Critical Review: Improving the Efficacy of Games for Change Using Personalization Models

Persuasion is the act of influencing or reinforcing certain attitudes and behaviours [Khaled et al., 2008]. The use of technology for encouraging behavioural change to benefit its users or the wider community is a long-term area of research [Fogg, 2002]. This review will present a summary and critical analysis of Orji et al. [2017] whose paper explores the use of personalisation models as a persuasive device for improving the efficacy of games which are designed to change user behaviour, as well as putting forward a set of suggestions for future work in this domain of Persuasive Technology.

Summary of Contributions

Orji et al. [2017] highlight the rising prominence of *games for change* that are designed for purposes other than entertainment, to effectively educate players about certain topics in a way that influences their behaviour [Busch et al., 2015]. The authors raise the issue that many such games are designed with a "*one size fits all*" philosophy whereby the design of the game itself (and its adopted persuasive *strategies*) are not tailored to the *type* of the player. Orji et al. [2017] therefore seek to answer two main research questions to understand the observed efficacy of certain strategies in existing games [Peng, 2009, Kaipainen et al., 2012]. Firstly, whether tailoring games for change to a specific player type increases their persuasiveness. Secondly, if beneficial effects of tailoring are observed, whether these effects are mediated by an improved play experience. If these could be answered, results could inform the future decisions of games designers in which persuasive strategies they adopt to maximise efficacy in certain player types.

Initial work by the authors indicated that a strategy shown as effective for one type of user could indeed be detrimental to another [Orji et al., 2013] (Table 1). This table sets out a well-founded taxonomy which maps gamer types defined by the BrainHex model of Nacke et al. [2014] (*Achiever, Conqueror, Daredevil, Mastermind, Seeker, Socializer and Survivor*) against commonly adopted persuasive strategies selected by Gerling et al. [2014] based on a large-scale online survey of gamers.

Table 1: β values confusion matrix: Strength of motivation of different players that result from different strategies. Positive β values indicate that gamers of this type are motivated by the corresponding given strategy. Negative β values indicate demotivation, whilst an empty value indicates neither motivation demotivation.

Strategies / Gamer type	CMPT/ CMPR	COOP	CUST	PERS	PRAS	SEMT/ SUGG	SIML	REWD
Achiever	-	.15	-	-	-	.10	-	.10
Conqueror	.25	-	-	.12	-	.12	.14	-
Daredevil	-.10	-	-	-	-	-.14	.11	-
Mastermind	.12	-	.10	.12	-	.14	.12	-
Seeker	.10	-	.19	.11	.10	-	-	-
Socializer	.11	.17	-.12	-	-.12	-.13	-	-
Survivor	.17	-.20	-.13	-	-	.27	-	-.14
CMPT/CMPR = competition and comparison, COOP = cooperation, CUST = customization, PERS = personalization, PRAS = praise, SEMT/SUGG = self-monitoring and suggestion, SIML = simulation, REWD = reward.								

Whilst ..., the data collected from authors' earlier experiments is corroborated by other existing work - treating user groups in a monolithic way is generally considered dangerous, especially in the domain of games for health [Berkovsky et al., 2010].

To evaluate their research questions, Orji et al. implemented two versions of a custom a game called *Junk Food Aliens* (Figure 1). The reward-based version (JFA-R) adopted persuasive strategies such as achievement badges (Figure 3) whereas the competition-based version (JFA-C) adopted comparative strategies such as leaderboards (Figure 2).
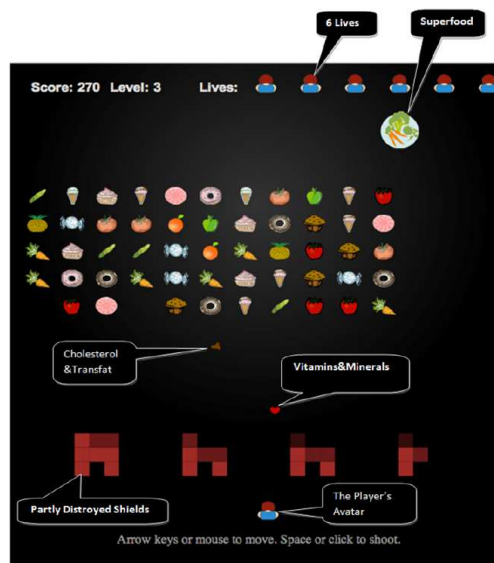

Figure 1: "Junk Food Aliens" (JFA): A persuasive game designed to change gamer behaviour towards healthy eating.

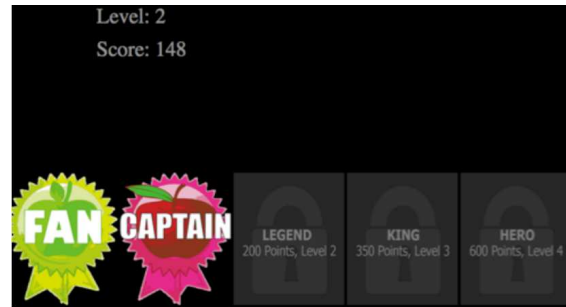Figure 2: JFA-C: Competition-based version of JFA.

Figure 3: JFA-R: Reward-based version of JFA.

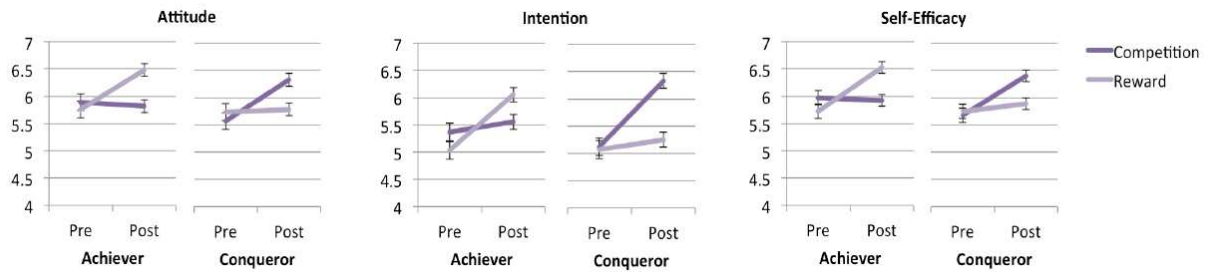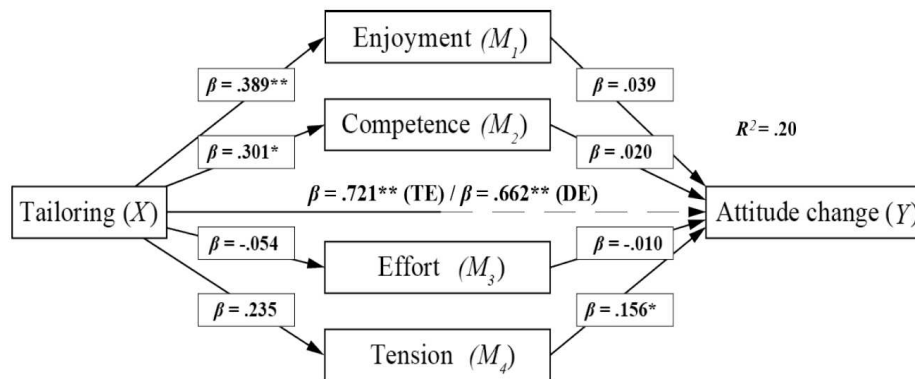## Justifications for Conclusions

Figure 4: Mean values $\pm$ SE for Attitude, Intention, and Self-Efficacy by Gamer type (Achiever, Conqueror) and Game version (Competition, Reward).

Figure 5: Parallel mediation model of tailoring on attitude change with play experience as mediator.

Limitations and Suggested Further Work

Conclusion

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Rita Orji, Regan L. Mandryk, and Julita Vassileva. Improving the efficacy of games for change using personalization models. *ACM Trans. Comput.-Hum. Interact.*, 24(5):32:1–32:22, October 2017. ISSN 1073-0516. doi: 10.1145/3119929. URL `http://doi.acm.org/10.1145/3119929`.

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Critical Review: Exploring Interactions with Physically Dynamic Bar Charts

Scientific studies investigating how data can be effectively presented to, explored and interpreted by users forms the core part of Information Visualisation ('InfoVis'). This research is under the guise of supporting users in the decision-making process. This review will present a summary and critical analysis of Taher et al. [2015] whose paper explores the use of physically dynamic bar chart as a device for exploring user interactions with visualisations of data, as well as putting forward a set of suggestions for future work in this domain of Information Visualisation.
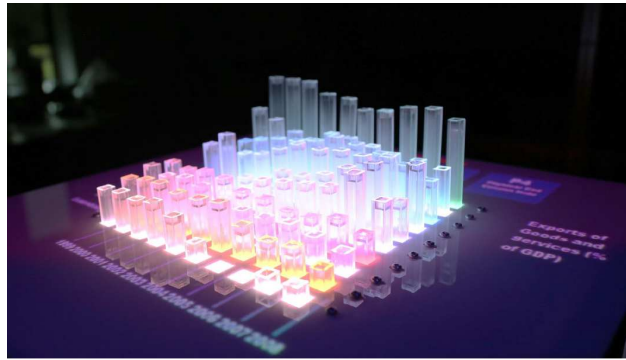
Summary of Contributions

Figure 1: EMERGE: Exploring Interactions with Physically Dynamic Bar Charts using actuating physical rods and RGB LEDs to display international export data.

Table 1: Task-sets and interaction techniques explored during the user study.

Task	Overview	Interaction Techniques
Annotation *(Process & provenance)*	Selecting and marking individual data points.	Point, pull, press.
Filtering *(Data view & specification)*	Hiding and refining data for enhanced perception and comparison.	Swipe away, manual press, assisted press, press shortcut, and press to compare.
Organization *(View manipulation)*	Data arrangement by moving rows and columns.	Drag and drop with immediate transition and hide-all with transition, press with instant transition and hide-all with transition.
Navigation *(View manipulation)*	Controlling the view of large data sets.	Scroll, directional arrows, directional press, and paging.

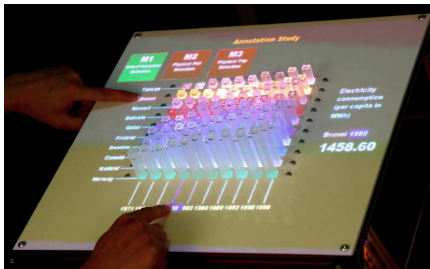## Justifications for Conclusions
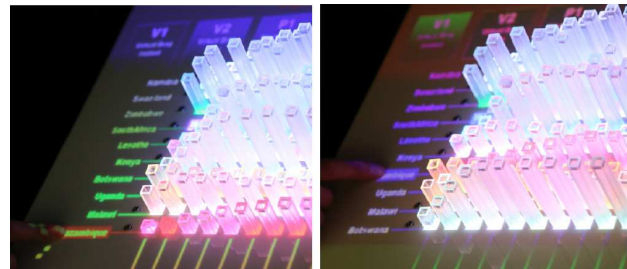

Figure 2: Annotation (Point technique).

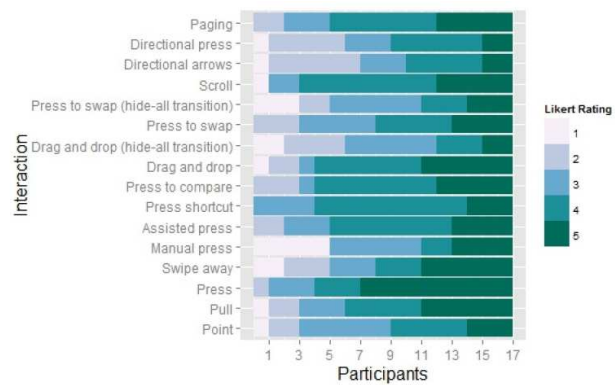Figure 3: Organisation (Drag and Drop technique).

Figure 4: Likert scale ratings for helpfulness of interaction techniques. Range = 1: Strongly Disagree, 5: Strongly Agree.

Limitations and Suggested Further Work

Conclusion

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