There are several interesting differences between handwriting and computer typing (cf. Grabowski, 2008). For instance, the physical movements during handwriting consist of different trajectories and acceleration patterns depending on the written letter and the writer’s visual attention is typically at the same location as the physical production of the text. Movements in computer typing, on the other hand, consist of less dynamic patterns and are executed on spatially different targets. Additionally, there is also a dissociation between the feedback displayed on the monitor and the location of typing execution. As was shown in Johansson, Wengelin, Johansson, and Holmqvist (2010) computer typists can access the visual feedback from their emerging texts to different degrees depending on how skilled typists they are.

The present study is an explorative study that compares global differences in text production patterns between computer typing and handwriting with the main objective to study how the different visual feedback from the emerging text in these two input modes influences the text production process. In this report, the two input modes are studied in regards of pause proportion and to what extent the writers read their own emerging texts.

Method

Ten university students, six females and four males, participated in the experiment. To get a more homogenous and comparable group we only included right-handed participants (in regards of visual feedback in handwriting) and those who mainly looked at the monitor while typing (Johansson et al., 2010).
Each participant wrote two expository texts about two typical problems in a school setting (bullying and cheating). One text was produced in the synchronized combination of keystroke logging and eye tracking as described in Wengelin et al. (2009). The other text was produced on a writing tablet with the eye and pen software (Alamargot, Chesnet, Dansac, & Ros, 2006), which makes it possible to analyse pen traces synchronized with eye movement data. The handwriting task and typing task were balanced for order.

Proportion of pauses (in relation to total time on task) was measured for pauses longer than 2 seconds (cf., Wengelin, 2006). The reason to analyse the time when the writer is not ‘writing’ is because this time is often related to important cognitive processes (Wengelin, 2006). For example, the writer may plan for future text segments, reflect on her text, review and/or read her own text.

Since eye movements were recorded during both texts it is also possible to study how much the writer reads her emerging text. As described in Johansson et al. (2010) reading in a text production task consists of several complex eye movement patterns on the text. However, only comparisons of the proportion of regular forward reading will be reported in this study.

Results and Discussion

A within subjects ANOVA revealed no significant difference in pause proportion between the two input modes. For proportion reading a significant main effect ($p = 0.05$) revealed that during computer typing the participants spent significantly more of their time reading (mean: 8.4%) than during handwriting (mean: 5.2%).

The results from our comparisons of handwriting and computer typing in expository writing indicate that writers do not differ in pause proportion between these two input modes, but reading is to a higher extent performed in computer typing.

This study was a first exploration of how these two input modes and their different visual feedback of the emerging text affect text production. Larger studies and further analyses on both text level and eye movements have to be performed to detect more detailed differences. For example, are individual differences more important than general differences between handwriting and computer typing? What is the impact of the different possibilities to revise between these two input modes? How do pause and reading distribution relate to syntactic aspects of the text?

References
