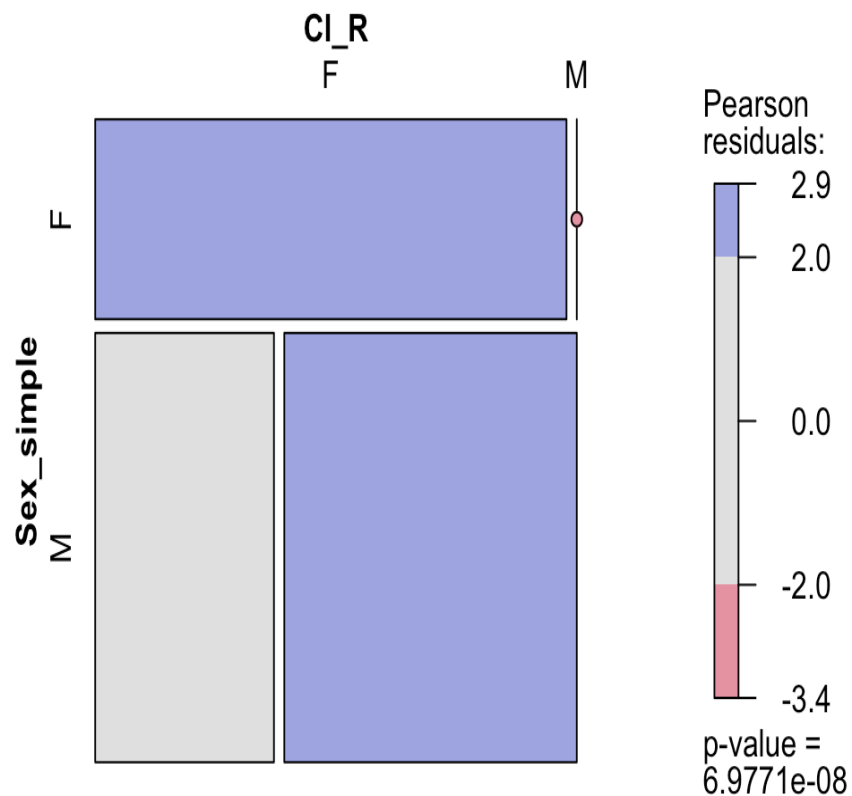
Accuracy in % for the Cl_R metric sexing function

Sex_simple/Cl_R	F	M	Total
F	27 (100.0%)	0 (0.0%)	27 (100.0%)
M	22 (37.9%)	36 (62.1%)	58 (100.0%)
Total	49 (57.6%)	36 (42.4%)	85 (100.0%)

For the right clavicle, complete functions could only be generated for a total of 85 individuals, of which 27 were morphologically females and 58 males. The function classified the clavicles of the females correctly in 100% and those of males in 62.1% of cases. There is a 37.9% chance that, if the function indicates female, that the individual might be male.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Clavicula R metrical data



4.1.12 Clavicula L

Accuracy table

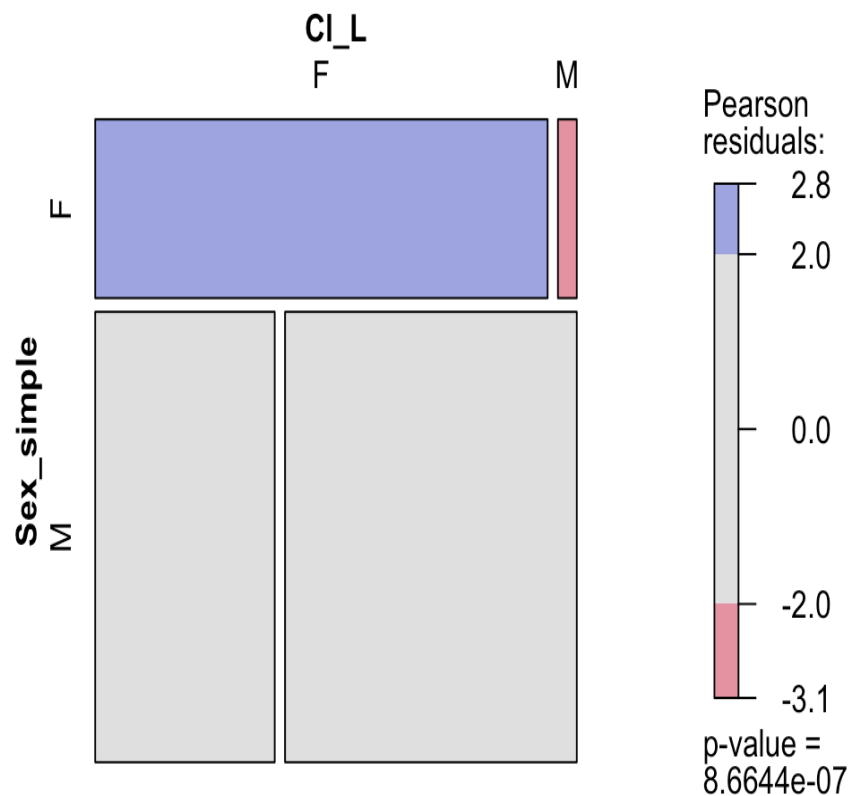
Accuracy in % for the Cl_L metric sexing function

Sex_simple/Cl_L	F	M	Total
F	24 (96.0%)	1 (4.0%)	25 (100.0%)
M	24 (38.1%)	39 (61.9%)	63 (100.0%)
Total	48 (54.5%)	40 (45.5%)	88 (100.0%)

For the right clavicle, complete functions could only be generated for a total of 88 individuals, of which 25 were morphologically females and 63 males. The function classified the clavicles of the females correctly in 96% and those of males in 61.9% of cases. There is a 38.1% chance that, if the function indicates female, that the individual might be male.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for Clavicula L metrical data



4.1.13 Calcaneus F1 R

Accuracy table

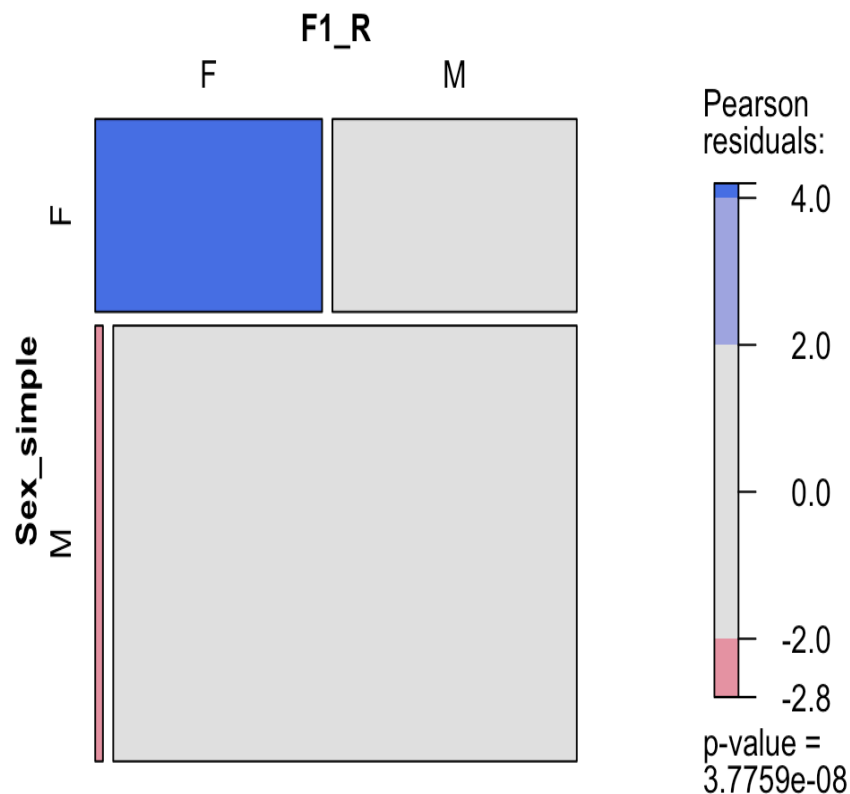
Accuracy in % for the F1_R metric sexing function

Sex_simple/F1_R	F	M	Total
F	13 (48.1%)	14 (51.9%)	27 (100.0%)
M	1 (1.6%)	60 (98.4%)	61 (100.0%)
Total	14 (15.9%)	74 (84.1%)	88 (100.0%)

For the right calcaneus, complete functions could only be generated for a total of 88 individuals, of which 27 were morphologically females and 61 males. The function classified the calcanei of the females correctly in only 48.1% but those of males in 98.4% of cases. Therefore, if the discriminant function indicates male, there is a high possibility (51.9%) that the individual is actually female. However, if the function indicates female, the possibility of a correct classification is much higher (only 1.6% misclassified males).

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for calcaneus R metrical data



4.1.14 Calcaneus F1 L

Accuracy table

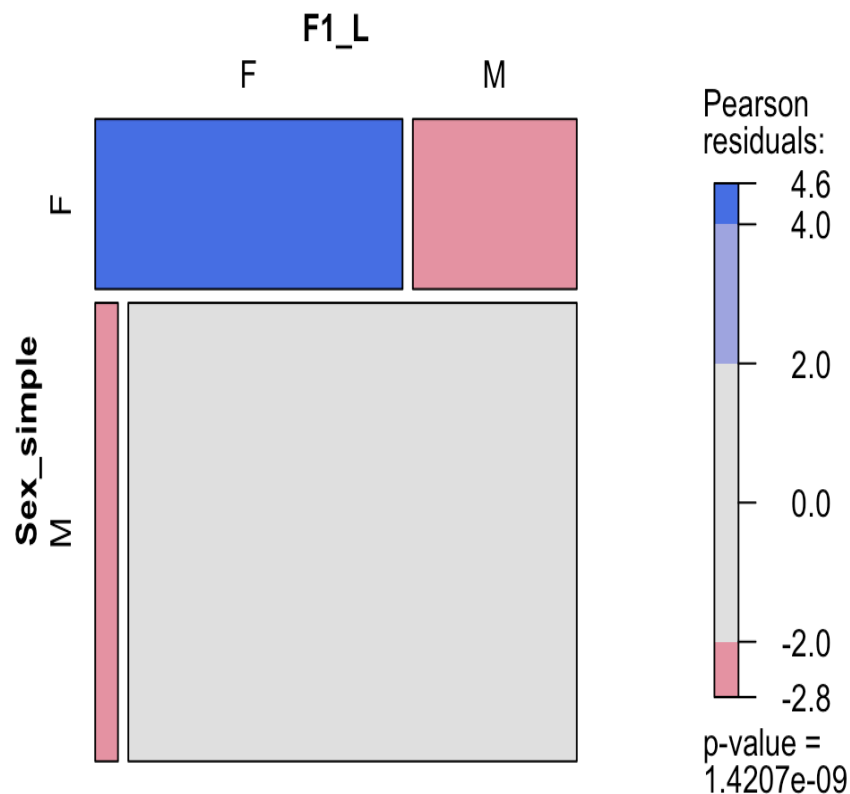
Accuracy in % for the F1_L metric sexing function

Sex_simple/F1_L	F	M	Total
F	15 (65.2%)	8 (34.8%)	23 (100.0%)
M	3 (4.8%)	59 (95.2%)	62 (100.0%)
Total	18 (21.2%)	67 (78.8%)	85 (100.0%)

For the left calcaneus, complete functions could only be generated for a total of 85 individuals, of which 23 were morphologically females and 62 males. The function classified the calcanei of the females correctly in only 65.2% but those of males in 95.2% of cases. Therefore, if the discriminant function indicates male, there is a good possibility (34.8%) that the individual is actually female. However, if the function indicates female, the possibility of a correct classification is much higher (only 4.8% misclassified males).

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for calcaneus L metrical data



4.1.15 Talus F2 R

Accuracy table

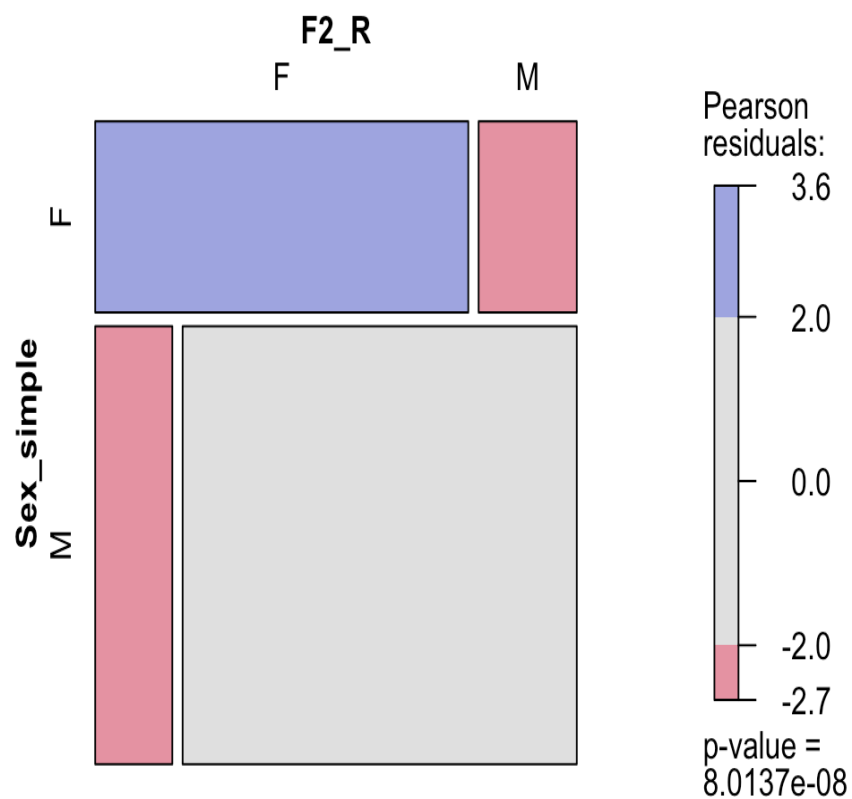
Accuracy in % for the F2_R metric sexing function

Sex_simple/F2_R	F	M	Total
F	19 (79.2%)	5 (20.8%)	24 (100.0%)
M	9 (16.4%)	46 (83.6%)	55 (100.0%)
Total	28 (35.4%)	51 (64.6%)	79 (100.0%)

For the right talus, complete functions could only be generated for a total of 79 individuals, of which 24 were morphologically females and 55 males. The function classified the tali of the females correctly in 79.2% and those of males in 83.6% of cases.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for talus R metrical data



4.1.16 Talus F2 L

Accuracy table

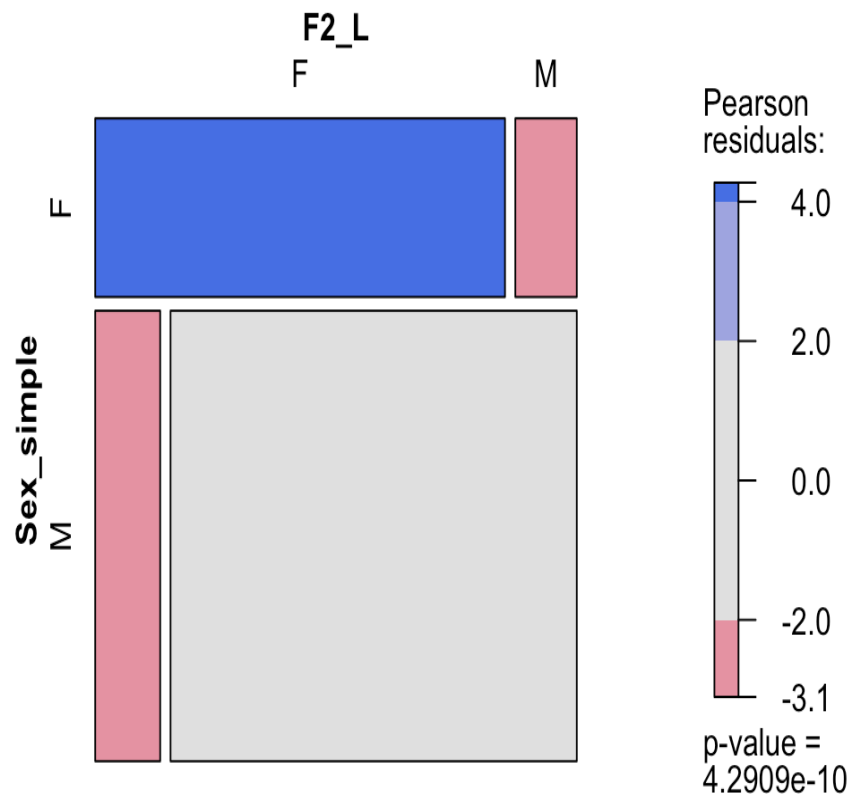
Accuracy in % for the F2_L metric sexing function

Sex_simple/F2_L	F	M	Total
F	20 (87.0%)	3 (13.0%)	23 (100.0%)
M	8 (13.8%)	50 (86.2%)	58 (100.0%)
Total	28 (34.6%)	53 (65.4%)	81 (100.0%)

For the left talus, complete functions could only be generated for a total of 81 individuals, of which 23 were morphologically females and 58 males. The function classified the tali of the females correctly in 87% and those of males in 86.2% of cases.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for talus L metrical data



4.1.17 Calcaneus + Talus F5 R

Accuracy table

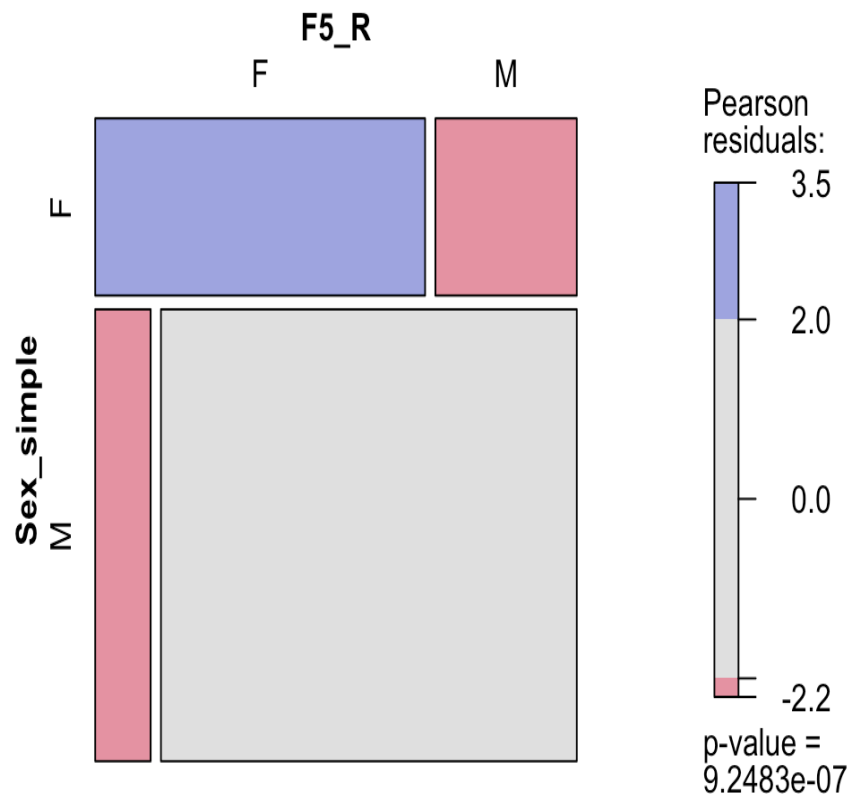
Accuracy in % for the F5_R metric sexing function

Sex_simple/F5_R	F	M	Total
F	14 (70.0%)	6 (30.0%)	20 (100.0%)
M	6 (11.8%)	45 (88.2%)	51 (100.0%)
Total	20 (28.2%)	51 (71.8%)	71 (100.0%)

For the combined right calcaneus and talus, complete functions could only be generated for a total of 71 individuals, of which 20 were morphologically females and 51 males. The function classified 70% of the individuals correctly as females and 88.2% correctly as males.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for calcaneus + talus R metrical data



4.1.18 Calcaneus + Talus F5 L

Accuracy table

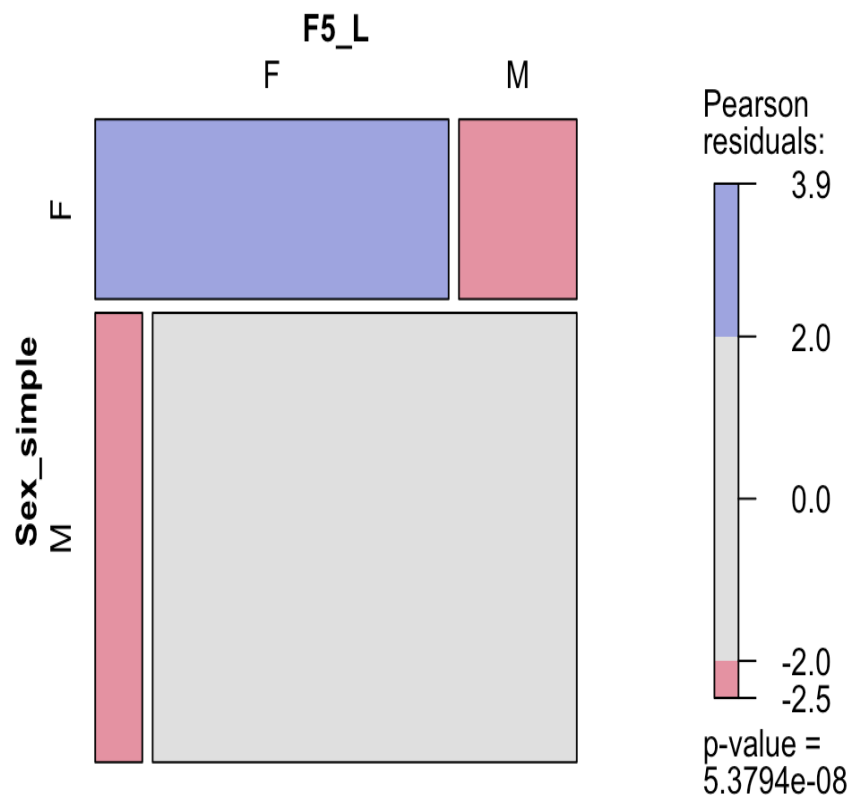
Accuracy in % for the F5_L metric sexing function

Sex_simple/F5_L	F	M	Total
F	15 (75.0%)	5 (25.0%)	20 (100.0%)
M	5 (10.0%)	45 (90.0%)	50 (100.0%)
Total	20 (28.6%)	50 (71.4%)	70 (100.0%)

For the combined right calcaneus and talus, complete functions could only be generated for a total of 70 individuals, of which 20 were morphologically females and 50 males. The function classified 75% of the individuals correctly as females and 90% correctly as males.

Mosaic plot with Pearson's correlation coefficients and p-value

Sexing accuracy for calcaneus + talus L metrical data



4.2 Conclusion

Not all functions performed equally well in the accuracy tests performed above. Among the most reliable functions for metrically determining an Individual's sex are Those of the humerus, femur and radius described in Spradley and Jantz 2011 and that of the talus and the combined function for talus and calcaneus described in Steele 1976. The functions for tibia, fibula, clavicle (Spradley and Jantz 2011) and calcaneus (Steele 1976) can only securely classify males. If the value of the function lies below the cutoff point and indicates female, there is a high possibility that despite the function's indication, the individual might still have been male. However, if the value lies above the cutoff point and indicates male, the possibility of a correct classification is very high, as there were very little to no misclassifications of females to the male category. These latter functions should therefore not be used on their own for classifying individuals whose sex could not be determined morphologically. Therefore, all individuals for which sexing was only possible through the latter functions will remain classified as indeterminate, while those, that could be sexed using the former functions will be attributed to their metrically determined sex.

5 Bibliography

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