Activated Motivation: An Opportunity for HCI Research?

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1 ACTIVATED MOTIVATION

Self-Determination Theory [7, 13, 14] is a decades-old, widely-validated macro-theory that describes human motivation. Generally, it defines motivation on a spectrum ranging from amotivation, or a lack of motivation, to extrinsic motivation driven by external factors like rewards, to intrinsic motivation associated with one's internal enjoyment or interest. Moreover, the theory establishes the benefits of more internal forms of motivation: individuals acting with internal forms of motivation will tend to feel more open and curious, be more persistent, and are more likely to succeed at difficult tasks [8, 13, 14]. Indeed, these concepts have been widely validated, and have been shown to provide a practical framework for technology design [9]. However, researchers have also argued that current engagement with the theory is shallow [11, 12], particularly some of the concepts described in Self-Determination Theory's 'micro-theories' [9].

Causality Orientations Theory [7, 13, 14], one such micro-theory, describes how an individual's motivation shapes their behaviour. It defines three *orientations* that individuals take on in pursuit of a goal: those with *autonomy orientation* are driven by internal factors like their own interests and opportunities for growth; those with *controlled orientation* are driven by external contingencies and power structures; and those with *impersonal orientation* are driven by the need to avoid negative consequences like performance anxiety or failure [13]. Like the benefits associated with more internal motivation, individuals who are autonomously oriented will tend to perform better, invest more effort, be more persistent, and enjoy a task more than those with controlled or impersonal orientations [10]. These traits have been found to translate to concrete outcomes like task time, effort, and performance in experimental settings [8, 18].

Critically, the psychology literature has also shown that an individual's orientation can be *primed*, through environmental messaging like text, music, or images — an effect called *activated motivation* [18]. That is, individuals can be prompted to take on an autonomy orientation for a task, and in doing so also take on its many benefits. Activated motivation has been demonstrated in experimental, short-term contexts for a wide range of activities, including education, sports training, and medicine adherence [8, 18]. However, it's not clear how priming can be implemented in the interactive computer systems people use on a daily basis for self-improvement, and so the potential

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benefits of activated motivation for remain unexplored. I propose that there is an opportunity for HCI researchers to use activated motivation to promote health in interactive technologies, and to develop guidance for *how* and *when* it can most effectively be integrated into computer interfaces.

2 BIO AND RESEARCH EXPERIENCE

My lab, the HCI and Health Lab at the University of Waterloo, investigates how to effectively design, build, and deploy self-improvement technology. This research applies our expertise in technology design and evaluation to domains with pressing needs like education [5, 6, 15, 16], nutrition [1, 2], and mental health [3, 4]. For instance, Marcela Bomfim is exploring the use of gameful techniques to motivate fewer impulse purchases when grocery shopping [1, 2]. Similarly, Tina Chan used Self-Determination Theory as a design guide to motivate peer-to-peer support in Cognitive Behavioural Therapy [3, 4]. Mila Tahai applied developed an educational game for children with attention-deficit hyperactivity disorder (ADHD) [15, 16].

However, in exploring SDT, our work has also identified obstacles to the development of these technologies in practice. In particular, there's little guidance for when a gameful intervention will be most effective, compared to, for example, simple visualizations [1]. This realization aligns with calls-to-action in the CHI Play community to more deeply engage with Self-Determination Theory (e.g., [17]), and points to a need for deeper engagement with existing theory on motivation.

On a personal note — I'm still a novice when it comes to SDT. But I'm keen to learn more, and I am particularly excited for the opportunity to attend this workshop. Thank you for creating this opportunity!

REFERENCES

[1] Marcela CC Bomfim, Sharon I Kirkpatrick, Lennart E Nacke, and James R Wallace. 2020. Food Literacy while Shopping: Motivating Informed Food Purchasing Behaviour with a Situated Gameful App. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. ACM.

[2] Marcela CC Bomfim and James R Wallace. 2018. Pirate Bri's Grocery Adventure: Teaching Food Literacy through Shopping. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*. 1–6.

[3] Long Ting Chan and James R Wallace. 2018. Changing Peer Support Attitudes with Avatar-Based Gamification. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*. 1–5.

[4] Tina Chan. 2021. Merlynne. *Proceedings of the ACM on Human-Computer Interaction* 5, CHI Play (2021), 1–27.

[5] Victor Cheung and James Wallace. 2016a. Quantum Cats: The Demo. In *Proceedings of the 2016 ACM International Conference on Interactive Surfaces and Spaces*. 445–448.

[6] Victor Cheung and James R Wallace. 2016b. Felines, foragers, and physicists: Supporting scientific outreach with multi-surface and multi-space games. In *Proceedings of the 2016 ACM International Conference on Interactive Surfaces and Spaces*. 297–306.

[7] Edward L. Deci and Richard M. Ryan. 1985. *Causality Orientations Theory*. Springer US, Boston, MA, 149–175. DOI: http://dx.doi.org/10.1007/978-1-4899-2271-7_6

[8] Fiona B. Gillison, Peter Rouse, Martyn Standage, Simon J. Sebire, and Richard M. Ryan. 2019. A meta-analysis of techniques to promote motivation for health behaviour change from a self-determination theory perspective. *Health Psychology Review* 13, 1 (2019), 110–130. DOI: http://dx.doi.org/10.1080/17437199.2018.1534071

[9] Elisa D. Mekler, Florian Brühlmann, Alexandre N. Tuch, and Klaus Opwis. 2017. Towards understanding the effects of individual gamification elements on intrinsic motivation and performance. *Computers in Human Behavior* 71 (2017), 525–534. DOI: http://dx.doi.org/https://doi.org/10.1016/j.chb.2015.08.048

[10] Stephen L Murphy and Ian M Taylor. 2020. Priming autonomous and controlling motivation and effects on persistence. *Current Psychology* (2020), 1–13.

[11] Rita Orji and Karyn Moffatt. 2018. Persuasive technology for health and wellness: State-of-the-art and emerging trends. *Health Informatics Journal* 24, 1 (2018), 66–91. DOI: http://dx.doi.org/10.1177/1460458216650979

[12] Dorian Peters, Rafael A. Calvo, and Richard M. Ryan. 2018. Designing for Motivation, Engagement and Wellbeing in Digital Experience. *Frontiers in Psychology* 9 (2018), 797. DOI: http://dx.doi.org/10.3389/fpsyg.2018.00797

[13] Richard M. Ryan and Edward L. Deci. 2019. Chapter Four - Brick by Brick: The Origins, Development, and Future of Self-Determination Theory. Advances in Motivation Science, Vol. 6. Elsevier, 111–156. DOI: http://dx.doi.org/https://doi.org/10.1016/bs.adms.2019.01.001

[14] Richard M Ryan, C Scott Rigby, and Andrew Przybylski. 2006. The motivational pull of video games: A self-determination theory approach. *Motivation and emotion* 30, 4 (2006), 344–360.

[15] Liudmila Tahai, James R. Wallace, Christian Eckhardt, and Krzysztof Pietroszek. 2019a. Scalebridge: Design and Evaluation of Adaptive Difficulty Proportional Reasoning Game for Children. In *2019 11th International Conference on Virtual Worlds and Games for Serious Applications (VS-Games)*. 1–4. DOI: http://dx.doi.org/10.1109/VS-Games.2019.8864526

[16] Liudmila Tahai, James R Wallace, Christian Eckhardt, and Krzysztof Pietroszek. 2019b. Scalebridge: Design and evaluation of adaptive difficulty proportional reasoning game for children. In *2019 11th International Conference on Virtual Worlds and Games for Serious Applications (VS-Games)*. IEEE, 1–4.

[17] April Tyack and Elisa D. Mekler. 2020. Self-Determination Theory in HCI Games Research: Current Uses and Open Questions. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20)*. Association for Computing Machinery, New York, NY, USA, 1–22. DOI: http://dx.doi.org/10.1145/3313831.3376723

[18] Evan Weingarten, Qijia Chen, Maxwell McAdams, Jessica Yi, Justin Hepler, and Dolores Albarracin. 2016. From primed concepts to action: A meta-analysis of the behavioral effects of incidentally presented words. *Psychological bulletin* 142, 5 (2016), 472.