**Alternative movement analysis method.**

To verify the accuracy of the movement analysis described above, an alternative approach was developed, and the results compared for the no distractor and synchronous distractor conditions.

The method used for detection of movement onset, lags and errors relies on the computation of the sign of the stylus velocity. Because the touch position is quantized, the stylus velocity is exactly zero as long as the readout position is the same pixel. If the stylus drifts slowly then a series of short pulses are observed in the velocity. Voluntary movements are sustained for some time and hence, the velocity maintains the same sign for the same interval.

Fig. xx gives an example. In the event 3, the stylus remained stationary over the same pixel until t=0.4 s. Then the sign of the velocity remains positive (towards the target) till 0.85 s. This is the intentional target reach movement. Note that about t=0.9 s there is a negative velocity spoke which represents the stylus stepping back one pixel. Event 12 is more complex: in this case at about t=0.1 s there is a spike because the stylus steps to the next pixel. If spikes are ignored, the real movement is made of three steps two initial steps towards the target and one backwards (because the target was overshoot). Example 21 represents an error: at t=0.25 the stylus moves away from target, but then, at t=0.38 the direction of movement is correct towards the target. Example 26 is another error example: in this case the movement starts slowly in the wrong direction and looks like a spike preceding the sustained phase.

In order to detect the time when an intentional movement begins, spikes needs to be ignored. This has been done by filtering the velocity sign signal with a median filter (the radius of the median filter determines the duration of the neglected spikes and was 40 ms in our implementation, which also means that only movements lasting longer are considered intentional). The red dots in Fig. xx represent the detected movement onset. The sign of the velocity at that point carries the information whether the movement is correct or an error.

The method may produce outliers of two kinds: a) if there is no movement no delay is computed (a condition that had instead to be explicitly omitted above), b) if the subject is distracted and reacts too late a long reaction time is produced which is filtered as an outlier.

This method has been used with only two omission conditions: a) target jump size greater than 20 pixel (like above) and b) drift of stylus smaller or equal to 1 pixel in the first 0.15 s. These two conditions are intentionally different than the above so that we can compare the results of a different method with slightly different omission criteria.

This second method has confirmed the estimation carried out with the primary method: the mean reaction time with this method is 3 ms shorter (maybe because the method is better at detecting the exact movement onset) and 6.6 for the distractor case.

