Inputlog Fact Sheet

# Between WORDS/SENTENCES/PARAGRAPHS Pause

## 1. Definition

The 'BETWEEN' pause time calculation is a part of the larger *Pause Analysis*. It takes the pause time of an AFTER-pause location and sums it with the pause time of the next BEFORE location of a word, sentence or paragraph. Pauses with a time equal or smaller than the PauseThreshold are ignored. This PauseThreshold has a default value of 200 milliseconds in the Pause Analysis settings.

**C**OMBINATION KEY\*

sum of pauses

*key-in*

*key-in*

*key-in*

*key-in*

**A**FTER WORDS\*

pause

BETWEEN WORDS

Total Pause Time

**A** + **B** + **C**

**B**EFORE WORDS\*

pause

\* using the time in milliseconds at the key-in moment of pressing the keys

w

o

r

d

*shift*

W

o

r

d

*space*

*shift*

Example of a BETWEEN WORD pause time. See 2. Components for a description of how a pause time is calculated.

In this example a 'space' marks the boundary of the first word. An AFTER WORDS pause is calculated as the time difference between clicking 'd' and the time needed to click the 'space' bar. The user then presses a shift key (key-in) in order to generate the capital letter 'W'. Multiple shift events are created when the user is pushing longer than the few milliseconds the computer needs to record this action. Only the last shift is used to calculate the BEFORE WORDS pause time. The shift key is a 'combination key' because in this case the outcome of pressing *shift* followed by pressing 'w', results in one outcome, a capital letter 'W'. While only the last shift is used for the BEFORE WORDS pause, all the pause times of the different shift events are summed together to define the BETWEEN WORDS pause time. In conclusion: the BETWEEN WORDS pause consists of the AFTER WORDS pause, the summed COMBINATION KEY pauses and the BEFORE WORDS pause.

The sum of the pause time of the 'w' and the pause time of the preceding COMBINATION\_KEYs is used. It is assumed that the writing process starts cognitively at that point. If only the pause time of the main key 'w' was taken, which is often very short, it could be discarded because it falls under the pause threshold. In the case of multiple consecutive AFTER-locations only the last one counts.

When the program encounters a sentence boundary, such as a question mark or an end of sentence point, or a paragraph boundary, then the same procedure is used to construct a BETWEEN SENTENCES pause or a BETWEEN PARAGRAPH pause.

Internally, the work is done by a 'betweenPauseCollector' accumulating in sequence the pause locations and their pause times, event after event.

While collecting the pause time between AFTER and BEFORE, any intermediate pause location is inspected separately. Certain pause locations break the BETWEEN routine by setting the betweenPauseCollector back to zero. The purpose of the BETWEEN (word, sentence, paragraph) pause is to capture the process flow of writing a new word, sentence or paragraph. User actions such as starting a revision of changing focus interrupt this flow. Hence, no BETWEEN pause is constructed. It concerns the following elements:

* PauseLocation.WITHIN\_WORDS
* PauseLocation.REVISION
* PauseLocation.MOUSE
* PauseLocation.CHANGE
* PauseLocation.UNDETERMINED
* PauseLocation.UNKNOWN
* PauseLocation.END
* PauseLocation.INITIAL

For example: EventType.FOCUS, EventType.REPLACEMENT or EventType.INSERT are all labelled with the pause location tag 'CHANGE'. Because a PauseLocation.CHANGE breaks the BETWEEN routine, the time of a REPLACEMENT event is not added to the BETWEEN pause. This is why only COMBINATION KEYS observed between an AFTER and a BEFORE are taken into account in a BETWEEN pause time calculation. The pause time of the pause locations mentioned in the list are not discarded and are used in other calculations of this analysis.

## 2. Components used by the algorithm

"EventTypes" -The following events are used in a Pause analysis,: EventType.KEYBOARD, EventType.MOUSE, EventType.FOCUS, EventType.REPLACEMENT, EventType.INSERT

Are ignored in a Pause analysis: EventType.SELECTION; EventType.STATISTICS; EventType.PLACEHOLDER; EventType.AUTHORCOMMENT; EventType. EYETRACK; EventType.DRAGONNS; EventType.QUESTIONS

"[event](file:///C:\Users\ericv\Documents\InputLog\FactSheets\IFS_Event.docx)" - Represents any kind of keyboard, mouse, focus, ... action. An event consists of EventParts that can be added/removed using the Parts property.

"combination\_key" - Is any keyboard SHIFT, ALT, CTRL, diacritic or if the keyboard state of an empty key contains one of these controls.

"[pauseLocation](file:///C:\Users\ericv\Documents\InputLog\FactSheets\IFS_PauseLocation.docx)" - Pause locations are positions in a text that have some kind of pause pattern. A special Inputlog-module scans every event in sequence to determine word, sentence and paragraph boundaries and allocates a specific pause location tag to it.

"[pauseTime](file:///C:\Users\ericv\Documents\InputLog\FactSheets\IFS_PauseTime.docx)" - A simple pause time is the time in milliseconds elapsed between the start time of pressing a key (key-in) of an event and the start time when pressing a key (key-in) of the next event. Subtracting the start time of the current event from the start time of the previous event calculates the pause.

"currentPauseThreshold" - How long a pause between two events should be to qualify as a pause. The default value is 200 milliseconds. It can be made longer or shorter in the Pause Analysis settings according to the research requirements.

"combinedPauses" - The list collecting the combined pauses for a given AFTER-BEFORE sequence.

"logCombinedPauses" - The list collecting the log of the combined pauses for a given AFTER-BEFORE sequence.

## 3. Program Flow

Run pauseLocationMarker over all events if event type is KEYBOARD, MOUSE, FOCUS, REPLACEMENT, INSERT

Define Start time

Define interval size and number of intervals

Prepare pause statistics

Iterate over all pause locations

Go to the next location when a breaking location is encountered

else

Collect every COMBINATION\_KEY time

then

Sum the current pauseTime and that of the preceding COMBINATION\_KEYs with the previously saved AFTER time

Calculate the Combined Pause Locations

Fill pause statistics with appropriate time when the summed pause time >= pauseThreshold

## 4. Reference

https://www.inputlog.net/wp-content/uploads/Inputlog\_manual.pdf