
How Person-Centric Traits Moderate the Influence of Needs Satisfaction on Player Engagement with Games

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Abstract

Whether or not playing video games results in a positive play experience depends on many factors, including aspects of the player that are generally not considered. We present an approach for understanding how several player-centric traits alter the relationship between needs satisfaction and player engagement. Results from three case studies on personality, motivation, and self-esteem show how *person-centric traits must be considered in combination with the satisfaction of needs to ultimately predict game engagement*.

Author Keywords

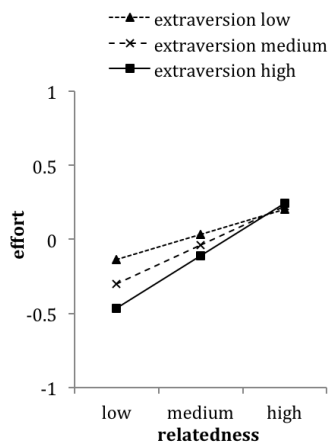
Personality, self-esteem, SDT, moderated regressions

Introduction

To help guide decisions, game designers often imagine a representative player of their game. These archetypal players – or ‘player personas’ [1] – can be created from many factors, including demographic characteristics (e.g., age, sex), expertise (e.g., novices), or motivation for playing (e.g., fill time while waiting). Recently, designers and researchers have explored the value of describing players using personality traits (e.g., extroverted, conscientious). In fact, the prevailing

Sidebar One: Personality

There were many significant moderations of personality; for example, the satisfaction of relatedness predicted how much effort a player will invest ($\beta=.26$, $p<.001$); however, a player's level of extraversion moderates the influence of relatedness on invested effort. As the figure below shows, when extraversion is low, the importance of relatedness for predicting effort is lower ($\beta=.17$, $p=.03$) than when extraversion is medium ($\beta=.26$, $p<.001$) or high ($\beta=.35$, $p<.001$).



model of player-centric design in the computer game industry [12] describes how players with different personality traits are drawn to play different types of games. In the Five Domains of Play [12], VandenBerghe maps the Big Five Personality Traits (Extroversion, Conscientiousness, Agreeableness, Neuroticism, and Openness to Experience [5]) to five experiences common in games (Stimulation, Challenge, Harmony, Threat, and Novelty). The model suggests that players with certain personality traits will be drawn to games that offer the corresponding play experience – for example, players high in openness to experience will be drawn to novelty and may choose a game with an innovative interface (e.g., GuitarHero).

Although the Five Domains of Play describe what draws a player to initiate a play experience, it does not help designers or researchers understand why players enjoy a particular experience once they have initiated play. Multiple theories have been proposed to explain sustained engagement with games (e.g., [11]); one leading theory [10] is based on the idea that well-designed games satisfy our need for *competence* (i.e., the mastery over challenge), *autonomy* (i.e., engagement under our own volition), and *relatedness* (i.e., connection to people and things). This theory of Self-Determination (SDT) suggests that satisfying each of these needs in gameplay will lead to increases in invested effort, interest, enjoyment, and ultimately result in sustained engagement [10].

VanderBerghe combined these concepts of personality and need satisfaction in his Engines of Play Model [12], which attempts to explain the process by which players become engaged with games. In his two-step model, personality and need satisfaction are treated in isolation – first, a certain type of player feels drawn to

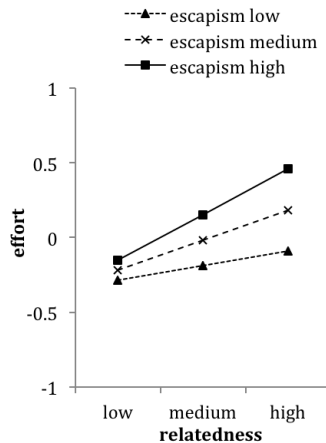
a game (based on their personality), and then the players' needs must be satisfied (based on SDT) so that the player will enjoy the game and keep playing. However, no consideration is given in his model of whether people of different personalities have their needs satisfied differently during play, i.e., whether or not personality and needs satisfaction interact.

Beyond the Big Five

Although VanderBerghe focuses on describing a player using the five-factor model of personality, there are other established factors that can be used to describe a person, their motivation to play, and the experiences they bring to play. For example, different players have differing reasons why they choose to play games. The Digital Games Motivation Scale (DGMS) [2] measures how much people are motivated to play games by eight orthogonal factors (Performance, Narrative, Social, Pastime, Habit, Escapism, Agency, Moral Self Reflection). These factors are grounded in social cognitive theory and are game-centric – that is, developed and validated in the context of play. Furthermore, in games user research (GUR), we are concerned with understanding the experience of players; however, we generally consider the experience of a play session in isolation – that is, as disconnected from the previous life experiences that people bring with them into game play. However, play experience can depend on a player's life experience – both in terms of the context resulting from their situation at the moment of play (i.e., states), and the type of person who they are in general (i.e., traits). For example, individuals who enter into game play when in a state of ego-depletion – a state of reduced self-control from having exerted effort and willpower – are more likely to negatively appraise their time spent

Sidebar Two: Motivation

There were many significant moderations of DGMS; for example, there is a moderation of motivation for escapism on the influence of relatedness on invested effort. For players low in escapism, the satisfaction of relatedness is a non-significant predictor of invested effort ($\beta=.10, p=n.s.$); however, relatedness predicts effort weakly for players with medium escapism ($\beta=.20, p<.001$) and highly for players with high escapism ($\beta=.31, p<.001$).



playing games, feel guilt over having played, and profit less from the demonstrated benefits of games [7]. And individuals who have low satisfaction of their basic psychological needs in life have been shown to experience less enjoyment, more tension, and higher negative affect post-play (i.e., an obsessive passion as opposed to a harmonious passion) [6]. Because low self-esteem [8] is linked to lower satisfaction of needs, to lower self-regulation, and to a propensity toward obsessive passion, the results in [6] also likely extend to people with low self-esteem [4].

Our Approach

To provide knowledge about how person-centric traits affect play experience, we collect traits from players along with validated measures of player experience [10] and logs of in-game behaviours. We conduct moderated regressions (controlling for demographic factors and game achievement) of how person-centric traits moderate the influence of need satisfaction factors (i.e., competence, autonomy, relatedness) on player engagement measures (i.e., enjoyment, invested effort, and tension [9], and positive and negative affect [13]).

Specifically, we use moderated multiple regression analysis [3], which is similar to a traditional multiple regression but includes interactions between pairs of individual predictors. Our regressions are thus able to detect both simple and interaction effects. The predictors are one of the three need satisfaction constructs, the person-centric traits, and the interaction between the trait and the need satisfaction construct. The dependent measures are player experience constructs. We follow up on significant interactions with a simple slopes analysis, which considers the regression

for low, average, and high levels of the moderating variable [3]. Comparing the slopes in terms of their significance and the value and direction of beta allows us to interpret the moderating influence of person on how needs satisfaction predicts game engagement.

Case Studies

We tested personality, motivation for play (DGMS), and self-esteem in a study with 125 participants who played a side-scrolling shooter. We cannot describe the results in detail, but present a few example results.

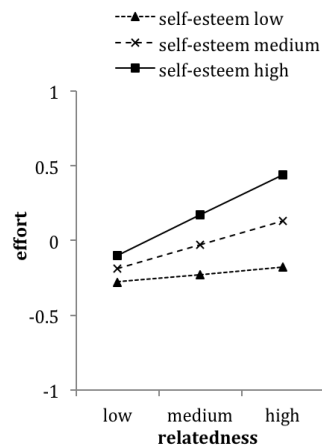
Effects of Personality (five factors): Our results for personality confirm VandenBerghe's assumptions – some personality traits predict game engagement as do the satisfaction of competence, autonomy, and relatedness within game play. However, our results also show that personality factors *moderate* the influence of need satisfaction on engagement, showing that personality and need satisfaction interact and thus should not be treated in isolation. See Sidebar One for examples. The significant contribution of this case study is the finding that *personality traits must be considered in combination with the satisfaction of needs to ultimately predict game engagement* in terms of enjoyment and effort in game play.

Effects of Motivation: We found several effects whereby DGMS traits affect how the satisfaction of needs during play affects game experience. See Sidebar Two. The significant contribution of this study is that *the motivation for why people play games influences how the satisfaction of needs during play predicts game engagement*.

Effects of Self-Esteem: Our results for self-esteem revealed that increases in self-esteem predicted

Sidebar Three: Self-Esteem

There were many significant moderations of self-esteem; for example, there is a moderation of self-esteem on the influence of relatedness on invested effort. There is a non-significant effect for low self-esteem ($\beta=.05$, *n.s.*), while the steepness of the slope is lower for medium ($\beta=.16$, $p<.01$) than high self-esteem ($\beta=.27$, $p<.01$), indicating that relatedness becomes a more importance predictor of effort as players increase in self-esteem.



increased positive affect and effort and decreased tension and negative affect; however, there are also interactions between self-esteem and need satisfaction – see Sidebar Three. The significant contribution of this case study is that *for players with different levels of self-esteem, need satisfaction within play differentially translates into changes to game experience.*

The three sidebar examples each demonstrate how a person-centric trait (extraversion, escapism, and self-esteem) affect the role of relatedness in predicting invested effort. Interestingly, these factors influence the role of relatedness in different ways and there is no correlation between self-esteem and motivation for escapism in our sample ($R^2=.113$, $p=.211$).

Conclusions

In HCI, we study how humans interact with technology; however, we often reduce people to a representation of their cognitive or motor abilities, conceptualizing *people* as *users*. Concepts like personality and self-esteem are part of our core – a central and personal aspect comprised of the sum of our life experiences that shape how we interact with technology. Our work begins to consider the role of the person, their diversity, and their previous experiences within the context of modeling and understanding player experience.

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