Actigraphy (Actiware) Scoring Hierarchy Manual

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Note: Based on our internal validation, we typically choose to use 10 immobile minutes for sleep onset/offset. We typically use a "low" wake threshold (i.e., 20 activity count threshold) as our work primarily involves sleep-disordered populations. However, you should choose (and report) settings that make sense for your study.

1) Save each analysis as low wake threshold
    a. Analysis name begins with time point (if applicable), group (if applicable), scorer initials, date of scoring analysis, threshold (if applicable)
    b. Right click – edit analysis properties – active analysis – low – apply - ok
2) If actiwatch and diary sleep time and up time match (within 30 minutes in either direction) and the auto score used the event marker to score the rest interval, then keep that rest interval. (Note: Mark as "good day" in database).
    a. If the auto scoring does not use the event markers, then manually set interval start and/or end times to match the unused event marker(s).
3) If actiwatch and diary sleep time and up time don't match within 30 minutes, or one event marker is missing, (Note: Mark as "bad day" in database).
    a. Inspect visually, then use the following hierarchy to score (follow individually for sleep time and up time)
        i. If event marker is present
            1. If event marker matches activity and light data (e.g., ~50% change in activity [based on previous/subsequent 30 minutes {use best judgment on this duration, as smaller or longer may make more sense}] and/or light), assume it is correct, and use it to score.
                a. Note: Use previous 30 minutes for bedtime and subsequent 30 minutes for rise time.
                b. This guideline will vary in people with and without insomnia. In people with insomnia, there will likely be higher (e.g., > 20 activity counts) activity and perhaps light for longer (e.g., leave TV on) at bedtime than people without insomnia.
                c. For wake times, sometimes morning sun may cause light data to show slow steady rise while activity data still indicates sleep, so activity may be best guide in these cases.
            2. If multiple event markers exist, then use the one that appears to match activity and light data best (see 3.a.i. guideline). If ambiguous, use event marker.
            3. If event marker(s) does not match activity and light data, proceed with 3.b.ii. instructions (as if event marker is absent).
        ii. If event marker is absent/doesn't match activity and light
            1. If diary appears to match the activity and light data within 30 minutes (see 3.b.i.1. guideline), assume it is correct, and use diary time to score.
            2. If diary doesn't match the activity and light data, do the following:
                a. If the auto score for interval start and/or end times appears to be within 15 minutes of the 50% change in activity or light data (see 3.a.i. and 3.a.i.1 guidelines), then use that interval start and/or end time.
                b. If the auto score for interval start and/or end times *does not* appear to be within 15 minutes of the 50% change in activity or light data (see 3.a.i. and 3.a.i.1 guidelines), then use the activity (and light data if necessary) to determine the 50% change in activity or light data to set that interval start and/or end time.
4) If query or diary comments are available use this data, along with guidelines below, to determine the interval start and/or end times.

Scoring Naps/Rest (optional – depends on population)

*Note: score major rest intervals first, then proceed to nap/rest scoring as follows.

5) Start a new analysis
6) Delete major rest interval information (cross-check with night scoring).
7) Check diary if a nap is indicated.
    a. If a nap is indicated on sleep diary, check autoscored interval.
        i. If it appears to match diary length and activity/light data, mark as "good nap" and leave autoscore interval.
        ii. If it does not appear to match diary length, but activity/light data matches adequately, mark as "bad nap" and leave autoscore interval.
        iii. If it does not match diary length or activity/light data adequately, mark as "bad nap" and hand-score to match activity/light data.
    b. If a nap is not indicated on sleep diary, check autoscored interval
        i. If none, leave as none.
        ii. If an interval is present and it appears to match activity/light data, leave autoscore interval.
        iii. If an interval is present and it does not appear to match activity/light data, erase autoscore interval.

References that may be of use:

Ancoli-Israel, S., Martin, J. L., Blackwell, T., Buenaver, L., Liu, L., Meltzer, L. J., ... & Taylor, D. J. (2015). The SBSM guide to actigraphy monitoring: clinical and research applications. *Behavioral Sleep Medicine, 13*(sup1), S4-S38.

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