An investigation of the validity of virtual reality for shopper research.

Submission for the degree of Doctor of Philosophy

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ABSTRACT

A computer-generated 'virtual' simulation of a real store is an innovative research method that requires further validation to support its use in marketing. This research investigates how accurately consumers' usual brand and product choices are captured in virtual reality (VR) simulations of familiar retail environments. It also investigates how the fielding mode and protocols of VR studies affect the validity of results.

Data from eight VR studies (n = 4463 VR purchases) is benchmarked against purchase data collected in real stores and multivariate modelling is used to confirm what biases are consistently evident. Additionally, the experiences and concerns of 40 marketing managers and market researchers that have used VR for marketing research are discussed.

This research establishes that a number of biases affect VR purchase data and that contrary to expectations, half of all participants select products or packs sizes they do not usually buy in real stores despite being instructed to shop normally.

Regression analysis establishes that five variables, including the relative price, size and popularity of products, relate to biases in the selection of products.

Descriptive and regression analyses demonstrate that deploying VR studies with practice trips, as recommended by prior research, does little to reduce these biases in VR studies for frequently purchased hedonic, or utilitarian, grocery products. On average the shares of products differed by just one or two percent between studies that simulated one or more 'normal' shopping trips, and the number of trips simulated was not significant predictor of bias in regression analyses. Similarly, analyses demonstrate that fielding studies with specialised equipment and in-person researcher supervision, does not affect the magnitude of the biases evident. Modelling found that the VR shares of products were overestimated in VR studies fielded in specialised facilities and in studies fielded online using panel members' home computers.

Despite these issues, VR may still be a good method for testing how changes to pack designs, product assortments or shelf layouts in real stores may affect shoppers' purchase choices. However, they do indicate that studies must be carefully designed and that calibration models to correct for the biases evident in VR data, should be devised.

Additionally, this research demonstrates that VR simulations limited to one area of the store, such as the confectionery aisle, and displayed on normal computer screens can replicate the effects of shelf layout and assortment organisation changes in real stores, using data from two studies. The studies examined provided sales estimates within 1% of sales estimates from real stores, suggesting that the extensive simulations and specialised

equipment used in some studies (e.g. Burke and Leykin 2014, van Herpen, van den Broek et al. 2016, Waterlander, Jiang et al. 2015) are not required to obtain useful results.

A key limitation of this research is that protocols which may improve the realism of VR purchase data, for example having participants shop for products they actually need or introducing real financial consequences to experiments, were not tested. Future research should address this gap.