







two with all other triggers of spontaneous utterances showed that these two triggers resulted in significantly longer utterances. The longest spontaneous sentences were evoked by *sound* (3.5 words) and when commenting “*it wants to be down here*” or asking about pointing or dragging *interactions* “can you put it there?” (2.9). Most of the spontaneous utterances around interactions occurred in the last scene, which had no sound but various animals could be repeatedly dragged and re-positioned anywhere on the screen. The prompted utterances that fared better than average (1.8 words) were the ones in which the children described an *action* (2.4), *labeled* an object or character (2.3) or talked about a *sound* that was made (2).

The adults prompted the children on average 2.3 times per minute and between zero to 12 times in the different scenes. We tested *gesture*, *sound* and *repetition* impacted on the adult’s prompting frequency by entering them along with *ipm*, *caar*, and *age* as predictors in a stepwise regression in which factors with the smallest p-value (<.05) were entered first. Only *age* and *sound* significantly predicted *prompts per minute*. The adults prompted more frequently when the children were older ( $\beta=.14$ ,  $t(90)=2.77$ ,  $p<.01$ ) and in scenes that did not contain sound ( $\beta=.56$ ,  $t(90)=2.02$ ,  $p<.05$ ). This was mirrored during the debrief interviews with the caregivers. The caregiver who had prompted least suggested including music and narration while the most prompting caregiver feared that narration would weaken the contact with the child. Both disliked interactive elements not supported by text, as they did not know what to tell about them.

## 5. DISCUSSION

The initial concern that children might talk less often or with shorter responses when engaged with interactive elements was not warranted in our sessions. The children who interacted with the application more than the caregivers (larger *caar*) made more spontaneous utterances, too. However, since *caar* represents a covariate this finding would need more controlled follow-up research to provide causal conclusions.

The engaging effect of sound does not come as a surprise with the number of books available that supplement the visual reading experience with sounds. While sound in the scenes resulted in fewer prompts from the caregivers, it stimulated longer spontaneous utterances from the children. We used only sounds shorter than six seconds and further studies need to include the limits at which sound might begin to have detrimental effects, which the survey results from Vaala & Takeuch suggest.

The sizes of targets and difficulties with dragging might pose a usability problem but we found that these problems fostered verbal exchanges in line with the goal of dialogic reading.

We decided against using one facilitator unfamiliar to the children and relied instead on caregivers they knew. However, we found that facilitation by different adults varied a lot both in terms of dialogic reading and how much they allowed or encouraged the children to interact with the application. While dialogic reading represents an interactive, child-driven situation with large differences between children, we would still advocate for using one trained facilitator to keep this condition more controlled. The fact that the children’s spontaneous utterances were longer than the prompted ones was partially due to some caregivers’ prompts. This raises an important concern for training, which Zevenbergen and Whitehurst originally addressed with two workshops. Although our caregivers were all familiar with and had received a refresher before the session, they might have facilitated the

sessions differently with more training. When engaged in dialogic reading with e-books facilitators might benefit from having access to example prompts as some of the closed questions we observed resulted in short yes/no answers and the caregivers disliked interactive elements not supported by the storyline. Similarly, initial work on teaching facilitators dialogic reading involved example and training sequences.

## 6. CONCLUSION

The children’s agency in manipulating interactive elements did not adversely affect their responses to dialogic reading prompts. Interactive elements did provide triggers for children to speak in addition to dialogic reading prompts in shared e-book readings sessions. Sounds and being able to move objects and characters around produced longer spontaneous utterances in comparison to responses to dialogic reading prompts. Open-ended interactions worked particularly well and future research should explore concepts for spontaneity more in the context of dialogic reading.

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