

Supplemental Figure 1. *Mean Absolute Percent Error for unedited commercial activity monitor relative to unedited Actiwatch total sleep time and wake after sleep onset.*

Panel A: total sleep time; panel B: wake after sleep onset. Data are shown as mean±standard deviation. Abbreviations: SD=standard deviation; TST=total sleep time; WASO=wake after sleep onset.

Supplemental Figure 2. *Bland-Altman plots for unedited commercial activity monitor vs. unedited Actiwatch total sleep time.*

Data are shown in minutes. X-axis indicates the mean total sleep time of the commercial activity monitor and Actiwatch (CAM & AW). Y-axis indicates the difference in total sleep time between the commercial activity monitor and actiwatch (CAM-AW). Closed circles=good sleepers (i.e., Pittsburgh Sleep Quality Index [PSQI] global score ≤ 5); open circles=poor sleepers (i.e., PSQI global score > 5). Abbreviations: AW=Actiwatch; CAM=commercial activity monitor; TST=total sleep time.

Supplemental Figure 3. *Bland-Altman plots for unedited commercial activity monitor vs. unedited Actiwatch wake after sleep onset.*

Data are shown in minutes. X-axis indicates the mean wake after sleep onset of the commercial activity monitor and Actiwatch (CAM & AW). Y-axis indicates the difference in wake after sleep onset between the commercial activity monitor and actiwatch (CAM-AW). Closed circles=good sleepers (i.e., Pittsburgh Sleep Quality Index [PSQI] global score ≤ 5); open circles=poor sleepers (i.e., PSQI global score > 5). Abbreviations: AW=Actiwatch; CAM=commercial activity monitor; WASO=wake after sleep onset.

Supplemental Table 1. Overall and sex-stratified comparison of total sleep time between the unedited commercial activity monitor and edited Actiwatch.

CAM	CAM TST	AW TST	Difference	P-value	ICC (95% CI)
Fitbit Alta					
Overall	466.4 (146.7)	410.1 (97.4)	56.4 (80.9)	.001	.84 (.51-.93)
Females	476.5 (113.5)	428.9 (71.3)	47.6 (14.6)	.02	.86 (.47-.96)
Males	456.4 (177.4)	391.3 (117.5)	65.1 (91.1)	.02	.79 (.30-.93)
Jawbone Up3					
Overall	473.1 (137.6)	419.4 (75.2)	53.7 (107.4)	.01	.65 (.26-.83)
Females	524.8 (111.8)	431.1 (81.6)	93.7 (67.0)	<.001	.69 (-.23-.92)
Males	421.5 (145.0)	407.8 (68.9)	13.7 (126.3)	.68	.57 (-.35-.86)
Misfit Shine 2					
Overall	434.2 (119.5)	363.4 (65.3)	70.8 (97.0)	<.001	.56 (.03-.80)
Females	416.1 (136.6)	366.0 (81.4)	49.9 (101.9)	.07	.71 (.19-.90)
Males	452.3 (101.1)	360.7 (46.7)	91.6 (90.3)	.002	.35 (-.31-.74)
Polar A360					
Overall	305.1 (93.9)	386.9 (78.2)	-81.8 (124.9)	.001	.00 (-.70-.40)
Females	315.1 (106.5)	401.1 (83.9)	-86.0 (40.8)	.05	.00 (-.99-.36)
Males	295.2 (81.9)	372.7 (72.2)	-77.5 (85.8)	.004	.41 (-.29-.78)
Samsung Gear Fit2					
Overall	366.8 (68.1)	359.7 (61.2)	7.1 (34.9)	.27	.92 (.84-.96)
Females	379.7 (65.8)	368.6 (65.7)	11.1 (10.2)	.001	.98 (.84-.99)
Males	353.9 (70.1)	350.8 (57.1)	3.1 (48.9)	.81	.84 (.51-.95)
Xiaomi Mi Band 2					
Overall	474.8 (119.5)	394.3 (76.2)	80.5 (86.4)	<.001	.65 (-.01-.86)
Females	527.8 (106.9)	443.3 (68.3)	84.5 (82.2)	.001	.58 (-.20-.86)
Males	421.8 (110.0)	345.2 (46.8)	76.6 (24.1)	.007	.45 (-.27-.79)

Analyses for the overall sample are based on 30 participants for each CAM; n=15 for females and n=15 for males. AW: Actiwatch; CAM: commercial activity monitor; CI: confidence interval; ICC: intra-class correlation; TST: total sleep time in minutes. CAM TST, AW TST, and Difference data are reported as mean (standard deviation).

Supplemental Table 2. Overall and sex-stratified comparison of wake after sleep onset between the unedited commercial activity monitor and edited Actiwatch.

CAM	CAM WASO	AW WASO	Difference	P-value	ICC (95% CI)
Fitbit Alta					
<i>Overall</i>	31.4 (22.9)	46.4 (32.9)	-14.9 (26.5)	.004	.67 (.26-.85)
<i>Females</i>	29.1 (27.4)	38.1 (22.6)	-9.0 (14.6)	.03	.88 (.60-.96)
<i>Males</i>	33.7 (17.9)	54.7 (39.7)	-21 (34.2)	.03	.49 (-.11-.69)
Jawbone Up3					
<i>Overall</i>	60.1 (50.1)	53.3 (35.6)	6.8 (43.6)	.40	.67 (.30-.84)
<i>Females</i>	33.7 (17.9)	54.7 (39.7)	-21 (34.2)	.03	.49 (-.11-.69)
<i>Males</i>	74.1 (64.0)	69.5 (40.7)	4.6 (56.0)	.75	.64 (-.12-.88)
Misfit Shine 2					
<i>Overall</i>	13.8 (17.9)	37.8 (24.6)	-24.1 (24.1)	< .001	.38 (-.19-.70)
<i>Females</i>	14.2 (16.5)	33.2 (25.5)	-19.0 (26.4)	.02	.31 (-.45-.73)
<i>Males</i>	13.3 (19.7)	42.5 (23.7)	-29.2 (21.2)	.002	.44 (-.27-.80)
Polar A360					
<i>Overall</i>	69.7 (32.8)	42.0 (28.4)	27.7 (32.5)	< .001	.48 (-.10-.76)
<i>Females</i>	61.7 (29.9)	38.5 (28.3)	23.2 (25.2)	.003	.65 (-.10-.89)
<i>Males</i>	77.7 (34.5)	45.5 (29.1)	32.2 (38.9)	.006	.30 (-.39-.72)
Samsung Gear Fit2					
<i>Overall</i>	21.0 (15.5)	36.9 (23.6)	-15.9 (15.8)	< .001	.69 (-.03-.88)
<i>Females</i>	17.2 (15.9)	29.9 (24.0)	-12.9 (12.9)	.002	.81 (.1-.95)
<i>Males</i>	24.8 (14.6)	44.0 (21.8)	-19.2 (18.0)	.001	.52 (-.24-.83)
Xiaomi Mi Band 2					
<i>Overall</i>	15.6 (28.1)	43.5 (28.8)	-27.9 (28.3)	< .001	.51 (-.14-.79)
<i>Females</i>	7.2 (12.3)	41.3 (26.5)	-34.1 (28.3)	< .001	.10 (-.34-.50)
<i>Males</i>	24.0 (36.5)	45.7 (31.6)	-21.7 (27.8)	.009	.72 (.10-.91)

Analyses for the overall sample are based on 30 participants for each CAM; n=15 for females and n=15 for males. AW: Actiwatch; CAM: commercial activity monitor; CI: confidence interval; ICC: intra-class correlation; WASO: wake after sleep onset in minutes. CAM TST, AW TST, and Difference data are reported as mean (standard deviation).

Supplemental Table 3. Overall and sleep quality-stratified comparison of total sleep time between the unedited commercial activity monitor and unedited Actiwatch.

CAM	CAM TST	AW TST	Difference	P-value	ICC (95% CI)
Fitbit Alta					
Overall	466.4 (146.7)	414.6 (100.5)	51.9 (85.7)	< .01	.83 (.56-.93)
PSQI ≤ 5	491.4 (165.7)	416.9 (108.8)	74.5 (90.6)	.002	.82 (.32-.94)
PSQI > 5	416.7 (84.9)	410.0 (86.6)	6.7 (53.9)	.70	.89 (.59-.98)
Jawbone Up3					
Overall	473.1 (137.6)	418.4 (84.4)	54.7 (89.1)	< .01	.77 (.43-.90)
PSQI ≤ 5	484.8 (139.3)	423.1 (84.1)	61.7 (96.5)	.01	.73 (.26-.90)
PSQI > 5	449.7 (138.3)	409.0 (88.7)	40.7 (74.8)	.12	.86 (.78-.97)
Misfit Shine 2					
Overall	434.2 (119.5)	370.3 (73.7)	63.9 (88.0)	< .001	.67 (.18-.88)
PSQI ≤ 5	424.3 (124.6)	355.2 (76.5)	69.1 (92.6)	.003	.66 (.10-.87)
PSQI > 5	453.9 (112.2)	400.5 (60.1)	53.4 (81.5)	.07	.68 (-.10-.91)
Polar A360					
Overall	305.1 (93.9)	393.5 (81.9)	-88.4 (119.8)	< .001	.10 (-.42-.49)
PSQI ≤ 5	300.1 (80.5)	391.7 (84.4)	-91.6 (122.0)	.003	.00 (-.86-.43)
PSQI > 5	315.2 (120.7)	397.0 (80.9)	-81.8 (121.4)	.06	.39 (-.62-.83)
Samsung Gear Fit2					
Overall	366.8 (68.1)	359.0 (61.4)	7.8 (34.9)	.23	.92 (.84-.96)
PSQI ≤ 5	371.4 (74.4)	367.9 (64.1)	3.5 (41.6)	.71	.90 (.76-.96)
PSQI > 5	357.6 (55.7)	341.1 (54.0)	16.5 (12.3)	.002	.96 (.40-.99)
Xiaomi Mi Band 2					
Overall	474.8 (119.5)	396.3 (76.1)	78.5 (86.7)	< .001	.65 (.01-.86)
PSQI ≤ 5	489.3 (132.1)	405.6 (76.7)	83.7 (95.5)	.001	.64 (-.03-.87)
PSQI > 5	445.7 (87.9)	377.8 (75.3)	67.9 (68.9)	.01	.66 (-.20-.91)

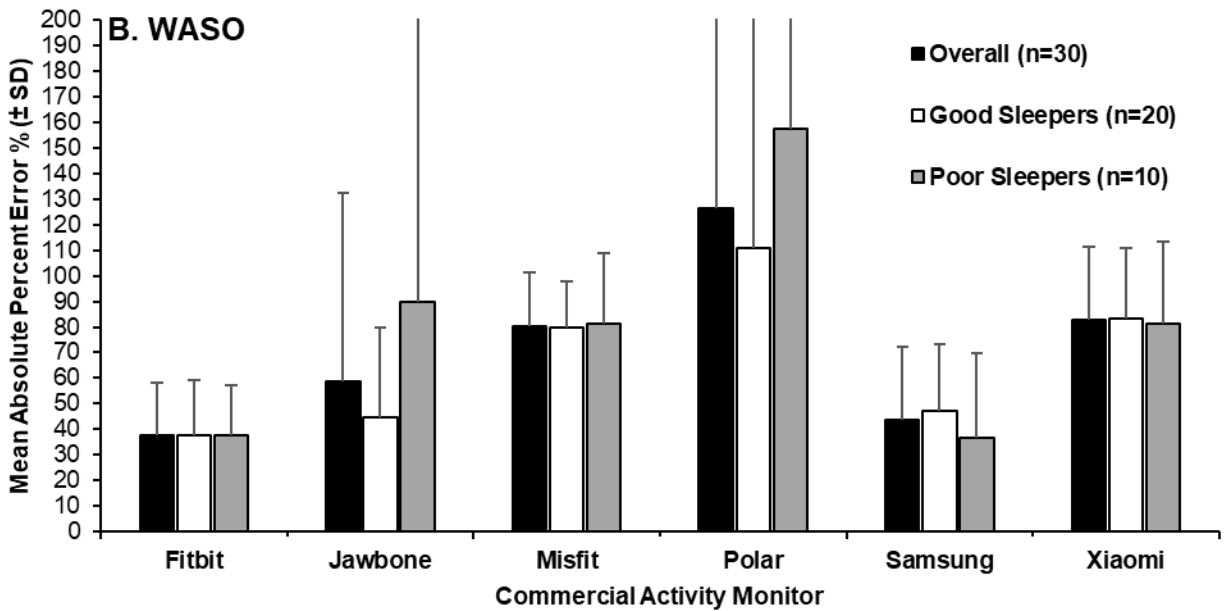
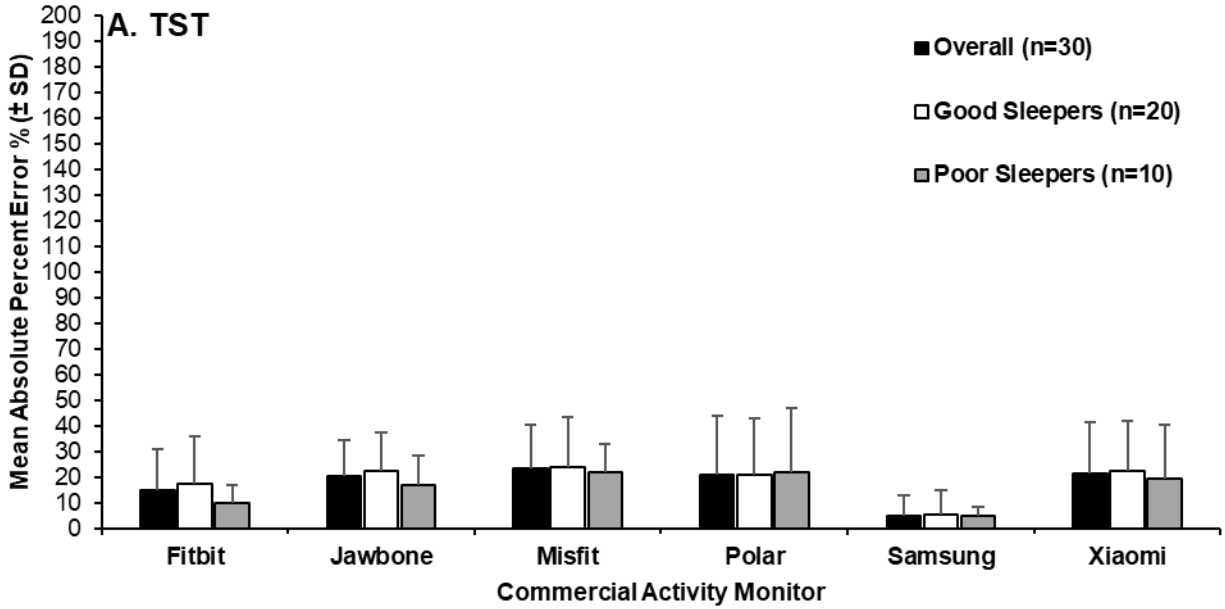
Analyses for the overall sample are based on 30 participants for each CAM; n=20 for PSQI ≤ 5 and n=10 for PSQI > 5. AW: Actiwatch; CAM: commercial activity monitor; CI: confidence interval; ICC: intra-class correlation; PSQI: Pittsburgh Sleep Quality Index; TST: total sleep time in minutes. CAM TST, AW TST, and Difference data are reported as mean (standard deviation).

Supplemental Table 4. Overall and sleep quality-stratified comparison of wake after sleep onset between the unedited commercial activity monitor and unedited Actiwatch.

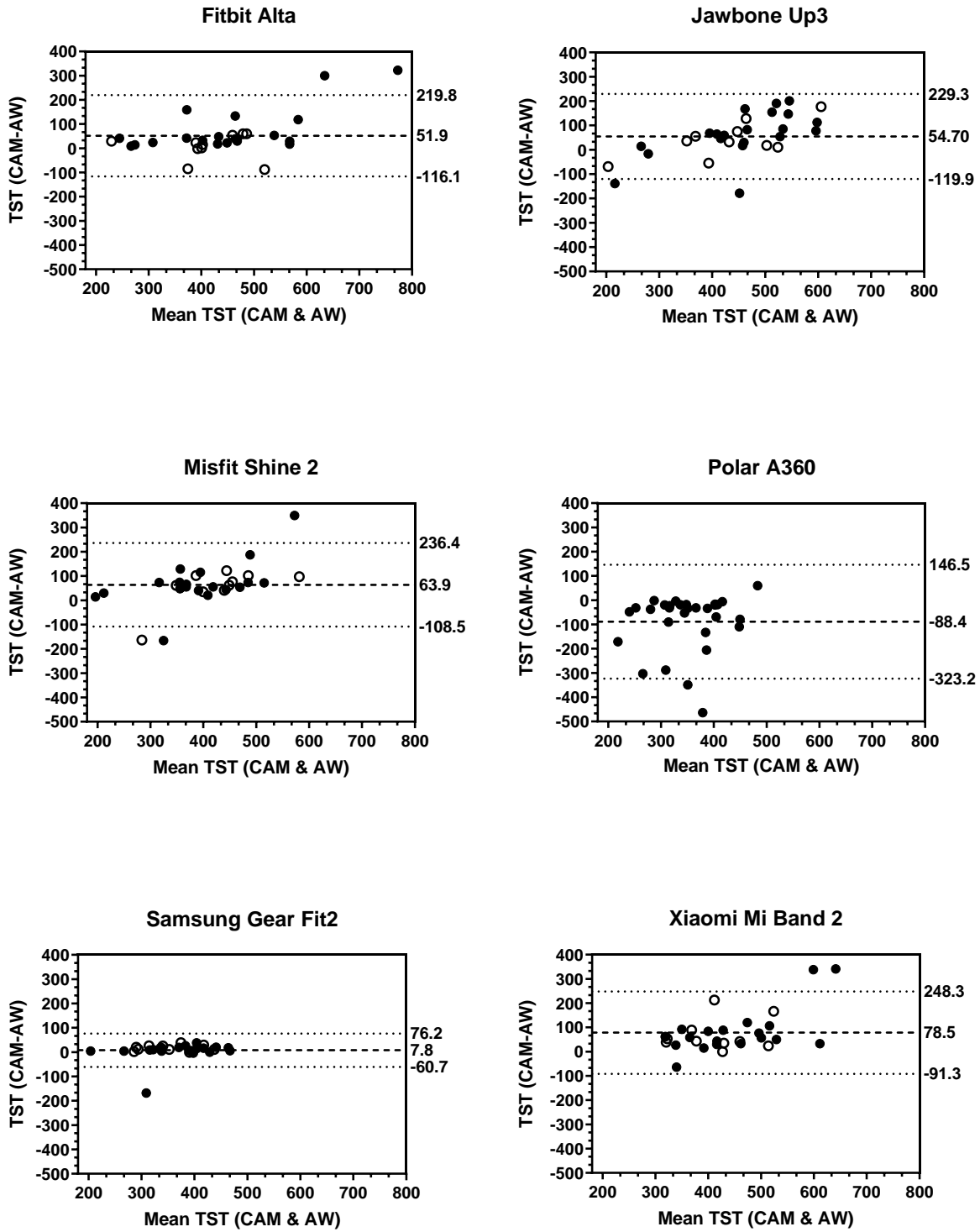
CAM	CAM WASO	AW WASO	Difference	P-value	ICC (95% CI)
Fitbit Alta					
<i>Overall</i>	31.4 (22.9)	47.8 (32.1)	-16.4 (26.8)	< .01	.63 (.19-83)
<i>PSQI ≤ 5</i>	34.6 (25.8)	50.3 (30.8)	-15.6 (28.3)	.02	.61 (.10-.85)
<i>PSQI > 5</i>	25.0 (14.6)	42.8 (35.7)	-17.8 (24.7)	.05	.66 (-.12-.91)
Jawbone Up3					
<i>Overall</i>	60.1 (50.1)	50.9 (30.1)	9.3 (37.1)	.18	.74 (.47-.88)
<i>PSQI ≤ 5</i>	61.5 (56.9)	55.8 (29.7)	5.8 (41.2)	.54	.75 (.36-.90)
<i>PSQI > 5</i>	57.3 (35.1)	41.1 (30.1)	16.2 (27.8)	.10	.74 (.10-.93)
Misfit Shine 2					
<i>Overall</i>	13.8 (17.9)	40.3 (25.1)	-26.5 (21.2)	< .001	.47 (-.22-.78)
<i>PSQI ≤ 5</i>	11.4 (14.6)	41.6 (24.9)	-30.2 (21.4)	<.001	.36 (-.24-.72)
<i>PSQI > 5</i>	18.5 (23.2)	37.7 (26.6)	-19.2 (19.7)	.01	.71 (-.15-.93)
Polar A360					
<i>Overall</i>	69.7 (32.8)	42.5 (28.2)	27.3 (31.8)	< .001	.50 (-.09-.77)
<i>PSQI ≤ 5</i>	73.9 (37.9)	46.6 (30.4)	27.4 (32.1)	.001	.60 (-.10-.85)
<i>PSQI > 5</i>	61.3 (17.9)	34.2 (22.4)	27.1 (32.9)	.03	.00 (-.99-.52)
Samsung Gear Fit2					
<i>Overall</i>	21.0 (15.5)	36.2 (24.0)	-15.2 (16.0)	< .001	.70 (.03-.89)
<i>PSQI ≤ 5</i>	21.9 (15.9)	40.1 (26.3)	-18.2 (17.0)	< .001	.68 (-.11-.89)
<i>PSQI > 5</i>	19.1 (15.3)	28.3 (16.7)	-9.2 (12.4)	.04	.76 (.08-.94)
Xiaomi Mi Band 2					
<i>Overall</i>	15.6 (28.1)	44.2 (28.7)	-28.6 (28.7)	< .001	.49 (-.15-.78)
<i>PSQI ≤ 5</i>	14.5 (20.6)	44.9 (24.1)	-30.4 (34.5)	.001	.00 (-.89-.37)
<i>PSQI > 5</i>	17.7 (40.4)	42.7 (37.7)	-25.0 (10.7)	< .001	.89 (-.11-.98)

Analyses for the overall sample are based on 30 participants for each CAM; n=20 for PSQI ≤ 5 and n=10 for PSQI > 5. AW: Actiwatch; CAM: commercial activity monitor; CI: confidence interval; ICC: intra-class correlation; PSQI: Pittsburgh Sleep Quality Index; WASO: wake after sleep onset in minutes. CAM WASO, AW WASO, and Difference data are reported as mean (standard deviation).

Supplemental Figure 1. Mean Absolute Percent Error for unedited commercial activity monitor relative to unedited Actiwatch total sleep time and wake after sleep onset.



Supplemental Figure 2. Bland-Altman plots for unedited commercial activity monitor vs. unedited Actiwatch total sleep time.



Supplemental Figure 3. Bland-Altman plots for unedited commercial activity monitor vs. unedited Actiwatch wake after sleep onset.

