The Comparative Self: Understanding the Motivation to Play and the Subsequent Video Game Use

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ABSTRACT
Existing video game research postulates a rather static concept of the personality of players. The study at hand uses a more fluid understanding of players' personality based on the assumptions of the social identity approach. Thereby, we aim to illustrate that the self-concept is a richer approach than the widespread big five taxonomy as an operationalization of players' personality to explain the motivation to play and video game use. Using structural equation modelling, our results show support for this assumption in two instances. First, we show that the self-concept explains bigger shares of variance of the motivation to play. Second, we illustrate that the self-concept predicts video game use in a more holistic fashion. We discuss the contribution of our analyses to the research on players' personality, the motivation to play, and on video game use, and identify potential paths for future research.

Keywords
personality, big five, self-concept, motivation to play, video game use

INTRODUCTION
To the present day, video games experience a remarkable upturn regarding their popularity and social meaningfulness. This is illustrated by the manifestations that

more than 2.2 billion people worldwide played video games and the industry had an estimated global revenue of $108.9 billion in 2017 (Newzoo 2017). Accordingly, a better understanding of video game players, their perceptions, and their behavior is a crucial question for academic research and practice to fully leverage existing economic opportunities. For instance, a better understanding of player behavior can enable game companies to implement specific features targeted at increasing player motivation, loyalty, continuous use, and monetary investments.

An answer to the enquiry to better understand video game players has been a major vein of research in various disciplines, such as Information Systems (IS), Human-Computer Interaction (HCI), Economics, and Psychology. Contemporary video game player research can be divided into three broad categories: 1) Player attitudes and preferences (Bartle 1996; Hamari and Tuunanen 2014; Kallio, Mäyrä, and Kaipainen 2011; Vahlo et al. 2017; Yee 2006), 2) demographic factors of players and differential impacts (Greenberg et al. 2010; Griffiths, Davies, and Chappell 2003; Koivisto and Hamari 2014), and 3) gratification mediated by technology, which players derive from playing video games (Hamari and Sjöblom 2017; Hamari and Keronen 2017a).

One construct related to all three categories is the motivation to play video games. While the interdisciplinary literature on player motivations is a rapidly growing area of research, many popular models used to explain motivations to play have different shortcomings. One example for this are predictors of the motivation to play, such as the widely used models with context-unspecific personality traits (e.g. Big Five) (Yee 2006; Yee, Ducheneaut, and Nelson 2012). The underlying theoretical assumptions suggest a rather static understanding of personality, which limits the explanatory power significantly because it falls short in covering the context-specific saliency of different parts of personality (Johnson and Gardner 2010; Jeng and Teng 2008).

Looking at the adjacent field of Psychology, a different and much more fluid understanding of personality (also referred to as self-identity) can be detected. One especially relevant approach in this regard is the Social Identity Approach (SIA), which states that individuals construct their own self-identity in a given situation using different levels of abstraction on a personal (e.g. self as an individual) and a social (e.g. self as a team member) level. Taken together, the SIA postulates a much more fluid, comparative, and inherently variable self-identity (Tajfel 2010). As an illustrative example think about an individual who shows high levels of agreeableness at work but behaves rather rowdily in her/his private relationships. Consumer research already used the self-concept to explain different forms of motivation (Achouri and Bouslama 2010; Souiden, M'Saad, and Pons 2011; Jamal and Goode 2001). Based on this previous work, the study at hand transfers the assumption of a fluid self-concept to the context of video games and aims to provide a richer explanation for the motivation to play and the subsequent video game use. Therefore, the paper is guided by the following research question:

RQ: Can the self-concept of an individual better explain the motivation to play and the subsequent video game use compared to existing approaches?

By answering our research question, we make several important contributions. First, it allows academia to better understand one contemporary and meaningful form of motivation and technology use and transfer the findings to neighboring contexts (e.g. health, learning, gamification). Second, it provides the gaming industry with the opportunity to learn more about the design of a game, gain insights into the emergence of motivation, subsequent effects, and target group specific consultations as drivers for economic success.

RELATED WORK

Social Identity Approach

The theoretical framework and the understanding of the individual within this study is based on the assumptions of the SIA (consisting of the Social Identity Theory and the Self-Categorization Theory) which tries to explain intergroup and individual behavior (Tajfel 2010). Within the SIA, the personality (self-identity) of an individual is defined as a collection of beliefs about oneself referring to the characteristics defining an individual's own perception in a given situation (Myers 1999).

According to Social Identity Theory, individuals seek the attribution of competence and its confirmation, either with reference to general abilities or to a specific skill. Self-identity is constructed in a given situation using personal and social aspects of identity which are located on an interpersonal-intergroup continuum (Tajfel 2010). Personal identity refers to the individual and identifies them as different from others on a lower level of abstraction (e.g. the video game player as an individual). In contrast, social identity identifies the individual as a member of a group and different from other groups (e.g. the video game player as a group member). In general, individuals strive for a positive self-identity, therefore they use social comparisons on the level of individuals and groups aiming for maintaining or enhancing a positive self-identity attaining positive distinctiveness (McLean and Syed 2014).

The Self-Categorization Theory assumes that individual behavior takes place on different levels of abstraction. It explains when and under what circumstances an individual perceives a group of people as a group and how this process interacts with different aspects of the individual's personal identity. The theory postulates a dynamic salience and context-specific meaningfulness of a group membership for an individual as a function of the perceived identification with the relevant group, which influences subsequent behavior (Haslam et al. 1999). If an individual perceives themself as part of a group, depersonalization and self-stereotyping can occur (e.g. a higher salience of group norms compared with individual norms). The process of self-categorization constitutes a comparative, inherently variable, fluid, and context dependent process (Turner et al. 1994).

From the perspectives of HCI and IS academia, a corresponding construct that already caught the interest of researchers is online identity (Haimson et al. 2016; Kim and Chan 2007). Online identity is rather loosely defined as a configuration of characteristics of an individual in an online space. In contrast to the offline world it is much easier to portray a desired identity in an online context since characteristics can be selectively changed or hidden (Baumeister and Hutton 1987). Thus, becoming and being perceived as a member of a specific group especially in the context of video games becomes easier than in real life, which increases the meaningfulness of the concept of identity. Based on the assumptions of the SIA, the study at hand uses different levels of abstraction of self-identity ranging from personal (e.g. Big Five) to social (e.g. academic self-concept) entities to explain the motivation to play and video game use.

Video Game Use

Technology use is one of the best known areas and most central constructs of IS and HCI research (DeLone and McLean 1992; Delone and McLean 2003). Widely accepted and disseminated theories including the Technology Acceptance Model and its extensions (Venkatesh et al. 2003; Davis 1989), post-adoption theories (Bhattacherjee 2001; Bhattacherjee and Premkumar 2004) and research on discontinuance (Maier et al. 2015; Turel 2016) refer to technology use.

In the specific context of video games, existing research can be distinguished into two different streams dealing with technology use. First, negative issues like pathological use and addiction (Gentile et al. 2011; Sim et al. 2012), violence (Olson et al. 2007; Ferguson and Olson 2014), and physical correlates (Vandewater, Shim, and Caplovitz 2004; Mentzoni et al. 2011) are oftentimes roots of the scientific matter. Second, based on the psychology of action (Heckhausen 1977; Gollwitzer and Bargh 1996), several studies proposed, tested, and compared different motivational drivers to play video games (Yee 2006; Przybylski, Rigby, and Ryan 2010; Hamari and Keronen 2017a, 2017b). Since we want to expand the current understanding of the motivation to play video games, we anchor our study within the second stream.

Gaming Motivations

One particularly relevant construct to explain video game use is the motivation to play. Within this context, two widely used approaches are the Self-Determination Theory (SDT) (Ryan and Deci 2000) from Motivational Psychology and the Uses and Gratifications Theory (UGT) from media psychology (Ruggiero 2000). SDT focuses on self-motivation and self-determination and proposes competence, autonomy, and relatedness as main intrinsic needs of an individual. Opposed to this, the UGT tries to answer the questions why and how people actively seek out specific media to satisfy specific needs.

We build our study around one of the most frequently used approaches in contemporary video game research. Specifically, we use a widely accepted taxonomy of three main motivations (immersion, achievement, social) to predict video game use (Yee, Ducheneaut, and Nelson 2012). The taxonomy already proved its potential to explain relevant outcome variables (Park, Song, and Teng 2011; Graham and Gosling 2013).

Dimension of Motivation	Components
Immersion	Advancement, Mechanics, Competition
Achievement	Socializing, Relationship, Teamwork
Social	Discovery, Role-Playing, Customization

Table 1: Components of the motivations to play (based on the UGT).

Against the aforementioned background, we expect to replicate the findings of Yee et al. (2012) proposing that all three dimensions of motivation (immersion, achievement, social) hold the potential to predict video game use.

Hypothesis 1a: Immersion motivation predicts video game use.

Hypothesis 1b: Achievement motivation predicts video game use.

Hypothesis 1c: Social motivation predicts video game use.

Predictors of Motivation

Following the assumptions of the UGT, video game players actively seek to satisfy their needs with their behavior (Ruggiero 2000). Therefore, the choice of behavior largely depends on the players' motivation to play and their personality. The study at hand uses and compares two different approaches both positioned on the level of individual personality.

First, one of the most established models to categorize personality is the five-factor model of personality. Looking at the Big Five taxonomy from a perspective of the SIA, rather static and context unspecific personality traits of players can be detected. The taxonomy consists of the dimensions openness (e.g. curious vs. cautious), conscientiousness (e.g. organized vs. careless), extraversion (e.g. energetic vs. reserved), agreeableness (e.g. compassionate vs. detached), and neuroticism (e.g. nervous vs. confident) (Barrick and Mount 1991) and has already been used as a predictor of motivation to play in several game related studies (Johnson and Gardner 2010; S. Park and Chung 2011). Unfortunately, existing research did not look for (e.g. Yee, Ducheneaut, and Nelson 2012) or did not find any direct effects from the level of personality traits to relevant outcome parameters like playing time or game genre preference (J. Park, Song, and Teng 2011). We postulate that the Big Five include a disjunctive share of variance explaining video game use, which is not mediated through motivation. Thus, we want to expand current research by proposing direct effects of the Big Five on video game use.

Hypothesis 2: Personality traits directly predict video game use.

Additionally, different studies already showed empirical connections between specific personality traits and different dimensions of the motivation to play (Yee, Ducheneaut, and Nelson 2012). We aim to replicate the results within the framework of our study.

Hypothesis 4a: Openness predicts immersion motivation.

Hypothesis 4b: Conscientiousness predicts achievement motivation.

Hypothesis 4c: Extraversion predicts social motivation.

Second, a so far underutilized concept to capture personality in the context of video games is the self-concept. The self-concept can be understood as the totality of the individual's thoughts and feelings referencing to him or herself as an object (Rosenberg et al. 1995). Considering the self-concept from a SIA perspective, it can be characterized by its fluid and context-specific salience of different parts of an individual's identity (Tajfel 2010; Baumeister and Hutton 1987). Different studies already proposed different dimensions to describe the self-concept. Within the framework of our study, we use a validated understanding of the self-concept capturing the personality of young people and their relevant social surrounding consisting of the self-concept dimensions academic, social, family, peer, class (game), ability, and physical, which we adapted to the context of our study (Hattie 2014). We assume that video game use depends on an individual's own perception of how well a certain game is able to satisfy needs and the corresponding self-concept.

Hypothesis 3: Dimensions of the self-concept directly predict video game use.

With the aim to test the assumption of a hierarchical structure of the self-concept and different saliencies of different dimensions of the self-concept, we postulate that the dimensions *game* and *ability* are more important for the constructed self-identity in the context of our study. The underlying assumption is that they possess a closer proximity than the other rather general dimensions of the self-concept (*academic, social, family, peer, physical)* because of their contextual significance.

Hypothesis 5a: The game dimension predicts immersion motivation.

Hypothesis 5b: The game dimension predicts achievement motivation.

Hypothesis 5c: The game dimension predicts social motivation.

Hypothesis 5d: The ability dimension predicts immersion motivation.

Hypothesis 5e: The ability dimension predicts achievement motivation.

Hypothesis 5f: The ability dimension predicts social motivation.

Relevant Context

Since the main purpose of our study was to eliminate existing shortcomings on the level of theory, we decided to capture a wide field with a high external validity of existing video games as the relevant context of our study. The only restriction we made was that games offered the opportunity to be played in real time with others.

METHODOLOGICAL APPROACH

Research Design and Data Analysis

We used a cross-sectional survey to test the hypotheses of our study. Therefore, we collected self-reports of players with a digital questionnaire and analyzed the data with covariance-based quantitative statistics and structural equation modeling.
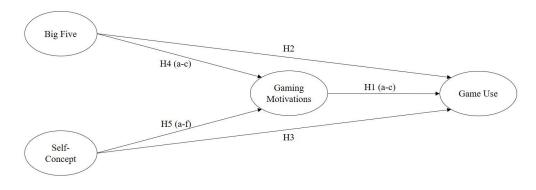

Figure 1: Research Model

Data Sampling

We used several channels to acquire respondents for our questionnaire. First, we posted a message on official community boards containing the link to our survey. Second, we used different groups related to the context of our study on social media platforms (i.e. Facebook and Reddit) to share our survey link. In both instances, we provided a link to a digital questionnaire for self-selection, thus, the participation was voluntary. To increase the motivation for people to participate, incentives for survey attendance were given out in the form of a lottery comprising five in-game currency vouchers.

Participant Characteristics

The final sample of our study consisted of 236 participants. The age of the participants was 33 years on average ($M = 33.38$, $SD = 10.72$) and ranged from 17 to 68 years. The vast majority of our sample consisted of males (154 males, 82 females). Most participants came from Germany (116) or North America (34) and stated that the highest academic degree they currently held was a high school diploma (50) or bachelor's degree (54). Additionally, participants had been playing video games for 2 up to 37 years ($M = 15.98$, $SD = 8.99$). To check the representative nature of our sample, we compared the demographic characteristics of our sample to general characteristics of video game players in the United States using different sources of

research (Statista. 2018a, Statista. 2018b). Looking at the results of Table 2, we can assume that our sample is representative for the wider population of video game players.

Characteristic	General population	Our sample
Average age	35	33
Gender distribution	60% (m)	63% (m)
Average years of play	13	14

Table 2: Representative nature of our sample.

Measurements
We used empirically validated scales adjusted to the context of our study wherever possible. The majority of scales used a five-point Likert scale (1 = "strongly disagree", 5 = "strongly agree") evaluating self-reports of players.

Dependent variable
Video game use. We operationalized *video game use* by asking participants for their *frequency of play*, the *time spent playing video games*, and the *amount of games* they played every week during the year 2018. With the goal to use a dependent variable covering a wide spectrum, we standardized the variables to make them comparable and aggregated all three items to a single factor (M = .00, SD = .79, α = .70).

Mediating Variable
To measure the mediating variable of our study *motivation to play video games*, we used an existing and validated scale with 12 items (Yee, Ducheneaut, and Nelson 2012). The scale consists of the three dimensions' *immersion motivation* (e.g. "...to feel immersed in the world"; M = 5.09, SD = 1.16, α = .79), *achievement motivation* (e.g. "...to compete with other players"; M = 5.01, SD = 1.18, α = .75), and *social motivation* (e.g. "...to chat with other players"; M = 4.31, SD = 1.51, α = .86).

Independent variables
Big Five. To measure the Big Five, we used the *BFI-2-S,* which is a validated thirty item scale from personality psychology (Soto and John 2017). The scale comprises the personality traits *openness* (e.g. "…is original, comes up with new ideas"; M = 3.41, SD = .60, α = .63), *conscientiousness* (e.g. "…tends to be disorganized"; M = 3.61, SD = .58, α = .62), *extraversion* (e.g. "…is full of energy"; M = 3.20, SD = .70, α = .71), *agreeableness* (e.g. "…assumes the best about people"; M = 3.61, SD = .59, α = .67), and *neuroticism* (e.g. "…tends to feel depressed or blue"; M = 2.70, SD = .72, α = .79).

Self-Concept. To measure the different self-concept dimensions, we adapted an existing scale from literature to the context of our study (Hattie 2014). The multi-dimensional scale consists of thirty-five items and comprises the dimensions *academic* (e.g. "I am happy with the work I do at my school/university/job"; M = 3.70, SD = .79, α = .88), *social* (e.g. "I am a cheerful person"; M = 3.73, SD = .64, α = .76), *family* (e.g. "I wish I had been born into another family"; M = 4.15, SD = .72, α = .80), *peer* (e.g. "Persons of my age enjoy my company"; M = 3.68, SD = .63, α = .80), *game* (e.g. "I am sure of myself in the game"; M = 3.57, SD = .51, α = .61),

ability (e.g. "I am proud of my ability in the game"; M = 3.81, SD = .58, α = .82), and *physical* (e.g. "I am an attractive person"; M = 3.40, SD = .65, α = .63).[1]

Control Variable

Experience of play. We measured *experience of play* by asking participants for how many years they have been playing video games. Answers varied between 2 and 37 years and showed a mean value around 16 years (M = 15.98, SD = 8.99).

Game type. We asked participants about the video game they play most often in an open question. The majority of participants played the games Fortnite (32), League of Legends (22), Fifa (20), or PUPG (19).

RESULTS

The results section consists of four different parts. First, we describe preceding analyses to control for confounding effects on the dependent variable (*video game use*). Second, we test the Big Five approach as a predictor of the *motivation to play video games* and *video game use*. Third, we examine the self-concept as a predictor of the *motivation to play video games* (*immersion, achievement, social*) and *video game use*. Fourth, we compare the results of the second and third part.

Preceding analysis

We ran preceding analyses to make sure that we considered all meaningful patterns in our data in the further course of our analysis. First, we used a multiple regression analysis to control for unwanted effects on the dependent variable *video game use*. Therefore, we inserted demographic (*age, gender, education, country*) and control variables (*experience of play, game type*) as predictors. The regression equation explaining *video game use* illustrated a significant result (F (6,228) = 4.88, p < .001) and explained 10% of the variance. In addition, only *country* (β = -.18, p < .01) showed a significant effect explaining *video game use* (all others $p \geq .06$).

Second, we investigated the correlations between the dimensions of motivation (*immersion, achievement, social*). Results showed that *immersion* and *achievement* (*r* = .47, p < .001), *immersion* and *social* (*r* = .36, p < .001), and *achievement* and *social* (*r* = .64, p < .001) motivation were all positively connected.

Third, we looked for meaningful relationships on the level of independent variables of both approaches. For this purpose, we ran correlation analysis. In case of the Big Five, the relationships between *conscientiousness* and *extraversion* (*r* = .31, p < .001), *conscientiousness* and *agreeableness* (*r* = .33, p < .001), *conscientiousness* and *neuroticism* (*r* = -.42, p < .001), and *extraversion* and *neuroticism* (*r* = -.57, p < .001) were significant, whereas all others did not significantly correlate with each other (p ≥ .18). In case of the self-concept, all dimensions of the self-concept correlated in a positive and significant fashion (r ≥ .32, p < .001).

Big Five approach

To test the explanatory power of the Big Five taxonomy to explain the *motivation to play video games* and *video game use*, we ran preceding analysis to have the chance to control for non-hypothesized relationships. Thus, we proceed in three subsequent steps.

First, we looked for direct effects of the independent variables (*openness, conscientiousness, extraversion, agreeableness, neuroticism*) on the mediating dimensions of motivation (*immersion, achievement, social*).
In case of *immersion motivation,* we found a significant regression equation (F (5,229) = 3.30, p < .01) which explained 7% of the variance. Additionally, only the

regression weight of *agreeableness* (β = .20, p < .01) showed a significant effect (all others p ≥ .32).

In case of *achievement motivation,* we found a significant regression equation (F (5,229) = 7.48, p < .001) which explained 14% of the variance. Supplementary, the predictors *openness* (β = -.15, p < .05) and *neuroticism* (β = -.18, p < .05) played a meaningful role (all other p ≥ .08).

In case of *social motivation,* we found a significant regression equation (F (5,229) = 10.87, p < .001) which explained 19% of the variance. In addition, *extraversion* (β = .18, p < .05), *agreeableness* (β = .17, p < .01) and *neuroticism* (β = -.17, p < .05) showed meaningful effects (all others p ≥ .08).

Second, we wanted to find out if we had to consider any direct effect of the independent variables (*openness, conscientiousness, extraversion, agreeableness, neuroticism*) on the dependent variable (*video game use*). For this purpose, we ran another multiple regression analysis using *openness, conscientiousness, extraversion, agreeableness,* and *neuroticism* as predictors explaining *video game use.* Additionally, we controlled for the effects of the dimensions of motivation to play (*immersion, achievement, social*). The regression equation showed a significant result (F (8,226) = 6.79, p < .001) and explained 19% of the variance of the dependent variable. Besides the regression weights of *social motivation* (β = .32, p < .001) only *openness* (β = .23, p < .001) and *conscientiousness* (β = -.25, p < .001) played additional roles explaining *video game use* (all others p ≥ .11).
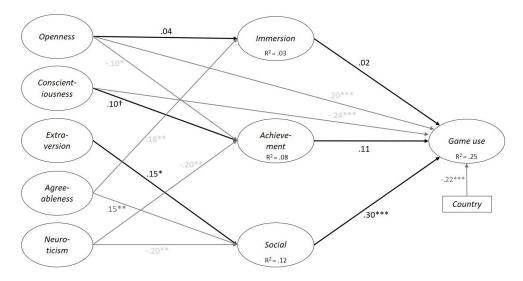

Figure 2: SEM Big Five[2]

Third, we used the derived information of the prior steps and inserted them in a structural equation (path) model using the covariance-based software AMOS (see Figure 2). The results showed a sufficient fit between the theoretical model and the empirical model (χ2 (24,236) = 35.56, p = .06). All predictors accounted for 25% of the variance of the dependent variable (*video game use*) and additional fit values indicated a good fit (CFI = .97, SRMR = .06). Using the results of the model, we only found partial empirical support for hypothesis 1. Thus, *social motivation* (β = .30, p < .001; h1a) showed the postulated relationships opposed to *achievement motivation* (β =.11, p = .14; h1b) and *immersion motivation* (β = .02, p = .72; h1c). Regarding hypothesis 2 we found an indicator that *openness* (β = .20, p < .001) and *conscientiousness* (β = -.24, p < .001) have direct effects on *video game use.* Additionally, we only found partial support for all of the relationships specified in hypothesis 4 . Specifically, *extraversion* predicted *social motivation* (β =.15, p < .05;

h4a) and *conscientiousness* showed a marginal significant effect on *achievement motivation* (β =.10, p < .10; h4b). Opposed to that, we did not find the postulated relationship for *openness* predicting *immersion motivation* (β =.04, p = .56; h4c).

Self-concept approach

To test the explanatory power of the self-concept approach to explain the *motivation to play video games* and *video game use*, we used the same steps specified before.

First, we looked for direct effects of the independent variables (*academic, social, family, peer, game, ability, physical)* on the mediating dimensions of motivation (*immersion, achievement, social*).
In case of *immersion motivation,* we found a significant regression equation (F $(7,227) = 11.96$, p < .001) which explained 25% of the variance. The regression weights of the *peer* (β = .21, p < .05) and *ability dimensions* (β = .41, p < .001) of the self-concept showed significant effects (all others p $\geq$ .12).
In case of *achievement motivation,* we found a significant regression equation (F $(7,227) = 10.08$, p < .001) which explained 21% of the variance. None of the predictors played a meaningful role explaining the dependent variable (p $\geq$ .06).
In case of *social motivation,* we found a significant regression equation (F $(7,227) = 12.04$, p < .001) which explained 25% of the variance. Only the dimension of *peer* (β = .21, p < .05) of the self-concept showed a meaningful effect (all others p $\geq$ .09).

Second, we wanted to find out if we had to consider any direct effects of the self-concept variables (*academic, social, family, peer, game, ability, physical*) on the dependent variable (*video game use*). For this purpose, we ran a multiple regression analysis using the dimensions of the self-concept as predictors explaining *video game use*. Additionally, we controlled for the effects of the dimensions to play (*immersion, achievement, social*). The regression equation showed a significant result (F $(10,224) = 6.70$, p < .001) and explained 20% of the variance of the dependent variable. Besides the regression weights of *social motivation* (β = .32, p < .001), the dimensions of *physical* (β = -.18, p < .05), *academic* (β = -.25, p < .01), and *ability* (β = .35, p < .001) of the self-concept played additional roles explaining *video game use* (all others p $\geq$ .20).

Third, we used the derived information of the prior steps and inserted them in a structural equation (path) model. The results showed a sufficient fit between the theoretical model and the empirical model ($\chi2$ $(27,236) = 43.27$, p = .03). The predictors accounted for 30% of the variance of the dependent variable (*video game use*) and additional fit values indicated a good fit (C*FI* = .99, SRMR = .04). The results show mixed results regarding hypothesis 1 given that only *social motivation* (β = .29, p < .001; h1a) explained the dependent variable opposed to *achievement motivation* (β = .12, p = .12; h1b) and *immersion* (β = -.07, p = .26; h1c). Additionally, the model indicated that the self-concept dimensions of *academic* (β = -.27, p < .001), *ability* (β = .34, p < .001), and *physical* (β = -.21, p < .01) had a direct effect on *video game use* illustrating support for our postulate in hypothesis 3. On a level of predicting motivation, the self-concept dimension of *ability* (β = .37, p < .001; h5d) predicted *immersion motivation*. The dimensions of *game* (β = .29, p < .001; h5b) and *ability* (β = .19, p < .01; h5e) predicted *achievement motivation*. Additionally, *game* (β = .22, p < .05; h5c), *ability* (β = .14, p < .10; h5f), and *peer* (β = .19, p < .001) predicted *social motivation*. We understand these results as support of our hypotheses 5 postulating that the two dimensions of the self-concept (*game, ability*) are able to better explain the *motivation to play video games*.
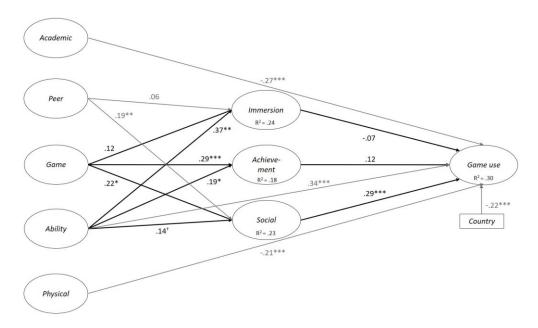
Figure 3: SEM self-concept[3]

Comparison of approaches

First, with regard to the explanatory potential for the different forms of motivation, the results of our structural equation models showed that the self-concept explains bigger shares of variance in case of the dependent variables *immersion* (.24 vs. .03), *achievement* (.18 vs. .08), and *social motivation* (.23 vs. .12).

Approach	χ^2	p-value	Adjusted R^2	CFI	SRMR
Big Five	35.56	.06	.25	.97	.06
Self-Concept	43.27	.03	.30	.99	.04

Table 3: Comparison of approaches to explain video game use.

Second, the used criteria indicated gratifying results regarding the explanatory potential for the dependent variable *video game use*. Regarding the fit between the postulated model and the empirical data, our results showed that the self-concept showed a marginally better fit (p-values: .06 vs. .03) and better fit indices compared to the Big Five (CFI: .99 vs. .97; SRMR: .04 vs. .06). Additionally, the self-concept approach indicates a richer explanation of variance (adjusted R^2 = .30 vs. R^2 = .25). Accordingly, we understand those findings as support for our main assumption that the self-concept has the potential to explain bigger shares of variance of *video game use* in comparison to the Big Five taxonomy.

DISCUSSION

First and foremost, we are able to answer our initial research question that the self-concept of an individual has the potential to explain the motivation to play and video game use in a richer fashion than existing video game research. Accordingly, we found empirical indicators that the context specific self-concept of a player, which already proved its usefulness in marketing research, has the potential to explain bigger shares of variance than the Big Five explaining all three dimensions of the motivation to play (immersion, achievement, social) and video game use. Therefore,

we understand our results as a reference to the fluidity of the self-identity of individuals in the context of video games (Tajfel and Turner 2004).

Regarding the results of hypothesis 1, we discovered some unexpected findings. Opposed to existing research (J. Park, Song, and Teng 2011; Graham and Gosling 2013) only social motivation (hypothesis 1c) predicted video game use opposed to immersion (hypothesis 1a) and achievement motivation (hypothesis 1b). We explain this finding in a bivariate fashion. First, it might relate to the specifics of our sample. The majority of games our respondents played (e.g. Fortnite, League of Legends, PUBG) represent a rather new game genre and can be characterized by high levels of interactivity with other team members. Additionally, the games are frequently played with friends in teams of two or more members, which might have outshined the effects of the immersion and achievement motivation and raised the effect of social motivation. Second, the majority of prior studies did not control or did not report direct effects of the personality of players on video game use. Thus, the reported effects of all three dimensions of motivation might be confounded postulating a purely mediated effect on video game use.

Concerning hypothesis 2, we were able to confirm our assumption that personality traits (openness, conscientiousness) directly predict video game use and possess the potential for a disjunctive explanation. Classifying this finding in the literature of video game use it is surprising that widespread models (Yee, Ducheneaut, and Nelson 2012) did not test direct effects of personality traits. We understand the finding in line with our concept of the individual. Thus, the positive influence of openness represents an indicator that the personality trait has the potential to uniquely explain video game use as a manifestation of curiosity, which extends the external validity of the finding from psychological literature to the realm of our context (Ventura, Shute, and Kim 2012). Additionally, we understand the negative effect of conscientiousness on video game use as an indicator that the stereotypical player in our sample is rather careless when making a decision to invest spare time into playing video games, which is consistent with the research regarding video games and addiction (Chory and Goodboy 2011).

Regarding hypothesis 3, our results indicate two interesting findings. First, the academic dimension of the self-concept had a negative impact on video game use. We understand this as an indicator of the validation of findings from the context of problematic video game use, which showed that a low academic self-concept is positively associated with video games use (Mößle and Rehbein 2013; Roe and Muijs 1998). This finding can be explained using the assumptions of the SIA in which individuals seek the attribution of competence and its confirmation striving for a positive self-identity. Accordingly, a higher academic self-concept reduces the demand to experience the feeling of competence playing video games. Second, the physical dimension of the self-concept showed a negative impact on video game use. This finding is in line with research from video game addiction which illustrated that the negative evaluation of the physical self-concept of video game players was positively connected to video game use (Lemenager et al. 2013). Understanding this finding through the lens of the SIA the interdependence between different parts of the self-concept becomes apparent. According to this, the perception of an individual with a higher physical self-concept reduces the probability to play video games.

Referring to hypothesis 4, our findings represent a dichotomous picture. First, we found the postulated positive relationships between conscientiousness and achievement motivation (h4b) and extraversion and social motivation (h4c). Accordingly, we understand our findings as a confirmation of existing video game related research (Yee, Ducheneaut, and Nelson 2012). Thus, video game players who

see themselves as more organized and rational are motivated by potential achievements of their video game play. Second, we were not able to validate the relationship between openness and immersion motivation (h4a). We explain this finding with the indicated proximity of our sample to the new and uprising gaming culture (e.g. Fortnite, League of Legends, PUBG). We assume that for them the handling of technological artefacts is a greater part of their everyday life and the chances that they already earned experiences with more immersive technologies (e.g. virtual reality) are increased. Thus, they do not play games primarily to be immersed.

Regarding hypothesis 5, we were able to confirm the postulated relationships. Accordingly, we found support for the postulates that the game and the ability dimensions predict immersion motivation (hypothesis 5a/5d), achievement motivation (h5b/5e), and social motivation (h5c/5f). We understand our findings as indicators of the validation for the hierarchical structure of the self-identity specifically constructed in the salient context of video games and support for the main assumptions of the SIA (Tajfel 2010). The two most relevant dimensions of the self-concept (game, ability) possess a closer proximity to the motivation to play video games in contrast to the other dimensions (academic, social, family, peer, physical). This relates to the answer to our research and illustrates the comparative, inherently variable, fluid, and context dependent nature of constructing self-identity (Turner et al. 1994).

For Practice
Looking at our findings from a practical perspective, we present three aspects which seem to be particularly relevant. First, game developers can use the knowledge derived to create games that are more appealing to the individual. Based upon our finding that the game dimension of the self-concept plays a noteworthy role in explaining all three dimensions of the motivation to play, game developers can create reference attractions to provide additional opportunities to increase the saliency of the game related social identity (e.g. to feel like being part of the group of a specific video game) and the motivation to play. Specific starting points could be to transfer functionalities from existing social media platforms (e.g. bulletin boards, self-selected groups, or autograph books) or consumer motivation to the context of video games and give players the chance to receive a more holistic impression of others which can increase the meaningfulness of a specific game for the self-identity. Additionally, to address the ability dimension of the self-concept and to increase the motivation to play video games, game developers can provide a wider field of play-related behavior feedback. One opportunity would be to transparently offer more granular levels of awards for players (e.g. "most social", "most effort", or "most knowledge") to others exceeding existing approaches providing only tools such as aggregated or purely functional awards (e.g. "honor level" or "won/lost games").

Second, based on the knowledge about the negative effects of the physical and academic dimensions of the self-concept explaining video game use, game developers could use this finding providing additional functionalities and buffer the negative effects. One instance in which game developers could try to use this finding would be to emphasize that functional in-game competencies (related to the ability dimension of the self-concept) of a player like executive functions (e.g. attentional control, cognitive inhibition, inhibitory control, working memory, and cognitive flexibility) are part of the general concept of intelligence (Ardila, Pineda, and Rosselli 2000; Moreno et al. 2011), which can be beneficial in the academic context as well. This could improve the academic dimension of the self-concept. On a level of design this could be achieved using elements of gamification to make executive functions visible to every player in form of awards or profile cards.

Third, game publishers can use our findings to utilize existing monetary potentials. One connecting point is the conception of the communication strategy and the way public relations are used to get in contact with potential demanders of a specific game. Adopting our finding regarding the influence of the peer dimension of the self-concept on the social motivation to play (which is the most important predictor of video game use) game publishers could use referral marketing tools (e.g. friends advertise other friends and get some compensation in return) to enhance the meaningfulness of a specific game within the framework of a given peer group, which should strengthen the social motivation.

For Theory

The results of our paper comprise several contributions which are interesting on a theoretical level as well. Subsequently, we present three aspects that stand out and seem noteworthy to be discussed in more detail.

First, we found empirical indicators that the assumptions of the SIA in the context of our study seem valid (Tajfel 2010; Turner et al. 1994; DeLone and McLean 1992; Haslam et al. 1999). We understand this finding as a call for a more fluid and context specific understanding of the personality suggesting more comprehensive explanations of the behavior of video game players extending current approaches explaining the motivation to play and video game use (Johnson and Gardner 2010; Jeng and Teng 2008). Accordingly, the insights of our study allow for a better understanding of one contemporary and meaningful form of motivation and technology use.

Second, the findings of our study suggest being more careful assuming fully mediated effects. Accordingly, we illustrated that different independent variables on the level of personality (e.g. openness, conscientiousness, academic, physical) directly predicted the dependent variable of our study (video game use). We understand this indicator in a way that the postulate of statistical moderators should be done with more caution and additional tests should always be reported to minimize the danger of neglecting confounding effects in a given data set.

Third, one interesting finding from a theoretical perspective is that only the social dimension of motivation predicted video game use (opposed to immersion motivation and achievement motivation), even though our sample seemed representative in nature. We understand this as a call to constantly evaluate and possibly modify existing motivational approaches against the background of fast occurring new manifestations of the gaming culture. This train of thought is based on the information that the majority of participants of our sample played the new phenomenon of Fortnite, which has not been part of extensive motivational research to the best of our knowledge.

Limitations and Outlook

Like every empirical study our study includes several limitations as well. Subsequently, we will name some of them and illustrate potential ways to deal with them. First, only five out of the seven dimensions of the self-concept had a meaningful impact on either the motivation to play or video game use, which indicates potential weaknesses of the used instrument. For future studies we propose to develop a self-concept instrument specifically designed for the context of video games using qualitative and quantitative methods (Buss and Craik 1983). Second, it was surprising that only social motivation played a meaningful role in explaining video game use, which we explained with the occurrence of new video games accounting for a substantial part of our sample. To test the stability and external validity of this finding, we encourage future research to use a more detailed

instrument measuring the motivation to play. Third, we do not have the chance to identify causal connections between the constructs of our study. Nonetheless, on the basis of our results it is possible to conduct experiments to test the causality of relationships in the future.

CONCLUSION

Since the world of video games is innovative, fast changing, and undergoes rising levels of popularity, the need for understanding contemporary player behavior is crucial. Two highly relevant questions in this regard concern the explanation of the motivation to play and video game use. The major contribution of this study is that we transferred the understanding of a more fluid, specific, hierarchical, and context-dependent approach to measure personality to the context of video game research. This calls for a more holistic answer to explain motivation to play and the use of video games. Accordingly, we extended current video game research, which promises a variety of fruitful avenues for future research exploring the meaningfulness of the comparative character of player identity.

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ENDNOTES

1 After a discussion between all authors, we transferred the *class dimension* to the context of our study and named it *game dimension*.

2 We left the correlations between the Big Five taxonomy and the three forms of motivation out of the figure out of reasons of clarity.
† < .10 * < .05, ** < .01, *** < .001

3 We do not list the correlations between the different dimensions of the self-concept and the motivation in the figure out of reasons of clarity. Additionally, we left the self-concept dimensions *social* and *family* out of the figure since they did not explain any variance regarding the mediating and dependent variables as was indicated in the preceding regression analyses.
† < .10 * < .05, ** < .01, *** < .001