

Personalizing a parenting app: survey-based models outperform behavioral reading-based models

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Personalization in Parenting

As new parents get used to their new roles, they face many challenges. One of these is finding articles that are in line with their parenting styles. We investigated if knowing a persons parenting style (based on the model in Fig 1) helps in personalizing the order of 101 articles in a digital library.

RQ: How does personalization based on parenting styles compare to personalization based on reading behavior in terms of user behavior and user experience?

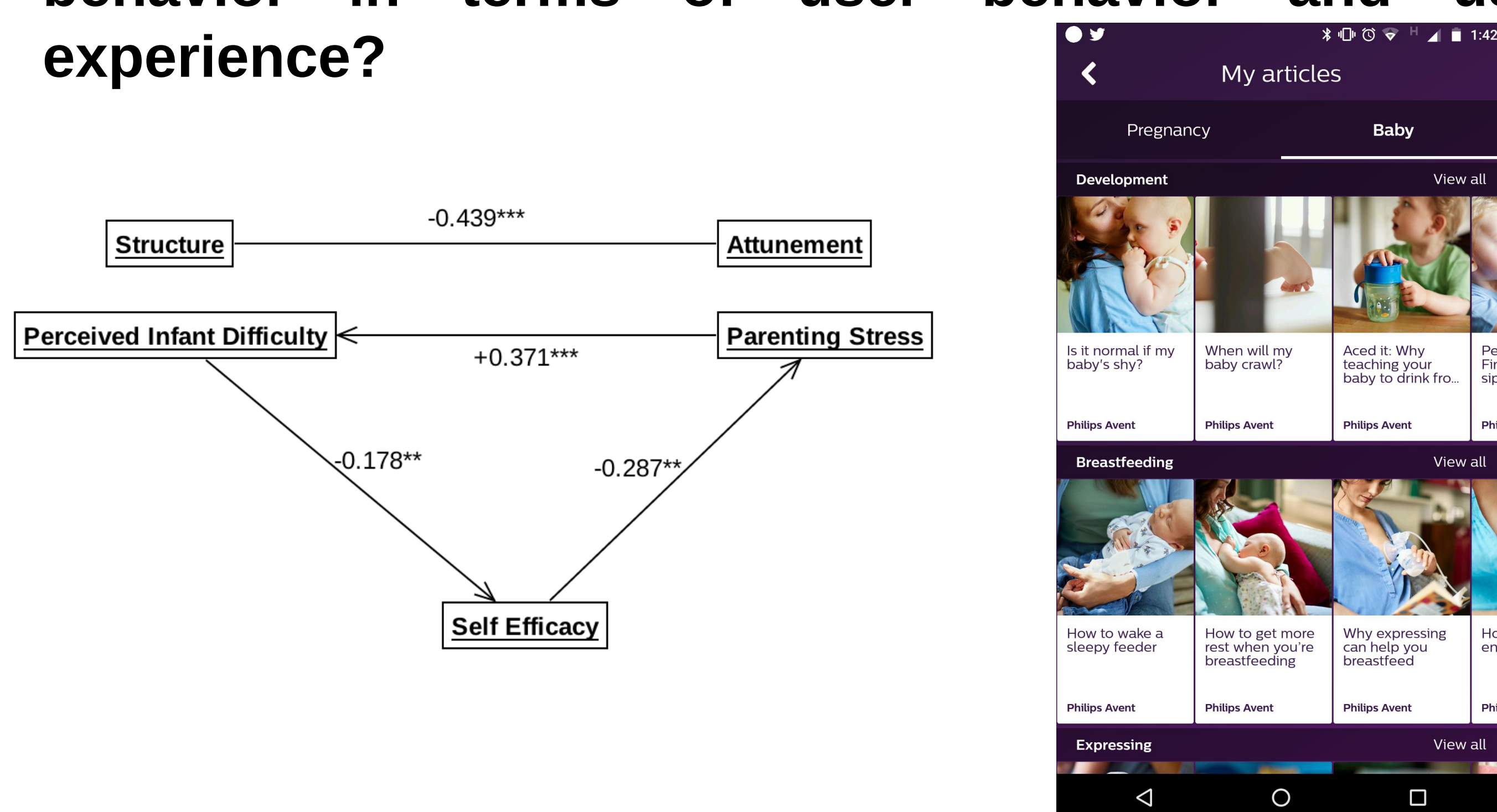


Figure 1. Model of Parenting Styles [1] and screenshot of the digital library

User Study

To address this research question we designed a three step user study.

Step 1 – Initial Data Collection

181 participants completed our 14-item parenting style survey [1] and browsed the non-personalized library. This allowed us to measure their parenting style and their reading behavior.

Step 2 – Article Relevance Prediction

For each participant we calculated the predicted relevance for each article in four different ways:

1. using general (non-personalized) popularity (**baseline**)
2. using the survey responses (**survey**)
3. using reading behavior (**reading**)
4. using reading behavior and survey response (**hybrid**)

For the survey-based predictions the participants were subdivided in four groups (high/low structure x high/low attunement). For each group we sorted the articles based on popularity within that group. Reading-based and hybrid predictions were calculated through BPRMF[2] and BPRMF extended to incorporate the parenting styles as user attributes.

	AUC	prec@5	prec@10	NDCG
baseline	0.706	0.146	0.104	0.477
survey	0.650	0.060	0.062	0.353
reading	0.767	0.176	0.114	0.522
hybrid	0.807	0.214	0.126	0.561

Table 1. Predictive performance of the used algorithms

Step 3 – Revisiting the now personalized library

121 participants revisited the library and were randomly assigned to one of four conditions in which the order of articles was ranked in one of four ways described above. To answer our research question we measured the participants' reading behavior and (through a survey) their user experience.

Results

Reading Behavior

The different conditions did not significantly influence whether or not or the number of articles users read.

User Experience

For the user experience we measured two aspects: the perceived level of personalization (e.g. "The library shows articles I find interesting") and system satisfaction (e.g. "I can find interesting items using the library"). Participants in the survey-based condition expressed a higher perceived level of personalization and user satisfaction (see fig. 2), despite a lower algorithmic performance.

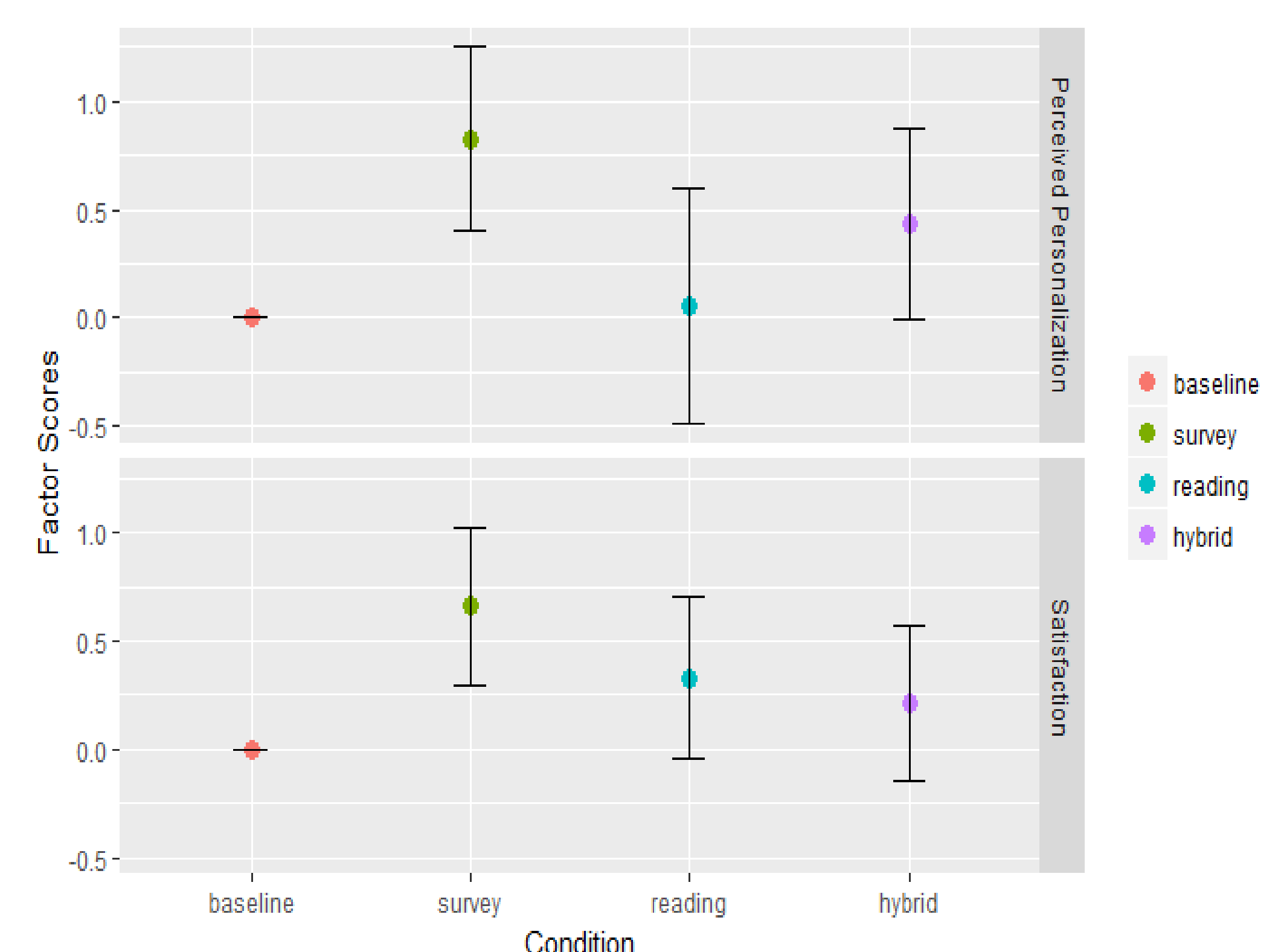


Figure 2. Perceived Level of Personalization and System Satisfaction

Conclusion

The current study shows that using a survey can lead to personalization that users like better than when using reading behavior. It also shows that a higher algorithmic performance does not guarantee a better user experience.

Literature

- [1] Tiange Zhao. 2016. *Investigating the relationship between parenting beliefs and parenting practice for in-app personalization*. Master thesis. Eindhoven University of Technology.
- [2] Rendle, S., Freudenthaler, C., Gantner, Z., & Schmidt-Thieme, L. (2009). BPR: Bayesian personalized ranking from implicit feedback. In *Proceedings of the Twenty-Fifth Conference on Uncertainty in Artificial Intelligence* (pp. 452–461). Arlington, Virginia, United States: AUAI Press.