Supplementary Material Part A - Presentation of detailed experiment results

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Supplementary Material for *Continuous Sonification Enhances Adequacy of Interactions in Peripheral Process Monitoring.*

1. Detailed Main Task Results

The number of performed calculations for C_{vis} is slightly higher (mean: 131.22 ± 31.87) than for C_{sota} (127.0 ± 31.43) and C_{son} (124.94 ± 28.48), see Fig. 1. However, the differences are not significant (p>0.388). The highest

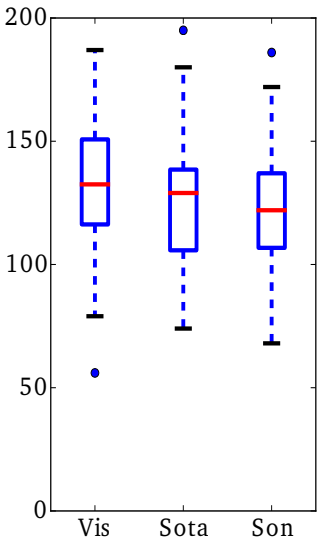

Figure 1: Numbers of solved calculations

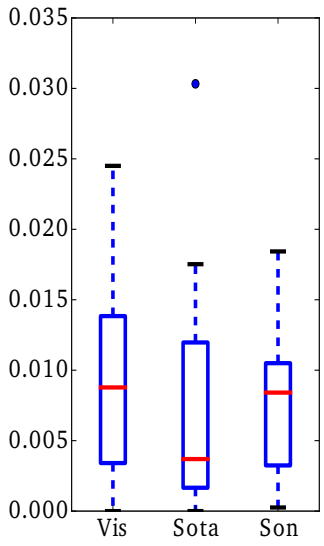

Figure 2: Deviation from correct solution

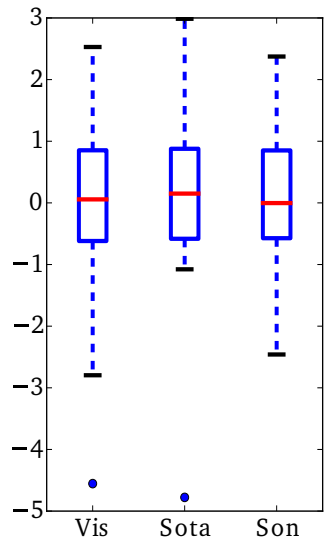

Figure 3: Main task scores, encompassing both numbers of solved calculations and their correctness

deviations of the results of the arithmetic problems from the correct solution were observed under C_{vis} (0.0098 ± 0.0080), compared to C_{son} ($0.0079 \pm$

0.0051) and C_{sota} (0.0070 ± 0.0078). However, again the differences were not significant (p>0.393, see Fig. 2).

Concerning the overall main task score, participants achieved the highest results during C_{sota} (0.1416 ± 1.622), lower scores under C_{son} (-0.0399 ± 1.336), and the lowest scores under C_{vis} (-0.1017 ± 1.655), see Fig. 3. The differences are not significant. Fig. 4 depicts the average main task scores under the three conditions, depending on whether the respective condition was the first, second or third part of the experiment for the respective participant.

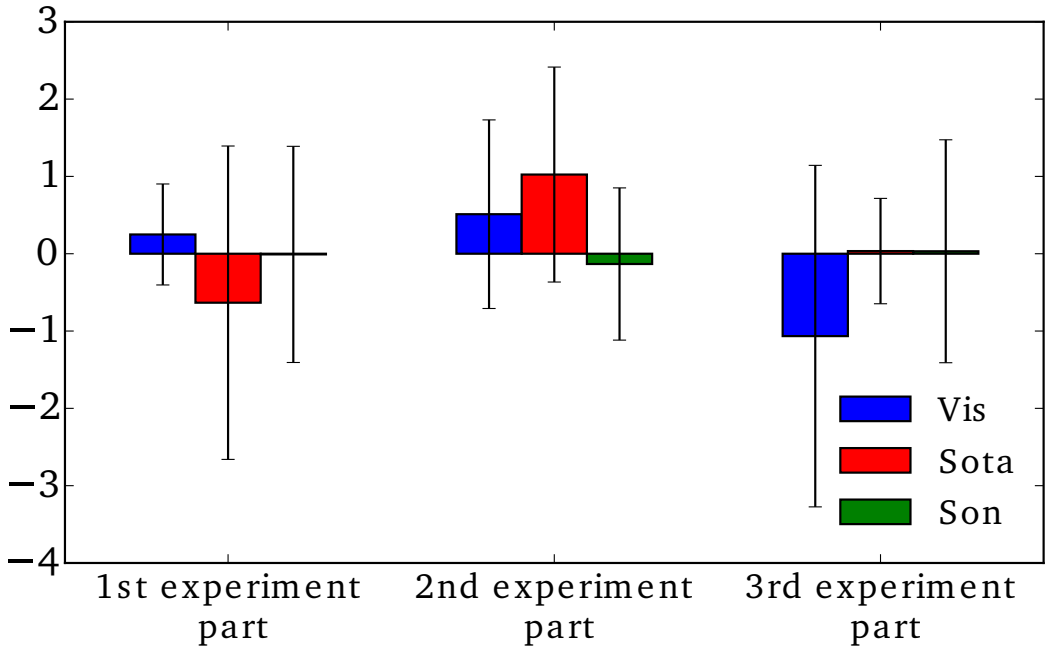

Figure 4: Main task scores, depending on if the respective condition was the subjects first (left), second (middle) or third part (right) of the experiment. The three sub figures compare the results of C_{vis} (left), C_{sota} (middle) and C_{son} (right).

There are some tendencies that can be observed, e.g. that when the participants performed monitoring under C_{vis} as their last experiment part, significantly lower main task performances were achieved compared to when it was their first or second experiment part. This could be caused by the fact, that the participants had to shift their attention between the two tasks more often, as the process status was not conveyed aurally as well.

2. Non-significant Process Monitoring Results

The median buffer value when clicking 'supply' was at 0.16 ± 0.295, or 16% . Quite a few participants waited until the input buffer was completely depleted before supplying.

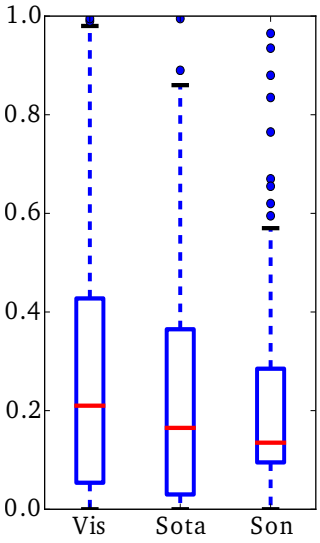

Figure 5: Input buffer levels when clicking 'supply'

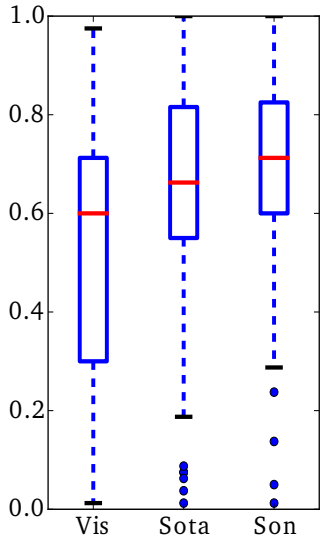

Figure 6: Input buffer levels when clicking 'empty'

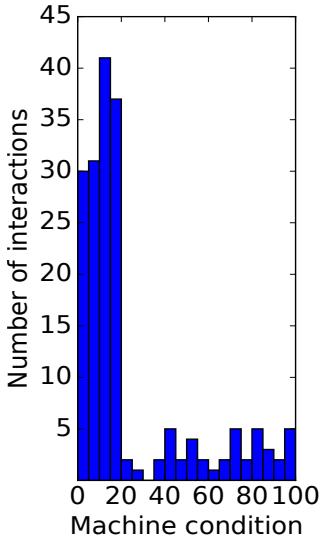

Figure 7: Histogram of machine condition when maintaining machine C

The aggregated median value when clicking 'supply' was highest during C_{vis} (0.246 ± 0.253), lower in C_{sota} (0.207 ± 0.218), and lowest in C_{son} (0.166 ± 0.127). The differences however are not statistically significant. Fig. 5 shows all buffer levels at the time of supplying.

The median buffer value when clicking 'empty' was at 0.662 ± 0.325, or 66.2%. Not many participants waited until the output buffer was completely full to empty it, but quite a few emptied it when the buffer was still relatively empty. The aggregated median value for clicking 'empty' was lowest under C_{vis} (0.676 ± 0.118), higher under C_{sota} (0.6825 ± 0.133) and highest under C_{son} (0.680 ± 0.104). The differences between the conditions are however not significant. Fig. 6 shows all buffer levels at the time of emptying.

The median condition of machine C when maintaining it was at $13.085\% \pm$ 10.690. Fig. 7 suggests that most participants intervened only when the machine was about to breakdown, while many even waited until the machine had stopped.

Under C_{vis}, the aggregated median condition of machine C at maintaining was 11.131 ± 7.071, 13.343 ± 12.426 under C_{sota} and 11.526 ± 6.868 under C_{son}. The differences between the conditions are not significant. As observed for machine E, more participants reacted only after a machine had already stopped under C_{vis} (4/65) and C_{sota} (3/61) than under C_{son} (1/56).