

Supplemental Material

I. Comparison between males and females

Table S1: *f0* (hz)

Study or Subgroup	Males			Females			Weight	Mean Difference		Mean Difference	
	Mean	SD	Total	Mean	SD	Total		IV, Random, 95% CI	IV, Random, 95% CI	IV, Random, 95% CI	IV, Random, 95% CI
Decoster, Debruyne, 1997	140.55	29.25	100	186.68	27.08	105	12.2%	-46.13	[-53.86, -38.40]		
Goy, Fernandes, Pichora-Fuller, Lieshout	127	27	51	211	42	82	11.3%	-84.00	[-95.73, -72.27]		
Makiyama, Yoshihashi, Park, Shimazaki, Nakai, 2006	118.1	9.43	80	199.93	26.1	74	12.5%	-81.83	[-88.13, -75.53]		
Mautner 2014	124.33	19.16	24	179.4	25.2	42	11.5%	-55.07	[-65.88, -44.26]		
Mezzedimi, Di Francesco, Livi, Spinosi, De Felice	137.11	36.187	37	179.98	43.37	47	9.9%	-42.87	[-59.89, -25.85]		
Mueller, Sweeney, Baribeau, 1984	122	21.78	70	181.66	29.26	157	12.4%	-59.66	[-66.51, -52.81]		
Sebastian, Babu, Oommen, Ballraj	140.28	23.65	20	187.48	12	20	11.3%	-47.20	[-58.82, -35.58]		
Xue and Deliyski	127.62	29.18	21	187.7	42.15	23	8.7%	-60.08	[-81.35, -38.81]		
Xue, Fucci	125.91	26.52	41	181.35	45.18	43	10.2%	-55.44	[-71.20, -39.68]		
Total (95% CI)			444			593	100.0%	-59.53	[-70.46, -48.59]		

Heterogeneity: Tau² = 239.66; Chi² = 81.39, df = 8 (P < 0.00001); I² = 90%
 Test for overall effect: Z = 10.67 (P < 0.00001)

Table S2: APQ

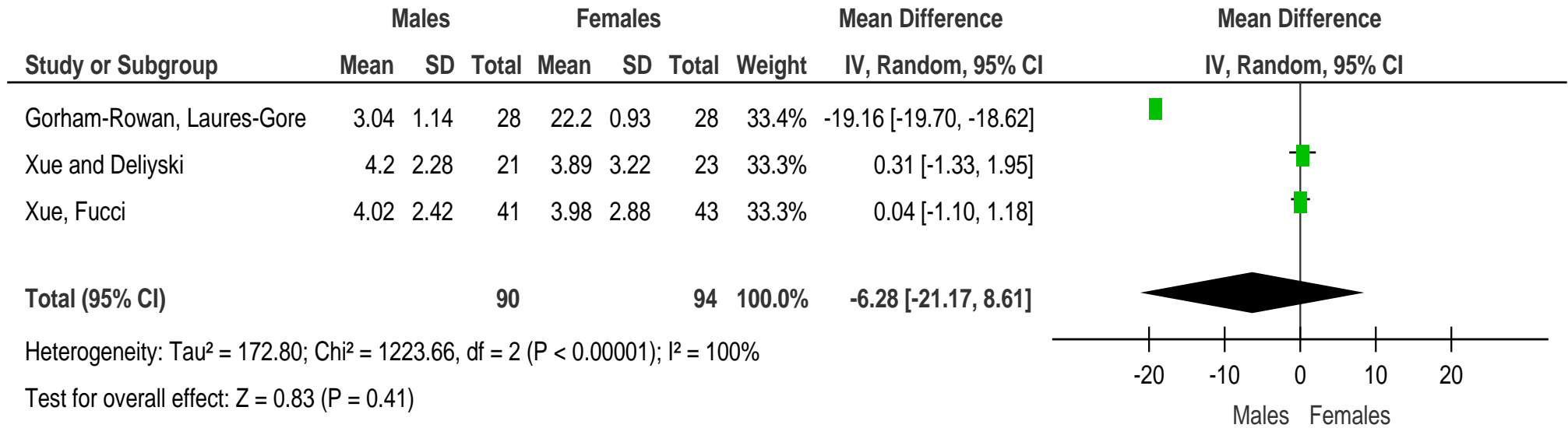


Table S3: NHR%

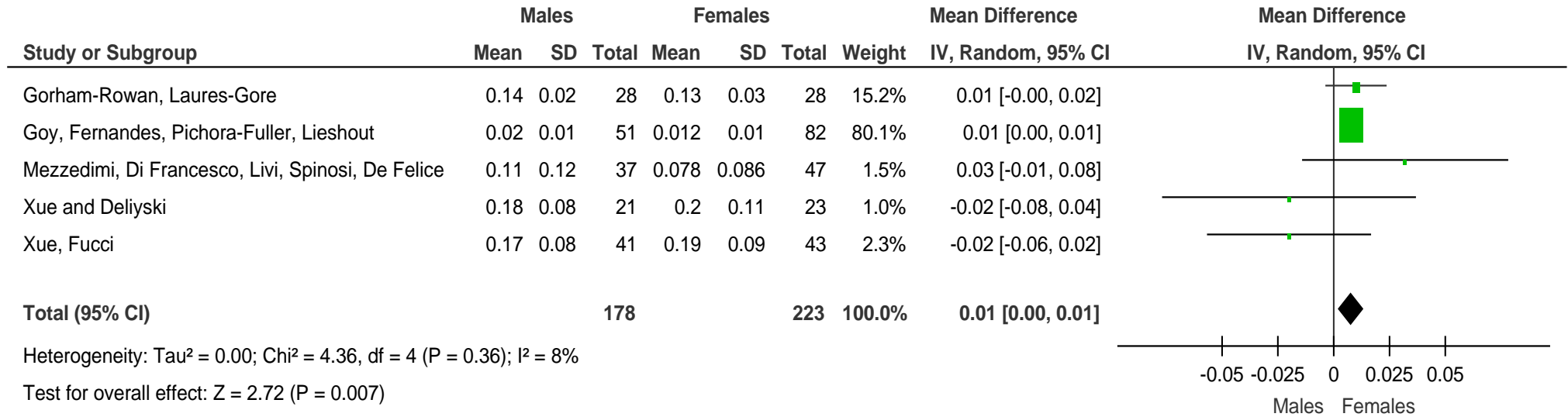


Table S4: Jitter(%)

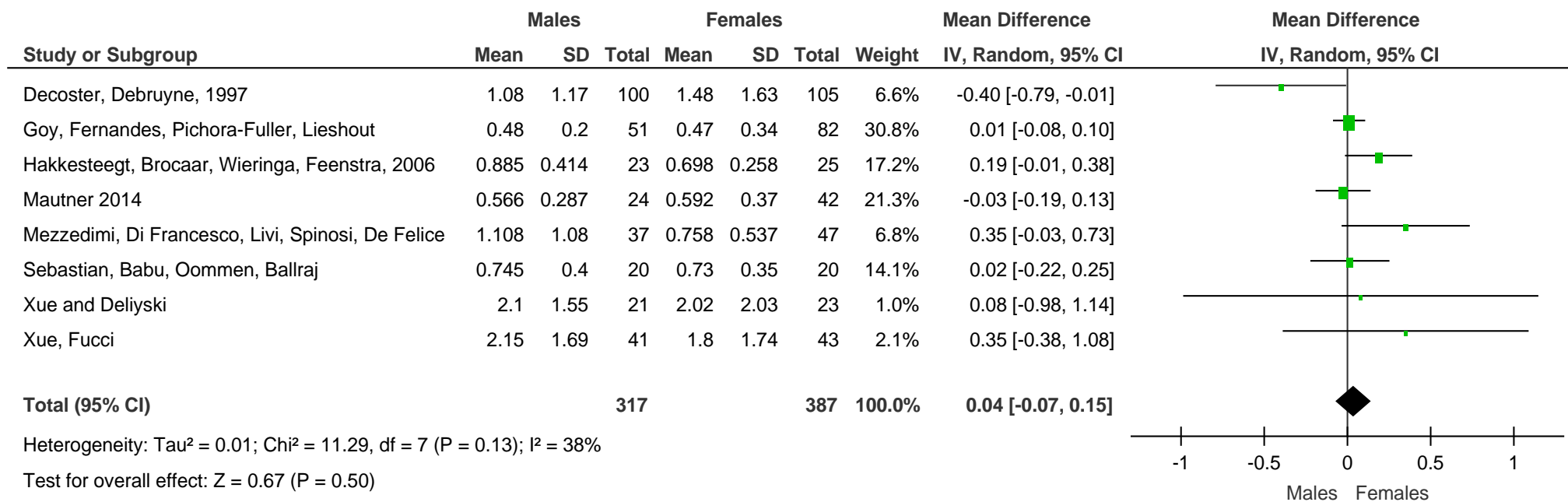


Table S5: Jitter (us)

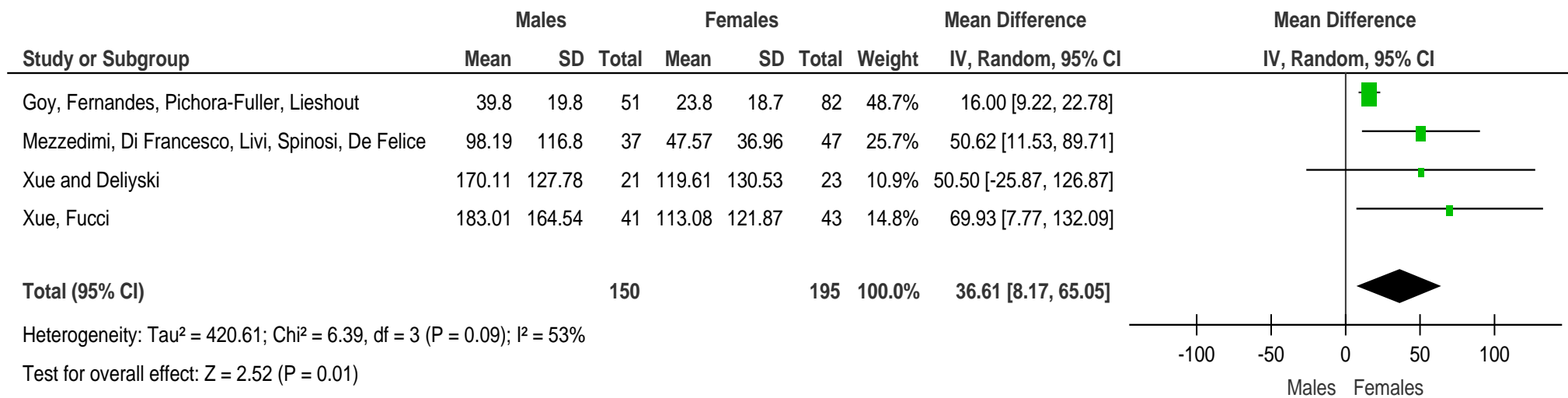


Table S6: Shimmer%

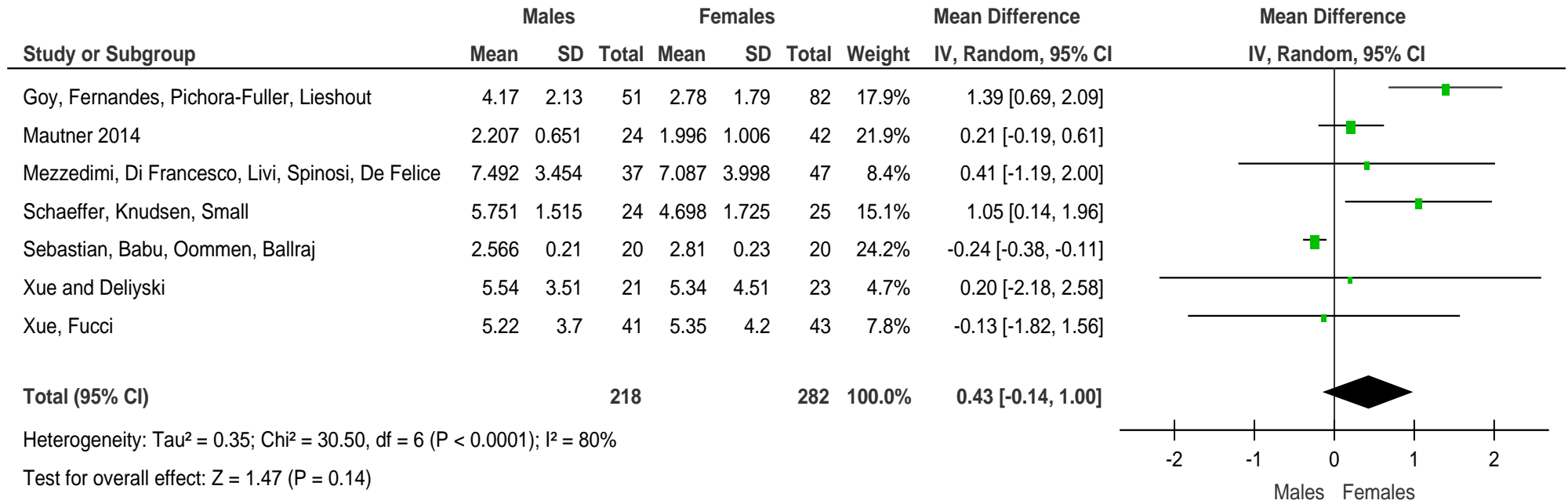


Table S7: ShdB

Study or Subgroup	Males			Females			Weight	Mean Difference	Mean Difference
	Mean	SD	Total	Mean	SD	Total		IV, Random, 95% CI	IV, Random, 95% CI
Decoster, Debruyne, 1997	0.45	0.31	100	0.46	0.31	105	27.6%	-0.01 [-0.09, 0.07]	
Goy, Fernandes, Pichora-Fuller, Lieshout	0.37	0.19	51	0.25	0.16	82	33.8%	0.12 [0.06, 0.18]	
Mezzedimi, Di Francesco, Livi, Spinosi, De Felice	0.66	0.306	37	0.644	0.36	47	15.9%	0.02 [-0.13, 0.16]	
Xue and Deliyiski	0.49	0.31	21	0.48	0.42	23	8.5%	0.01 [-0.21, 0.23]	
Xue, Fucci	0.47	0.32	41	0.48	0.4	43	14.2%	-0.01 [-0.16, 0.14]	
Total (95% CI)			250			300	100.0%	0.04 [-0.03, 0.11]	

Heterogeneity: Tau² = 0.00; Chi² = 7.50, df = 4 (P = 0.11); I² = 47%

Test for overall effect: Z = 1.11 (P = 0.27)

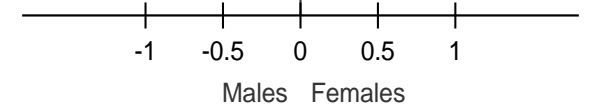


Table S8: PFRst

Study or Subgroup	Males			Females			Weight	Mean Difference	Mean Difference
	Mean	SD	Total	Mean	SD	Total		IV, Random, 95% CI	IV, Random, 95% CI
Xue and Deliyiski	3.52	1.63	21	4.65	4.11	23	38.7%	-1.13 [-2.95, 0.69]	
Xue, Fucci	3.59	2.23	41	4.61	4.26	43	61.3%	-1.02 [-2.46, 0.42]	
Total (95% CI)			62			66	100.0%	-1.06 [-2.19, 0.07]	

Heterogeneity: Tau² = 0.00; Chi² = 0.01, df = 1 (P = 0.93); I² = 0%

Test for overall effect: Z = 1.84 (P = 0.07)

Table S9: PPQ%

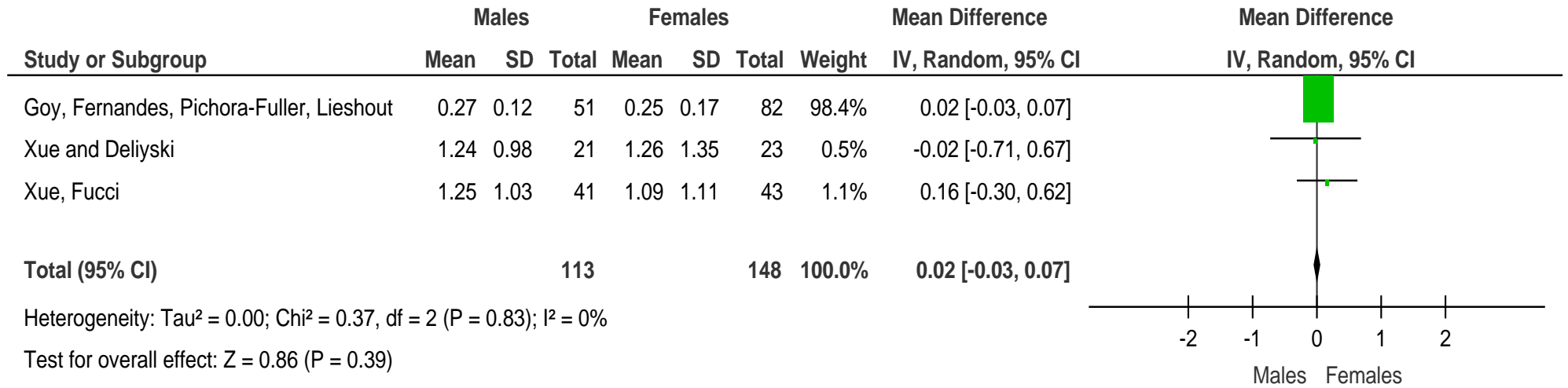


Table S10: RAP%

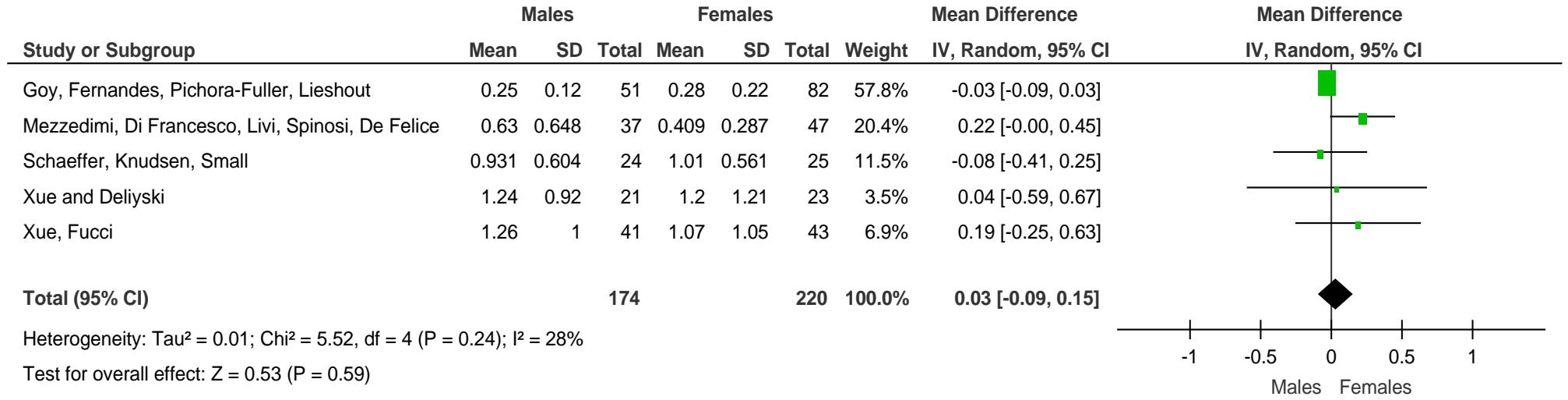


Table S11: SPI

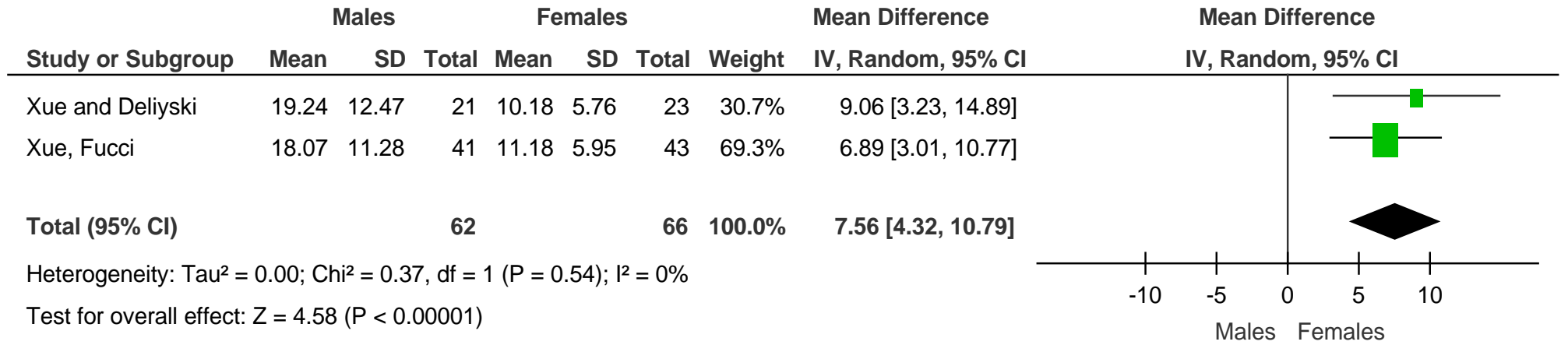


Table S12: sPPQ%

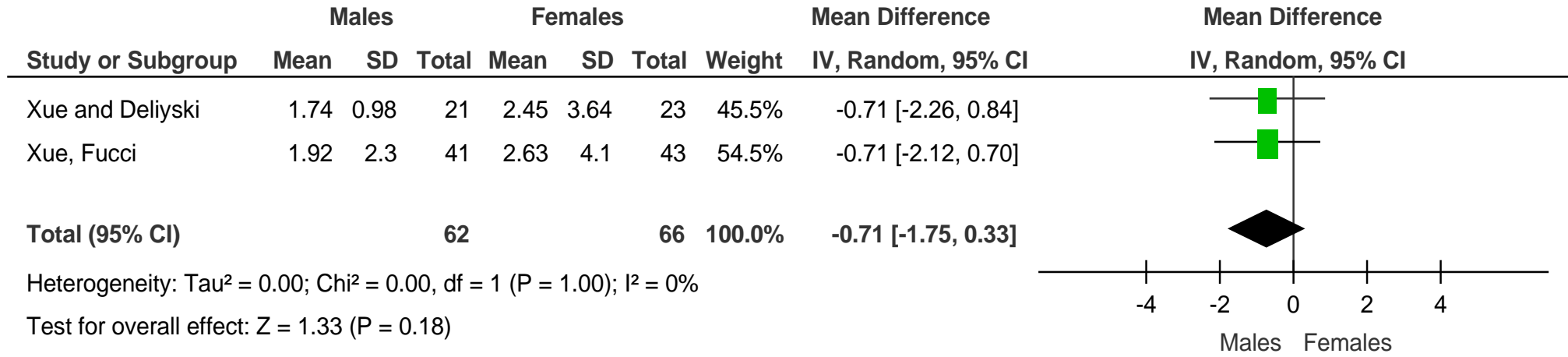


Table S13: *f0* SD

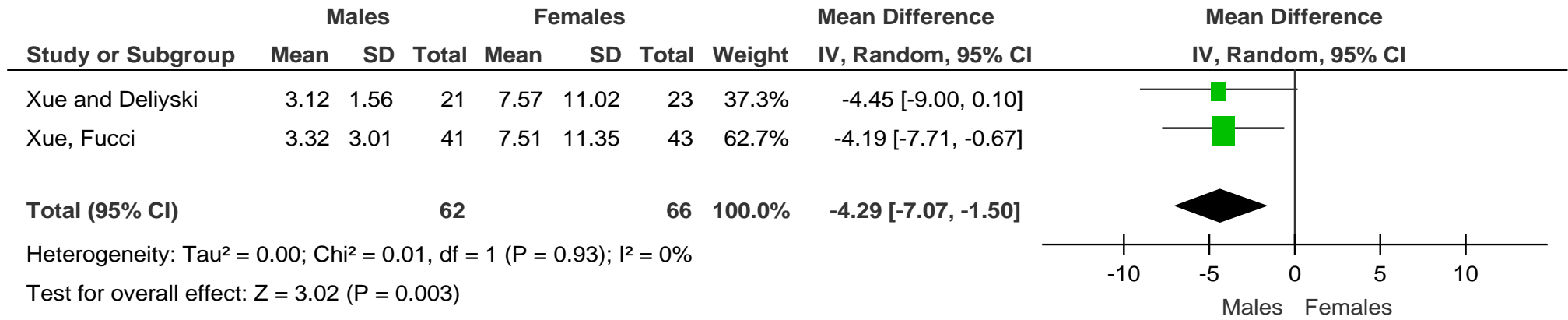


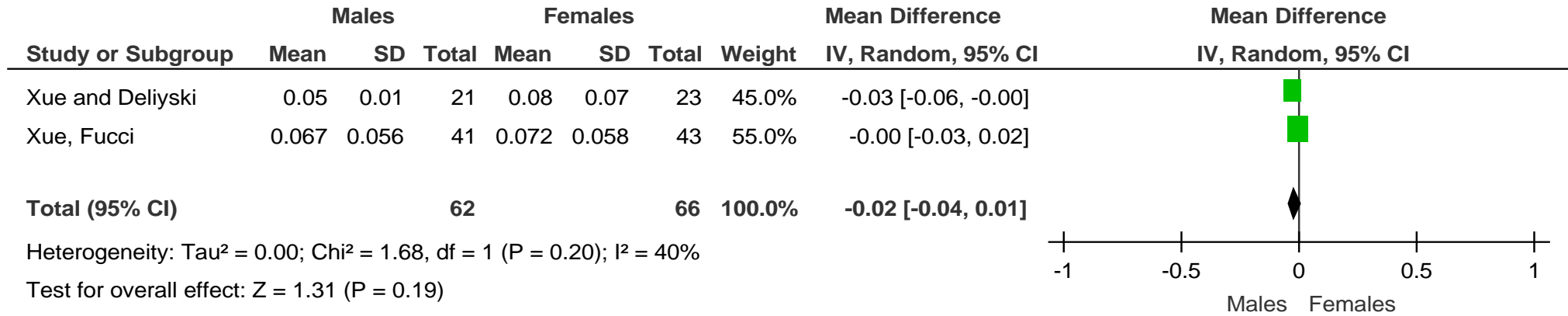
Table S14: vf0

Study or Subgroup	Males			Females			Weight	Mean Difference	Mean Difference
	Mean	SD	Total	Mean	SD	Total		IV, Random, 95% CI	IV, Random, 95% CI
Xue and Deliyiski	2.45	1.2	21	4.51	7.59	23	42.3%	-2.06 [-5.20, 1.08]	
Xue, Fucci	2.72	2.59	41	4.86	8.61	43	57.7%	-2.14 [-4.83, 0.55]	
Total (95% CI)			62			66	100.0%	-2.11 [-4.15, -0.06]	

Heterogeneity: Tau² = 0.00; Chi² = 0.00, df = 1 (P = 0.97); I² = 0%

Test for overall effect: Z = 2.02 (P = 0.04)

Table S15: VTI



II. Comparison by age

a) 60-69 vs. 70-79

Table S16: f_0

Study or Subgroup	(60-69)			(70-79)			Weight	Mean Difference	Mean Difference
	Mean	SD	Total	Mean	SD	Total		IV, Random, 95% CI	IV, Random, 95% CI
Decoster, Debruyne, 1997	155.75	30.15	60	159.8	28.25	60	14.7%	-4.05 [-14.50, 6.40]	
Goy, Fernandes, Pichora-Fuller, Lieshout	164.4	33.039	52	170.49	33.285	71	11.5%	-6.09 [-17.95, 5.77]	
Makiyama, Yoshihashi, Park, Shimazaki, Nakai, 2006	159.9	19.05	55	158.4	16.9	55	35.6%	1.50 [-5.23, 8.23]	
Mautner 2014	149.25	19.95	24	158.15	21.5	22	11.2%	-8.90 [-20.92, 3.12]	
Mezzedimi, Di Francesco, Livi, Spinosi, De Felice	155.03	40.118	42	162.838	46.169	30	3.8%	-7.81 [-28.31, 12.69]	
Mueller, Sweeney, Baribeau, 1984	148.5	21.77	57	153.5	28.11	81	23.2%	-5.00 [-13.33, 3.33]	
Total (95% CI)			290			319	100.0%	-3.22 [-7.23, 0.80]	

Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 3.36$, $df = 5$ ($P = 0.64$); $I^2 = 0\%$
 Test for overall effect: $Z = 1.57$ ($P = 0.12$)

Table S17: Jitter%

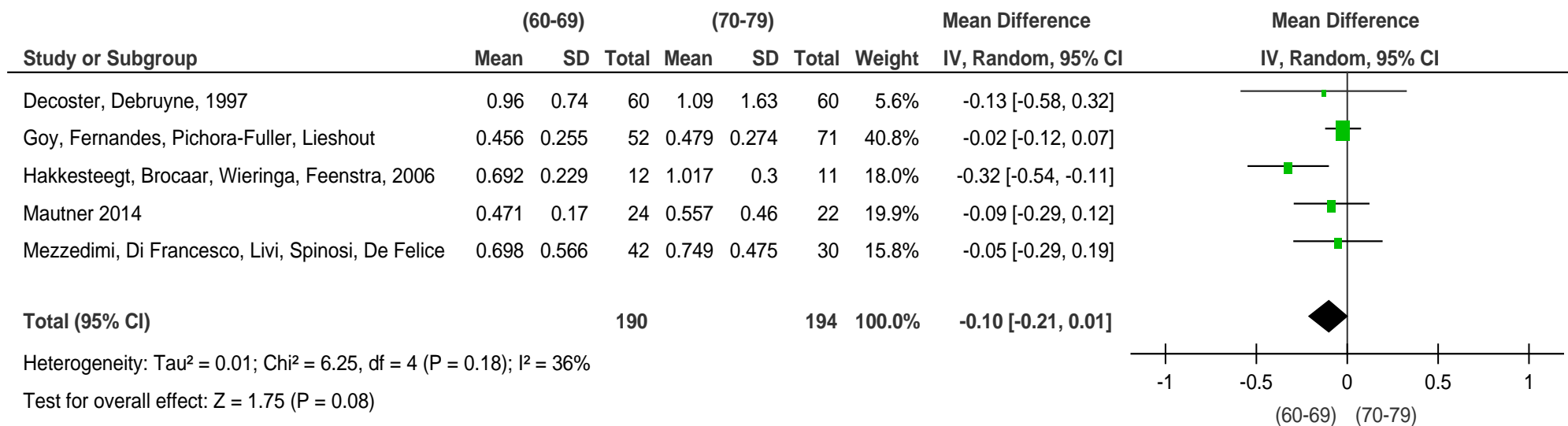


Table S18: Jitter (us)

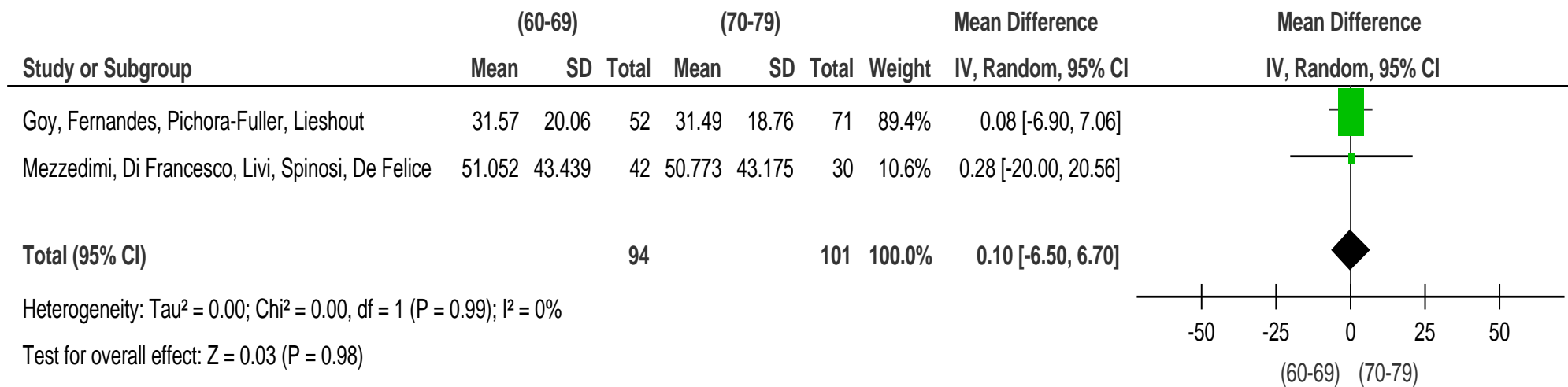


Table S19: RAP%

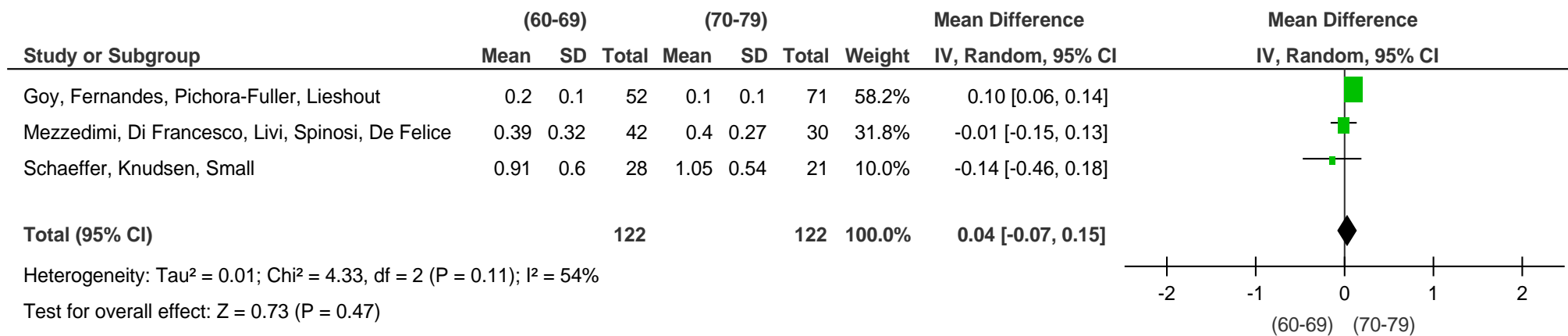


Table S20: Shimmer%

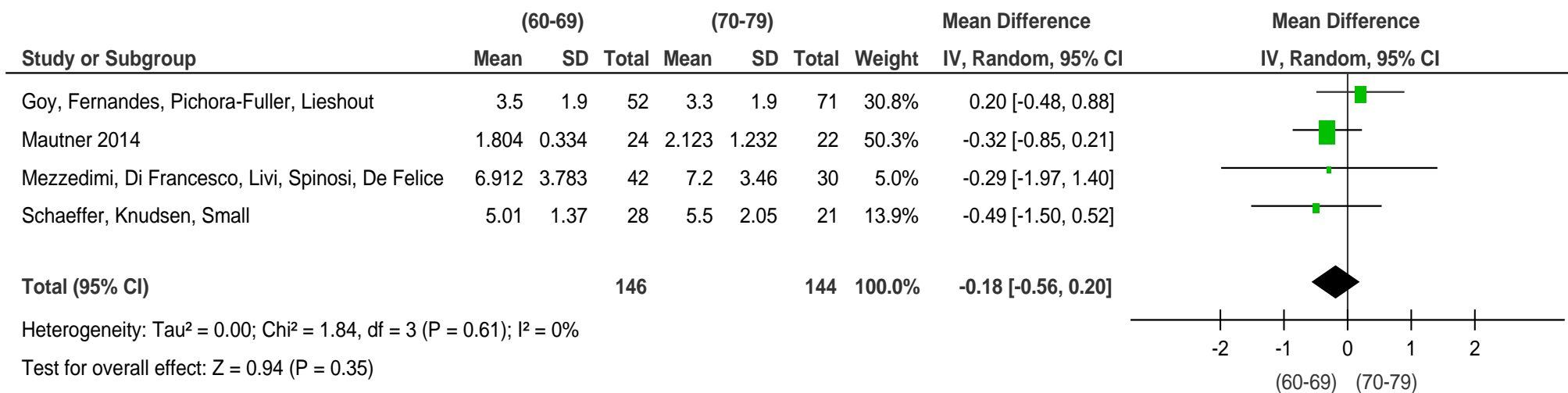


Table S21: ShdB

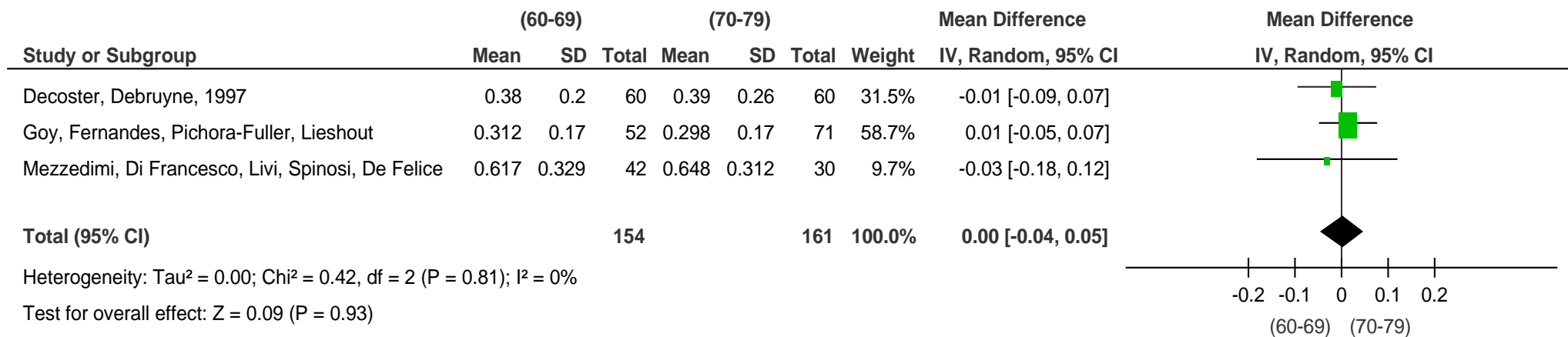


Table S22: NHR%

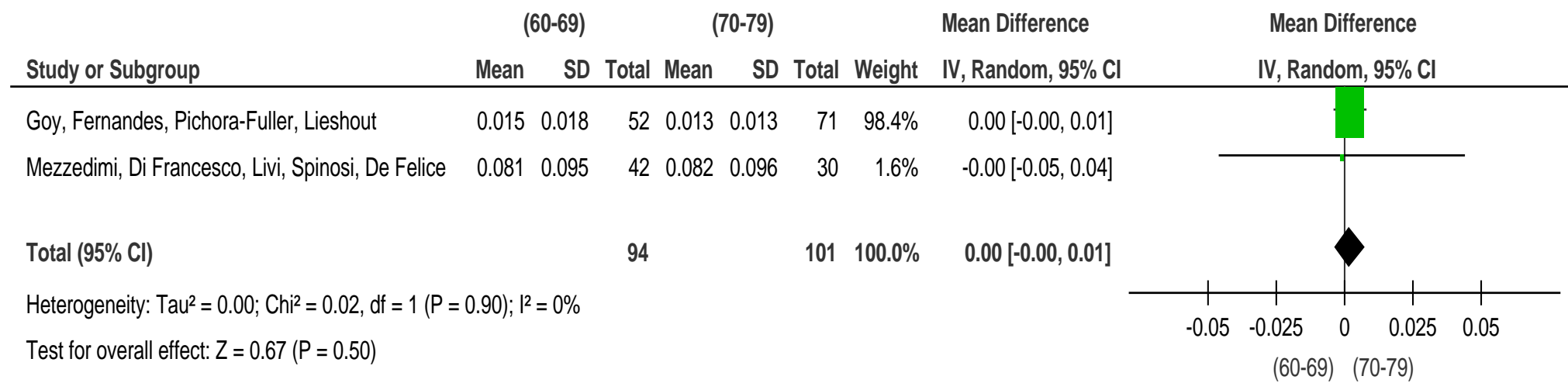
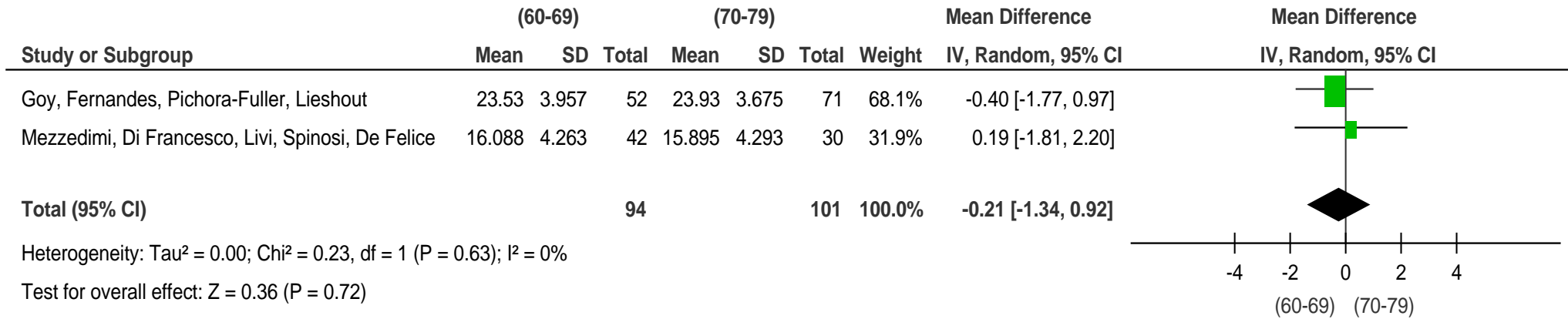


Table S23: HNR (dB)



b) 60-69 vs. 80-89

Table S24: f0

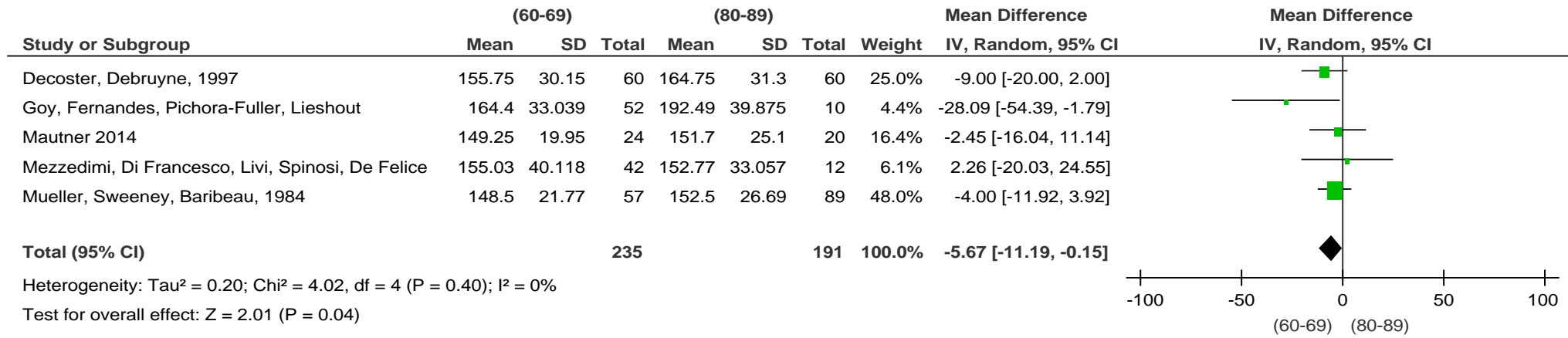


Table S25: Jitter%

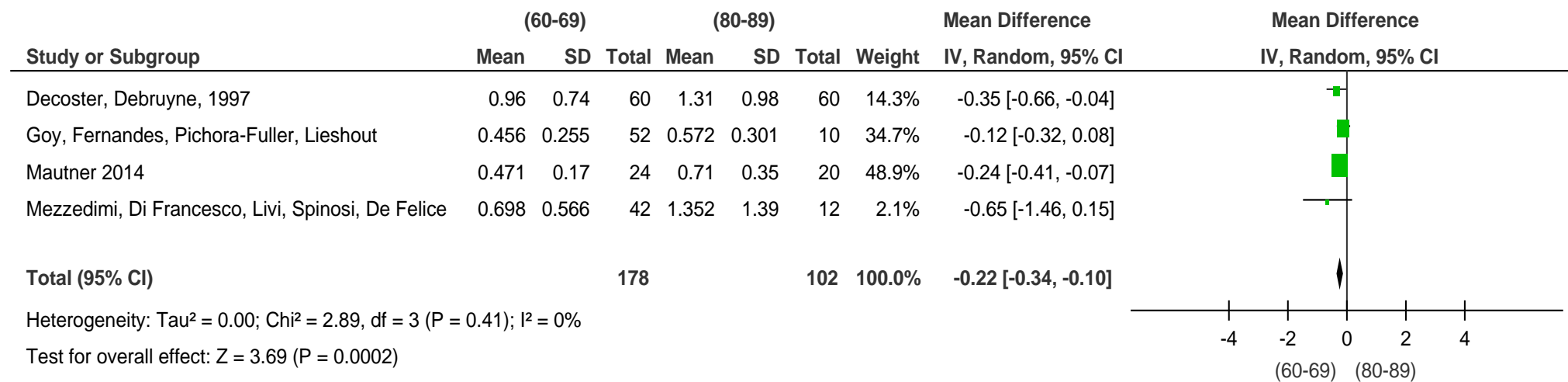


Table S26: Jitter (us)

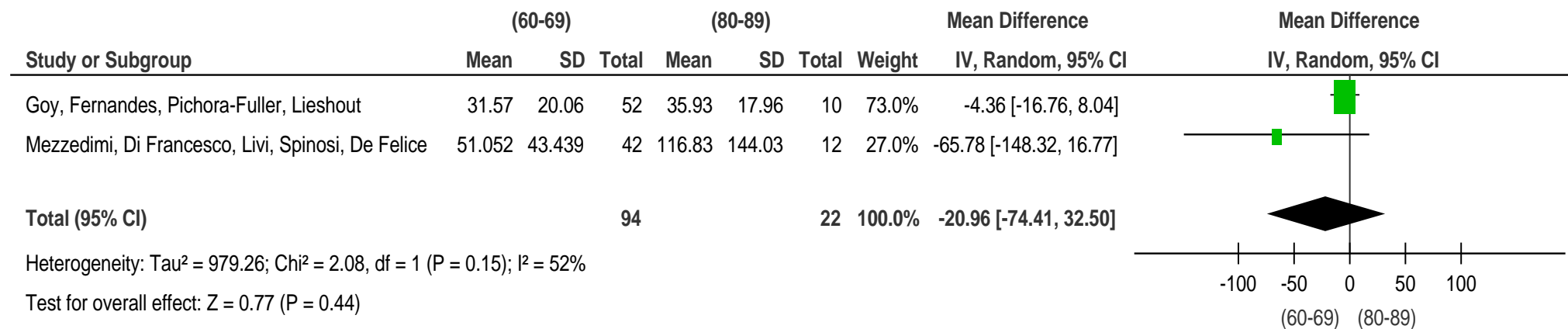


Table S27: RAP%

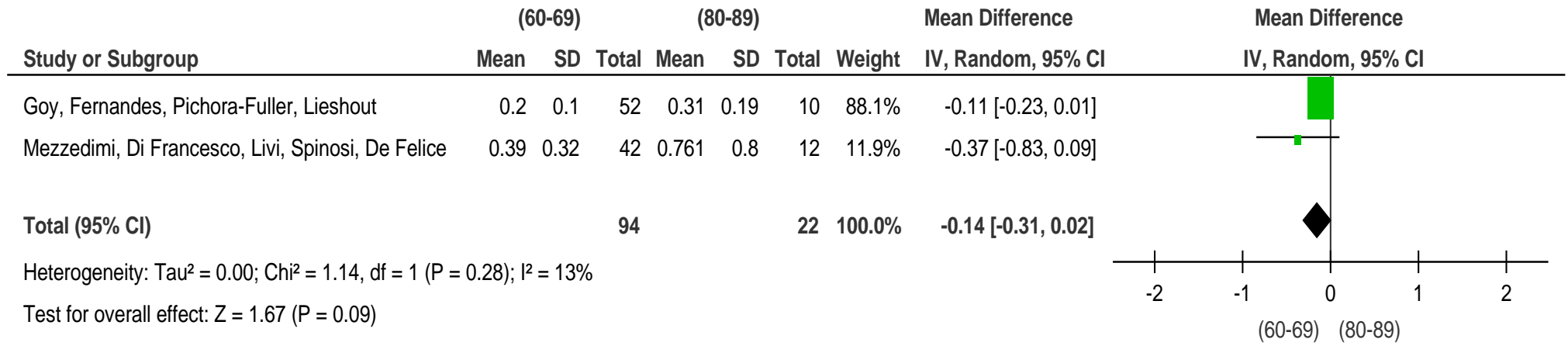


Table S28: Shimmer%

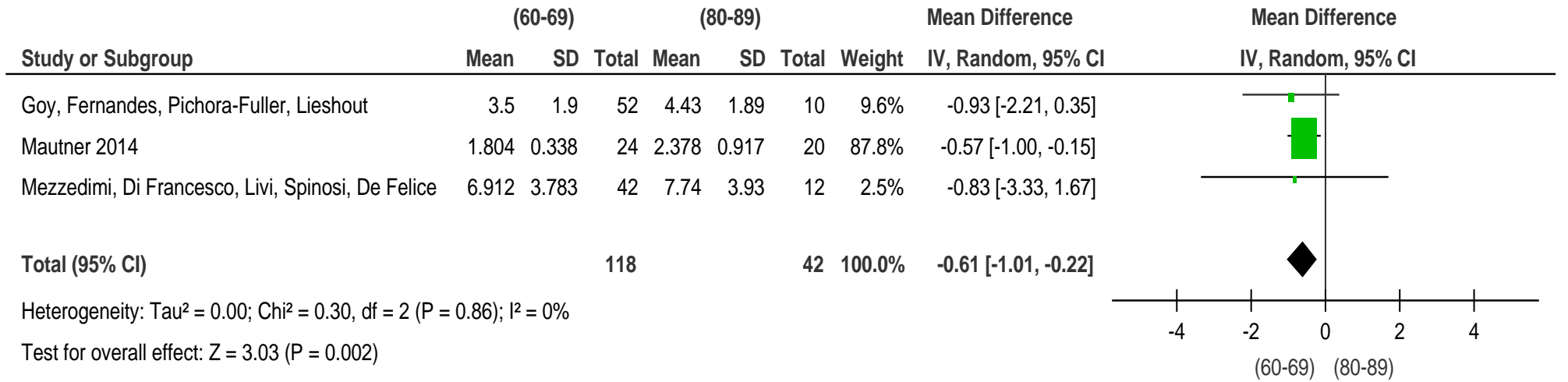


Table S29: ShdB

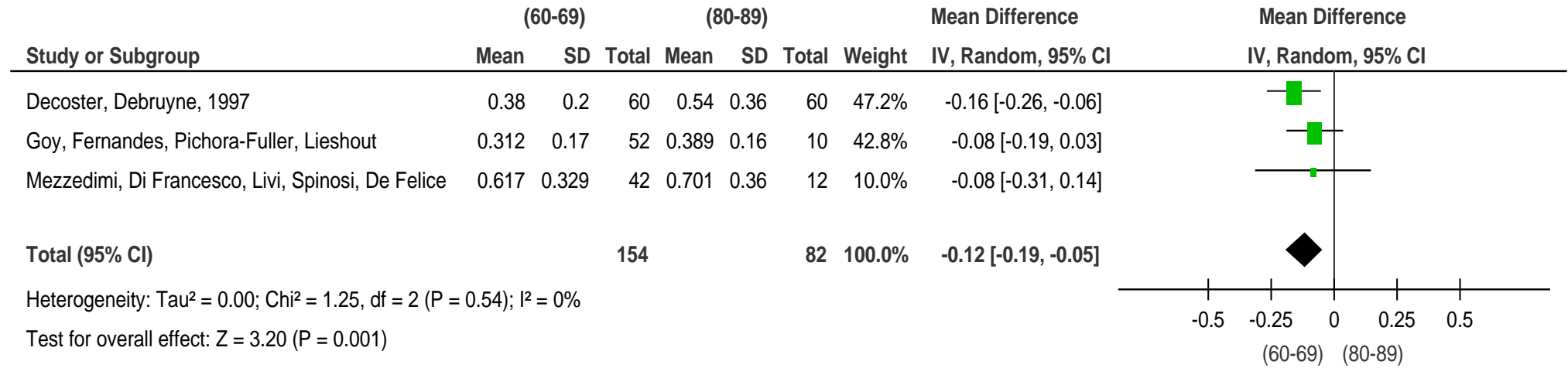


Table S30: NHR%

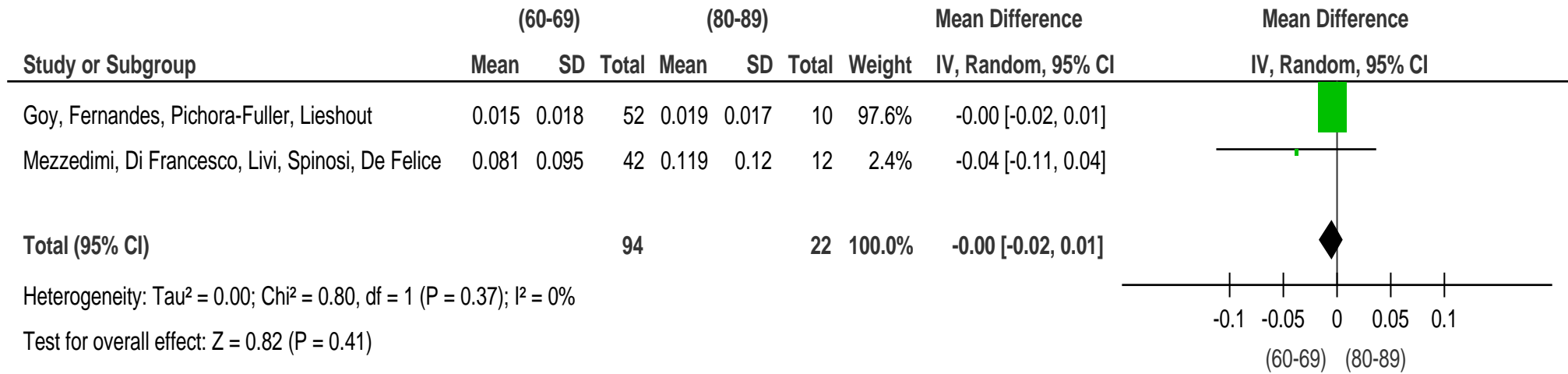
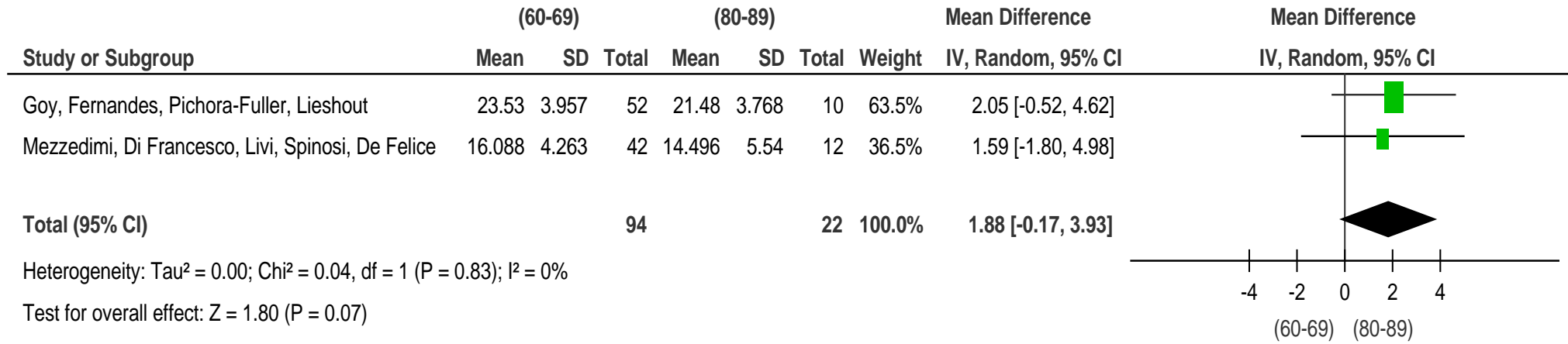


Table S31: HNR (dB)



c) 70-79 vs. 80-89

Table S32: f0

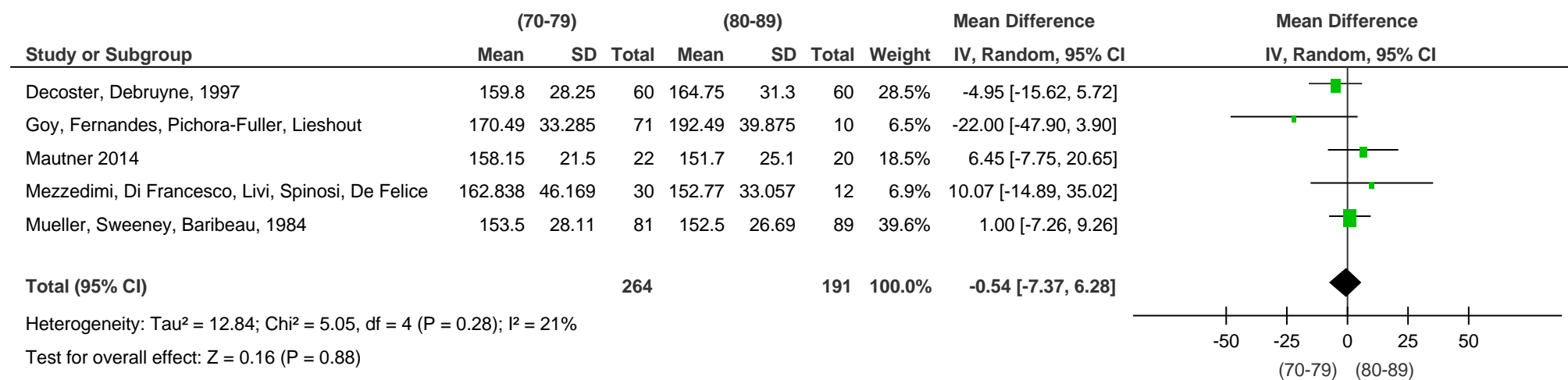


Table S33: Jitter%

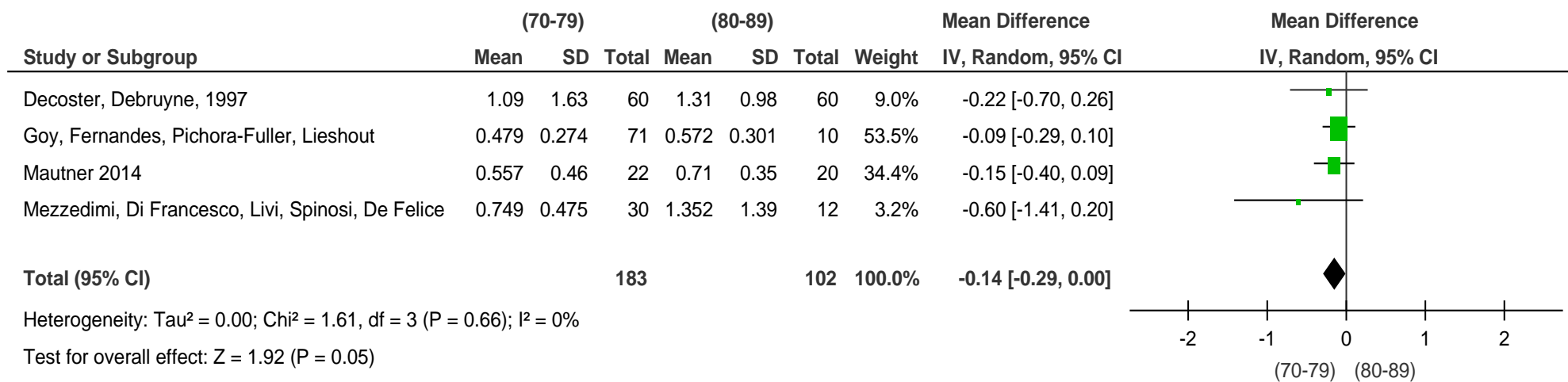


Table S34: Jitter (us)

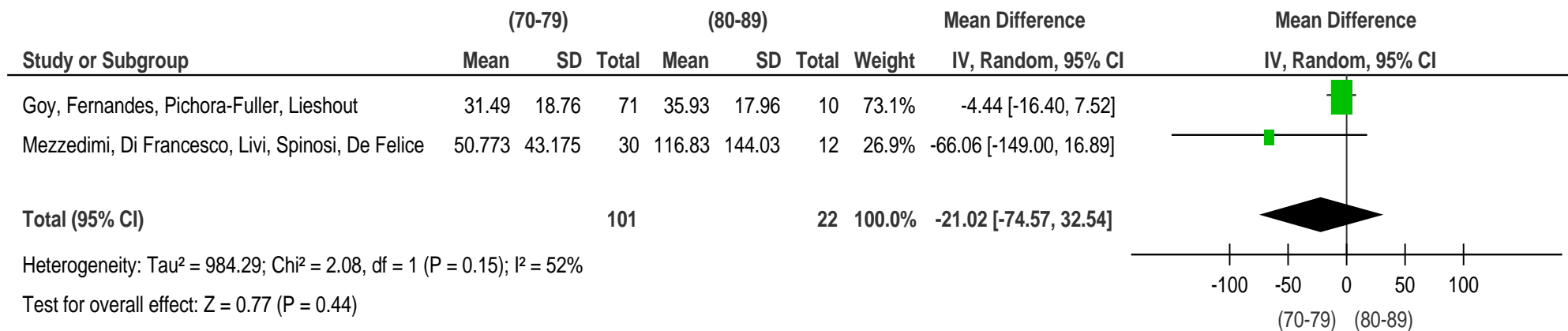


Table S35: RAP%

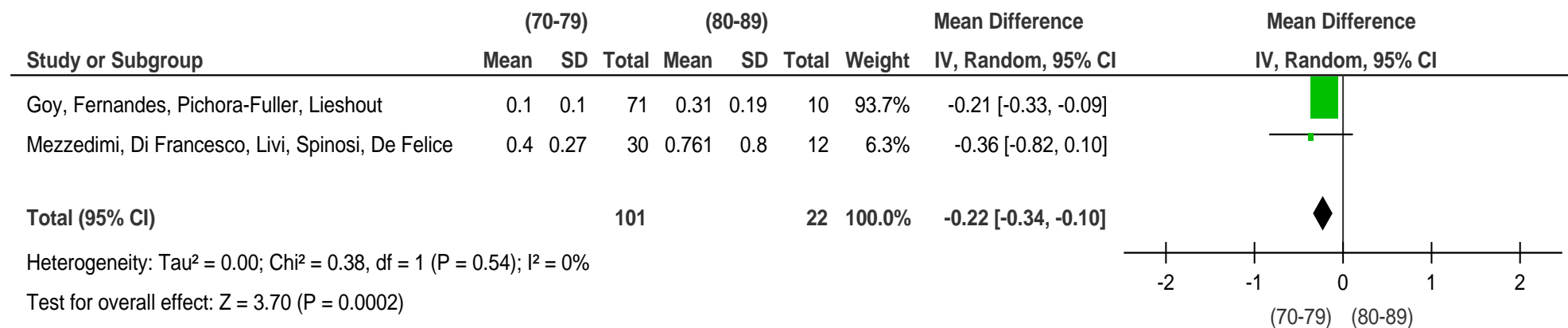


Table S36: Shimmer%

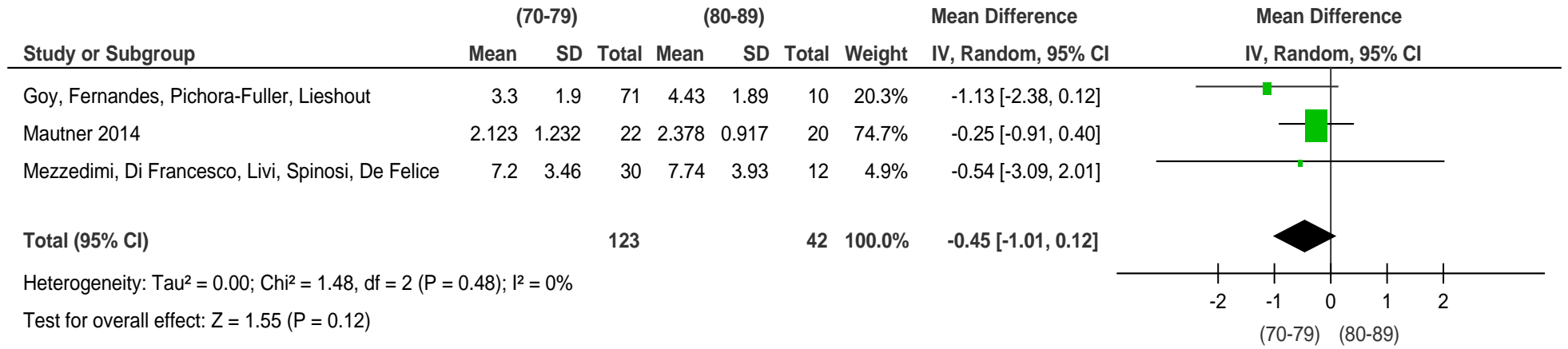


Table S37: ShdB

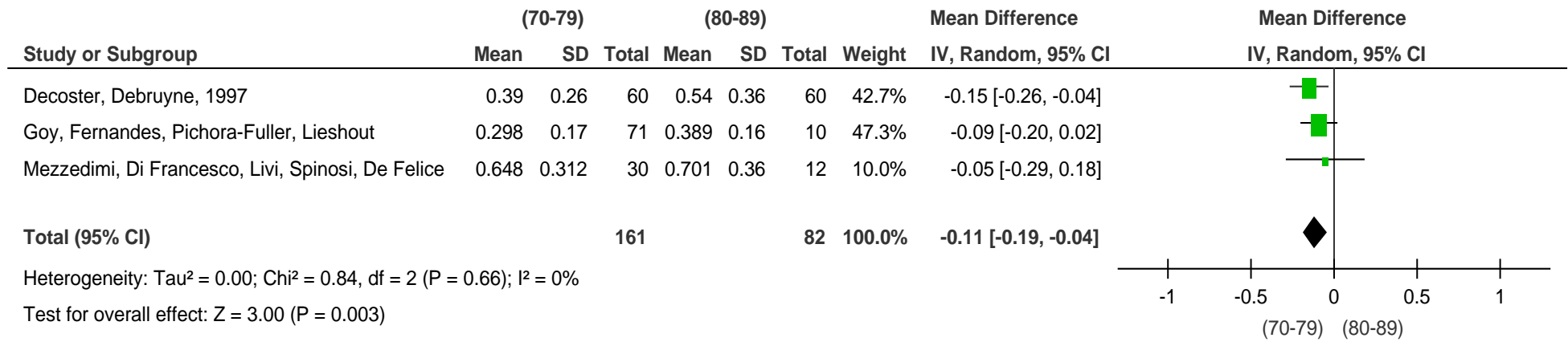


Table S38: NHR%

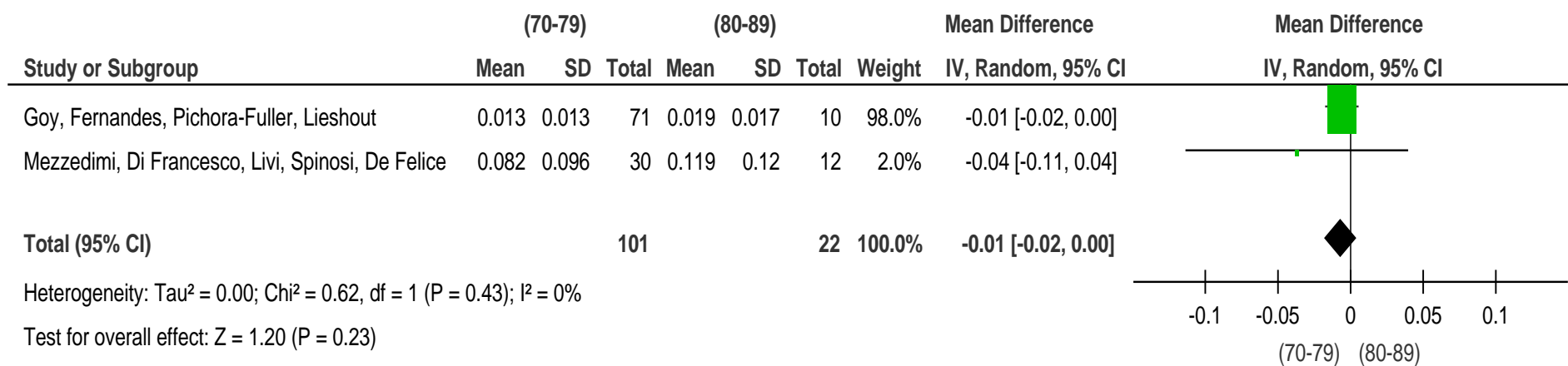
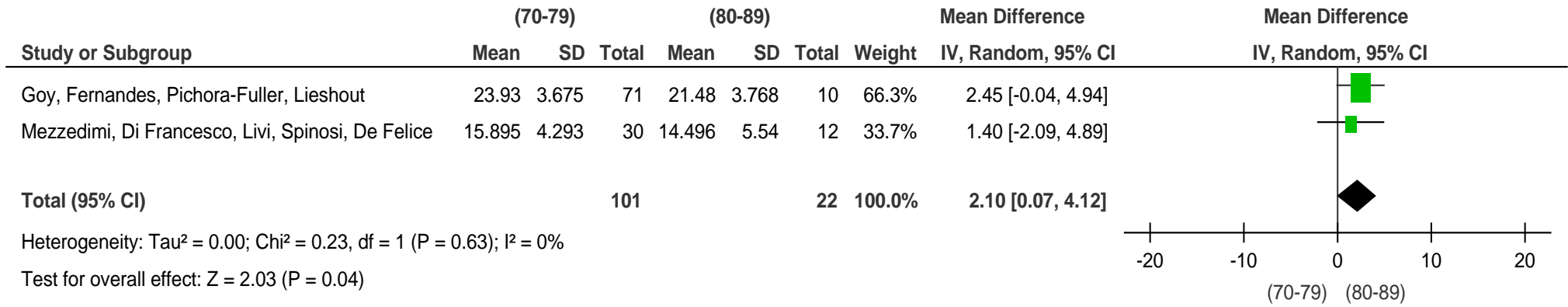


Table S39: HNR (dB)



III. Comparison between males and females by age (60 to 69) – (70 to 79) – (80 to 89)

Table S40: f_0

Study or Subgroup	Males			Females			Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI
	Mean	SD	Total	Mean	SD	Total			
2.2.2 (60-69)									
Makiyama, Yoshihashi, Park, Shimazaki, Nakai, 2006	118.8	9.9	27	201	28.2	28	6.7%	-82.20 [-93.29, -71.11]	
Goy, Fernandes, Pichora-Fuller, Lieshout	128.9	32.47	13	199.9	33.61	39	5.0%	-71.00 [-91.56, -50.44]	
Mautner 2014	111.8	14.7	7	179.7	25.2	17	5.8%	-67.90 [-84.09, -51.71]	
Mueller, Sweeney, Baribeau, 1984	118	15.83	21	179	27.7	36	6.7%	-61.00 [-72.30, -49.70]	
Decoster, Debruyne, 1997	128.1	28.4	30	183.4	31.9	30	5.9%	-55.30 [-70.58, -40.02]	
Mezzedimi, Di Francesco, Livi, Spinosi, De Felice	132.64	34.08	15	177.41	46.15	27	4.3%	-44.77 [-69.27, -20.27]	
Subtotal (95% CI)			113			177	34.4%	-65.16 [-75.65, -54.67]	
Heterogeneity: Tau ² = 104.51; Chi ² = 13.86, df = 5 (P = 0.02); I ² = 64%									
Test for overall effect: Z = 12.17 (P < 0.00001)									
2.2.3 (70-79)									
Goy, Fernandes, Pichora-Fuller, Lieshout	127	27.1	34	213.9	39.47	37	5.9%	-86.90 [-102.54, -71.26]	
Makiyama, Yoshihashi, Park, Shimazaki, Nakai, 2006	117.5	10.7	29	199.3	23.1	26	6.9%	-81.80 [-91.50, -72.10]	
Mueller, Sweeney, Baribeau, 1984	121	26.86	27	186	29.36	54	6.4%	-65.00 [-77.81, -52.19]	
Mautner 2014	127.3	18.5	8	189	24.5	14	5.4%	-61.70 [-79.84, -43.56]	
Xue and Deliyiski	127.62	29.18	21	187.7	42.15	23	4.9%	-60.08 [-81.35, -38.81]	
Xue, Fucci	125.91	26.52	41	181.35	45.18	43	5.9%	-55.44 [-71.20, -39.68]	
Decoster, Debruyne, 1997	133.9	32.3	30	185.7	24.2	30	6.1%	-51.80 [-66.24, -37.36]	
Mezzedimi, Di Francesco, Livi, Spinosi, De Felice	149.47	49.48	15	176.2	42.85	15	3.2%	-26.73 [-59.85, 6.39]	
Subtotal (95% CI)			205			242	44.6%	-63.87 [-75.05, -52.69]	
Heterogeneity: Tau ² = 183.04; Chi ² = 27.83, df = 7 (P = 0.0002); I ² = 75%									
Test for overall effect: Z = 11.20 (P < 0.00001)									
2.2.4 (80-89)									
Goy, Fernandes, Pichora-Fuller, Lieshout	124.5	13.004	4	260.4	66.75	6	1.5%	-135.90 [-190.81, -80.99]	
Mezzedimi, Di Francesco, Livi, Spinosi, De Felice	129.21	24.99	7	186.32	41.12	5	2.4%	-57.11 [-97.63, -16.59]	
Mueller, Sweeney, Baribeau, 1984	127	22.66	22	178	30.72	67	6.5%	-51.00 [-62.99, -39.01]	
Decoster, Debruyne, 1997	144.9	34.6	30	184.6	28	30	5.8%	-39.70 [-55.63, -23.77]	
Mautner 2014	133.9	24.3	9	169.5	25.9	11	4.7%	-35.60 [-57.65, -13.55]	
Subtotal (95% CI)			72			119	21.1%	-52.20 [-70.24, -34.16]	
Heterogeneity: Tau ² = 248.09; Chi ² = 12.53, df = 4 (P = 0.01); I ² = 68%									
Test for overall effect: Z = 5.67 (P < 0.00001)									
Total (95% CI)			390			538	100.0%	-61.49 [-69.11, -53.87]	
Heterogeneity: Tau ² = 193.89; Chi ² = 71.55, df = 18 (P < 0.00001); I ² = 75%									
Test for overall effect: Z = 15.81 (P < 0.00001)									
Test for subgroup differences: Chi ² = 1.55, df = 2 (P = 0.46), I ² = 0%									

Table S41: APQ

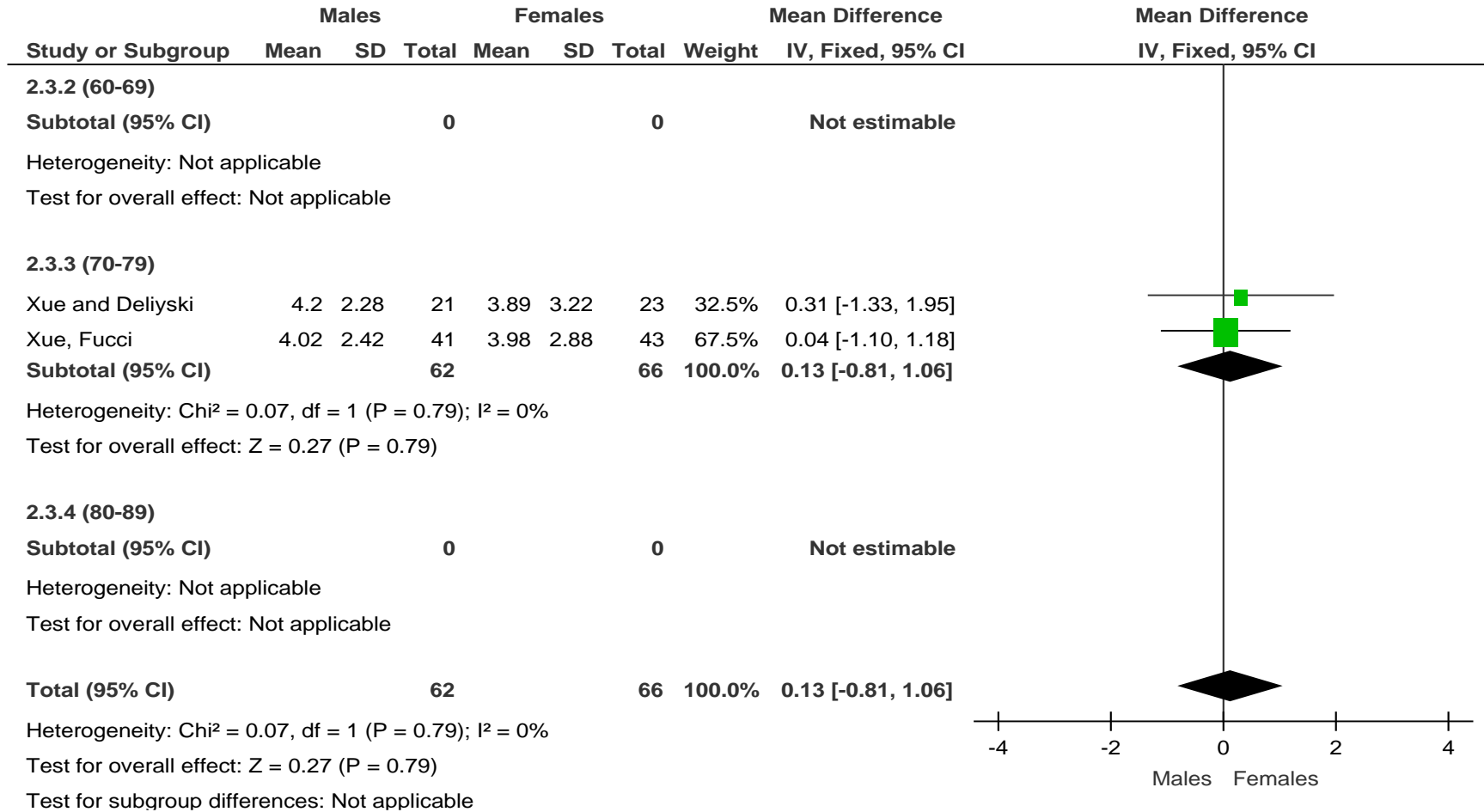


Table S42: NHR%

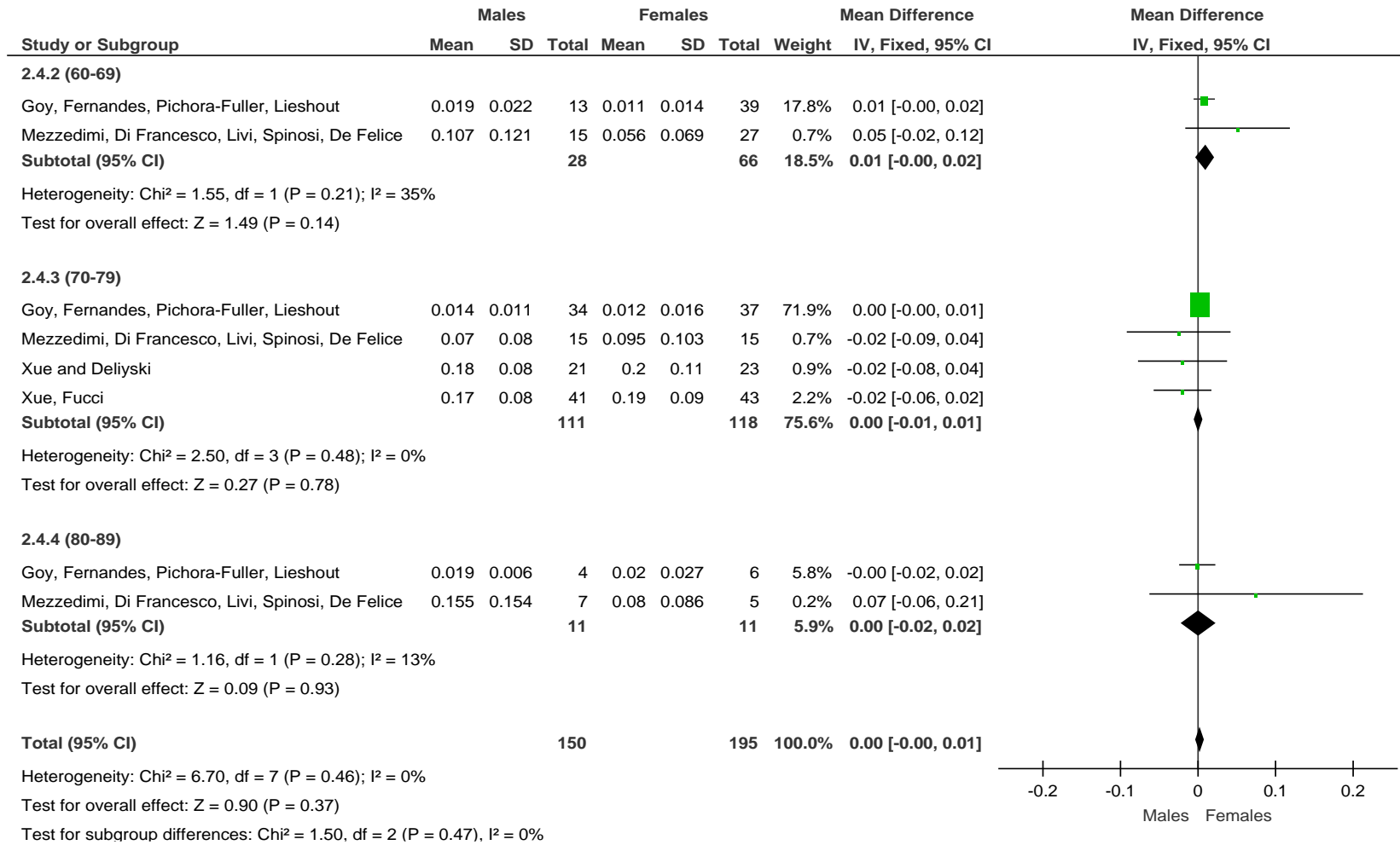


Table S43: Jitter%

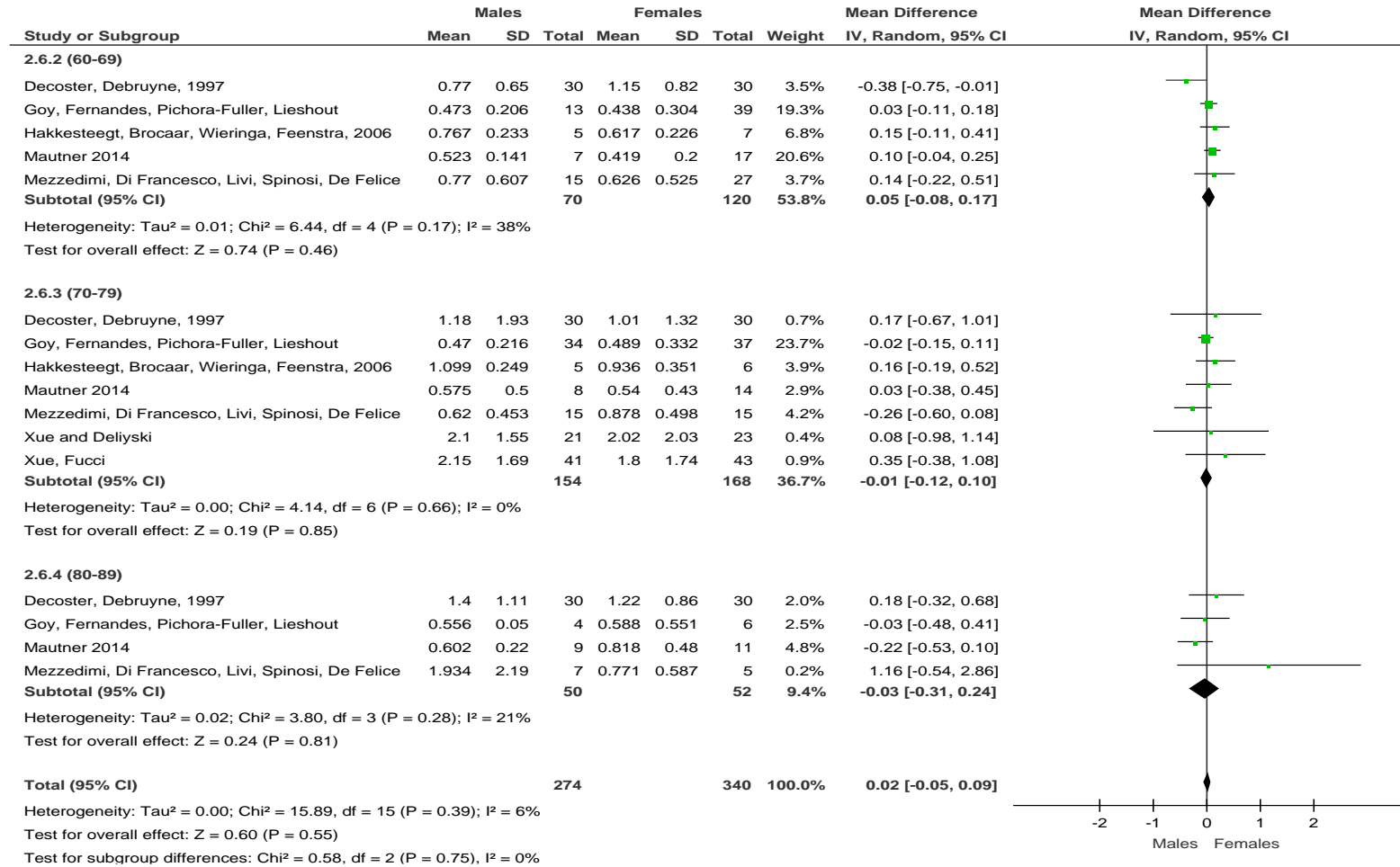


Table S44: Jitter (us)

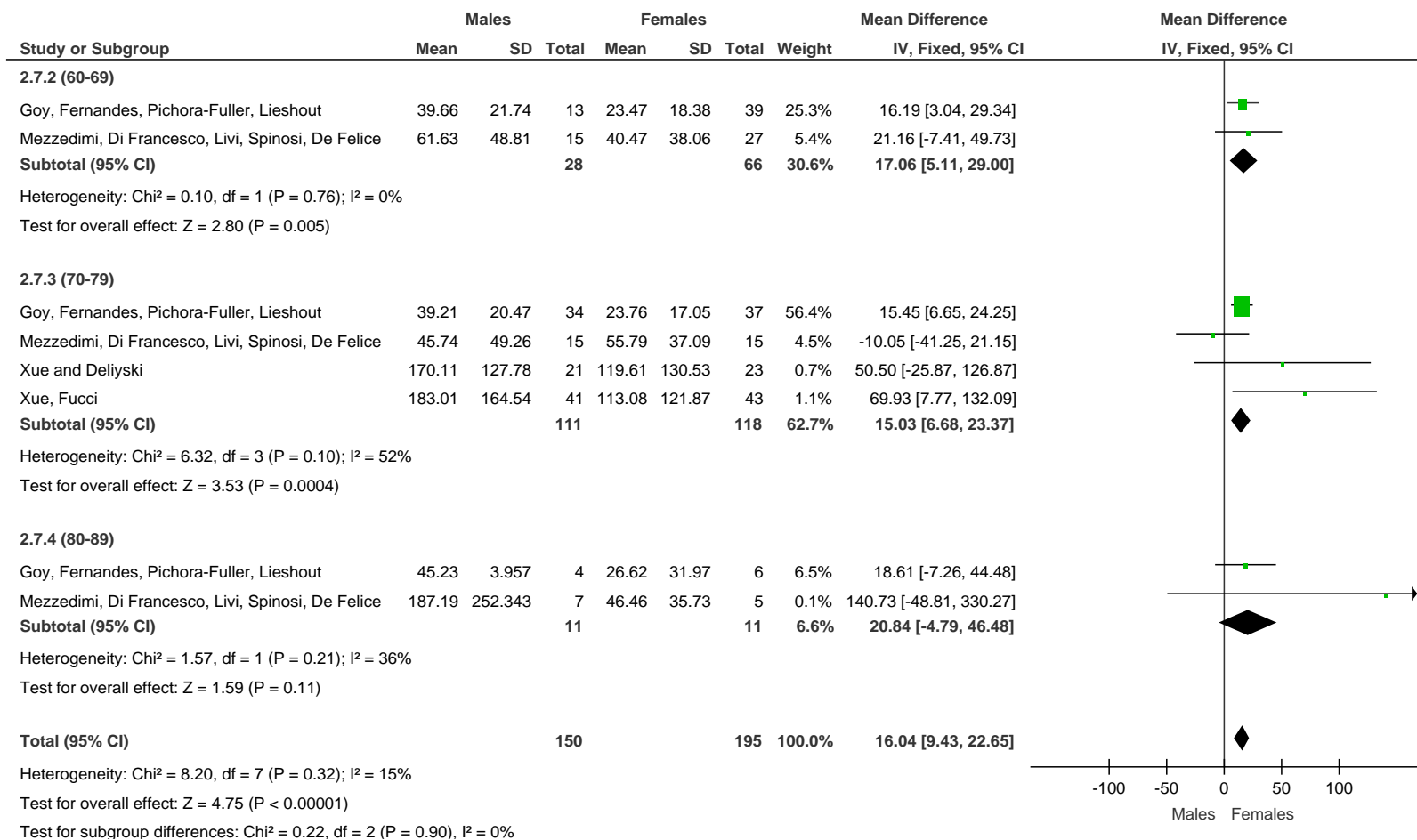


Table S45: Shimmer%

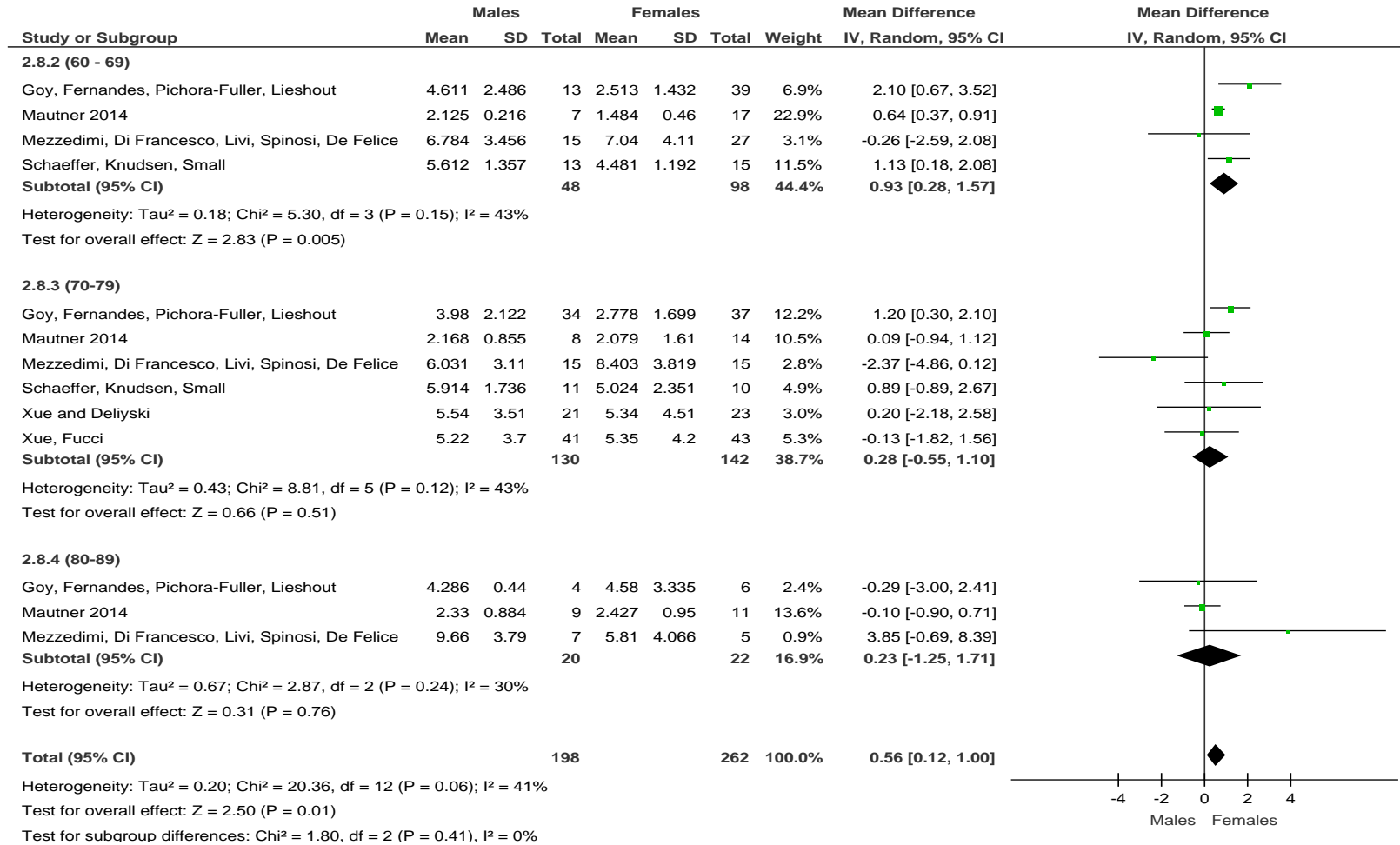


Table S46: ShdB

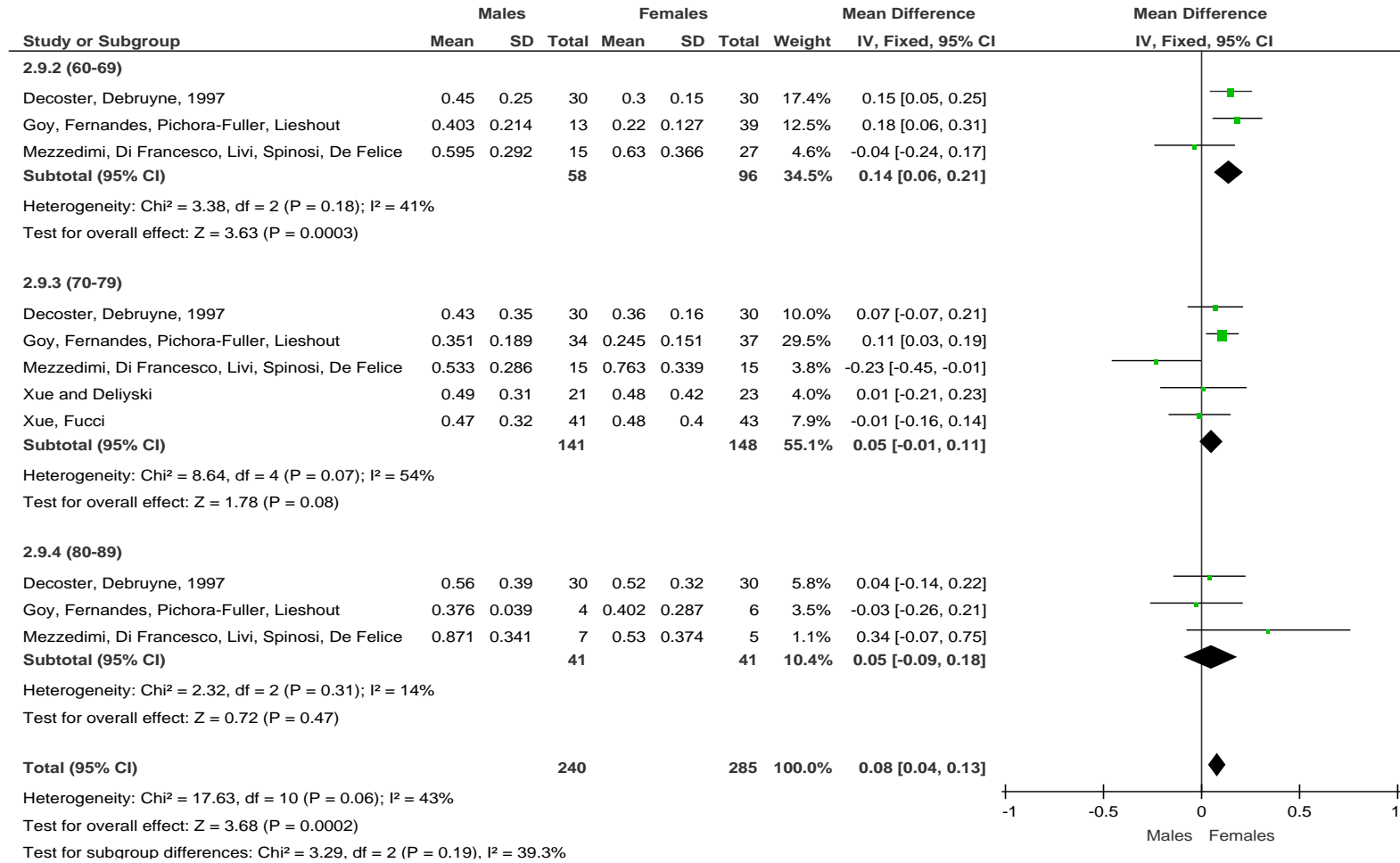


Table S47: PFRst

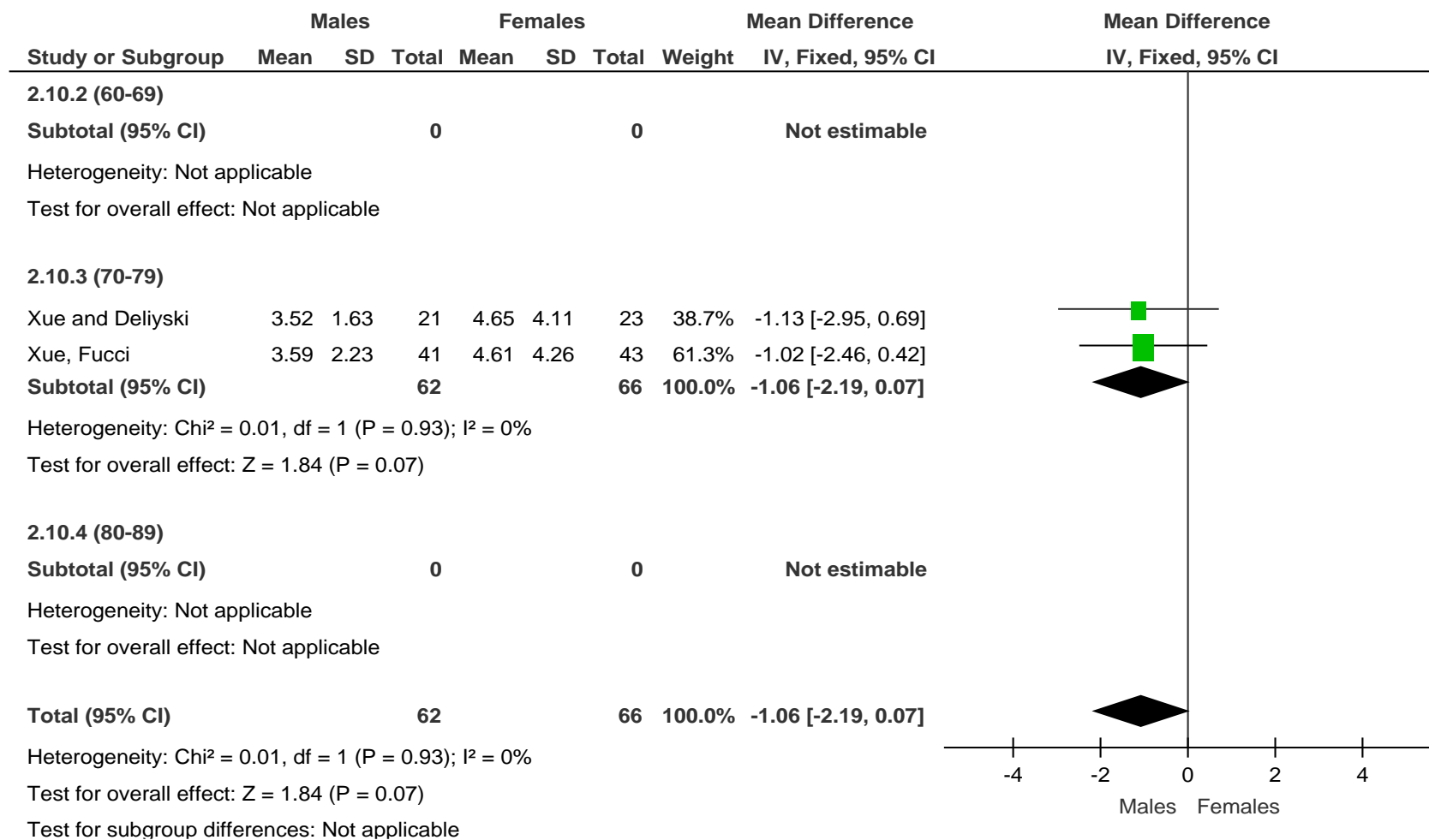


Table S48: PPQ%

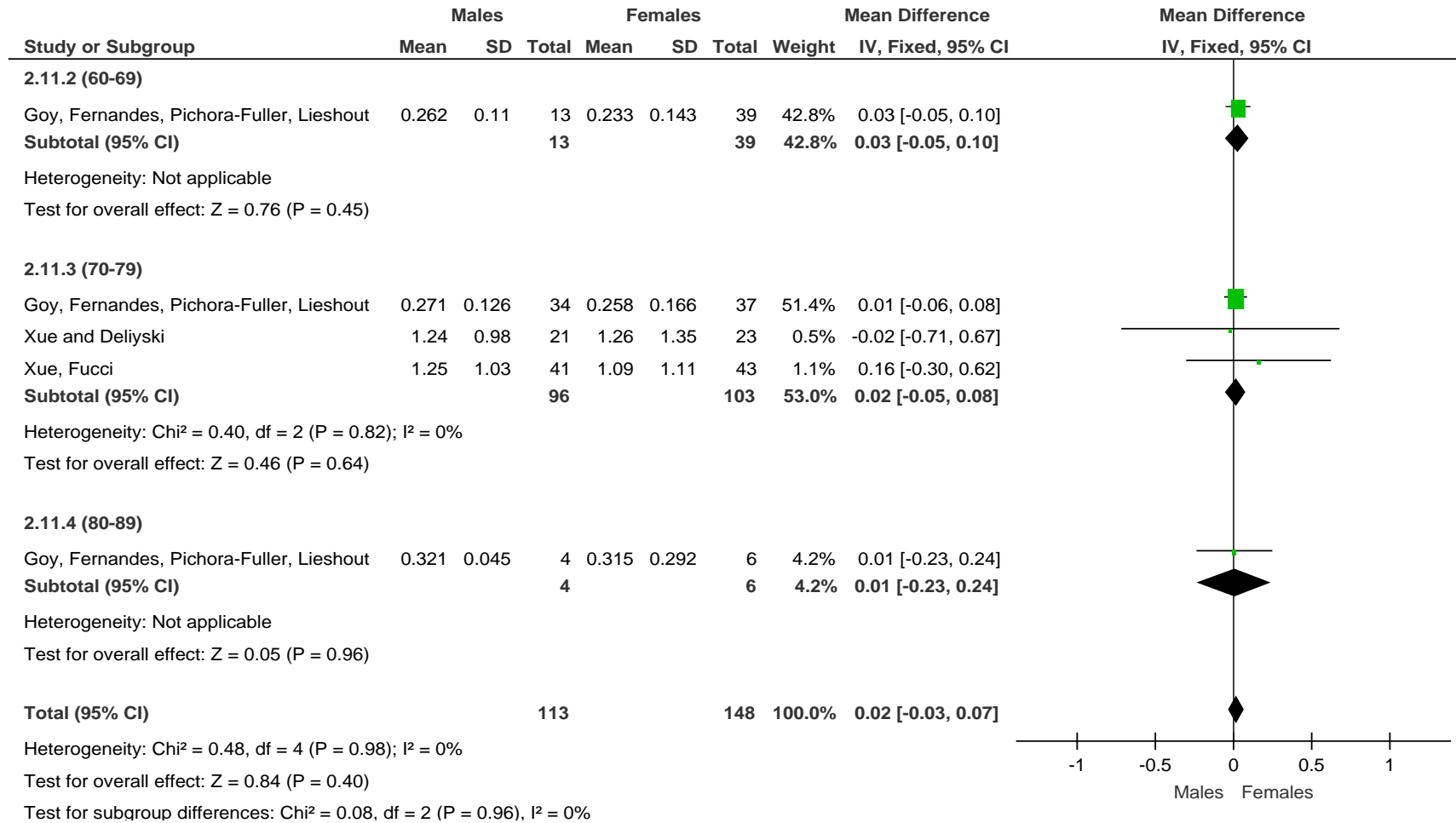


Table S49: RAP%

Study or Subgroup	Males			Females			Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI
	Mean	SD	Total	Mean	SD	Total			
2.12.2 (60-69)									
Goy, Fernandes, Pichora-Fuller, Lieshout	0.249	0.136	13	0.255	0.195	39	32.0%	-0.01 [-0.10, 0.09]	
Mezzedimi, Di Francesco, Livi, Spinosi, De Felice	0.42	0.351	15	0.363	0.297	27	6.7%	0.06 [-0.15, 0.27]	
Schaeffer, Knudsen, Small	0.864	0.693	13	0.955	0.538	15	1.4%	-0.09 [-0.56, 0.37]	
Subtotal (95% CI)			41			81	40.0%	0.00 [-0.08, 0.09]	
Heterogeneity: Tau ² = 0.00; Chi ² = 0.44, df = 2 (P = 0.80); I ² = 0%									
Test for overall effect: Z = 0.04 (P = 0.97)									
2.12.3 (70-79)									
Goy, Fernandes, Pichora-Fuller, Lieshout	0.243	0.126	34	0.289	0.214	37	45.0%	-0.05 [-0.13, 0.03]	
Mezzedimi, Di Francesco, Livi, Spinosi, De Felice	0.337	0.277	15	0.476	0.28	15	7.4%	-0.14 [-0.34, 0.06]	
Schaeffer, Knudsen, Small	1.011	0.5	11	1.092	0.615	10	1.3%	-0.08 [-0.56, 0.40]	
Xue and Deliyiski	1.24	0.92	21	1.2	1.21	23	0.7%	0.04 [-0.59, 0.67]	
Xue, Fucci	1.26	1	41	1.07	1.05	43	1.5%	0.19 [-0.25, 0.63]	
Subtotal (95% CI)			122			128	55.9%	-0.05 [-0.12, 0.02]	
Heterogeneity: Tau ² = 0.00; Chi ² = 2.02, df = 4 (P = 0.73); I ² = 0%									
Test for overall effect: Z = 1.39 (P = 0.16)									
2.12.4 (80-89)									
Goy, Fernandes, Pichora-Fuller, Lieshout	0.28	0.031	4	0.347	0.346	6	3.8%	-0.07 [-0.35, 0.21]	
Mezzedimi, Di Francesco, Livi, Spinosi, De Felice	1.13	1.315	7	0.388	0.285	5	0.3%	0.74 [-0.26, 1.75]	
Subtotal (95% CI)			11			11	4.1%	0.19 [-0.55, 0.92]	
Heterogeneity: Tau ² = 0.19; Chi ² = 2.31, df = 1 (P = 0.13); I ² = 57%									
Test for overall effect: Z = 0.50 (P = 0.62)									
Total (95% CI)			174			220	100.0%	-0.03 [-0.08, 0.03]	
Heterogeneity: Tau ² = 0.00; Chi ² = 5.65, df = 9 (P = 0.77); I ² = 0%									
Test for overall effect: Z = 1.03 (P = 0.30)									
Test for subgroup differences: Chi ² = 1.19, df = 2 (P = 0.55), I ² = 0%									

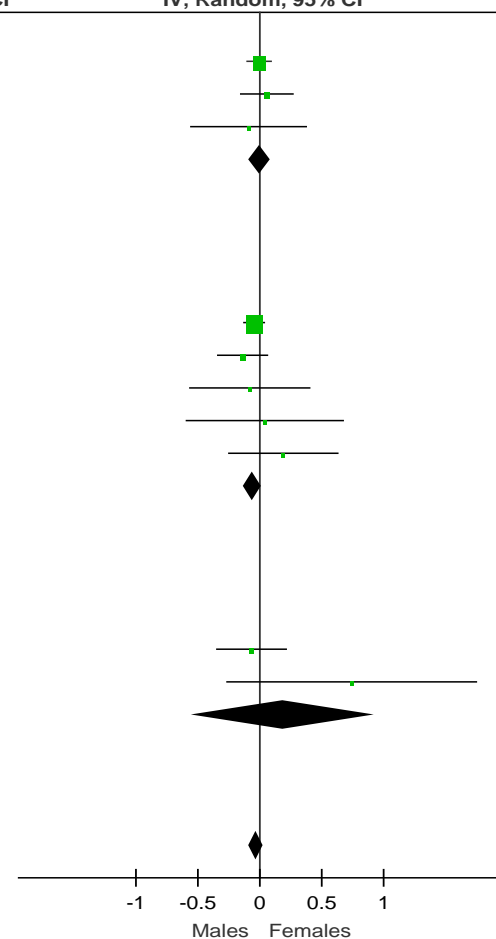


Table S50: SPI

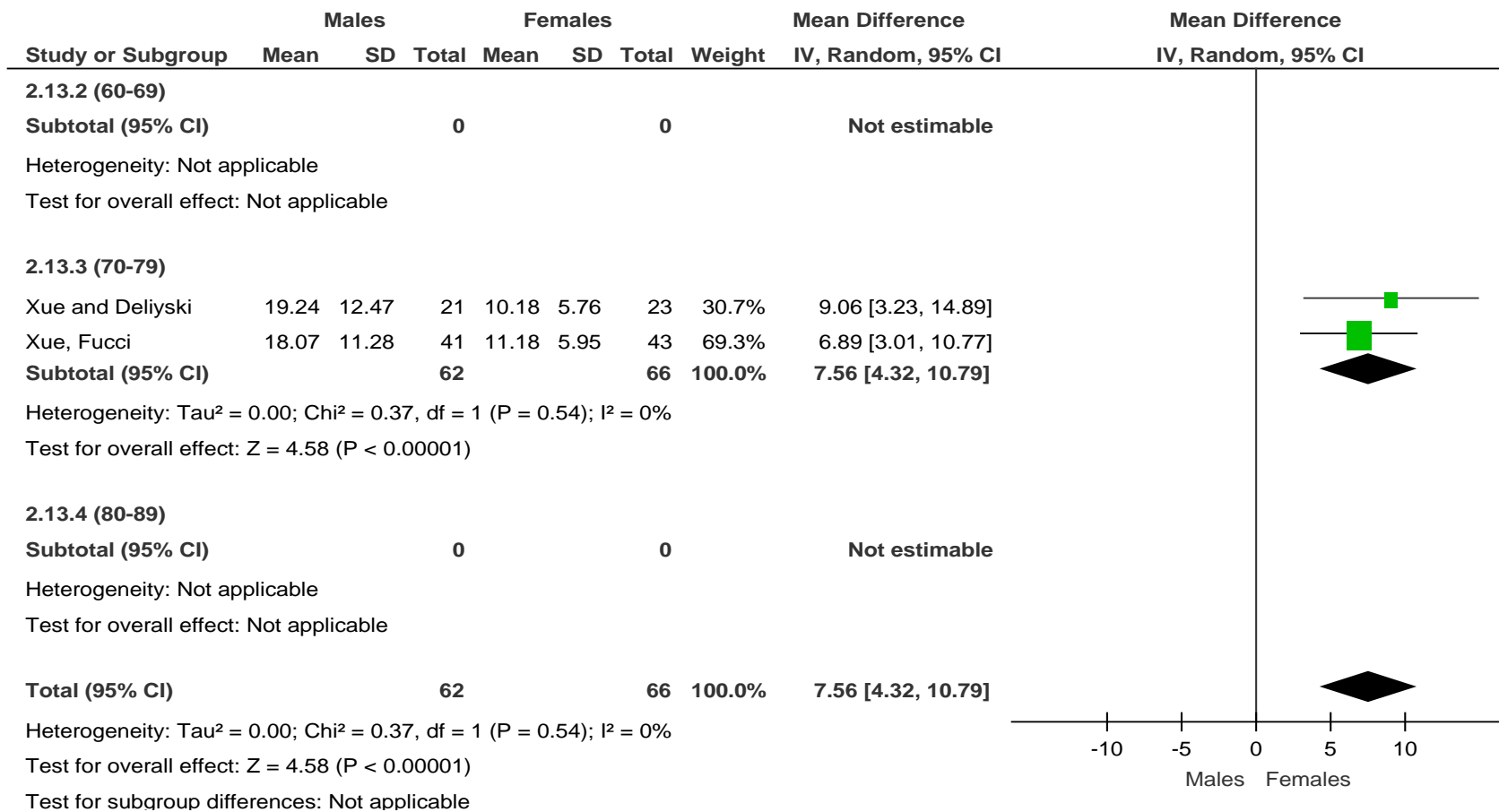


Table S51: sPPQ%

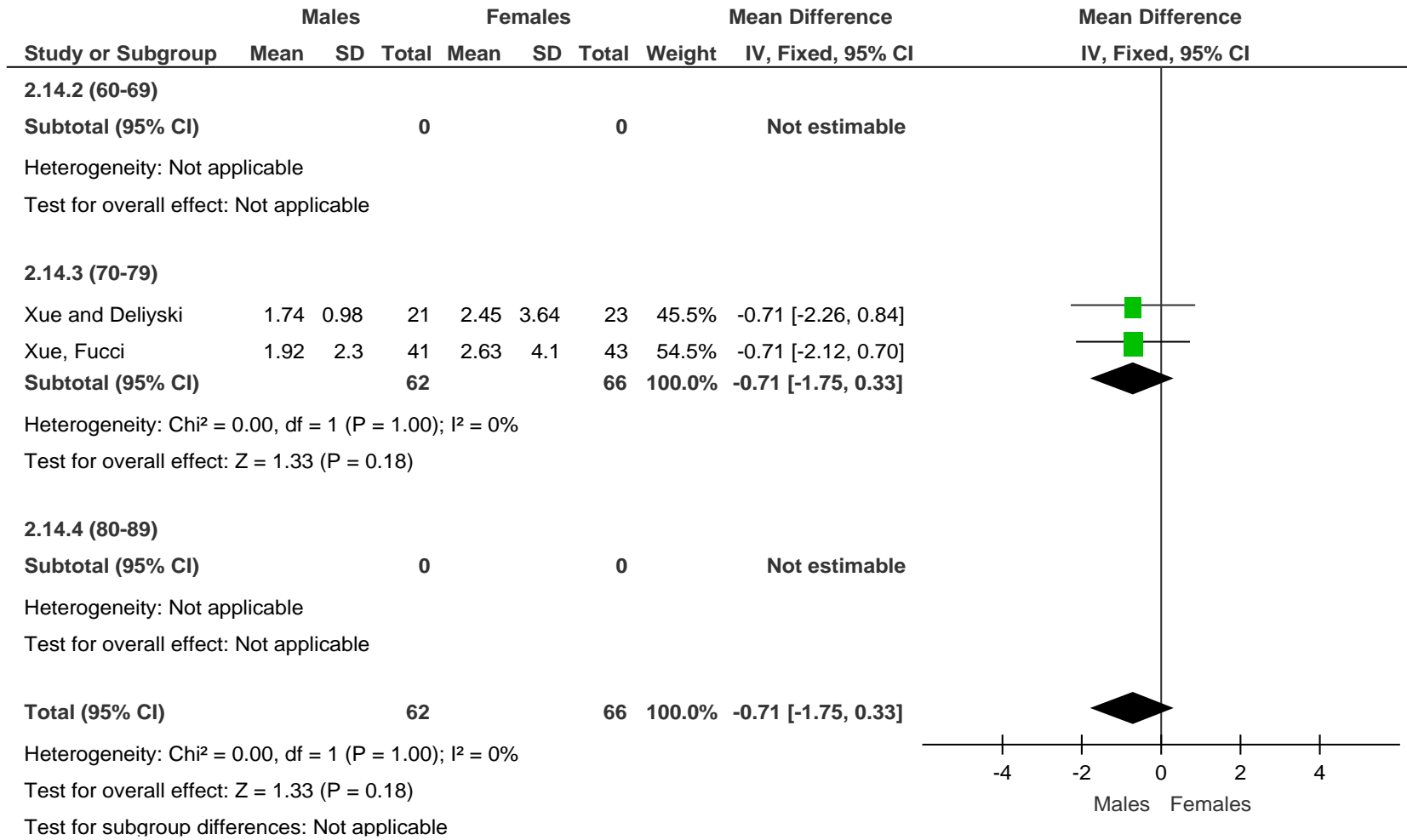


Table S52: f0 SD

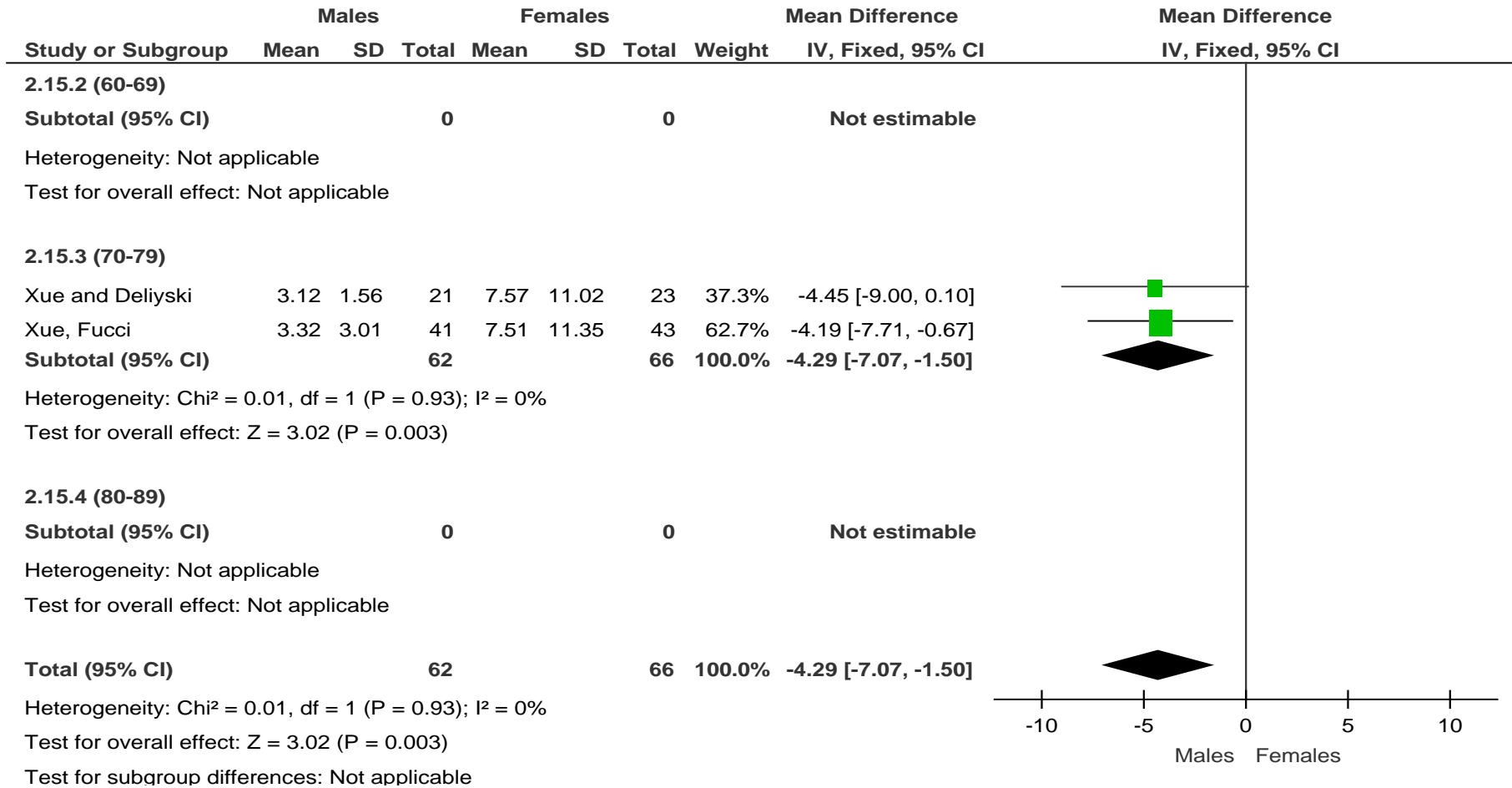


Table S53: v/f0

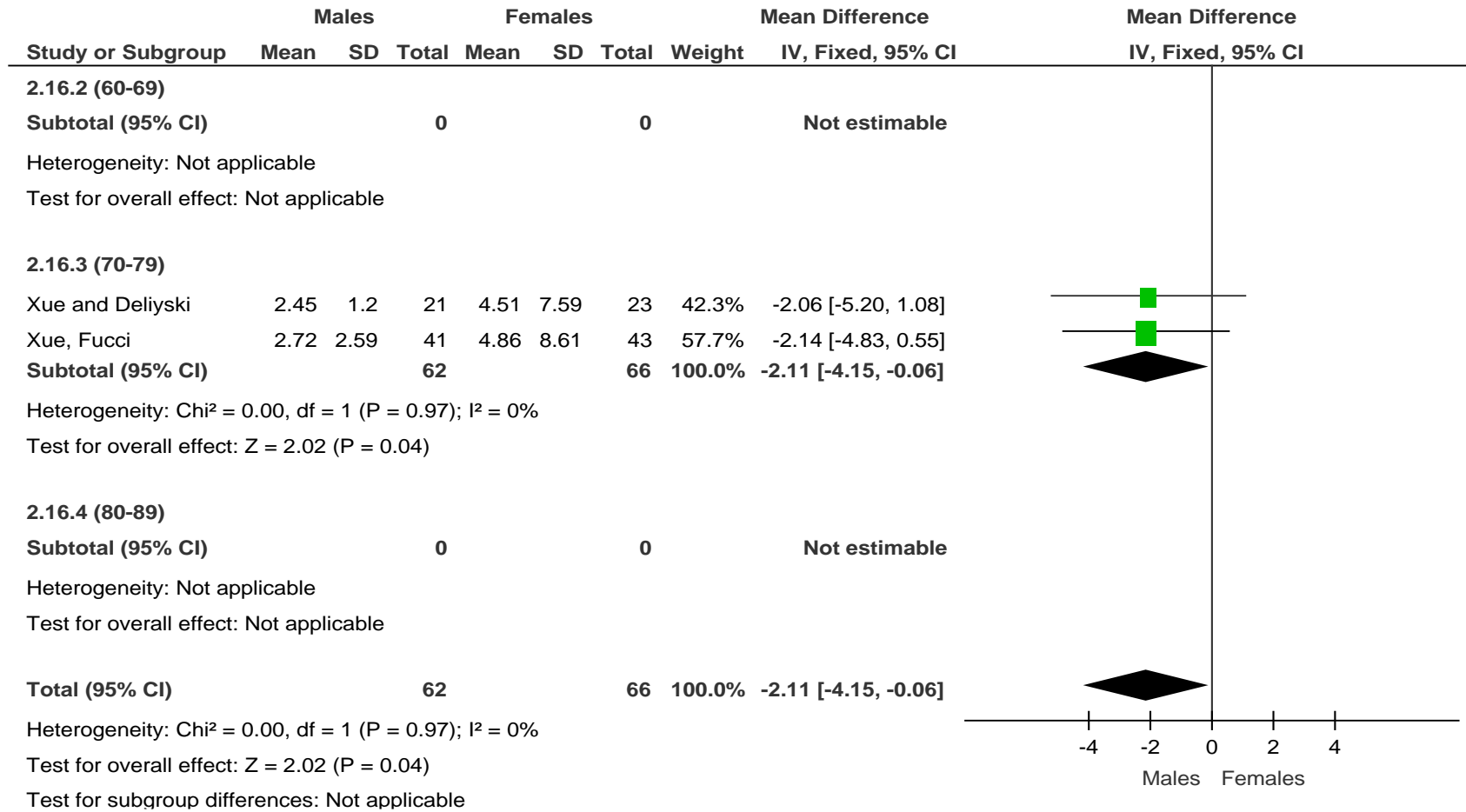
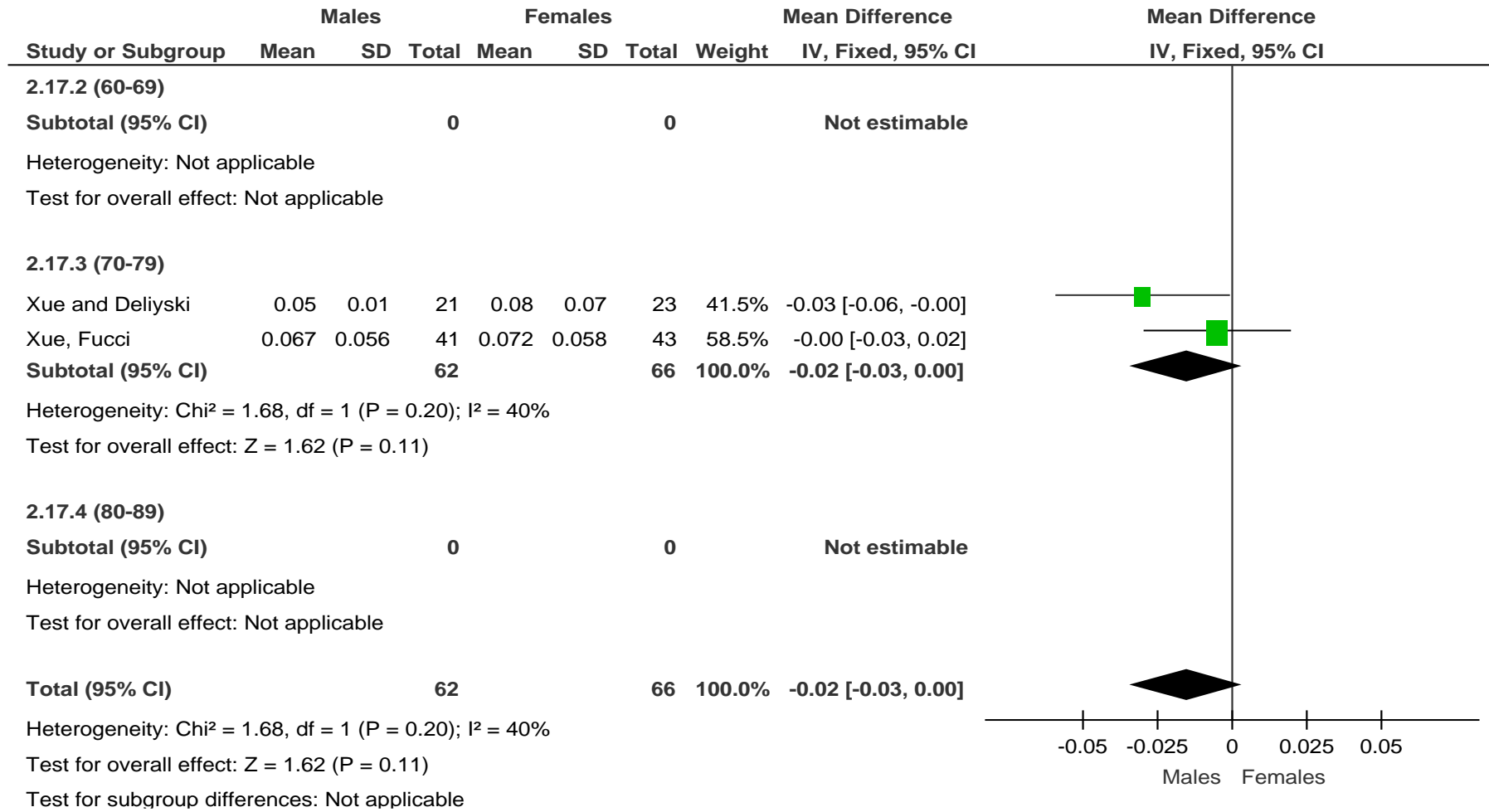


Table S54: VTI



IV. Comparison between males and females using the same acoustic analysis software.

a) MDVP

Table S55: f0

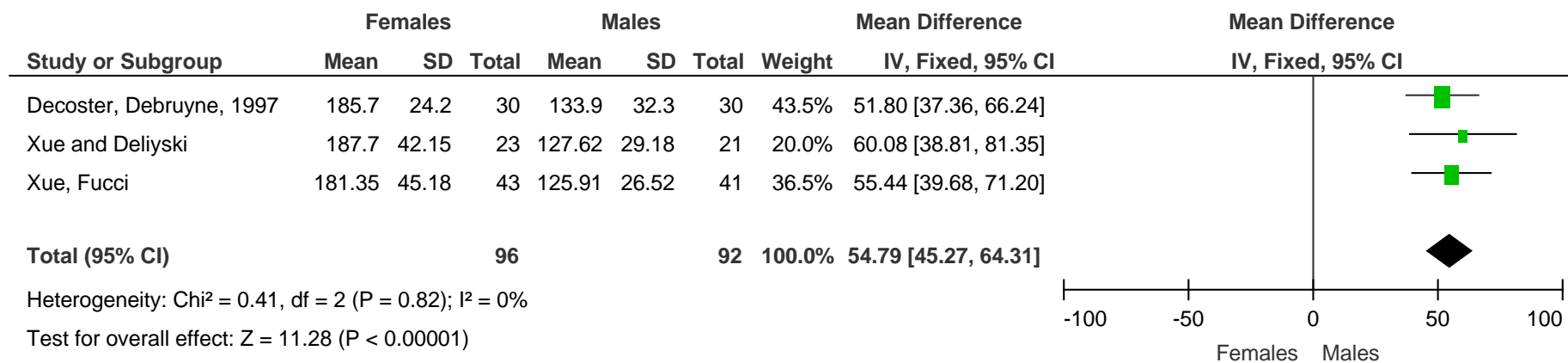


Table S56: Jitter%

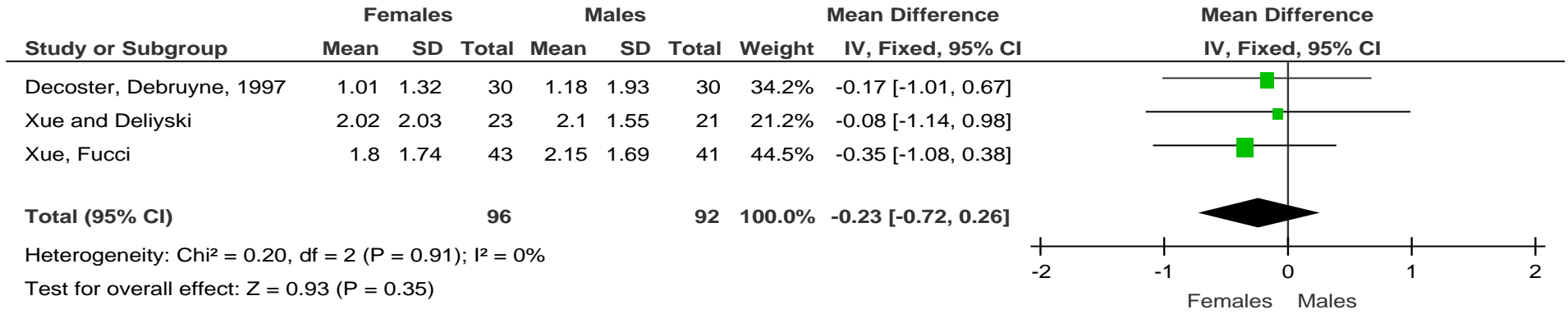


Table S57: ShdB

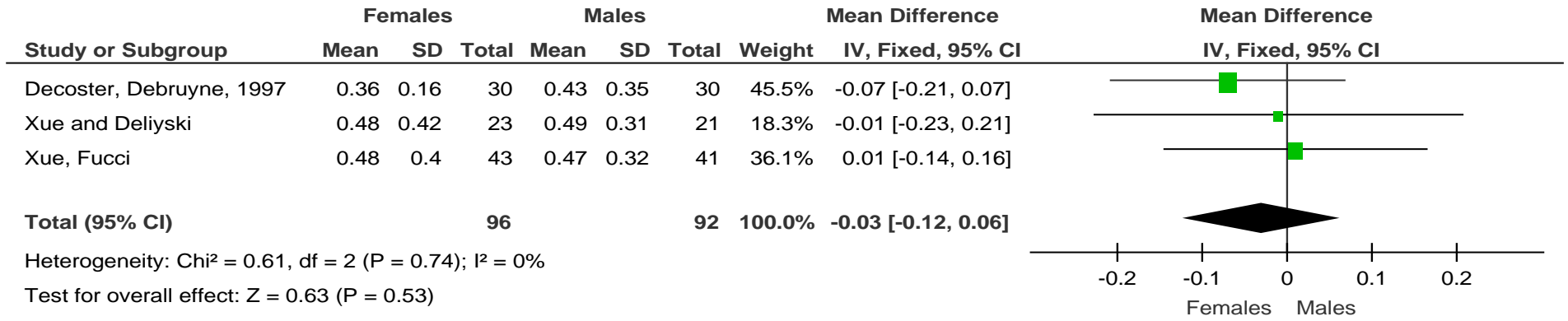


Table S58: Shimmer%

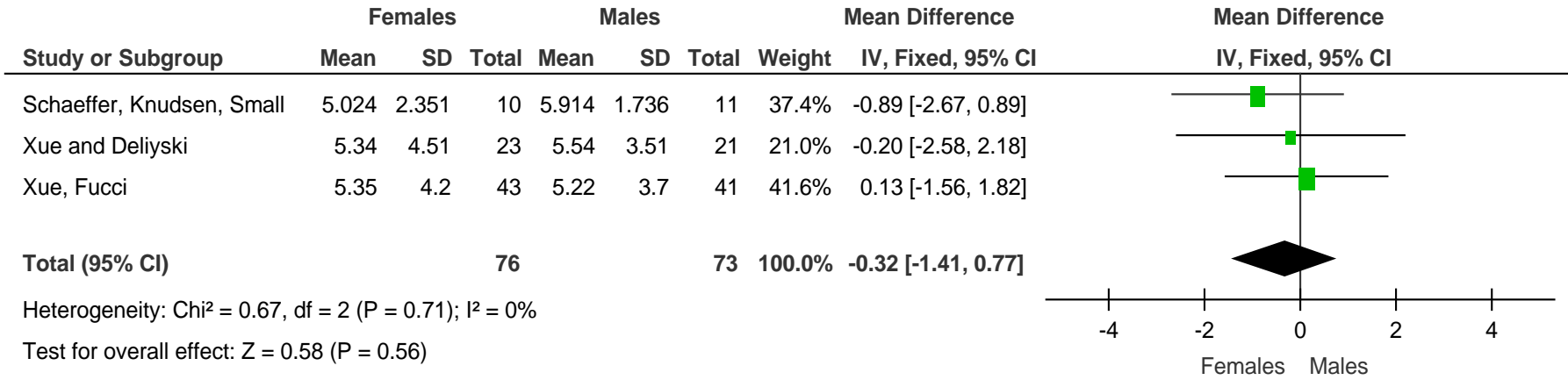
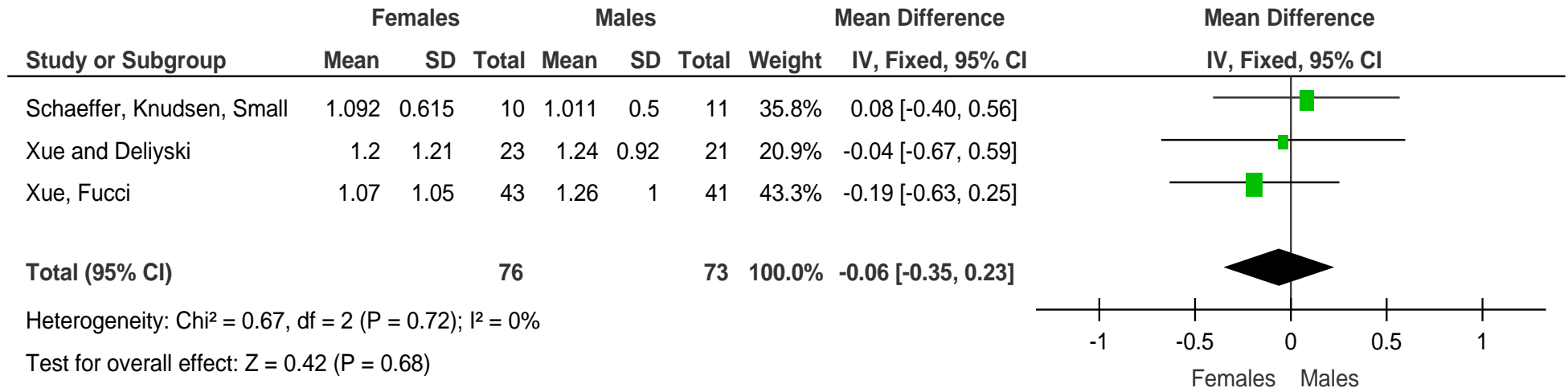


Table S59: RAP%



b) PRAAT

Table S60: f_0

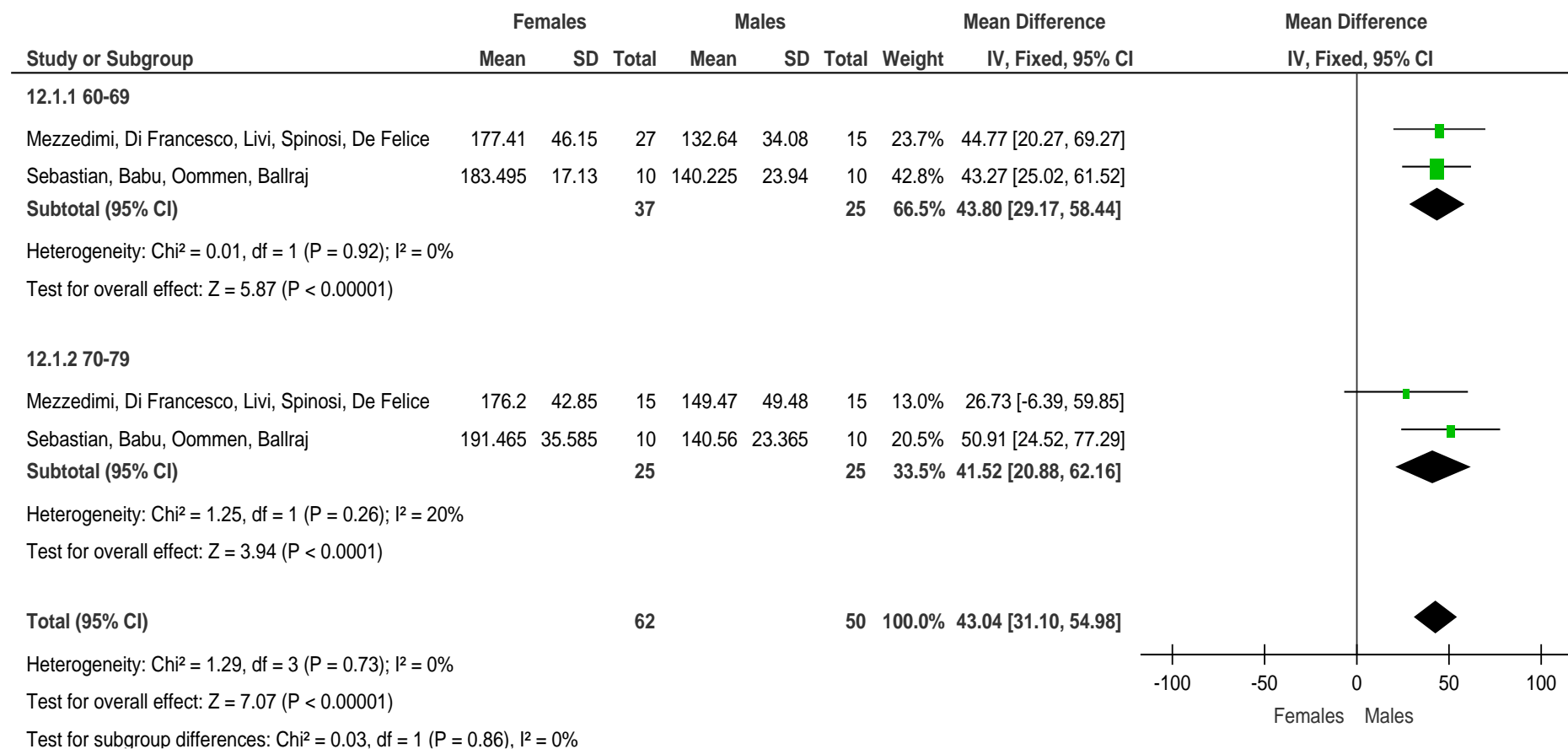


Table S61: Jitter%

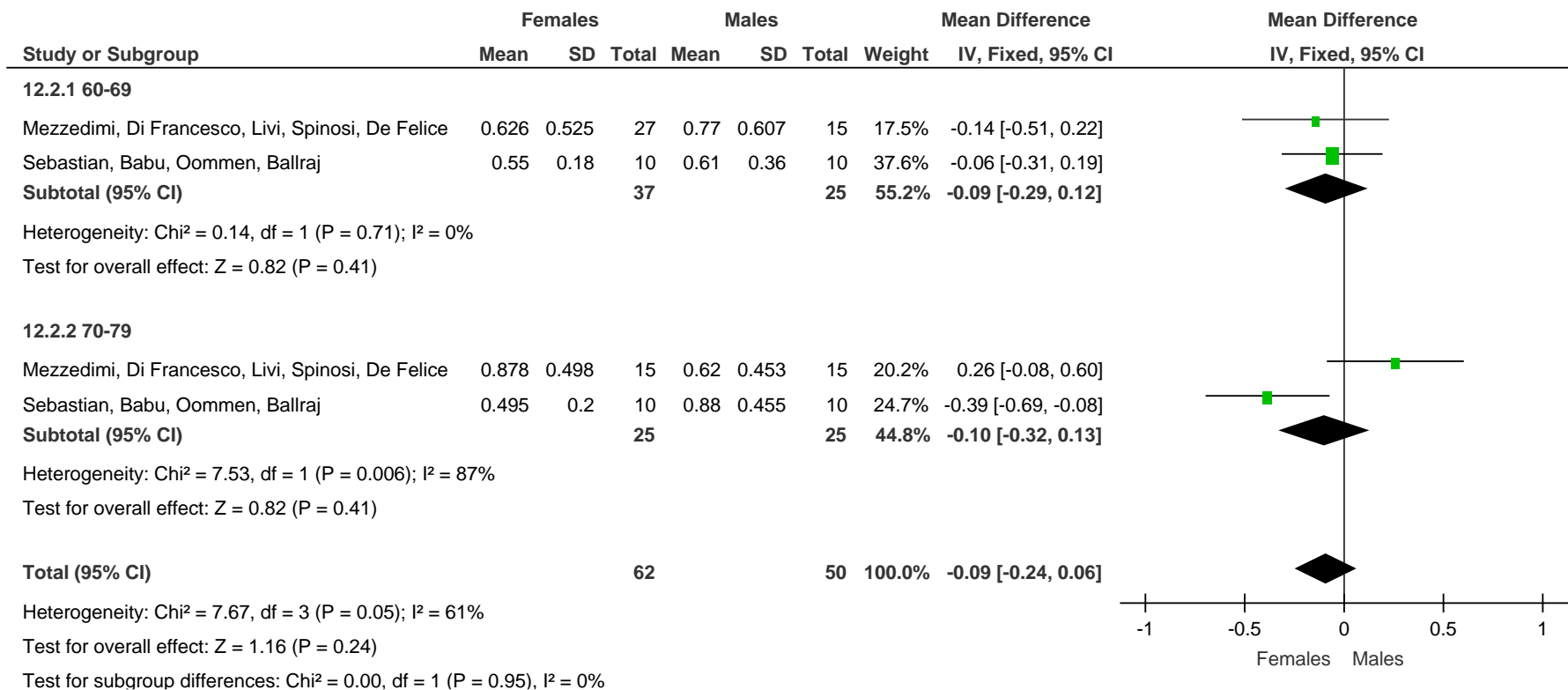


Table S62: Shimmer%

