P-01-05

The impact of tasting beef steaks in a traditional sensory booth versus an immersive virtual reality restaurant
(#584)

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Introduction
The need for sensory evaluation within the food industry is becoming increasingly complex as companies continuously compete for consumer product acceptance in today's highly innovative food environment. Consumer sensory testing is typically conducted in a sensory laboratory which does not accurately reflect real life conditions, and thus fails to consider the impact of contextual information in forming sensory perceptions and acceptance. Virtual reality (VR) technology is becoming increasingly popular as a tool for understanding the impact of context on consumer hedonic ratings (Siegrist et. al, 2019; Stelick et al, 2018). The aim of this study was to utilise immersive virtual reality techniques to examine the influence of the surrounding testing context on consumer's sensory perception of beef steaks.

Methods
Regular beef consumers (n=30) were recruited from staff and students at Teagasc. Two different experimental conditions were set-up: (1) a typical sensory laboratory (LAB) (Figure 1) and (2) an immersive virtual reality restaurant (VR) (Figure 2). The VR restaurant context was captured using a Samsung Gear 360 4K Ultra HD camera and was displayed to the consumer through a HMD device (Oculus Go). Audio recordings were transmitted through the HMD device. Individual steaks of 2.54 cm thickness were cut from the *M.longissimus lumborum*. Each beef steak was vacuum-packaged and stored at -20°C until analysis. The steaks were placed in a refrigerator to thaw approximately 24 hours prior to sensory analysis. One hour prior to cooking, the steaks were taken from the refrigerator and removed from the vacuum bag. Steaks were cooked on a Velox grill using minimal cooking oil and no seasoning, until an internal temperature of 71°C was reached (AMSA, 2015). Each steak was removed from the grill, wrapped in aluminium foil and allowed to rest for 2 minutes. Each steak was cut into two equal sized portions, and presented to consumers in sensory booth and VR contexts according to a randomized and balanced design. Consumers were instructed to evaluate the meat for perceived liking in terms of smell, tenderness, juiciness and beef flavour on a 9 point hedonic scale where 1 = dislike extremely and 9 = like extremely. Consumers were also asked questions regarding their experiences with VR to date. The data was collected electronically using Compusense Cloud software (Ontario, Canada) and the results were analysed using IBM SPSS Statistic 24 (SPSS Inc., Chicago, IL, USA.). Friedman's Anova test was used to determine whether there was a significant difference between the two contexts. Statistical significance was set at $P < 0.05$.

Results
Significant statistical differences were observed for all sensory beef steak attributes when the results from the two different contexts were compared. A significant increase in perceived liking scores for the beef steaks samples evaluated in the VR context in comparison to the sensory booth was observed ($P < 0.05$), indicating that the VR restaurant had a positive impact on consumer hedonic ratings of beef steaks. The majority of participants found the VR restaurant experience to be a more exciting and realistic testing environment in comparison to evaluating the beef steaks in the traditional sensory booth set-up.

Conclusion
Sensory consumer studies could benefit from VR as it facilitates experiments that could be otherwise expensive, challenging and time consuming to conduct in a real-life environment. The results from this study demonstrated that the surrounding context has a significant impact on consumer sensory perception of beef steaks. The application of VR technology within sensory science is in its infancy and further research will understand how it can be fully exploited as a context-enhancing tool in consumer food product evaluations.

References
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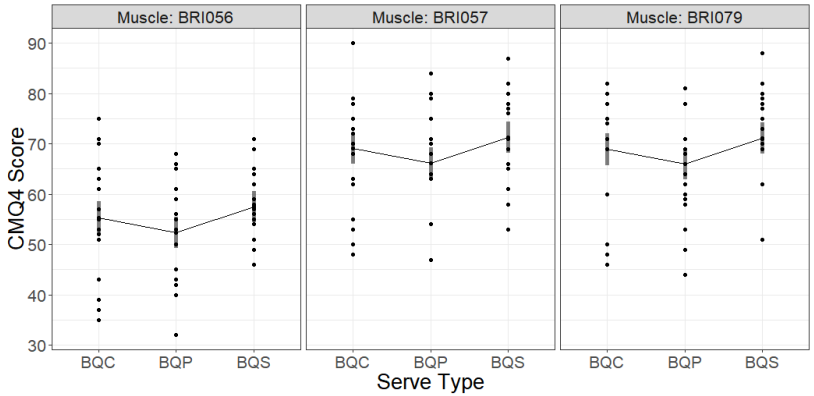
Acknowledgements
Funding from Meat Technology Ireland (MTI), under the Technology Centre programme, a co-funded industry/Enterprise Ireland project (TC 2016 002) is gratefully acknowledged, as well as internal funding from Teagasc. Authors would like to thank Dr. Michael Whelan for the assistance and to all the staff from Teagasc that participated in this study.

Notes

		Estimated Marginal Mean ± SE
Muscle	*M. pectoralis profundus* (BRI056)	55.1 ± 1.22[a]
	M. pectoralis superficialis (BRI057)	68.8 ± 1.22[b]
	M. serratus ventralis (BRI079)	68.7 ± 1.22[b]
Serve Type	Chopped	64.4 ± 1.23[cd]
	Pulled	61.5 ± 1.22[c]
	Sliced	66.6 ± 1.21[d]

[ab] Muscles with different superscripts are different ($P<0.0001$)
[cd] Serve types with different superscripts are different ($P<0.01$)

Table 1: Estimated marginal means of consumer sensory (CMQ4) score for muscle and serve type



Estimated marginal means prediction of consumer sensory (CMQ4) score for muscle by serve type

Figure 2.
Immersive VR restaurant context

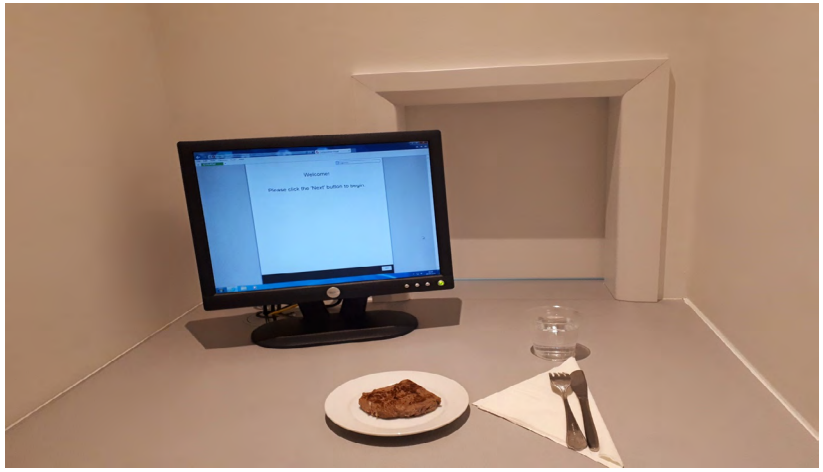


Figure 1.
Traditional sensory booth context

Notes