

The use of immersive technologies in consumer testing revised: The role of contextual cues in evaluating cappuccinos in Sensory Labs, Virtual Realities, and at the actual Point of Consumption.

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I – Introduction and Motivation

Recently, Bangcuyo et al. (2015) highlighted the role of immersive technologies to improve consumer testing. Affective evaluations derived in a virtual Coffeehouse compared with the data from a controlled Sensory Lab entail...

- higher engagement of consumers while performing product evaluation
- higher discriminatory validity,
- higher test-retest reliability, and
- a different order of mean product likings.

These results cast doubt on the external validity of Sensory Lab test findings. However, proof of the generalizability of the results to real-world situations is still missing.

The present study sets out to fill exactly this gap in research.

II – Main Objectives

Can a virtual Coffeehouse provide high discriminatory validity and high external validity simultaneously?

Test environment	Sensory Lab	Virtual Coffeehouse	Real Coffeehouse
characteristics	Artificial, but fully controlled environment	standardized sample preparation, but controllable contextual cues	contextual and uncontrollable cues
proposed consequences	lack of ecological validity	high discrimination and ecological validity	low ability to discriminate among products

If the answer is yes, virtual environments created by immersive technologies will have the potential to replace Sensory Lab tests.

III – Study Design

- n=104 consumers of cappuccinos
- 4 cappuccinos under evaluation
- (I) controlled Sensory Lab, (II) a virtual Coffeehouse, and (III) a real Coffeehouse.
- Sessions on 3 successive days.
- Professional Baristas took care of the standardized sample preparation.
- Consumers did not know the cappuccinos were the same in each environment.
- Serving design for samples did not vary across environments.
- Order of testing environments was balanced across consumers.

Fig. 1 Environments



References

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Affiliations

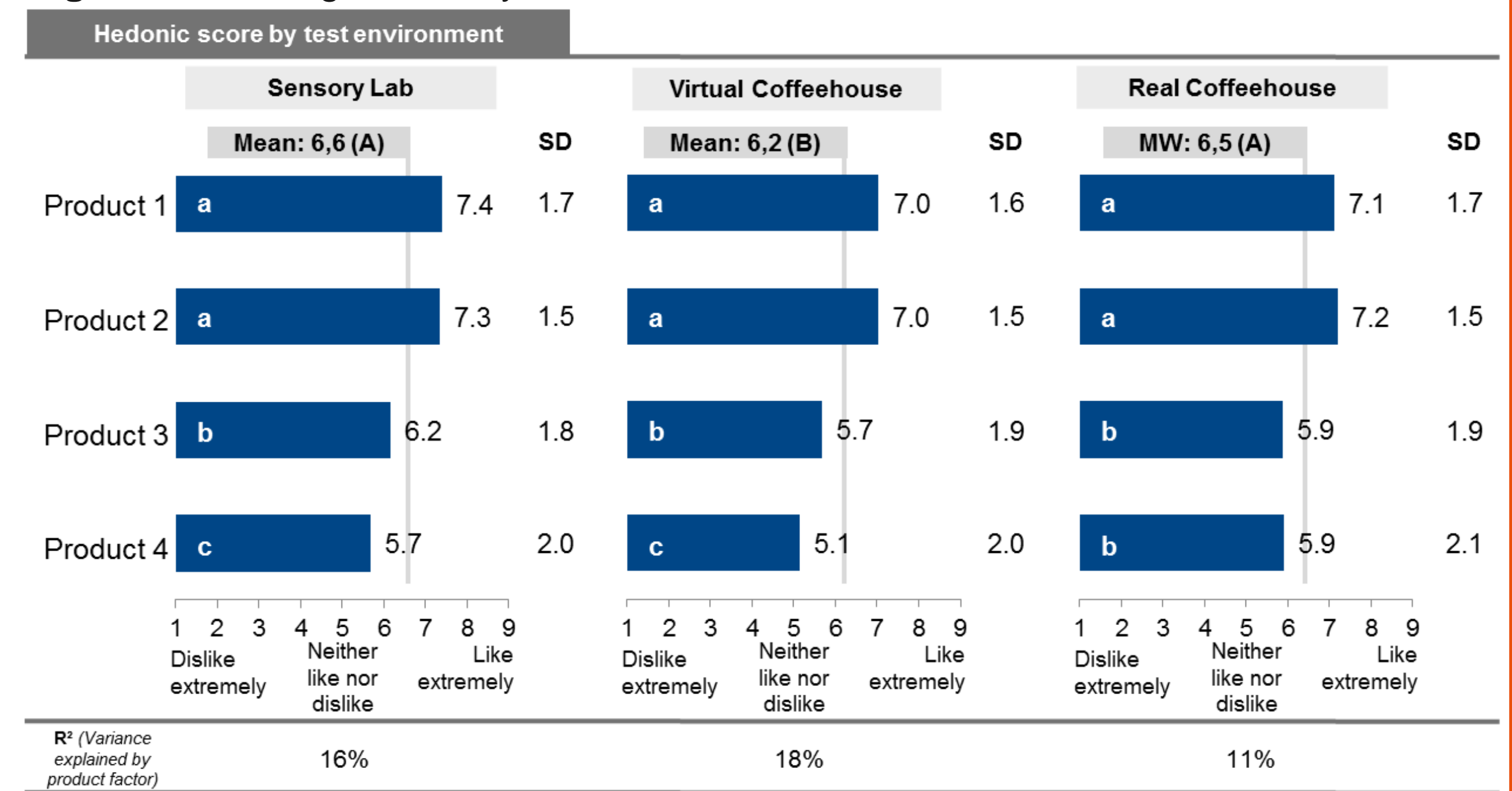
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IV – Key Findings

The virtual Coffeehouse provides better discrimination between samples compared with the actual Coffeehouse

1. Consumers discriminate less well in the real-world situation compared with the Virtual Reality and the Sensory Lab ($F(6,618)=1.62, p=.094, \text{partial } \eta^2=.02$).
2. The mean product liking depends on the environment ($F(2,206)=11.24, p<.001, \text{partial } \eta^2=.10$), the virtual Coffeehouse providing the lowest likings.
3. In contrast to the research mentioned earlier, we neither found differences in order of mean liking nor in directly stated preference order. Thus, our findings act as a safeguard for consumer researchers.

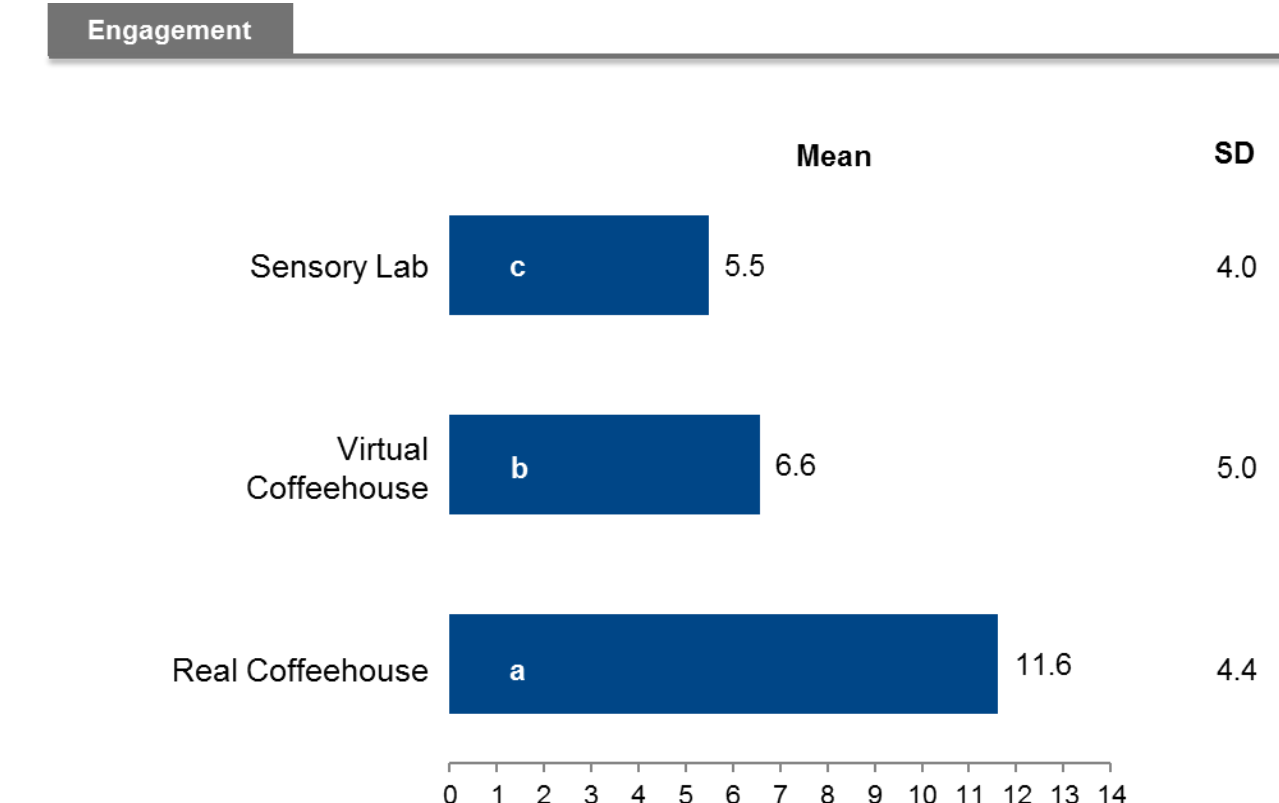
Fig. 2 Mean liking scores by test environment.



Assessment of the environment

- Using an engagement scale provided by Bangcuyo et al. (2015), the virtual Coffeehouse compensates for the low engagement in the Sensory Lab, yet it is not as engaging as the real Coffeehouse.

Fig. 3 Engagement by test environments.



Agreement of consumer segmentations across environments

- We evaluated which environment reflects the segmentation obtained in the Real Coffeehouse better in terms of adjusted Rand-Index (Milligan & Cooper, 1986).
- The Virtual Coffeehouse depicts the segmentation better than the sensory Lab.

Fig. 3 Analysis strategy

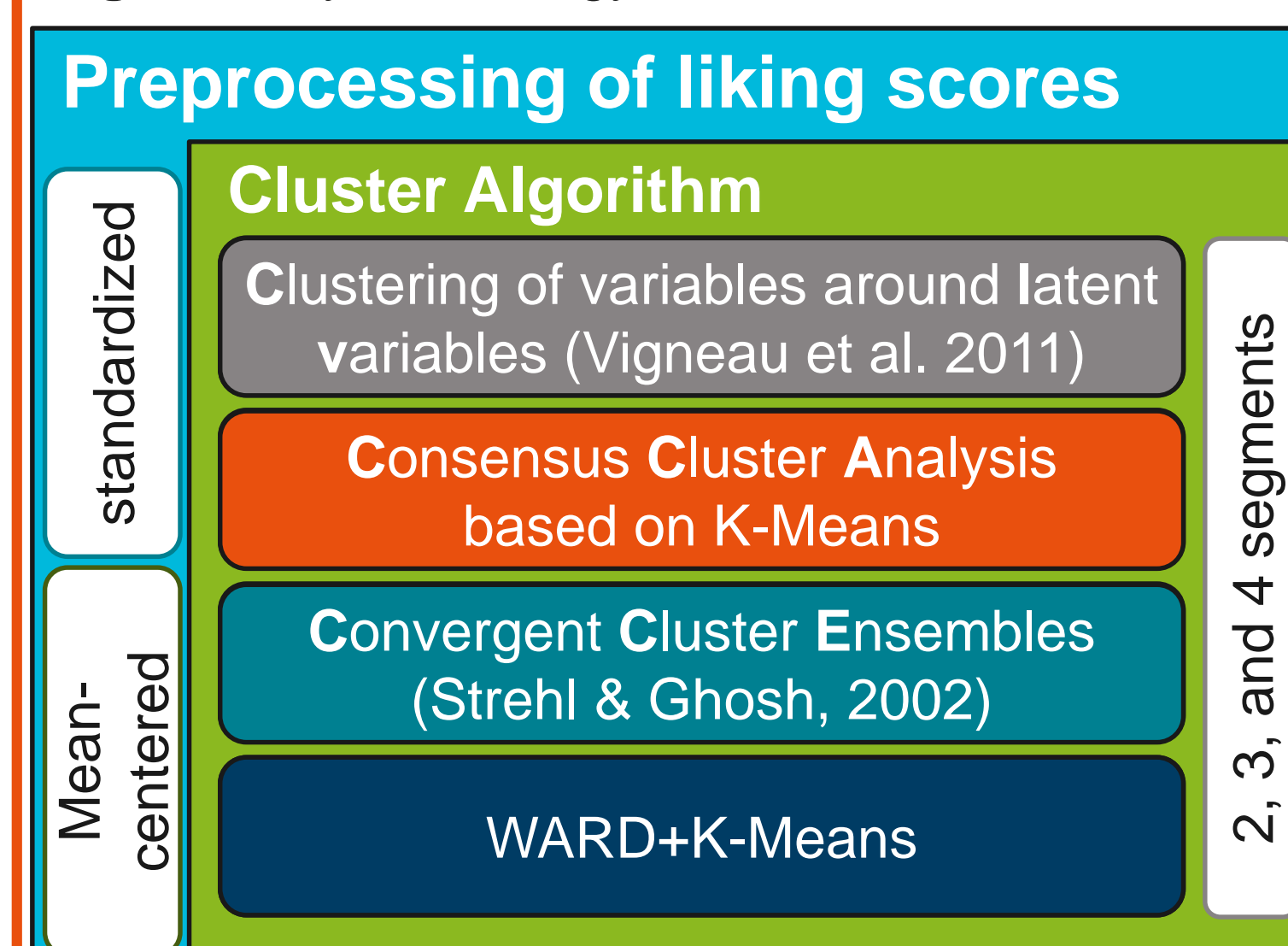
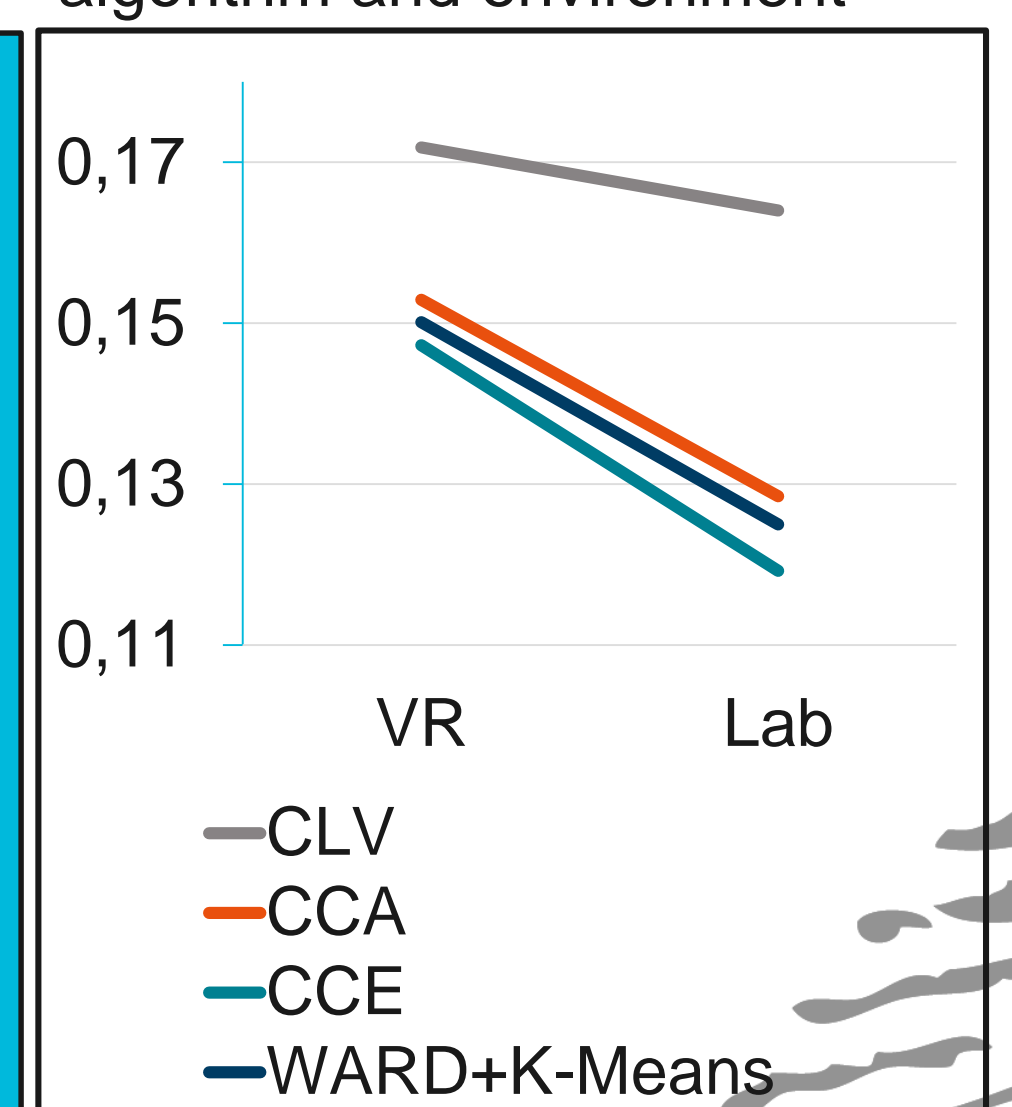


Fig. 4 Adjusted Rand-Index by algorithm and environment



V – Conclusion

Virtual realities are capable of providing a good compromise between natural environments and sensory Labs in terms of consumers' discrimination between products while allowing for a level of engagement which is higher than what we observe in a classical Sensory Lab test.

- In terms of the product's ranks and level of acceptance, the sensory Lab has, however, sufficient external validity.
- The virtual environment provides a higher degree of external validity in terms of segmentation agreement.
- We recommend future research to further investigate the relationship between engagement in performing product evaluation, environment liking and product liking.