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Relationships between player-roles, action, attitudes towards individuals and the world, and gaming experiences

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Relationships between player-roles, action, attitudes towards individuals and the world, and gaming experiences

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School of Psychology

September 2019

Thesis submitted to Bangor University, in partial fulfilment for the degree of Doctor of Philosophy

Declaration and Consent

Yr wyf drwy hyn yn datgan mai canlyniad fy ymchwil fy hun yw'r thesis hwn, ac eithrio lle nodir yn wahanol. Caiff ffynonellau eraill eu cydnabod gan droednodiadau yn rhoi cyfeiriadau eglur. Nid yw sylwedd y gwaith hwn wedi cael ei dderbyn o'r blaen ar gyfer unrhyw radd, ac nid yw'n cael ei gyflwyno ar yr un pryd mewn ymgeisiaeth am unrhyw radd oni bai ei fod, fel y cytunwyd gan y Brifysgol, am gymwysterau deuol cymeradwy.

I hereby declare that this thesis is the results of my own investigations, except where otherwise stated. All other sources are acknowledged by bibliographic references. This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree unless, as agreed by the University, for approved dual awards.

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"To agonize over the past cripples our thoughts of the future. Do not procrastinate for fear of what might have been, or what might become. Your choices define you - you must learn to live with them all, good and bad." – Zaros

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Thesis summary

Gaming offers a diverse array of formats and content, ranging from narrative-driven Massively Multiplayer Online Role-Playing Games (MMORPGs) to casual games across a variety of genres. Games can promote a number of psychological and social benefits. While previous research has focused upon players' motivations for gaming as they relate, for example, to hazardous patterns of MMORPG play, much less is known about how players' choices of genre and gaming benefits reflect psychological factors and broader social value and political factors. Trait hostility is an acknowledged risk factor for hazardous MMORPG play and so-called gaming addiction. Here, using large-sample survey data, I demonstrate that hostility is highest amongst players selecting combat-oriented roles but lowest amongst those selecting narrative/puzzle-oriented roles. At the same time, players high in trait hostility report the strongest skills benefits and positive transfer from online to offline relationships. This indicates a paradox in that hostility can be associated with hazardous play but at the same time strong experiences of gaming benefits, indicative of compensatory processes in gaming behaviours. Further, players selecting combat-oriented roles report the most socially and economically conservative political ideology, while players selecting narrative/puzzle-oriented roles report the most liberal ideology. Players of all roles generally express prosocial values. Libertarians report the strongest benefits but the most socially and economically liberal players, and individualists, the least benefits. This indicates, for the first time, that player choices and their experienced benefits are linked to political ideology. MMORPG environments are virtual worlds in which individuals have greater personal and economic freedom. Possibly, the combination of socially liberal and economically neoliberal views (i.e. as 'the freer the market, the freer the people') promotes greater experienced benefits from play. By contrast, in surveys of casual players, I show that this playerbase is apparently not highly differentiated, at least in terms of frequency of play of specific genres. These data show that players expressing high levels of identified regulation report greater transfer of useful skills from casual games to their offline lives, whilst players high in external motivation tend to play a wider selection of casual game genres, possibly allowing access to a greater variety of rewards. Playing multiplayer games and placing greater personal importance on gaming are both associated with higher levels of integrated regulation, suggesting that MMO play promotes identity formation through becoming part of a community via participation in clans/guilds and the formation of trust and close friendships through shared experiences. These data also suggest that casual games, or their players, represent a distinct sub-realm of gaming in which behavioural representation and attentional focus are unimportant factors. Behaviour identification in terms of actions or goals did not relate to enjoyment of a simple laboratory clicker game. Possibly, in games where time-investment is low, enjoyment does not depend upon their operant structures engaging representations of actions and goals, as much as their acquisitive aspects such as collecting points, or loose narrative bases. Collectively, my findings highlight the importance of a holistic approach to gaming research which considers the benefits gaming can promote.

Chapter 1: Introduction

Gaming Market & Diversity of Forms

Since the development of technology-enabled video gaming half a century ago, and more recently with the explosion in computer processor capabilities (Chikhani, 2015), gaming has become a hugely popular pastime, with an estimated 2.5bn worldwide gamers spending $152.1bn in 2019. These revenues reflect continuing year-on-year increases expected to reach in surplus of $196bn by 2022 (Wijman, 2019). In the U.S., the largest country by gaming market revenue (Wijman, 2019), 65% of adults play video games, with 75% of households containing at least one gamer (Entertainment Software Association, 2019). Worldwide, gamers reportedly spend an average of just over seven hours playing each week, a figure which has increased 19.3% in the last year, and for an average of 1hr 22mins at a time (Limelight Networks, 2019). There is a broadly equal gender-split in terms of gamers, albeit with men marginally over-represented (Entertainment Software Association, 2019; The Association for UK Interactive Entertainment, 2018a). In the UK, games sales exceeded that of music and video sales combined in 2018 (Entertainment Retailers Association, 2018), whilst there are over 2,000 active games companies in the UK alone (The Association for UK Interactive Entertainment, 2018a), with the industry contributing almost £3bn to the UK economy (The Association for UK Interactive Entertainment, 2018b).

The rise in popularity of gaming can be attributed, at least in part, to the variety of gaming forms available. Players can now engage with content via a wide range of platforms – PCs, consoles, tablets, smartphones (Chikhani, 2015) – and play a great variety of types of games – genres, defined not by their setting, be it science fiction, fantasy etc., but by their gameplay and interactivity (Adams, 2009; Apperley, 2006). Whilst there is no widely accepted taxonomy of genres (Arsenault, 2009; Eklund, 2017; Kuittinen et al., 2007; Mortensen,

2009), there is a huge diversity of options, from action to collectible card games (CCGs), strategy to simulation, puzzle to arcade, and role-playing (RPGs) to idle-clickers, with each of these genres – amongst others – having numerous subgenres. At the time of writing, Wikipedia lists 66 genres and sub-genres as "commonly defined" (Wikipedia, n.d.), but then over 100 in the video game genre category box.

Games can be further distinguished by whether they are designed to be played online or offline, and single-player vs. multiplayer, as well as the length of time they are designed to take to complete. Casual games, for example, are typically designed to provide quick engagement, with very low time investments required (Kuittinen et al., 2007; Wallace & Robbins, 2006). On the other hand, Massively Multiplayer Online games (MMOs), in which hundreds or thousands of players play on the same server, often require considerable time investments in order to gain basic competencies, advance through the game's structures, or complete the game. Massively Multiplayer Online Roleplaying Games (MMORPGs), in particular, are known for being very time intensive, but also offering unique opportunities for socialisation and – within the game – many different ways to play, with vast, persistent worlds (Yee, 2006a, 2006b).

MMORPGs afford core player activities which can broadly be grouped under three headings: 'Skilling'; 'Killing'; and 'Questing' (Worth & Book, 2014). 'Skilling' consists of a player/character either collecting or using in-game resources to gain competence in non-combat skills (e.g. woodcutting, mining, smithing). While skilling can involve repetitive activities, it can also offer settings in which players can congregate and socialise in communities (Crowe, 2009). 'Killing' involves engaging in combat against monsters/the environment (PvM/PvE) or against other players (PvP). Finally, 'Questing' signifies

completing narratives or storyline-driven content, often involving combat, puzzles, or search/exploration-based challenges (P. Barr et al., 2007; Meredith et al., 2009; Senn, 2014). It should be noted, though, that different MMORPGs will vary their focus on the basis of their intended playerbase (Bartle, 1996, 2010); some, for example, place a greater emphasis on player-vs-player combat, whilst others in the intended difficulty and complexity of their quests (Meredith et al., 2009; Suznjevic et al., 2008; Yee, Ducheneaut, & Nelson, 2012).

Benefits of Gaming

Research points to a number of benefits of gaming, including improving attention (Ramos & Melo, 2019), decision making, and problem-solving skills (Buelow et al., 2015). Action video games are associated with improved levels of a wide variety of visual selective attentional processes (Belchior et al., 2013; Green et al., 2010; Green & Bavelier, 2003), including mental rotation (Boot et al., 2008; Feng et al., 2007; Greenfield et al., 1994), multiple object tracking (Green & Bavelier, 2006), and spatial visualisation (Feng et al., 2007; Karle et al., 2010), whilst Li, Polat, & Bavelier (2007) found that playing action video games causally improved visual sensitivity.

These gains are not, though, exclusive to playing action games, with other games, including Tetris, also enhancing visual attention (Belchior et al., 2013) and mental rotation (De Lisi & Wolford, 2002; Okagaki & Frensch, 1994). Playing platform or puzzle games has been found to increase grey matter volume in various brain regions involved in navigation and visual attention (Kühn et al., 2014; Palaus et al., 2017; West et al., 2017, 2018). In addition, video gaming more generally has been seen to enhance multisensory temporal processing (Donohue et al., 2010), whilst first-person shooter (FPS) games have been associated with improvements in working memory (Colzato et al., 2013).

In addition, games may be beneficial in retaining or restoring cognitive faculties that decline with advancing age (Eichenbaum et al., 2014). Training studies – typically over the course of several weeks – show this to be the case for reaction times (Clark et al., 1987) and visual attention (Belchior et al., 2013), whilst different types of games enhance different aspects of cognition amongst older gamers (Oei & Patterson, 2013). For example, playing a real-time strategy (RTS) game led to improvements in multiple measures of executive control functions (Basak et al., 2008).

Aside from improvements in brain functioning, gaming is linked to concrete skill development across various domains (Matijević & Topolovčan, 2019). Vocabulary acquisition is one area in which gaming has shown to be helpful (Ebrahimzadeh & Alavi, 2017), particularly of English vocabulary in non-English speaking countries (Matijević & Topolovčan, 2019). Strategy games have been linked with higher open-minded critical thinking (Gerber & Scott, 2011), improved cognitive flexibility (Glass et al., 2013), and in improving problem-solving skills – with beneficial effects on academic achievement (Adachi & Willoughby, 2013). MMORPGs in particular have been shown to assist in development of social and leadership skills, particularly amongst younger players and those with an autism spectrum disorder (ASD) (Ducheneaut & Moore, 2005; Gallup et al., 2017; Visser et al., 2013; Yee, 2006a).

Given the potential for games to promote skill development, it is unsurprising that there is a long history of game development with educational aims. In the 1960s, for example, military officers played *T.E.M.P.E.R.* (Raytheon, 1961) to study the Cold War conflict on a worldwide scale (Djaouti et al., 2012). More recently, video games designed for educational

purposes (Susi et al., 2007) have been offered as 'Serious Games' (Sawyer, 2007; Sawyer & Rejeski, 2002), to promote domain-specific knowledge acquisition and understanding of content (Connolly et al., 2012).

Serious games have been developed and utilised by various sectors, including education (Cheng et al., 2015; Landers & Callan, 2011), productivity in business (Ahmed & Sutton, 2017), and military training (Orvis et al., 2009). In the health sector (Granic et al., 2014; Kato, 2010), games have been offered to promote health and well-being, including through training doctors' clinical skill (Graafland et al., 2012; Kato, 2010), improving treatment adherence and (psychoeducation) self-efficacy in adolescents undergoing cancer therapy (Kato et al., 2008), rehabilitation (Rego et al., 2010), and exergames designed to promote healthy lifestyles (DeSmet et al., 2014; Göbel et al., 2010).

Commercially available games may also play a positive role in mental wellbeing (Granic et al., 2014; Johnson, Jones, et al., 2013; Jones et al., 2014; Vella et al., 2013), promoting positive self-concept (Durkin & Barber, 2002) and moderating anxiety (Allahverdipour et al., 2010; Fish et al., 2018). Playing casual games can increase mood and reduce stress (GamesIndustry International, 2006; Russoniello et al., 2009; Russoniello & Parks, 2009). Studies show gaming to be beneficial in alleviating rumination and treatment-resistant depression symptoms relative to non-gaming control groups (Kühn et al., 2018; Russoniello et al., 2019). Playing games in general can reduce symptoms of depression in non-clinical samples (Valadez & Ferguson, 2012), and individuals more experienced with violent video games appear more resistant to depression symptoms following stressful experiences (C. J. Ferguson & Rueda, 2010). Cross-sectional research shows gaming to be associated with higher levels of social functioning and lower negative affect and depression in older

individuals living independently (Allaire et al., 2013). A systematic review found that gaming for entertainment can have beneficial effects for individuals in relation to the complex of negative psychological symptoms associated with depression (J. Li et al., 2014).

Whilst research suggests that gaming benefits wellbeing regardless of genre (Vella et al., 2013), different genres are associated with particular play experiences. Action-adventure, RPGs, and to a slightly lesser extent strategy games, are associated with elevated levels of flow and immersion (Johnson et al., 2012; Tychsen et al., 2008) relative to sports or combat games, whilst strategy and role-playing games (RPGs) are linked with increased presence and autonomy (Johnson & Gardner, 2010). These differences in play experiences could impact the psychological gains different genres of games confer to players.

There may be particular further benefits to be gained from playing MMORPGs, in which there is a greater social aspect than most other types of games (Vella et al., 2013). In addition to the aforementioned opportunities for developing social (Ducheneaut & Moore, 2005; Gallup et al., 2017) and leadership (Yee, 2006a) skills, MMORPG play can result in gains to social capital (Molyneux et al., 2015; Reer & Krämer, 2014; Williams et al., 2006) and social support (Longman et al., 2009), developing close relationships – forged through shared experiences and development of trust – with other players (Skoric & Kwan, 2011; Smyth, 2007; Yee, 2006a, 2006b), and transfer of in-game accomplishments and experiences in to offline social networks by playing with friends known offline (Snodgrass et al., 2011).

There is also evidence that some players – such as those with ASD (Gallup et al., 2017) – facing difficulties or challenges in their offline lives can use MMORPGs in a compensatory manner to improve their social skills and develop friendships. Some introverted players use

them as a way to form social relations and boost their social capital (Reer & Krämer, 2017), whilst *World of Warcraft* (*WoW*) (Blizzard Entertainment, 2004) players report reduced social anxiety and loneliness online (Martončik & Lokša, 2016). These benefits may reflect greater perceived freedom for players to express themselves as they wish in an online context compared to their offline lives (H. Cole & Griffiths, 2007). Indeed, MMORPG players with lower psychological well-being view their main, user-created, characters as being closer to their ideal self than are their real selves (Bessière et al., 2007), suggesting that MMORPG environments offer players the opportunity to create successful virtual selves without the constraints they may face offline (Yee, 2006a).

Whilst these findings point a spotlight on the potential benefits from gaming, one area still not explored is how the variety of ways of playing such games may offer differential benefits from play. Particularly, different in-game roles could result in different benefits; perhaps, for example, roles focusing on socialisation could lead to greater social skill benefits whilst roles with a focus on overcoming in-game challenges could better develop problem-solving skills. In fact, while players are known to game for social reasons, little is known about the connections between player-role choices and players' attitudes towards others and the world. One principle aim of my thesis is to broaden our understanding of the potential determinants of self-reported cognitive and social benefits of MMORPGs and their relationships with individuals' social values, political ideology, and cognitive factors.

Gaming Motivations

There are numerous models of motivations for gameplay (Boyle et al., 2012), mostly focused on MMORPGs and their forerunners, Multiple-User Dungeons (MUDs) (Bartle, 2010; Yee, 2006a).

Bartle (1996) identified four types of players playing MUDs: ‘Killers’, ‘Achievers’, ‘Socialisers’, and ‘Explorers’, and described these groups as being placed along two motivational axes in terms of their interest in MUDs. These axes were Acting vs. Interacting, and Players vs. World. Hence, Bartle argued, players vary in their motivations along these axes, and this is reflected in how they play MUDs. Killers are motivated by acting on players, demonstrating superiority over fellow players. Achievers are instead motivated by acting on the world, seeking to master the game-world. Contrastingly, Socialisers play to interact with players, talk, develop friendships, etc., with the game just being a setting in which to do so. Finally, Explorers are driven by interacting with the world, seeking a sense of wonder and finding ways in which the game can surprise them and how they can manipulate it in unexpected ways. Bartle further discussed how these player-types interacted, and how game developers can make their games appeal to particular groups of players. Specifically, developers can emphasise ‘Interacting’ (at the expense of ‘Acting’) by, for example, making help facilities vaguer and clues more cryptic, lowering the rewards for achievements, and only incorporating a shallow levelling system. Simultaneously, developers can emphasise ‘Players’ (at the expense of ‘World’) by increasing the ways players can interact and decreasing the size of the game-world whilst making it more quickly navigable. These design decisions can be combined to encourage particular styles of play and player-engagement. For example, to appeal to Achievers, developers can implement an extensive levelling system (‘Acting’ focus) and maximise the size of the game-world (‘World’ focus), thus rewarding time-investment and increasing the amount of things players can achieve.

Building on this seminal work, Yee ran two studies of large MMORPG player samples to create models of motivations using factor-analytic approaches (Yee, 2006b, 2006c). This

work produced related, but different, patterns of motivations: ‘Achievement’, ‘Social’, and ‘Immersion’ as major components of motivation to play MMORPGs, with each component having further sub-components (Yee, 2006c); five complementary factors: ‘Achievement’, ‘Relationship’, ‘Immersion’, ‘Escapism’, and ‘Manipulation’ (Yee, 2006b). Later research confirmed that these motivations do relate to in-game behaviours from one MMORPG, *WoW*. Higher levels of Immersion (particularly ‘Discovery’, one of its sub-components) are associated with a greater number of questing and exploration achievements, but fewer PvM and PvP combat-oriented achievements. Equally, higher levels of Achievements’ ‘Advancement’ and ‘Mechanics’ sub-components are associated with greater total progression and engagement in co-operative PvM combat, in contrast to the ‘Competition’ sub-component, which is related to PvP combat. Finally, greater overall Social motivation is related to being affiliated with a guild of players, whilst its ‘Relationship’ and ‘Teamwork’ (but not ‘Socialising’) sub-components predict participation in co-operative PvM combat (Billieux et al., 2013; Yee, Ducheneaut, & Nelson, 2012).

A more recent version of these models of gaming motivations is expanded to offer six clusters of motivations with two sub-components each, drawn from factor-analysis on a sample of over 250,000 gamers (Yee, 2015, 2019, 2016). These clusters focus on what gamers enjoy in terms of opportunities, and are: ‘Action’; ‘Social’; ‘Mastery’; ‘Achievement’; ‘Immersion’; and ‘Creativity’. The model has been used to characterise the varying patterns of motivations – and favourite specific games – of predominantly ‘core’ (as opposed to ‘casual’ or ‘hardcore’) gamers (Yee, 2019). It is used to predict what games other, subsequent gamers would enjoy playing, based on comparing their patterns of motivations with the most similar gamers in the existing dataset. It also provides the gaming industry with metrics on how gamers who report playing their games differ from the wider gaming

population in terms of their levels of each motivation.

Gaming motivations can also be viewed through the lens of needs-based motivational theories (Boyle et al., 2012). One such is the uses & gratifications theory, whereby individuals' use of media and its effects on them are largely a function of their intent in using that media (Rosengren, 1974). Applying this theory identifies a related pattern of motivations: 'Arousal'; 'Challenge'; 'Competition'; 'Diversion'; 'Fantasy'; and 'Social Interaction' (Lucas & Sherry, 2004; Sherry et al., 2006). These motivations have been seen to differ by gender, with women less driven by competition or social interaction than their male counterparts (Jansz et al., 2010; Lucas & Sherry, 2004). Adolescents, meanwhile, report a different set of uses & gratifications, with 'Companionship', 'Prefer to friends', 'Fun challenge', and 'Stress relief' here being the emergent themes (Colwell, 2007). A number of other studies have also sought to develop alternative models of motivations in terms of the goals players have when gaming, these often being developed through interviews with players or other qualitative methods (Boyle et al., 2012; Demetrovics et al., 2011; Frostling-Henningsson, 2009; Lee et al., 2012).

Self-Determination Theory-based approaches. A further needs-based theory is that of Self-Determination Theory (SDT), in which a sub-theory – Cognitive Evaluation Theory – posits that human motivation is best understood through the innate psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 1985, 2000; Przybylski et al., 2010). Satisfaction of these needs through gameplay experiences – measured by the Player Experience of Needs Satisfaction (PENS) – all appear related to game enjoyment and positive well-being (Ryan et al., 2006). Further, satisfaction of autonomy and competence needs from engaging with a video game were both related to a greater likelihood of intention to play

again, with competence additionally linked to greater immersion in the game world, and enhanced self-esteem (Przybylski et al., 2010; Ryan et al., 2006).

A somewhat different operationalisation of SDT to a gaming context is the Gaming Motivation Scale (GAMS) (Lafrenière et al., 2012). This measurement of gaming motivations exclusively assesses the underlying motivations of gaming, rather than its specific goals. These move from intrinsic motivation, through four types of extrinsic motivations, to amotivation. Extrinsic motivations vary in terms of the degree in which externally motivating factors are internalised in to personally-endorsed ones: what that behaviour in and of itself means to them personally. Together, these five motivations (plus amotivation) are presented as the following subscales, in order of self-determination from highest to lowest: Intrinsic Motivation, whereby playing the game is its own reward; Integrated Regulation, where play aligns with other life goals and the choice to play is integrated in to a wider organisation of the self; Identified Regulation, where playing helps to achieve other goals or because it has personal meaning; Introjected Regulation, whereby playing helps to avoid/manage internal pressures such as anxiety, or where the absence of playing would cause irritation or restlessness; External Regulation, whereby playing brings other rewards – be they in-game, such as virtual currency and achievements, or personal, such as admiration and recognition; and Amotivation, whereby an individual may no longer know why they play.

Research using the GAMS has indicated that gaming for intrinsic rewards is positively associated with psychological health (Comello et al., 2016) and flow (Czikszentmihalyi, 1990) through harmonious passion of gaming (Wang et al., 2008, 2011). More active gamers report higher levels of intrinsic and extrinsic motivations (Shaer et al., 2017), whilst problematic levels of gaming are associated with extrinsic motivations and amotivation

(Mills et al., 2018) (see below).

Whilst these motivational models can provide information about what different players look for in terms of game mechanics that can satisfy their motivations – and in some cases have clear commercial applications – they tell us much less about what the underlying psychological factors behind these motivations may be, or why they differ between individuals. Particularly, why some players prefer to achieve things in games and attain mastery, versus, for example, others who prefer to immerse themselves in a fantasy world, or engage with elaborate story arcs. The research which has attempted to shed light on this has primarily been concerned with how motivations relate to the Big Five Inventory (Goldberg, 1990).

Gaming to escape (Jeng & Teng, 2008) and to lead has been linked to increased conscientiousness, whilst socialising and achieving in games has been linked to lower conscientiousness (Graham & Gosling, 2013). Extroversion seems to be pivotal; motivations relating to opportunity to work, socialise with, and lead other players (Graham & Gosling, 2013; Jeng & Teng, 2008); to learn and to escape (Park & Lee, 2012); to adventure, escape, relax, and achieve (Park et al., 2011); and to be challenged and experience competence satisfaction (Johnson et al., 2012), are all likely to be elevated in extroverted individuals. Similarly, gaming for advancement (Jeng & Teng, 2008; Park et al., 2011) (though there is conflicting evidence here; see Graham & Gosling, 2013), adventure and escapism (Park et al., 2011), competence satisfaction (Johnson et al., 2012; Johnson & Gardner, 2010), enjoyment of challenge (Johnson et al., 2012), and learning from gaming (Park & Lee, 2012) are stronger motivations in individuals high in agreeableness. Finally, competence (Johnson et al., 2012) and being motivated to game in teams (Jeng & Teng, 2008) are linked to reduced

neuroticism, while gaming to socialise and for immersion is associated with higher neuroticism. (Graham & Gosling, 2013; Johnson & Gardner, 2010).

Other research has linked harmonious passion – engagement in an activity by choice, in a way which is harmonious with other activities (Wang et al., 2011) – with exploration, socialisation, and achievement motivations in MMORPGs. Obsessive passion – an internal pressure to engage in an activity an individual is passionate about in a way which conflicts with other activities – is linked with dissociation, achievement, and socialisation (Fuster et al., 2014).

Overall, this research suggests that MMORPG gamers have diverse reasons for choosing to play, and that these motivations are related to both cognitive factors and gaming outcomes.

Gaming Costs & Harms

Alongside the benefits of gaming, there is substantial evidence that there can be costs and harms for some (C. J. Ferguson & Smith, 2018; Granic et al., 2014; Jones et al., 2014).

Aggression. Historically, one concern has been whether playing violent video games increases aggression (Carnagey & Anderson, 2004; Copenhaver & Ferguson, 2018), through the framework of the General Aggression Model (Allen et al., 2018). Playing violent video games is associated with increased levels of aggression (Anderson & Dill, 2000), fighting in school (Gentile et al., 2004), greater hostile attribution bias and hostility (Anderson & Dill, 2000; Gentile et al., 2004), lower empathic concern (Fraser et al., 2012; Vieira & Krcmar, 2011), and less prosociality (Fraser et al., 2012; Przybylski, 2014b). In addition, playing violent video games can increase aggressive behaviour and cognitions in a laboratory context

(Anderson & Dill, 2000; Cooper & Mackie, 1986; Hollingdale & Greitemeyer, 2014; Irwin & Gross, 1995; Schutte et al., 1988), and can desensitise individuals to violent images (Engelhardt et al., 2011) and reduce inter-personal trust (Rothmund et al., 2015). This has raised public concern, particularly among older individuals and women (Przybylski, 2014a), sometimes in the wake of atrocities in the US (Markey et al., 2015) with politicians pointing to violent video games as a causal factor in recent mass shootings in the US (Coaston, 2019), despite the Supreme Court finding research to support this view "unpersuasive" (C. J. Ferguson, 2013).

The connection between violent video games and aggression remains uncertain (S. Smith & Ferguson, 2019). Whilst some meta-analytic approaches support the claim (Anderson et al., 2010; Anderson & Bushman, 2001), others find the effect to be minimal or non-existent (C. J. Ferguson, 2007b, 2015; Hilgard et al., 2017; Przybylski & Weinstein, 2019; Sherry, 2001). There are also concerns about the literature (C. J. Ferguson, 2010, 2015), including systemic issues such as citation and publication biases (C. J. Ferguson, 2007a; C. J. Ferguson & Kilburn, 2010; Hilgard et al., 2017). Methodological issues include the use of correlational designs and the possibility that players higher in trait aggression are drawn to games involving violent content in the first place (Olson et al., 2007; Przybylski et al., 2009). Laboratory paradigms may also be ineffective in studying real-world aggression (Tedeschi & Quigley, 2000). Between-study variation in how aggression is evaluated – even when utilising the same dataset (Przybylski & Weinstein, 2019) – and failures to match video games across experimental and control groups for relevant factors such as competitiveness (Adachi & Willoughby, 2013) or inducement of competence-based frustration (Przybylski et al., 2014) have also been highlighted as issues. There is also little evidence to suggest that

violence increases in line with violent video game adoption/releases (Markey et al., 2015).

Gaming addiction. The other area of intense study in relation to gaming-related harms has been that of problematic patterns of play which could be detrimental to health and well-being, perhaps amounting to 'gaming addiction' (Grüsser et al., 2007). Considerable evidence attests that gamers who play excessively can experience symptoms that, it is claimed, present like substance-addiction (Ko, Liu, et al., 2009; Kuss, 2013; Spekman et al., 2013; Wölfling et al., 2008). These include sacrificing hobbies, sleep, work, time spent with family etc. (Griffiths et al., 2004; Rehbein et al., 2010), irritability and withdrawal (Yee, 2002), maladaptive coping (Hussain & Griffiths, 2009a, 2009b; Schneider et al., 2018), dissociation (Hussain & Griffiths, 2009b), and dependency (Liu & Peng, 2009). Reported prevalence rates vary wildly based on sampling method; population-based surveys report rates as low as 0.2% (Festl et al., 2013), while convenience sampling of MMORPG players can reach reported rates of 46% (Wan & Chiou, 2006a). Rates also vary based on how 'gaming addiction' is operationalised, though most studies report percentages in the low-mid single-figures (Bean et al., 2017; Festl et al., 2013).

Problematic patterns of play are associated with a number of risk factors (Kuss & Griffiths, 2012), while high-engagement play alone is likely to have limited predictive value for any addiction-like symptoms (Brunborg et al., 2013; Griffiths, 2010; Lehenbauer-Baum & Fohringer, 2015; Spekman et al., 2013). Several of these risk factors are clinical, such as ADHD (Hyun et al., 2015), depression (Caplan et al., 2009; Hyun et al., 2015; Peng & Liu, 2010), trait anxiety (S. H. Cole & Hooley, 2013), and social anxiety (S. H. Cole & Hooley, 2013; Hyun et al., 2015; Lo et al., 2005).

Others are personality factors such as impulsivity (Choi et al., 2014; Hyun et al., 2015), sensation-seeking (Chiu et al., 2004; Mehroof & Griffiths, 2010), and factors relating to potentially difficult social experiences, including hostility (Chiu et al., 2004; Gentile et al., 2011; Ko, Yen, et al., 2009; Stavropoulos et al., 2017; Yen et al., 2007, 2008, 2011), aggression (Caplan et al., 2009; E. J. Kim et al., 2008; Mehroof & Griffiths, 2010), low self-esteem (Hyun et al., 2015; Ko et al., 2005; Lemmens et al., 2011; Yee, 2002), introversion (Caplan et al., 2009; S. H. Cole & Hooley, 2013), loneliness (Caplan et al., 2009; Lemmens et al., 2011), feelings of low social self-efficacy offline and high social self-efficacy virtually (Jeong & Kim, 2011), and both low agreeableness and high neuroticism (S. H. Cole & Hooley, 2013; Mehroof & Griffiths, 2010; Peters & Malesky, 2008).

Many gaming motivations have also been identified as risk factors (Kuss & Griffiths, 2012). These include: escapism and mood regulation (Ballabio et al., 2017; Beranuy et al., 2013; Kwon et al., 2011; Xu et al., 2012); achievement, and socialisation (Caplan et al., 2009; Kuss et al., 2012; Xu et al., 2012; Zanetta Dauriat et al., 2011); immersion and role-playing (Caplan et al., 2009; Hsu et al., 2009); extrinsic motivation and amotivation (King & Delfabbro, 2009a); intrinsic motivation (Wan & Chiou, 2007); recognition, validation-seeking, and a sense of belonging (Beard & Wickham, 2016; Hsu et al., 2009; King & Delfabbro, 2009b, 2014); reward-seeking (Beard & Wickham, 2016; Hsu et al., 2009); and empowerment, mastery, and completion (King & Delfabbro, 2009b).

MMORPGs in particular have been identified as potentially promoting problematic playing patterns (Kuss et al., 2012; Smyth, 2007; Stetina et al., 2011) due to the open-ended nature of play, encouragement of repetitive daily activities, and use of partial reinforcement schedules (Charlton & Danforth, 2007; Elliott et al., 2012; Thorens et al., 2012). In particular, the use of

operant conditioning through instantaneous gratification with overlapping fixed- and variable-ratio reward schedules means that players are always close to achieving a reward (Yee, 2002). In addition, MMORPG players tend to report playing to escape from real-life problems – a motivation associated with problematic play – more than do players of other genres of online games (Stetina et al., 2011).

'Internet Gaming Disorder' (specified for further study) and 'Gaming Disorder' have been included in the DSM-5 (American Psychiatric Association, 2013) and in the ICD-11 (World Health Organization, 2018), respectively. However, there remain concerns about specificity (Kuss et al., 2017) in the case of the DSM-5, with confusion arising over whether symptoms have to relate to games played online to fall under the disorder. In addition, relevance of proposed measurement criteria in both the DSM-5 and ICD-11 has been an issue of concern for researchers with widely divergent opinions (Aarseth et al., 2017; Griffiths et al., 2016; Kardefelt-Winther, 2015). It is unclear whether criteria stemming from substance addictions – such as those relating to withdrawal, tolerance, and reduced participation in other recreational activities – are helpful in the context of gaming. Craving an enjoyed leisure hobby that one has been unable to participate in for some time is not the same as experiencing short-term withdrawal symptoms, whilst tolerance is difficult to assess and complicated by ever-increasing demands on hardware for newer games (Griffiths et al., 2016). Gambling has been listed as a behavioural disorder in the DSM-5 and ICD-11 (American Psychiatric Association, 2013; World Health Organization, 2018). However, in the case of gaming, placing an intense focus on one hobby, at the cost of others, need not be seen as a marker of an addiction. Criteria relating to trying to reduce – or lying about – the time spent gaming may also relate more to pressures derived from negative societal and parental attitudes towards gaming (Aarseth et al., 2017; Griffiths et al., 2016; Kardefelt-

Winther, 2015). That problems arising directly from gaming is not a requirement criterion, and the lack of criteria unique to ‘gaming addiction’, are also potential issues (Griffiths et al., 2016).

Irrespective of whether there is any such thing as gaming addiction, the important issue is the broader suffering and psychological distress experienced by individuals engaging in problematic patterns of play, including depression (Caplan et al., 2009; Hyun et al., 2015; Peng & Liu, 2010), anxiety (S. H. Cole & Hooley, 2013; Hyun et al., 2015; Lo et al., 2005), disrupted relationships (Griffiths et al., 2004), and lower school achievement/higher truancy (Rehbein et al., 2010).

More generally, there are concerns as to whether high-engagement gaming is best seen through the prism of pathology at all (Bean et al., 2017), or whether it is better understood as a compensatory process (Kardefelt-Winther, 2014). This, in turn, requires a greater consideration of the context in which players engage with MMORPGs and the choices they make within them (C. J. Ferguson, 2010; C. J. Ferguson et al., 2017; Shibuya et al., 2008). For example, it may be that, rather than games promoting problematic patterns of play, some players who develop problematic patterns of play exist in already-problematic contexts (Caplan et al., 2009; Hussain et al., 2012). This could lead them to be attracted to – and perhaps become over-reliant on – gaming in order to manage broader social, economic, and educational pressures in their life (Kardefelt-Winther, 2016).

Given the large number of risk factors for problematic play which relate to difficult social experiences, it is perhaps unsurprising that low levels of needs satisfaction in life in general, and higher levels of in-game needs satisfaction, are associated with more problematic gaming

patterns (Bender & Gentile, 2019). Indeed, needs frustration appears to mediate the association between problematic video gaming and motivations (Mills et al., 2018), indicating that gaming can provide a source of coping or social compensation in which relatedness needs are successfully met (Colwell, 2007; Reer & Krämer, 2017; Wack & Tantleff-Dunn, 2009). Players of the MMORPG *WoW* experience a significantly lower degree of loneliness and social anxiety online than offline, indicating how such games can promote functioning and friendship in individuals who find the same level of needs satisfaction unattainable offline (Martončik & Lokša, 2016). These virtual environments appear to provide individuals with the opportunity to develop social skills (Ducheneaut & Moore, 2005) through a wider variety of communication partners, boosting social competence in adolescents (Visser et al., 2013) and those with ASD (Gallup et al., 2017).

Individuals identified as 'addicted' to gaming also report viewing their in-game MMORPG character as superior to them, and wishing they could be more like them (Smahel et al., 2008). Whilst this perhaps suggests that MMORPGs are risky contexts in relation to self-esteem, it may also indicate that some individuals use gaming environments to attempt to 'be their best selves' in ways they feel unable to do offline, possibly gaining confidence through engagement in this medium (Yee, 2002). Indeed, whilst some young introverted RPG players create characters who are idealised versions of themselves, this fades as they get older, suggesting that playing enables them to feel secure about being their 'real selves' (Yee, 1999).

Hence, MMORPG play may offer ways in which individuals can compensate for significant real-world challenges and adversity – e.g. lack of social stimulation – producing positive benefits which can lead to excessive, potentially problematic, play when compensatory

satisfaction needs are particularly great (Kardefelt-Winther, 2014, 2016; King & Delfabbro, 2014; Wan & Chiou, 2006b). Pre-existing psychiatric distress mediates the link between problematic patterns of play and escape, fantasy, and competition gaming motivations (Ballabio et al., 2017; Király et al., 2015), whilst attentional problems precede 'pathological' gaming behaviours, but not vice versa (C. J. Ferguson & Ceranoglu, 2014). Finally, viewing gaming to cope as an aspect of addiction does not in itself seem particularly helpful, particularly given the low levels of impairment experienced relative to in other pathologies (Nielsen, 2015; Przybylski et al., 2017; Scharkow et al., 2014) and instability of the construct of 'gaming addiction' over time (Rothmund et al., 2018; Strittmatter et al., 2016), with the disorder resolving without intervention (Bean et al., 2017; Scharkow et al., 2014).

One way to progress understanding of the holistic role of games is to explore how risk factors for hazardous or addicted gaming relate to self-reported benefits acquired through MMORPG play (Johnson, Wyeth, et al., 2013; Kardefelt-Winther, 2014).

Choice of Genre & Role

As discussed earlier, games are far from being one homogenous constant, as are, of course, their players. Individuals can gain (and, perhaps, be harmed) in different ways to each other, given the specific contexts in which they play. Relatively little research, however, has sought to explore how individuals play in different ways to each other, selecting genre(s) of games to play (Braun et al., 2016), or – in the case of games which offer diverse in-game activities – opting for a different playstyle/role to other players, as first postulated by Bartle (1996) and discussed above.

This is despite the fact that gamers appear to have clear gaming preferences, and that there

are some differences in demographics associated with these (Wood et al., 2004); MMOFPS players tend to be younger males (Jansz & Tanis, 2007), with lower levels of education and socioeconomic status compared to older MMORTS players, whilst more females play MMORPGs and 'other' types of online games than FPSs or RTSs (Jansz et al., 2010; Nagygyörgy et al., 2012). Females are particularly likely – relative to males – to play casual games over other game styles (GamesIndustry International, 2006; Kuittinen et al., 2007; Kultima, 2009; Wallace & Robbins, 2006; Wohn, 2011), as are older game players (GamesIndustry International, 2006; Russoniello & Parks, 2009).

Unsurprisingly, multiplayer and online gamers report higher motivation scores for competition, cooperation, and recognition, than do individuals who play single-player or offline games (Hainey et al., 2011), though for online browser games the social relationships gained from gameplay appear more important than competition (Klimmt et al., 2009). Preferences for casual games are also associated with higher extroversion and conscientiousness (Potard et al., 2019).

Choosing to play RPGs over other genres is associated with higher levels of openness (Potard et al., 2019), and action game players are higher in extroversion and lower in neuroticism than players of other genres (Braun et al., 2016). A preference for sports games is also associated with extroversion (Potard et al., 2019), as well as seeking to apply more specialist knowledge about – and identifying with – sport in general (Y. Kim & Ross, 2006).

Some specific MMORPG activities have been linked to certain demographic factors. Quests – though less complex in *WoW* than in some other MMORPGs (Meredith et al., 2009) – are preferred by older players, as is exploration of the game world and skilling. Female players

also tend to prefer exploration and skilling, in contrast to male players, who prefer PvP and PvM combat, as do younger players (Yee, Ducheneaut, Shiao, et al., 2012).

Some such activities have also shown associations with certain personality traits. Questing and exploration are associated with high agreeableness and openness, but low extroversion. Preferences for skilling are linked with high agreeableness, conscientiousness, and openness. PvE/M engagement is associated with high extroversion and low openness. Notably, this is different to PvP engagement, which is associated with low agreeableness, low honesty-humility, and high neuroticism and psychopathic traits. Finally, completionism in collecting items and achievements in MMORPGs which are difficult or time-consuming to attain is linked to conscientiousness (Worth & Book, 2014; Yee et al., 2011).

One cross-genre study sought to develop an independent taxonomy of motivations whilst categorising MMO and Multiplayer Online Battle Arena (MOBA) players as in-game 'types' based on these motivations and underlying reasons for play. The 'types' developed were: 'Socialisers'; 'Completionists'; 'Competitors'; 'Escapists'; 'Story-driven'; and 'Smarty-pants'. Many of these 'types' fit well with in-game player log data and metrics from other assessments such as of social capital (high among Socialisers), coping (among Escapists), lore knowledge (among Story-driven players), in-game killing sprees (among Competitors), etc. This suggests that it is indeed possible to identify 'types' of players who differ from each other in meaningful ways (Kahn et al., 2015), as Bartle (1996) originally proposed for MUDs.

Background for my thesis. Recently, I conducted research during my MSc on one MMORPG, *RuneScape* (Jagex, 2004). *RuneScape* is a long-established browser-based MMORPG developed and offered by Jagex (https://www.jagex.com/), with over 260m

accounts (Bartle, 2010). Research with the game has been limited and focused upon comparisons between virtual and material world economies (Bilir, 2009), whether 'mini-games' constitute gambling (Griffiths & King, 2015), and child identity formation in online worlds (Crowe, 2009). Little is known of the player-base beyond what Jagex has publicly released (Jagex, 2014).

My research showed that players of *RuneScape* were happy to identify their primary character as fitting one of the following in-game player-roles: 'Skiller' (30% of respondents); 'Killer' (17%); 'Quester' (22%); 'Other' (31%), based on their favoured in-game activities, with reported enjoyment of the relevant activities matching with their self-identification (C. Smith et al., 2019). The terminology of these player-roles is that used by the players of this MMORPG themselves, and maps on to the game developer's suggested three core 'paths' for playing the game: to be a 'Skiller', 'Combatant', or 'Adventurer'. Individuals identifying as being in the 'Other' grouping typically self-reported being a hybrid of two or more player-roles, often that they were 'Maxed' (having the top level in all skills, both combat & non-combat) or a 'completionist', meaning that they had completed – or were completing – all game content including skills, combat, and narrative challenges (Kahn et al., 2015). It should be noted that in *RuneScape*, quests tend to be more challenging and narrative driven than in *WoW*, on which much of the extant MMORPG research has been conducted (Meredith et al., 2009), whilst the dominant form of combat enjoyed by *RuneScape* players is PvM, due to a historic (controversial) update which affected the once-populous PvP segment of the community (Jagex, 2007).

Critically, two psychological factors relating to personal agency and attentional focus – action identification and daydreaming, discussed in the next two sections – proved relevant in

differentiating between different types of players. Questers reported viewing behaviours more in terms of the constituent actions than the overriding goals than did players preferring other player-roles. Questers also reported more frequent daydreaming experiences, particularly compared to Skillers and Killers. These psychological factors were also relevant to the gaming experiences and attitudes of players, with greater enjoyment of in-game activities and perceived skill and relationship benefits from playing MMOs showing associations with identifying behaviours in terms of higher-order goals and more frequent daydreaming. Viewing behaviours more in terms of actions, and greater daydreaming frequency, were both also associated with placing greater importance on in-game achievements relative to other achievements (C. Smith et al., 2019).

This research highlighted the importance of exploring how players' choices to play games in different ways, and their benefits, relate to psychological factors – beyond the Big Five and associated personality traits – including cognitive and attentional factors. What remains unknown is how these factors relate to forms of gaming other than MMORPGs, or indeed how other psychological factors relate to choice of player-role within MMORPGs and any differences in outcomes/experienced benefits resulting from such choices.

Action Identification

Action identification theory holds that actions can be represented cognitively in a number of ways, from low-level identities specifying the mechanics of an action through to superordinate structures of high-level goals, and that these identifications can be critical in the maintenance of behaviours (Belayachi & Van Der Linden, 2017; Dewitte & Lens, 1999; Vallacher & Wegner, 1987, 1989; Wegner et al., 1986). For example, the behaviour of 'drinking alcohol' could be described in a number of ways, from 'swallowing fluids' to

'relaxing', with the former being a low-level identity (of an action) but the latter being a high-level one (of a goal) (Vallacher & Wegner, 1989).

Research suggests that individuals' efficiency with a task and their enjoyment of it can be increased when its complexity, and its specification in terms of actions or goals, are in alignment. Specifically, completing complex tasks can be aided by their specification in terms of component actions to produce solutions, whilst completing simple tasks can be aided by their specification in high-level terms, as goals, facilitating mastery (Bandura & Schunk, 1981; Pham & Taylor, 1999; Ritts & Patterson, 1996; Stock & Cervone, 1990; Vallacher & Wegner, 1987). Mismatches, meanwhile, between task complexity and the specification in terms of actions versus goals can impede success and hinder enjoyment (Dewitte & Lens, 1999; Y. L. Ferguson & Sheldon, 2010; Seidel et al., 1998; Vallacher et al., 1989, 1992).

Importantly, individuals' tendency to identify behaviours in either lower- or higher- level terms appears to be temporally stable (Vallacher & Wegner, 1989). This variation in representations has both social (Kozak et al., 2006; Vallacher & Wegner, 1987), and occupational relevance (Dickerson, 1995; Stumpp et al., 2009; Taber & Alliger, 1995), and may be important in clinical contexts (Watkins, 2011; Watkins et al., 2011). For example, obsessive-compulsive disorder patients identify hand-washing behaviours in high-level goal-based terms more so than do controls (Dar & Katz, 2005; Jamnadass et al., 2014), in much the same way that frequent drinkers and individuals with alcohol problems specify drinking behaviours, at least as compared with inexperienced drinkers (Wegner et al., 1989). Individuals identifying behaviours more in terms of goals are also more likely to predict that a lucky streak will continue when predicting the outcomes of coin tosses in a gambling scenario (Caruso et al., 2010). Such abstract representations are, though, also associated with

experiencing greater positive affect and perceived meaning in life independent of self-esteem (Freitas et al., 2009), and perceiving greater similarity between people across different social groups, promoting empathy and willingness to help others through fostering greater perspective taking, irrespective of ideological or personality variables (Levy et al., 2002). In contrast, procrastinating students identify studying-related activities more in terms of lower-level actions than do non-procrastinators (Dewitte & Lens, 2000), suggesting that sometimes low-level action specifications can impede productive behaviour.

The small amount of research in the realm of gaming has shown that increased gaming time and participation in number of gaming subgenres are associated with the tendency to identify behaviours in terms of goals (Ewell et al., 2018), as are greater perceived skill level in an RPG (Matthews, 2015) and success in an FPS game (Ewell et al., 2018). This suggests that video game players may vary in how they view in-game aggressive actions, with goal- vs. action-orientation potentially moderating any links between play and aggression. Specifically, the higher-order goals that motivate violent in-game behaviours may not focus on the aggression component, and 'expert' game players view in-game behaviours more in terms of abstract goals than do novices (Ewell et al., 2018). Thinking in terms of abstract goals is associated with greater levels of moral reasoning (Agerström et al., 2013). This suggests that the increasing levels of abstraction when thinking about in-game behaviours which develops from gaining expertise can explain why prolonged usage of violent games may not result in desensitisation.

Given the above, and the relevance of action identification theory in player-role selections, enjoyment of in-game activities, and attitudes towards gaming achievements in an MMORPG context (C. Smith et al., 2019), further exploration of the role of action identification in other

gaming spheres – including genre selection – seems a potentially fruitful avenue of research.

Daydreaming

Whilst immersion is an acknowledged motivational component for gaming, particularly in the case of RPGs (Tychsen et al., 2008; Yee, 2006b, 2006c, 2019), little is known about how gaming preferences are linked to individual differences in attentional focus. Two related constructs, mind-wandering and daydreaming (Smallwood, 2013a), concern engaging in cognitions unrelated to current external stimuli, i.e. stimulus-independent thought (Smallwood & Andrews-Hanna, 2013). Daydreaming episodes, as attentional diversion away from tasks at hand, can largely involve prospective thought (D'Argembeau et al., 2011), especially when the task at hand does not require undivided attention (Smallwood et al., 2009), and are often related to an individual's current concerns, enabling anticipation and planning for future goals (Mooneyham & Schooler, 2013). As with mind-wandering (Deng et al., 2014; Watts et al., 1988), high levels of daydreaming are associated with vulnerability to psychological distress such as symptoms of depression and anxiety (Giambra & Traynor, 1978; Marchetti et al., 2014; Stawarczyk et al., 2012). However, daydreaming has also long been associated with enhanced levels of creativity (Baird et al., 2012; Dietrich, 2007; Singer & McCraven, 1961). This can include incubation, where low-demand task activities can result in a greater incubation effect than engaging in high demand tasks or no tasks at all (Baird et al., 2012; Sio & Ormerod, 2009), whilst low-demand tasks also maximise the frequency of task-unrelated thoughts (Smallwood & Schooler, 2006). Hence, daydreaming may be involved in the successful incubation of ideas and play a positive role in creative thinking (Mooneyham & Schooler, 2013). High levels of video gaming engagement are associated with constructive styles of daydreaming which assist in problem-solving and are not linked to psychopathology (Dauphin & Heller, 2010).

My previous research showed that daydreaming frequency is a predictor of choice of player-role in an MMORPG, perceived benefits from playing, and attitudes towards one's gaming achievements (C. Smith et al., 2019). Hence, it would be interesting to explore whether it retains relevance in gaming behaviours and experiences in the context of more casual games.

Social Capital & Social Values

As previously mentioned, MMOs – particularly MMORPGs – can promote gains in social capital (Molyneux et al., 2015; Reer & Krämer, 2014; Skoric & Kwan, 2011; Trepte et al., 2012; Williams et al., 2006), promoting stronger networks of relationships in society, both enabling society to function and providing greater resources ('human capital') to individuals (Coleman, 1988). Games enable this through the social opportunities provided and, often, the resulting friendships which develop between players from trust formed through shared experiences (Lai & Fung, 2019; Smyth, 2007; Yee, 2006a, 2006b), working together as a team (Bennerstedt & Linderoth, 2009; Jakobsson & Taylor, 2003), participation in clans/guilds (Ang & Zaphiris, 2010; Reer & Krämer, 2014; Williams et al., 2006; Zhong, 2011), and on game-related discussion boards (Lenhart et al., 2008).

These gains to social capital can have wider – positive – effects on society, with MMORPG play associated with greater civic engagement (Dalisay et al., 2015; Hartshorne et al., 2012; Molyneux et al., 2015; Zhong, 2011) and even elevated levels of peaceful protest (Stokes & Williams, 2018).

Extant research has shown that player gains in social capital derived from online games differ (Huvila et al., 2010; Vella et al., 2015) based on their gaming motives – e.g. intending to be

social or roleplay (Dalisay et al., 2015; Domahidi et al., 2014) – and in-game behaviours in terms of actual level of communication with other players and participation in guilds (Ang & Zaphiris, 2010; Kahn et al., 2015; Reer & Krämer, 2014; Vella et al., 2015; Zhong, 2011). In addition, some introverted players choose more social playing styles in MMORPGs, using the game as a form of social compensation to increase their chances of acquiring social capital (Reer & Krämer, 2017), a phenomenon which can be seen through the lens of SDT in terms of satisfying one's need for relatedness.

Given the ability for players to acquire social capital from MMORPG play, and the fact that players gain so differentially, there is a surprising dearth of research in to how such potential for gains is associated with a related construct: social values. The theory of social value orientation holds that individuals have 'stable preferences for certain patterns of outcomes for oneself and others' (McClintock, 1978; Van Lange, De Bruin, et al., 1997). This translates to some individuals ('prosocials') prioritising co-operation through mutually beneficial outcomes, others ('individualists') maximising outcomes for themselves with little regard for others, whilst others still ('competitors') maximise their own relative advantage over others' outcomes (Van Lange, 1999). These social values play an important role in how people interact with social partners (Au & Kwong, 2004; Van Lange, Agnew, et al., 1997; Van Lange, De Cremer, et al., 2007). For example, individuals with a prosocial orientation are strongly concerned with reciprocity, as such engaging in only the same level of co-operation as they anticipate from interdependent others (Van Lange, 1999), and requiring cues signalling trust in order to generate such positive expectations (Bogaert et al., 2010). On the other hand, proselfs (individualists and competitors) require external incentives in order to align their personal interest with a co-operative goal (Bogaert et al., 2010). Social values also relate to political views such as environmentalism (Joireman et al., 2010) and civic

engagement (Dawes et al., 2011), with prosocials showing greater levels of intentions and participation on both counts. Given that social values affect interpersonal interaction, and players' intentions and social behaviours are key to the acquisition of social capital in MMORPGs, it seems possible that social values may be relevant to gaining benefits from play, particularly social benefits. Choice of in-game player-role may also be influenced by social values, given that some in-game activities will naturally relate more towards either competition or co-operation.

As another dimension of people's attitudes towards other agents and beliefs about their social world, so too may broader political ideology be relevant to choice of in-game roles, and potentially benefits. Belief systems on the liberal-conservative continuum can reflect tolerance of ambiguity, complexity, and openness to new experiences on the one hand, versus a preference for structure, order, closure, and certainty on the other (Everett, 2013). These inclinations may well map differently on to player-roles. Openness, as measured by the Big Five, has been associated with the motivation to role-play in online games (Jeng & Teng, 2008), and quests in some games will pose players with quandaries to solve, with no 'correct' option and often unknown outcomes, instead inviting the player to make a choice based on their own morals and predictions about how each possible option will resolve. Hence, the questing side of MMORPGs may appeal to individuals with greater tolerance of ambiguity. On the other hand, some activities within MMORPGs offer more structure than others, for example the often-predictable rates of experience gain when skilling in a repetitive manner could perhaps appeal to a preference for structure and certainty.

Political ideology may also influence transfer of benefits from a gaming context to an offline context. However, thus far, no such research has explored this possibility. Just as

psychosocial skills acquired across child-to-adulthood can promote political engagement (Holbein, 2017), it is possible that the extent to which individuals gain socio-cognitive skills from non-traditional learning environments such as MMORPGs is related to their political ideology. Indeed, MMORPG spaces are connected to defined moral stances on socially taboo activities (Whitty et al., 2011) and in the exploration of cultural practices, promoting both meaning-making and tolerance towards religion through engagement with narrative content (Schaap & Aupers, 2016). MMORPG environments are virtual worlds which offer players greater personal and economic freedoms than they might experience in offline worlds. Thus, it is possible that a player's pre-existing beliefs relating to certain offline freedoms – for example, in relation to their position on a liberal-conservatism dimension – plays a role in to what extent they utilise the opportunity to develop virtual selves within an environment of reduced constraints, or indeed find such opportunities beneficial (Yee, 2006a).

Possibly, favourable attitudes to certain social or economic freedoms promote skill development in environments – such as MMORPGs – which are more aligned to such belief systems. On the other hand, some researchers argue that MMORPGs actually contribute to the restrictions of certain freedoms, restricting autonomy by reinforcing current economic norms and operating as a tool of hegemony (Weihl, 2015). Under this interpretation, MMORPGs essentially reinforce existing structures and certainty by offering opportunities and freedoms only within a limited bandwidth. This poses the possibility that they provide a richer environment in terms of promoting skill transfer from online to offline contexts for players who express preferences for certainty and order (i.e. conservative players), rather than those who express greater openness to new experiences, as associated with liberalism.

Aims

In this thesis, over six studies I will attempt to explore how (a) benefits accrued from gaming and choice of in-game MMORPG role relate to: (i) a risk factor for problematic gaming: hostility; (ii) social values and political ideology. I will additionally seek to discover (b) how action identification theory, daydreaming, and gaming motivations relate to gaming behaviours and experiences in the context of casual games, and if (c) enjoyment of a game can be differentially manipulated based on an individual's action orientation.

Specifically, I will test the over-arching hypotheses that individuals' choices in games – and of gaming genre – and the derived benefits are associated with divergent social and political attitudes, as well as cognitive and attentional factors.

Chapter 2: Hostility, player-role, and gaming experiences

I start my thesis with an investigation of Massively Multiplayer Online Role-Playing Games (MMORPGs). MMORPGs offer role-play and fantasy-themed narratives, sustain a diverse player-base of over 50m worldwide (11% of US households), and generate $12bn annually (Sierra et al., 2016). Individuals are motivated to play MMORPGs through a variety of psychological mechanisms. Drivers include excitement generated by immersive experiences or fantasies, a sense of achievement from progress through game structures, and a variety of social rewards involving developing relationships with other players and groups (Demetrovics et al., 2011; Sherry et al., 2006; Yee, 2006b, 2006c), possibly reflecting desires to enhance autonomy, competence, and relatedness (Przybylski et al., 2010; Ryan et al., 2006). These motivations relate to differential playing patterns between players (Billieux et al., 2013; Yee, Ducheneaut, & Nelson, 2012).

Several individual characteristics have been linked to patterns of MMORPG play that are detrimental to health and well-being, sometimes being classified as ‘gaming addiction’. These include clinical indicators (such as attentional or hyperactive difficulties, elevated anxiety or depressive symptoms (Caplan et al., 2009; S. H. Cole & Hooley, 2013; Hyun et al., 2015; Lo et al., 2005; Peng & Liu, 2010)), personality and cognitive factors (such as impulsivity, sensation-seeking, and poor coping skills (Chiu et al., 2004; Choi et al., 2014; Mehroof & Griffiths, 2010; Schneider et al., 2018)), and, from a motivational perspective, gaming to cope with stress, to socialise and seek validation, to achieve, for a sense of immersion, or completion, amongst many others (Ballabio et al., 2017; Beard & Wickham, 2016; Beranuy et al., 2013; Caplan et al., 2009; Hsu et al., 2009; King & Delfabbro, 2009a, 2014; Kuss et al., 2012; Kuss & Griffiths, 2012; Kwon et al., 2011; Xu et al., 2012; Zanetta Dauriat et al., 2011). However, some of the most salient aspects of vulnerability to

problematic patterns of play include difficult social experiences: loneliness (Caplan et al., 2009; Lemmens et al., 2011); introversion (Caplan et al., 2009; S. H. Cole & Hooley, 2013); low self-esteem (Hyun et al., 2015; Ko et al., 2005; Lemmens et al., 2011; Yee, 2002); low offline social self-efficacy (Jeong & Kim, 2011); and, of particular relevance here, hostile attitudes towards others (Chiu et al., 2004; Gentile et al., 2011; Kuss, 2013; Stavropoulos et al., 2017).

Specifically, hostility has been associated with problematic Internet use (Ko, Yen, et al., 2009; Kuss et al., 2013, 2014; Yen et al., 2007, 2008, 2011) and hazardous MMORPG play (Gentile et al., 2011; Stavropoulos et al., 2017), using primarily Asian samples of children (Gentile et al., 2011), adolescents (Gentile et al., 2011; Ko, Yen, et al., 2009; Stavropoulos et al., 2017; Yen et al., 2007, 2008), and college students (Yen et al., 2011), with effect sizes of medium magnitude - ranging between 0.48 to 0.66. Operationalisations of hostility vary across studies, with a common factor being thoughts or feelings of resentment or suspicion (hostile attribution) towards others (Buss & Perry, 1992; Gentile et al., 2011; Mehroof & Griffiths, 2010), though sometimes measures also encompass rage and irritability (Holi, 2003; Stavropoulos et al., 2017), or the expression and suppression of aggressive actions (Ko, Yen, et al., 2009; Lin et al., 2015; Yen et al., 2007). Whilst this link between hostility and hazardous MMORPG play can reflect how the online space offers opportunities to express hostility for some individuals (Kuss & Griffiths, 2012), more generally, it has been interpreted as indicating that hostile individuals are more likely to play MMORPGs as an escape-avoidance strategy (Stavropoulos et al., 2017; Yen et al., 2007). From this perspective, MMORPG play can be seen to operate as a coping mechanism that promotes gaming activities to the point of addiction (Kuss, 2013). Alternatively, MMORPG play may offer an accessible and practical way to compensate for significant negative real-world

challenges – e.g. lack of social stimulation – that, while producing positive benefits, can also lead to excessive play when the amount of compensation required by individuals is particularly great (Kardefelt-Winther, 2014, 2016).

Alongside this latter interpretation, research shows that MMORPG play can result in knowledge gain (Hopp et al., 2015) and development of both leadership (Yee, 2006a) and social (Ducheneaut & Moore, 2005; Visser et al., 2013) skills, particularly in groups – such as those with an autism spectrum disorder – for whom this is challenging (Gallup et al., 2017). MMORPG play can also facilitate the accumulation of social capital (Molyneux et al., 2015; Reer & Krämer, 2014; Williams et al., 2006), and some introverted players use the game as a form of compensation in order to boost their social capital (Reer & Krämer, 2017). These findings highlight how MMORPGs allow players to express themselves in ways that they find uncomfortable in offline settings (H. Cole & Griffiths, 2007) and, perhaps relatedly, that players of MMORPGs experience less social anxiety and loneliness in online (rather than offline) settings (Martončik & Lokša, 2016). These benefits, and the possibility that risk factors for problematic MMORPG play operate through compensatory mechanisms, suggest that player choices in MMORPGs and their cognitive and social benefits are linked to trait hostility. Put another way, trait hostility may be a marker for individuals who gain the most benefits from MMORPGs – through compensatory processes – or act as a block to the social benefits of MMORPGs, in line with the 'rich get richer' model of Internet use (Kraut et al., 2002). However, at present, almost nothing is known about how hostility relates to socio-cognitive benefits from play, or play-choices within MMORPGs – which may moderate any benefits – even though this may be critical to understanding the importance of trait hostility in hazardous play.

As discussed previously, the core available player activities in MMORPGs can broadly be grouped under three headings (Worth & Book, 2014): ‘Skilling’; ‘Killing’; and ‘Questing’. Possibly, for example, a preference for combat activities could positively relate to greater hostility, in contrast to the sometimes more social communal skilling activities.

Here, I surveyed players of the long-established browser-based MMORPG, *RuneScape* (Jagex, 2004). I sought to explore relationships between choices of player-roles, their trait hostility – as ‘resentment and suspicion of others’ (Buss & Perry, 1992) – and any resultant beneficial outcomes from play. Due to the lack of substantial prior work, it was hard to identify favoured directional hypotheses and predictions. However, I tested between the preliminary hypotheses that (i) trait hostility will be associated with experiencing fewer cognitive and social benefits from MMORPGs, versus, on the other hand, that (ii) reported MMORPG benefits are greater in hostile individuals. Finally, I also tested the hypotheses that: (iii) player-roles in MMORPGs are associated with differences in trait hostility; (iv) player-roles moderate the relationship between trait hostility and benefits from play; and (v) the importance placed by players on their in-game achievements relative to their real-life achievements is moderated by their levels of hostility towards others.

Study 1

Method

The study was approved by the Bangor University School of Psychology research ethics committee. At the start of the survey questionnaire, respondents read a brief participant information page and indicated their consent by clicking a single radio-button.

Recruitment and demographic information

By arrangement with Jagex, *RuneScape* players were recruited via a Twitter 'tweet' advertising the survey, a forum post on *RuneScape*'s official forum and a 'mention' in a game update-post. Recruitment was supported by an optional lottery draw for 9 one-year subscriptions to the *RuneScape 3* game. Respondents who wished to 'opt-in' and enter the draw provided their e-mail address on the final page of the survey. To preserve anonymity, survey responses and e-mail addresses were separated before data analysis. To start with, respondents answered questions regarding their gender, age, country of residence, educational attainment, and their current occupation.

Gaming (within *RuneScape*) preferences and self-reported benefits

First, respondents were asked to indicate their main *RuneScape* character role from the following options: 'Skiller'; 'Killer'; 'Quester'; or 'Other' to signal that they participated in several activities in the game and/or that the way they played *RuneScape* was not properly captured by any of the other three options; the first three options being categorisations known and used by *RuneScape* players. If respondents indicated 'Other', they were able to enter a short text description. In the main, these responses indicated a hybrid of two or more player-roles, often that they were 'Maxed' (having the top level in all skills, both combat & non-combat) or a 'completionist', meaning that they had completed – or were completing – all game content including skills, combat, and narrative challenges (Kahn et al., 2015).

Next, respondents rated how much they agreed or disagreed with the following statements*: "The skills I have gained in MMOs have helped me to achieve major things in my life."* and; "*My online relationships inside MMOs have helped my offline relationships"*, using a 10-point Likert scale with anchor points of 'Strongly disagree' and 'Strongly agree', and the term 'MMOs' indicating any/all Massively Multiplayer Online (MMO) games.

Third, respondents were asked to indicate *"How important do you regard your in-game achievements compared to achievements in other areas of your life?"* by indicating one of the following (categorical) options: 'Much less important'; 'Slightly less important'; 'No more or less important'; 'Slightly more important'; 'Much more important'.

Psychometric assessments

Respondents completed a number of self-report, psychometric assessments of socio-cognitive function. Here, I concentrate on one:

Hostility subscale of the Buss-Perry Aggression Questionnaire. The Hostility subscale of the Buss-Perry Aggression Questionnaire (Buss & Perry, 1992; Appendix A) includes 8 statements about resentment and suspicion towards other people, such as *"Other people always seem to get the breaks"* and "*I am suspicious of overly friendly strangers"*. These statements are rated for applicability using a 5-point Likert scale, together loading to offer a measure of trait hostility as the mean rating across all statements. The scale has been used in forensic and non-forensic samples to test associations between hostility and social support, inter-personal approach behaviours (Gallo & Smith, 1999), self-esteem (D'zurilla et al., 2003), and negative automatic thoughts (Ingram et al., 2007). The scale showed good internal reliability, with a Cronbach's α coefficient of .835, comparable with previously reported scores of .77-.80 (Archer & Webb, 2006; Buss & Perry, 1992; Guyll & Madon, 2003; Harris & Knight-Bohnhoff, 1996).

Data analysis

Data analysis was completed using R, aod, and SPSS (IBM Corp, 2016; Lesnoff & Lancelot, 2012; R Core Team, 2019). Five respondents were removed because of possibly unreliable survey responses (e.g. single-value or stereo-typed patterns of responding across questionnaire items). Four more were removed for duplicated submissions attached to the same e-mail address; in these cases, the original responses were retained and the duplicate responses deleted. Their inclusion (or exclusion) makes no difference to the patterns of data or statistics reported here.

Demographic variables were grouped into categories for convenience. Age was categorised on the basis of the intervals: '≤19'; '20-29'; '30-49'; '≥50'. For completed levels of education, categories were as follows: 'Primary/secondary education'; 'Partial 6th Form/University'; 'Completed 6th Form'; 'Undergraduate degree'; and 'Postgraduate degree'. Because my sample was drawn internationally, each education option included a parenthetic age guide to help non-UK respondents to use the terminology appropriately: e.g. age less than 16yr for 'Secondary school', 18yr for '6th Form', 21yr for 'Undergraduate degree'. Occupational categories included: 'Employed'; 'Student'; 'Unemployed'; 'Retired/Voluntarily unemployed'. Differences in demographics across the player-roles were tested with omnibus (with Yates correction) and nested (partitioned) χ^2 tests (Siegel, 1956).

Next, I used linear regression models to test associations between respondents' ratings of the transfer of MMO skills to real-life achievements and the benefits of online to offline relationships, on the one hand, against hostility on the other hand. I then used between-subjects analysis of variance (ANOVA) to test differences in hostility scores across player-role, with post-hoc Tukey-Kramer tests.

To test if player-role moderates the strength of association between benefits from play and hostility, I ran two multiple regressions on each of the tested benefit measures. The first included hostility and categorical dummy-coded player-role variables as predictors, and the second also included the interaction term between hostility and each of the dummy-coded player-role variables. I then compared these two regressions using an F-change likelihood-ratio test. Where appropriate to explore any moderation further, I ran simple linear regressions of benefits against hostility on each player-role.

I recoded relative importance of in-game achievements in to a binary variable of less important versus at least as important to create a meaningful binary distinction between respondents either seeing in-game achievements as less important than their achievements elsewhere, or – at the least – equal in importance. I then ran binary logistic regressions to predict category membership of this new variable, with hostility as a predictor and separate models for each player-role.

In all models, respondent was included as a random effect in the intercept and the threshold for statistical significance was set at the 5% ($p < .05$) level throughout.

Results

Of the 5,847 completed questionnaires, 1,738 respondents self-identified as Skillers, 964 as Killers, 1,331 as Questers, and 1,814 identified as Others. There were more male ($N = 4{,}954$) than female respondents ($N = 893$), χ^2 (1, $N = 5{,}847$) = 2819.155, $p < .001$. Self-identified player-roles differed markedly by gender (χ^2 (3, $N = 5847$) = 177.819, $p < .001$) (Table 2.1). Skillers were more likely to be females than Killers or Questers (partitioned χ^2 (2, $N = 4033$) = 173.764, $p < .001$). Player-roles also differed by age (χ^2 (9, $N = 5847$) = 301.350, $p < .001$)

(Table 2.1), with Skillers tending to be older than the other roles, and more reporting an age of ≥30 (partitioned χ^2 (1, N = 5847) = 220.254, p < .001). By contrast, more Killers reported ages of ≤19 years compared with the other player-roles (partitioned χ^2 (1, N = 5,847) = 53.048, p < .001).

Player-roles also differed in their levels of academic attainment (χ^2 (12, N = 5,847) = 81.006, p < .001), with more Skillers reporting completion of undergraduate or postgraduate degrees (partitioned χ^2 (1, N = 5,847) = 47.423, p < .001), but significantly more Killers having completed primary or secondary-level education and fewer having postgraduate degrees (partitioned χ^2 (2, N = 5,847) = 19.661, p < .001) (Table 2.1). Finally, employment status differed across player-roles as well (χ^2 (9, N = 5,847) = 110.204, p < .001), with Skillers being more likely to be employed or retired than other player-roles and less likely to be students than Questers in particular (partitioned χ^2 (1, N = 2,577) = 70.745, p < .001) (Table 2.1).

	Skillers (N= 1738)	Killers (N= 964)	Questers (N= 1331)	Others (N= 1814)
Male (%)	1318 (75.83)	892 (92.53)	1194 (89.71)	1550 (85.45)
Female (%)	420 (24.17)	72 (7.47)	137 (10.29)	264 (14.55)
Age				
≤19 (%)	505 (29.06)	448 (46.47)	539 (40.50)	623 (34.34)
20-29 (%)	865 (49.77)	474 (49.17)	703 (52.82)	1011 (55.73)
30-49 (%)	193 (11.10)	28 (2.90)	63 (4.73)	119 (6.56)
≥50 (%)	175 (10.07)	14 (1.45)	26 (1.95)	61 (3.36)
Education				
Primary/Secondary	454 (26.12)	317 (32.88)	377 (28.32)	521 (28.72)
Partial 6th Form/University (%)	377 (21.69)	245 (25.41)	361 (27.12)	484 (26.68)
6th Form (%)	459 (26.41)	250 (25.93)	348 (26.15)	472 (26.02)
Undergraduate degree (%)	322 (18.53)	129 (13.38)	201 (15.10)	269 (14.83)
Postgraduate degree (%)	126 (7.25)	23 (2.39)	44 (3.31)	68 (3.75)
Employment				
Employed (%)	721 (41.48)	335 (34.75)	423 (31.78)	645 (35.56)
Student (%)	591 (34.00)	422 (43.78)	619 (46.51)	695 (38.31)
Unemployed (%)	255 (14.67)	160 (16.60)	237 (17.81)	338 (18.63)
Retired/Voluntarily Unemployed (%)	171 (9.84)	47 (4.88)	52 (3.91)	136 (7.50)

Table 2.1. Counts of gender, age bands, educational attainment, and employment status of 5,847 players, recruited through a web-based survey, across the four player-roles in the browser-based MMORPG *RuneScape*; %s in brackets.

The majority of respondents (across all player-roles) had played *Runescape* for at least seven years (χ^2 (18, N = 5,837) = 35.635, p = .008), although Killers were less likely to report having played for >10 years (partitioned χ^2 (1, N = 5,837) = 10.459, p = .001) (Table 2.2). Almost all respondents were currently active, playing the game, though there was some variation between player-roles (χ^2 (3, N = 5,784) = 32.444, p = .001). The proportion of Questers (88.49%) currently playing was slightly lower than for the other player-roles (Skillers: 93.82%; Killers: 93.19%; Others: 92.47%) (partitioned χ^2 (1, N = 5,784) = 30.228, p < .001).

	Skillers (N= 1736)	Killers (N= 963)	Questers (N= 1331)	Others (N= 1807)
< 1 year	18 (1.04)	4 (0.42)	9 (0.68)	6 (0.33)
1-2 years	25 (1.44)	14 (1.45)	13 (0.98)	25 (1.38)
3-4 years	84 (4.84)	53 (5.50)	56 (4.21)	77 (4.26)
5-6 years	209 (12.04)	134 (13.91)	191 (14.35)	221 (12.23)
7-8 years	507 (29.21)	297 (30.84)	395 (29.68)	500 (27.67)
9-10 years	428 (24.65)	260 (27.00)	361 (27.12)	491 (27.17)
> 10 years	465 (26.79)	201 (20.87)	306 (22.99)	487 (26.95)

Table 2.2. Years playing in 5,837 players, recruited through a web-based survey, of the MMORPG *RuneScape*; %s in brackets. (Due to a technical error, the data of 10 respondents were missing for this item.)

Cognitive and social benefits of MMOs for hostile players

Players with the highest scores of trait hostility tended to report the strongest benefits in terms of skills gained in MMOs helping them to achieve major things in their lives (Figure 2.1A); $M = 5.617$, $SD = 2.617$, ($F(1, 5845) = 149.307$, $R^2 = .025$, $AdjR^2 = .025$, $p < .001$).

Similarly, the most hostile players reported the strongest agreement that their online relationships inside MMOs had helped their offline relationships (Figure 2.1B); $M = 5.317$, $SD = 2.837$, ($F(1, 5845) = 90.249$, $R^2 = .015$, $AdjR^2 = .015$, $p < .001$).

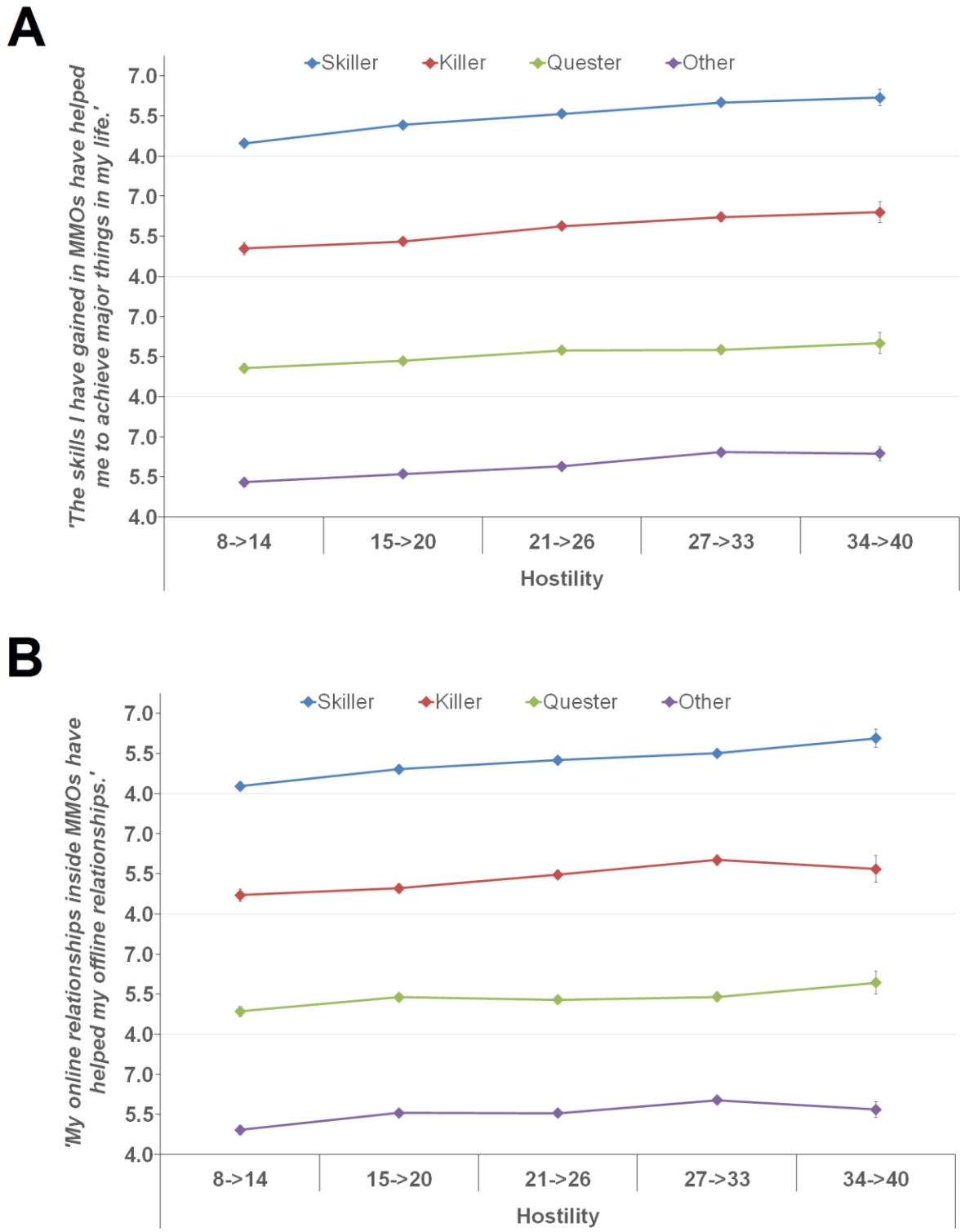

Figure 2.1. Stacked graphs of cognitive and relationship benefits of MMOs as a function of hostility, separated by player-role. (A) Rated agreement to the statement *'The skills I have gained in MMOs have helped me to achieve major things in my life'*. (B) Rated agreement to the statement *'My online relationships inside MMOs have helped my offline relationships'*. Hostility was measured by the hostility subscale of the Aggression Questionnaire (Buss & Perry, 1992); mean ± standard errors.

Hostility across player-roles

Hostility (M = 21.782, SD = 6.953) differed significantly across player-roles (F(3, 5843) = 3.614, R^2 = .002, $AdjR^2$ = .001, p = .013). Comparisons between player-roles revealed that self-identified Killers reported significantly higher hostility scores than did Skillers (p = .031) or Questers (p = .048). No other comparisons showed significant differences between player-roles (all ps > .1) (Figure 2.2).

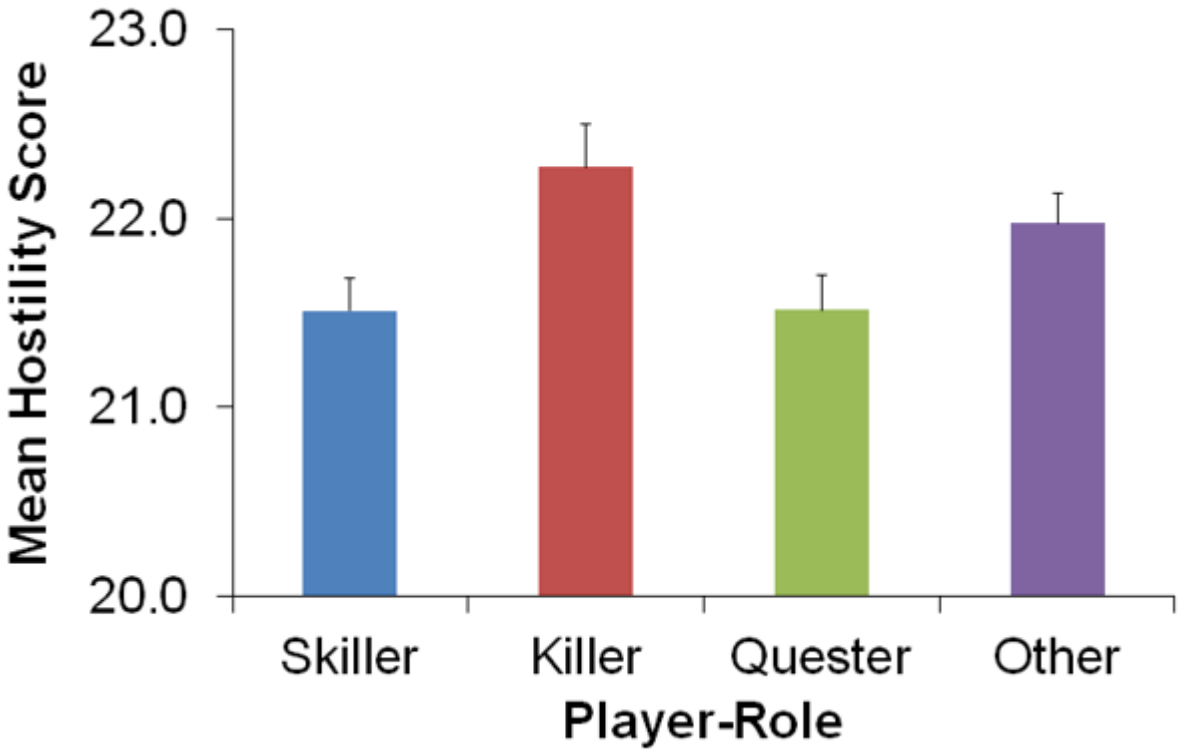

Figure 2.2. Hostility scores across player-roles of the browser-based MMORPG, Jagex's *RuneScape*. Hostility was measured by the hostility subscale of the Aggression Questionnaire (Buss & Perry, 1992); mean + standard errors.

Player-role moderation of hostility on cognitive and social benefits of MMOs

Self-reported player-role did not significantly moderate the effect of hostility on reported skill gain from MMOs ($F(3, 5839) = 2.412$, $p = .065$) (Figure 2.1A).

Player-role did, however, moderate the effect of hostility on reported relationship benefits from MMOs ($F(3, 5839) = 2.654$, $p = .047$), though only in terms of how strong this effect is, with Questers showing the weakest link (Figure 2.1B). Individual regression models for each player-role are presented in Table 2.3 to illustrate differences in slope.

	(Intercept)	**Hostility B Coefficient**	**SE**	R^2	$AdjR^2$	***F (df)***	***p***
Skillers	3.716	0.063	0.010	.025	.024	43.837 (1, 1736)	< .001***
Killers	3.881	0.067	0.013	.026	.025	25.872 (1, 962)	< .001***
Questers	4.690	0.028	0.011	.004	.004	5.992 (1, 1329)	.014*
Others	4.614	0.043	0.010	.011	.010	19.897 (1, 1812)	< .001***

Table 2.3. Regression models for each player-role of the predictor hostility on rated agreement to the statement *'My online relationships inside MMOs have helped my offline relationships'*. Hostility was measured by the hostility subscale of the Aggression Questionnaire (Buss & Perry, 1992).

Moderation of hostility on relative importance of in-game achievements

Finally, players with higher levels of hostility were more likely than players with lower levels to rate their in-game achievements as at least as important as, or more important than other life achievements; this was true for all player-roles (see Figure 2.3 & Table 2.4). Approximately half of players from each player-role viewed their in-game achievements as at least as important as their other achievements (i.e. were in the 'High Importance Group' in

Table 2.4), with increasing hostility predicting greater likelihood of being in this group as opposed to viewing in-game achievements as of lesser importance than achievements in other areas of their lives. With each upward increment in hostility score, the odds of membership of this 'High Importance Group' increased by 1.043-1.059, depending to only a limited extent on self-identified player-role (see Table 2.4).

Figure 2.3. Relative importance of in-game achievements across player-roles of the browser-based MMORPG, Jagex's *RuneScape*. Ratings to the question *'How important do you regard your in-game achievements compared to achievements in other areas of your life?'*. Hostility was measured by the hostility subscale of the Aggression Questionnaire (Buss & Perry, 1992); mean + standard errors.

	'High Importance Group' (%)	**Hostility B Coefficient**	**Exp(B)**	***Nagelkerke R^2***	***Wald χ^2 (df)***	**P(> χ^2)**
Skillers	49.60	0.058	1.059	.052	66.218 (1)	< . 001***
Killers	46.37	0.045	1.046	.031	22.090 (1)	< . 001***
Questers	44.33	0.042	1.043	.026	25.500 (1)	< . 001***
Others	50.22	0.054	1.055	.044	58.199 (1)	< . 001***

Table 2.4. Membership of the 'High Importance Group' (viewing in-game achievements as at least as important as achievements in other areas of life) and binary logistic regression models of each player-role of the predictor hostility on relative importance placed on in-game achievements. Hostility was measured by the hostility subscale of the Aggression Questionnaire (Buss & Perry, 1992).

Discussion

Here, I surveyed players of an MMORPG, *RuneScape*, to test the conjecture that hostility is related to choices of player-roles and the self-reported cognitive and social benefits of MMO play. My study has several strengths. First, I secured a high completion rate (≈80%) that provided 5,847 completed questionnaires. Most of my respondents were currently active (*RuneScape*) players (88% to 94% across the player-roles) but exhibited largely expected differences in demographic characteristics. Self-identified Skillers were more likely to be female than other roles, tended to be older, more likely to report higher educational attainments, and more likely to be in full-time employment. Killers tended to include the youngest respondents and, probably for that reason, reported lower educational attainments and, like the Questers, were more likely to be students. Slightly fewer Questers were active players, probably reflecting preferences for narrative content that can be engaged only episodically in contrast to repeatable activities of skilling or combat. These observations provide reassurance that my sample matches those of previous reports of MMORPGs (Griffiths et al., 2004; Williams et al., 2008; Yee, 2006a, 2006b).

To summarise my findings, I found that the most hostile respondents consistently reported the

most positive outcomes of MMO play, both in terms of skills gained enabling them to achieve major things in their lives and positive benefits of online for offline relationships. I also found that self-identified player-roles differed in terms of their trait hostility. Killers reported the highest levels of hostility, at a comparable level to Others. Skillers and Questers, by contrast, report the least hostility. These observations indicate that players' choices within MMORPGs can sometimes reflect adverse attitudes to others – in this instance, hostility in the sense of resentment and suspicion (Buss & Perry, 1992) – with implications for which players find which aspects of MMORPG play the most rewarding. Finally, players with the most hostile attitudes reported placing greater value on in-game achievements than did players with the lowest levels of hostility. This association was evident across all player-roles.

Trait hostility is associated with an increased vulnerability to psychological and physical ill-health in a number of populations including adolescents and young adults (Ingram et al., 2007; Miller et al., 1996; Räikkönen et al., 2003; Rutter & Behrendt, 2004; Vandervoort, 2006; Weiss et al., 2005). Hostility in adolescence is linked to mood disorders and substance misuse (Hampson et al., 2010; Ravaja et al., 2000), and to 'gaming addiction' (Chiu et al., 2004; Gentile et al., 2011; Ko, Yen, et al., 2009; Stavropoulos et al., 2017; Yen et al., 2007, 2008, 2011). One possible interpretation of the relationship between hostility and hazardous play is that it is complex, such that hostility increases problematic Internet behaviours in vulnerable individuals as an avoidance/escape-based coping strategy (Stavropoulos et al., 2017; Yen et al., 2007), while promoting hazardous patterns of Internet use that complicate cognitive and social adjustment to engender further hostility as an externalising response (Stavropoulos et al., 2017). In this context, my findings present a striking paradox by demonstrating, in a very large sample of players, that a risk factor for 'gaming addiction' is

also strongly associated with self-reported transfer of online skills to offline achievements and the positive effects of online relationships to offline relationships.

There are two ways to view these observations:

First, on the one hand, I find that hostility – here defined as 'resentment and suspicion' of others (Buss & Perry, 1992) – is linked to player-roles involving combat with game monsters or other players. Thus, MMORPGs (and other online activities involving social interactions) may offer vulnerable individuals a conduit for the expression of hostility that is unavailable, or subject to censor, in offline settings (Stavropoulos et al., 2017). I make no claims as to the proportion of my sample who might have been experiencing harms from MMORPG play or their Internet use generally. However, the observation that hostility in my sample was strongly associated with players' reports that in-game achievements were more important than their achievements in other areas of life could be indicative of potentially hazardous play or, equally, may simply capture the particular (momentary) recreational value of an enjoyed leisure activity or hobby.

Second, on the other hand, it is clear that players with the highest hostility scores also reported that the skills gained in MMOs have helped them to achieve valued goals in their own lives, and that their online relationships have helped their offline relationships. Thus, a risk factor for 'gaming addiction' – hostility – is also a marker for individuals who report cognitive and social relationship benefits of MMOs. Hostility is associated with avoidant coping styles that contribute to elevated risks of social isolation and health problems (Ingram et al., 2007; Vandervoort, 2006). Possibly, reflecting a compensatory mechanism (Kardefelt-Winther, 2014, 2016), MMORPGs offer vulnerable individuals a space in which to improve

problem-solving skills – in combat and/or questing roles (Adachi & Willoughby, 2013; Buelow et al., 2015) – and social skills through membership of structured ‘clans’ or unstructured partnerships with other players (Ducheneaut & Moore, 2005; Gallup et al., 2017). MMORPGs can also be helpful in building a form of online social capital and competence that can transfer to offline settings (Molyneux et al., 2015; Reer & Krämer, 2014, 2017; Williams et al., 2006), possibly highlighting more general benefits that accrue to players with high levels of hostility. This interpretation would be in line with the somewhat weaker association between social benefits and hostility in players identifying as Questers. This is because questing is arguably the most solitary core activity within MMORPGs, thus perhaps providing fewer opportunities to socialise through the player’s preferred core in-game activity. However, at the same time, other features of the MMORPG environment may promote over-involvement in hostile individuals, generating hazardous play that gets picked up in studies of ‘gaming addiction’ (Stavropoulos et al., 2017). Clarification of the mechanisms that mediate these associations will require careful (qualitative) study of the experiences of hostile individuals in the online space and of what it is about MMORPGs that facilitate positive effects (in terms of the development of skills and relationships).

There are inherent limitations in survey methods of the kind reported here, and inevitable areas of uncertainty. First, as with any self-report survey of a self-selected sample, I have to trust the information provided by my respondents. My main protection from idiosyncratic responding lies in the large sample size and completions; however, I acknowledge that bias in one or more of the self-identified player-roles cannot be ruled out, nor a bias in the characteristics of MMORPG players who elected to complete the survey in the first place.

Secondly, my survey involved only one MMORPG – the long-established, browser-based

game, *RuneScape* – so that the characteristics of my respondents reflect those for whom this game is the most appealing in a competitive marketplace. Therefore, I cannot rule out the possibility that my findings do not generalise to other MMORPGs. Finally, I am unable to provide any corroborating evidence about the skill transfer or offline social benefits of MMO play from players' social partners or family, although independent study involving players' family and friends could address this directly.

Notwithstanding the above uncertainties, the findings of Study 1 provide a new slant upon the choices players make within MMORPGs and the benefits that players believe they derive from these choices including both positive skill transfer to players' offline lives and, perhaps more strikingly, positive transfer from online to offline relationships. Critically, these data provide evidence that those vulnerable to patterns of play that might damage health and well-being appear to gain the most tangible benefits from these games. Hostility is a pivotal factor in terms of attitude towards other individuals and, often, social groups. My next study sought to extend research in this area by examining the relationships between player-roles and socio-cognitive benefits (on the one hand) and broader social values and political ideology (on the other hand).

Chapter 3: Social values, political ideology, player-role, and gaming experiences

In the previous chapter, I explored the relationships between a risk factor for hazardous patterns of gaming – hostility – and player-role within Massively Multiplayer Online Role-Playing Games (MMORPGs), as well as perceived benefits from play, finding that this psychological factor is indeed related to gaming preferences and outcomes. Given the potential – as previously discussed – for these accrued benefits from play to work through a compensatory mechanism – with trait hostility affecting how users may view and interact with other individuals, it may be that other factors concerning how players interact with people and view their social world relate to player-role choices and any benefits accrued. Two interesting concepts in this domain are those of social values and political ideology. Learning about links between player-roles, social values and political ideology could offer ways to understand the social and cultural impacts of MMORPGs.

Social values, identified as 'stable preferences for certain patterns of outcomes for oneself and others' (McClintock, 1978; Van Lange, De Bruin, et al., 1997), play an important role in how we interact with social partners (Au & Kwong, 2004; Van Lange, Agnew, et al., 1997; Van Lange, De Cremer, et al., 2007), how we expect them to behave (Bogaert et al., 2010; Van Lange, 1999), our political views (Joireman et al., 2010), and degree of civic engagement (Dawes et al., 2011). Simultaneously, MMORPGs have been linked to elevated levels of participation in peaceful protest (Stokes & Williams, 2018) and greater civic engagement (Dalisay et al., 2015; Hartshorne et al., 2012; Molyneux et al., 2015; Zhong, 2011).

MMORPGs can foster a sense of achievement, excitement generated by immersive experiences, and the social rewards of interacting with other players and groups (Demetrovics

et al., 2011; Sherry et al., 2006; Yee, 2006b, 2006c). Analogues of these motivations can be identified in Self Determination Theory perspectives on gaming: the expression of autonomy, competence, and relatedness (Cruz et al., 2017; Deci & Ryan, 2000; Lafrenière et al., 2012; Neys et al., 2014; Rogers, 2017; Ryan et al., 2006).

However, almost nothing is known about how MMORPG participation relates to players' social values, even though it may modulate how players experience MMORPGs and the impacts of resultant cognitive and social benefits. Given that players differ in the amounts of social capital they derive from online games (Huvila et al., 2010; Vella et al., 2015) based on their motives (Dalisay et al., 2015; Domahidi et al., 2014), it is possible that these related concepts may moderate how players derive social capital from MMORPGs (Molyneux et al., 2015). Possibly, they alter to what extent or how players interact with other players or participate in game-related groups and clans/guilds, these activities being critical to outcomes from play (Ang & Zaphiris, 2010; Bennerstedt & Linderoth, 2009; Jakobsson & Taylor, 2003; Reer & Krämer, 2014; Williams et al., 2006; Zhong, 2011). This could mean that social values and ideology are relevant to gaining benefits from play; particularly social benefits. Choice of in-game player-role may also be influenced by social values, given that some in-game activities will naturally relate more to either competition or co-operation.

Individuals' position on the liberal-conservatism (left-right) continuum can reflect tolerance of ambiguity, complexity, and openness to new experiences versus stronger preferences for order, structure, closure and certainty (Everett, 2013). Possibly, MMORPG player-roles reflect these psychological characteristics. For example, role-playing has been linked to openness (Jeng & Teng, 2008), raising the possibility of connections between low levels of conservatism and a preference for quests over other core game activities.

Although the two concepts are heavily related, conservatism can be broken down in to social and economic conservatism. Social conservatism tends towards the maintenance of moral traditions on the assumption that "political problems at bottom are religious and moral problems" (Kirk, 2001, p.8.), whilst economic conservatism involves a "dimension of attitudes that are concerned with the involvement of the government and the regulation of private enterprise in the economic lives of its citizens" (Crowson, 2009; Everett, 2013, p.1.; Kirk, 2001). Individuals may be socially conservative but economically liberal (as in some populist positions, a recent UK example being supporters of 'Lexit' (Stromme, 2017)), whilst others can be socially liberal but economically conservative (as in some forms of libertarianism (Stewart, 2017)). These combinations are represented in taxonomies such as the Nolan Chart (Nolan, 1971). Potentially, social and economic conservatism operate differently in terms of how they relate to gaming preferences and outcomes, possibly via the way individuals choose to interact and socialise with other players.

Here, I surveyed 5,847 players of the MMORPG *RuneScape* (Jagex, 2004) to explore, for the first time, relationships between choices of playing-roles and their players' social values as well as political orientation. I utilised a validated game-theoretic assessment of social value orientation to assess players' prosocial, individualist, or competitor orientations (Van Lange, De Bruin, et al., 1997), and psychometric assessments of political ideology using the 12 Item Social and Economic Conservatism Scale (SECS) (Everett, 2013). I sought to test exploratory hypotheses that individuals' social values and variation of attitudes reflecting liberalism-to-conservatism are linked to (i) players' choice of in-game roles and (ii) the self-reported benefits of MMORPG gaming.

The data reported here were collected as part of the same broader dataset reported in Study 1. I have reported this dataset across two chapters because they test hypotheses about related but actually distinct concepts: hostility to others (Study 1) versus broader social values and political ideology (Study 2). Unlike the former, these broader attitudes have not, so far, been linked with hazardous playing patterns.

Study 2

Method

The study was approved by the Bangor University School of Psychology research ethics committee. At the start of the survey questionnaire, respondents read a brief participant information page and indicated consent by clicking a single radio-button. For recruitment, demographic information, and questions relating to gaming preferences within *RuneScape* and reported benefits from play, see the previous chapter.

Psychometric measurements of social values and political ideology

Respondents completed the Van Lange Social Value Orientation (SVO) instrument (Van Lange, De Bruin, et al., 1997; Appendix B) and the SECS (Everett, 2013; Appendix C).

Van Lange Social Value Orientation (SVO) instrument. The SVO instrument (Van Lange, De Bruin, et al., 1997) consists of 9 items requiring the respondent to choose between three possible allocations of ‘point’ rewards in a hypothetical task involving an unknown ‘other’ person. The options include offering an equal split between the respondent and the ‘other’ (a prosocial decision), maximising points for the respondent at the expense of the other (an individualistic decision), or maximising the difference between the respondent’s points allocation and that of the other (a competitive decision). Respondents choosing the

same type of allocation on at least 6 out of the 9 items were categorised ‘prosocial’, ‘individualist’ or ‘competitor’. If they made fewer than 6 allocations of a single type, they were scored as ‘undifferentiated’ (Van Lange, De Bruin, et al., 1997). The SVO has previously been used extensively in student and community populations to investigate individual differences and associations with willingness to self-sacrifice in close relationships (Van Lange, Agnew, et al., 1997), co-operative behaviours (Balliet et al., 2009; Bogaert et al., 2010), and altruism (Van Lange, Bekkers, et al., 2007).

12 Item Social and Economic Conservatism Scale (SECS). The SECS (Everett, 2013) is a 12-item measure of political orientation and/or ideology along the single ‘left-right’ dimension of social and economic conservatism. Respondents rate (on a scale of between 0 and 100) their positivity or negativity towards so-called ‘peripheral’ topics, such as abortion, patriotism, business, and welfare benefits, that reflect a core political outlook. Seven of the scale’s items load on to a factor of social conservatism and five load on to a factor of economic conservatism (Everett, 2013). For both factors, scores from the relevant questions are averaged and divided by 10 to give final factor scores on a scale of 0-10. The measure builds upon research showing that a need for order, structure, closure and sometimes dogmatism is linked with conservative cognitions and, particularly, certainty and fear of threat in relation to right-wing authoritarianism (Everett, 2013; Thórisdóttir & Jost, 2011), and that liberal cognitive styles are associated with higher tolerance of ambiguity and openness to experience (Jost et al., 2003). The SECS has been used to test associations between political orientation and sexual behaviour (Marren, 2016), cognitive ability (Saribay & Yilmaz, 2017), and sensitivity to change (Delmonico, 2016). In my sample, the two SECS subscales of social and economic conservatism showed only a moderate correlation with each other: 0.37. Cronbach’s α coefficients for the Social subscale of the SECS, the Economic

subscale of the SECS, and the combined SECS score were .787, .507, and .767 respectively, indicating good-to-moderate internal consistency. These are somewhat lower than reported in the original validation study (Social: .87; Economic: .70; and combined: .88) (Everett, 2013), though closer to internal consistency scores published in other studies (Social .75-.89, Economic .58-.69) (Flournoy, 2018; Kerry & Murray, 2018; Saribay & Yilmaz, 2017).

Data analysis

Data analysis was completed using R and SPSS (IBM Corp, 2016; R Core Team, 2019). For respondent deletions, see previous chapter.

First, I compared player-roles on their social value orientation categories using omnibus and nested (partitioned) χ^2 tests (Siegel, 1956). Next, I used between-subjects analysis of variance (ANOVA) to examine the differences in social and economic SECS scores across player-roles, and differences in both the transfer of MMO skills to real-life achievements and the benefits of online to offline relationships across SVO categories. Where appropriate, I ran post-hoc Tukey-Kramer tests.

To test if and how self-reported benefits from playing MMOs relate to political ideology, I used multiple regressions to test associations with the two measures of benefits. In separate pairs of models for each benefit as an outcome variable, the first model contained social and economic SECS scores as main effect predictors, whilst the second model also included the interaction term between the two. In each case, I then compared these two models using an F-change likelihood-ratio test.

To further explore the complex relationship between political ideology and self-reported

benefits from play, I included a post-hoc categorisation of respondents on the basis of their SECS scores. For convenience, I designated respondents whose scores fell in the bottom quartile of both the social and economic conservatism subscales as 'Liberal-Left', with the same logic applying to 'Authoritarian', 'Libertarian', and 'Conservative-Right'; following the design of a Nolan chart (Nolan, 1971), all remaining respondents fell into the 'Centrist' group. The validity of these categorisations was tested against SVO using omnibus and nested (partitioned) χ^2 tests (Siegel, 1956). Differences in benefits between the political ideology groupings were tested with ANOVA and, where appropriate, post-hoc Tukey-Kramer tests.

The threshold for statistical significance was set at the 5% ($p < .05$) level throughout.

Results

Details and discussion of respondents' *RuneScape* histories and socio-economic characteristics are provided in the previous chapter.

Social values and political ideology across player-roles

Based upon their SVO choices (Van Lange, De Bruin, et al., 1997), all player-roles were most likely to be categorised as prosocial (65-71%; Table 3.1), well-above the median and close to the upper bound values (46% and ≈73%) observed in student and other populations (Au & Kwong, 2004). Although an omnibus χ^2 test of SVOs across the four player-roles only approached significance (χ^2 (9, N = 5,847) = 16.194, p = .063), an additional comparison showed significantly fewer prosocials, but marginally more individualists and more competitors among the Killers compared with the other groups combined (Table 3.1)

(partitioned χ^2 (3, N = 5,847) = 10.209, p = .017).

	Skillers (N=1738)	**Killers (N=964)**	**Questers (N=1331)**	**Others (N=1814)**
Prosocial	1193 (68.64)	629 (65.25)	932 (70.02)	1293 (71.28)
Individualist	260 (14.96)	151 (15.66)	206 (15.48)	245 (13.51)
Competitor	101 (5.81)	72 (7.47)	71 (5.33)	109 (6.01)
Undifferentiated	184 (10.59)	112 (11.62)	122 (9.17)	167 (9.21)

Table 3.1. Numbers of 5,847 prosocial, individualist, competitor, and undifferentiated players across player-roles of the MMORPG *RuneScape*; %s in brackets.

Social conservatism (M = 5.349, SD = 1.880) differed significantly across player-roles (F(3, 5843) = 12.994, R^2 = .007, $AdjR^2$ = .006, p < .001). Comparisons between player-roles revealed that self-identified Questers reported significantly lower social conservatism scores than did any other player-roles (all ps < .001). No other groups differed significantly in terms of social conservatism when compared to each other (all ps > .1) (Figure 3.1A).

Economic conservatism (M = 5.566, SD = 1.452) also differed significantly across player-roles (F(3, 5843) = 8.038, R^2 = .004, $AdjR^2$ = .004, p < .001). Comparisons showed that Questers again reported the lowest levels of economic conservatism, significantly lower than Killers (p < .001) and Others (p = .001), though not Skillers (p > .2). Skillers, in turn, reported significantly lower economic conservatism scores than Killers (p = .020). No other comparisons between player-roles were significant (all ps > .2) (Figure 3.1B).

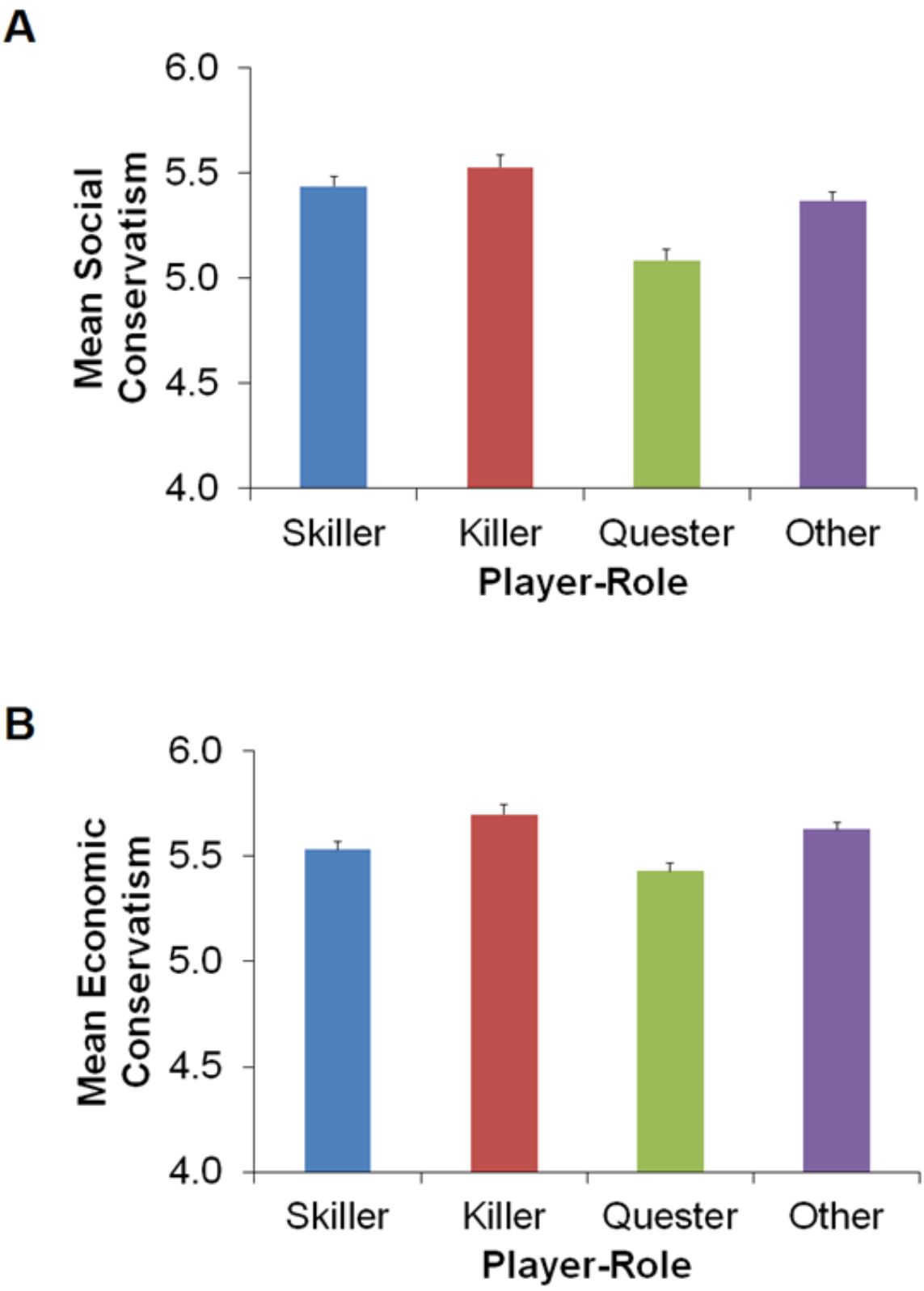

Figure 3.1. Social conservatism scores (A) and economic conservatism scores (B) across player-roles of 5,847 players of the MMORPG *RuneScape*. Social and economic conservatism were measured by the Social and Economic Conservatism Scale (Everett, 2013); mean + standard errors.

Cognitive and social benefits of MMOs by social value orientation (SVO)

The extent to which players felt that the skills they had gained in MMOs had helped them to achieve other major things in their lives differed significantly across SVO ($F(3, 5843) = 2.898$, $R^2 = .001$, $AdjR^2 = .001$, $p = .034$). Comparisons between SVO categories revealed that respondents identified as individualists by the SVO assessment tended to report lower levels of transfer of MMO skills to achievements in other areas compared with respondents identified as undifferentiated ($p = .018$). No other comparisons between SVO categories showed significant differences (all ps > .1) (Figure 3.2A).

The extent to which players felt that their online relationships inside MMOs produced benefits for their offline relationships also varied significantly based on SVO ($F(3, 5843) = 7.161$, $R^2 = .004$, $AdjR^2 = .003$, $p < .001$). Comparisons also showed that respondents categorised as individualists reported substantially reduced benefits from their online MMO relationships relative to prosocial ($p < .001$) and undifferentiated ($p = .001$) players. There were no other significant differences between SVO categories (all ps > .1) (Figure 3.2B).

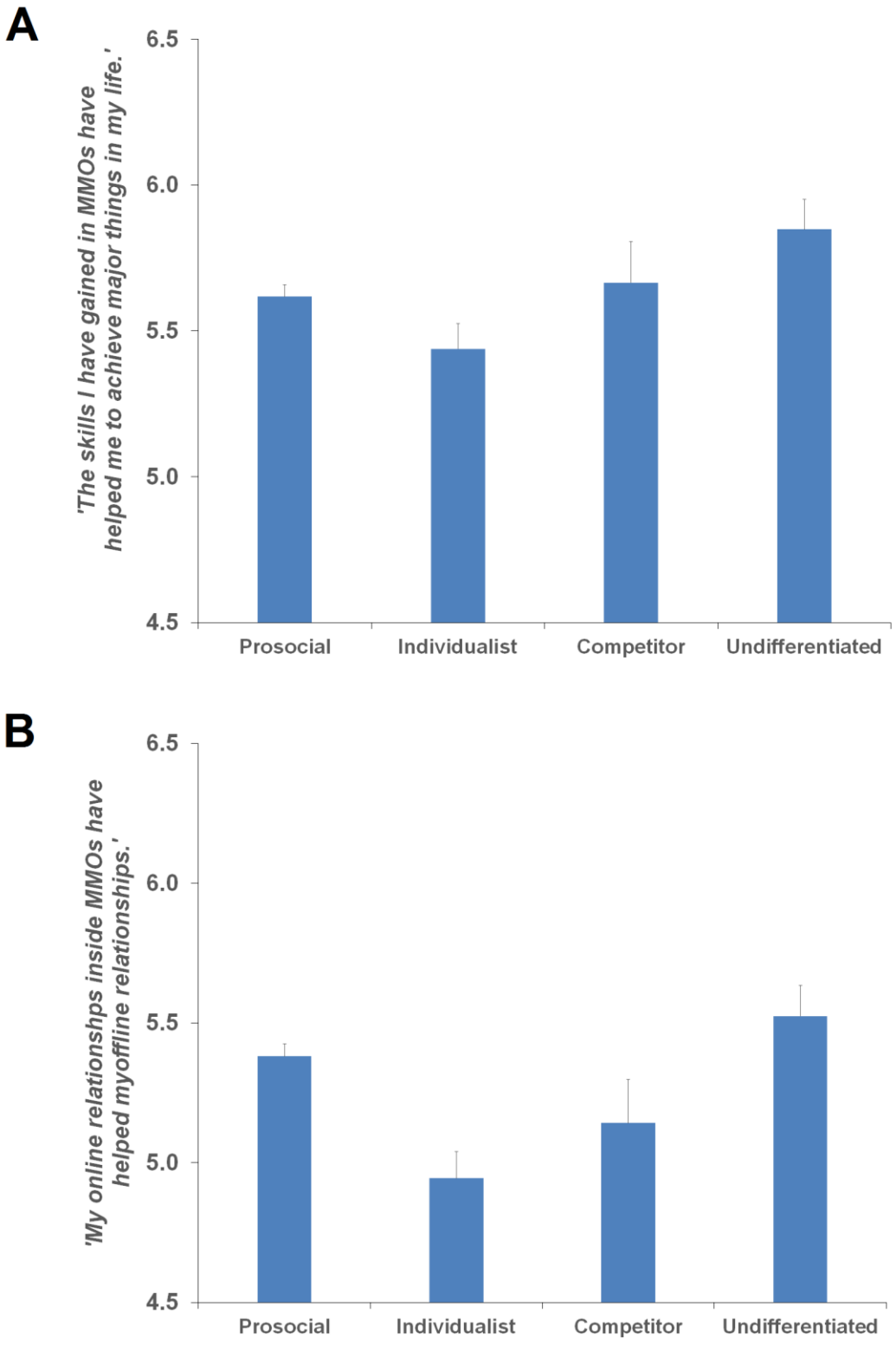

Figure 3.2. Cognitive and relationship benefits of MMOs as a function of social value orientation (Van Lange, De Bruin, et al., 1997) in 5,847 players of the MMORPG *RuneScape*. Rated agreement to the statement *'The skills I have gained in MMOs have helped me to achieve major things in my life'* (A) Rated agreement to the statement '*My online relationships inside MMOs have helped my offline relationships'* (B); mean + standard errors.

Cognitive and social benefits of MMOs as a function of political ideology

The interaction term between social and economic conservatism significantly contributed to explaining variance in the extent to which players felt that the skills gained in MMOs had helped them to achieve major things in their lives ($t(5843) = 4.610$, $p < .001$). The inclusion of this interaction term significantly improved the model ($F(1, 5843) = 21.253$, $p < .001$).

The interaction term between social and economic conservatism was also a contributing factor in to what extent players felt that their online relationships in MMOs had helped their offline relationships ($t(5843) = 3.243$, $p = .001$). Again, the inclusion of this interaction term significantly improved the model ($F(1, 5843) = 10.514$, $p = .001$).

A Nolan categorisation based upon the two subscale scores of the SECS demonstrated that 1,679 out of the 5,847 respondents fell into one of the four groups: Liberal-Left; Libertarian; Authoritarian; and Conservative-Right (Table 3.2). All remaining respondents fell into the control group as 'Other'. The distribution of these categories differed across player-roles (χ^2 (12, N = 5,847) = 44.979, $p < .001$). There were significantly more Liberal-Left (12.62%) and fewer Conservative-Right (8.34%) respondents among the Questers in contrast to the Killers who had the fewest Liberal-Left respondents (6.43%), and Skillers who had the most Conservative-Right respondents (2.72%) (partitioned χ^2 (4, N=4,033)=37.095, p<.001).

	Skillers (N=1738)	**Killers (N=964)**	**Questers (N=1331)**	**Others (N=1814)**
Liberal-Left	186 (10.70)	62 (6.43)	168 (12.62)	160 (8.82)
Libertarian	68 (3.91)	44 (4.56)	50 (3.76)	71 (3.91)
Authoritarian	73 (4.20)	38 (3.94)	42 (3.16)	66 (3.64)
Conservative-Right	221 (12.72)	110 (11.41)	111 (8.34)	209 (11.52)
Other	1190 (68.47)	710 (73.65)	960 (72.13)	1308 (72.11)

Table 3.2. Numbers of 5,847 players of the MMORPG *RuneScape* self-identifying as Skillers, Killers, Questers, and Others, against categorisation (by scores falling in the top and bottom quartile of both the social and economic conservatism subscales of the Social and Economic Conservatism Scale to identify respondents as 'Liberal-Left', 'Authoritarian', 'Libertarian', and 'Conservative-Right'), following the design of a Nolan chart; %s in brackets.

The above groupings also showed good face-validity; I found significant differences in the distribution of social value orientations (Van Lange, De Bruin, et al., 1997) across my categorisation of respondents as Liberal-Left, Authoritarian, Libertarian and Conservative-Right (χ^2 (12, N = 5,847) = 29.029, p = .004). There were more prosocials (73.61%) and fewest undifferentiated (5.90%) among the Liberal-Left respondents compared with Authoritarian respondents, who had the highest proportion of undifferentiated (13.70%) (partitioned χ^2 (4, N= 5,847) = 15.693, p= .003). Libertarians were the most likely to be scored as individualist (19.74%) (partitioned χ^2 (1, N = 5,847) = 4.827, p = .028) while the Conservative-Right respondents were the most likely to be competitors (7.99%) (partitioned χ^2 (1, N = 5,847) = 4.913, p = .027).

Players' self-reported skills benefits differed significantly by political ideology grouping (F(4, 5842) = 5.092, R^2 = .003, $AdjR^2$ = .003, p < .001). Players categorised as Liberal-Left reported having gained significantly less than did Libertarians (p = .003) or Centrists (p = .001) (Figure 3.3A). The extent to which players felt their online relationships had benefitted their offline relationships also varied by political ideology grouping (F(4, 5842) = 3.246, R^2 = .002, $AdjR^2$ = .002, p = .011). Liberal-Left players reported fewer social benefits than did Libertarians (p = .014). Libertarians also reported greater benefits than did Authoritarian players, though this difference missed significance when controlling for multiple comparisons (p = .066) (Figure 3.3B).

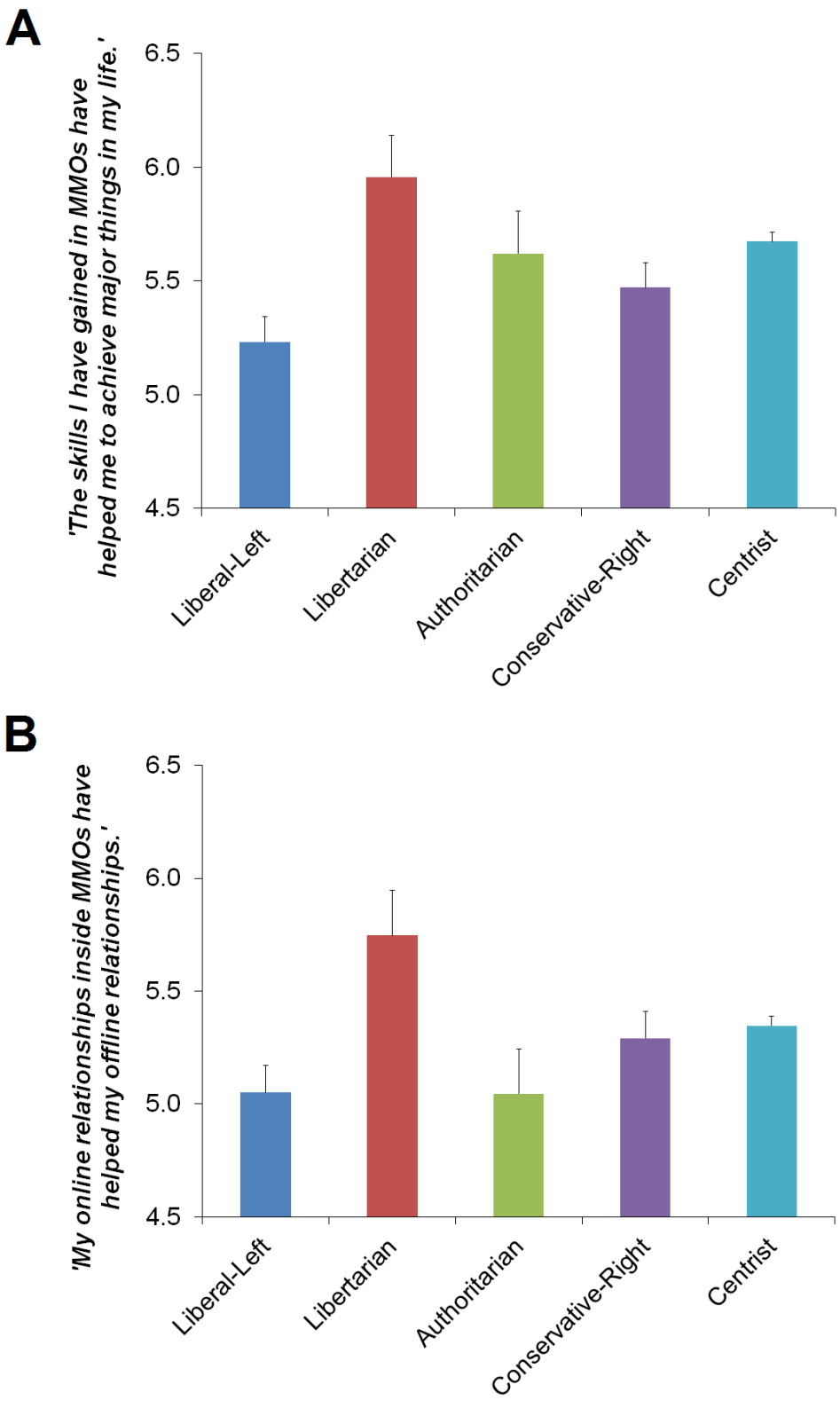

Figure 3.3. Cognitive and relationship benefits of MMOs across political ideology categorisations (Nolan, 1971) in 5,847 players of the MMORPG *RuneScape*. Rated agreement to the statements *'The skills I have gained in MMOs have helped me to achieve major things in my life'* (A) and '*My online relationships inside MMOs have helped my offline relationships'* (B); mean + standard errors.

Discussion

Study 2 surveyed players of an MMORPG, *RuneScape*, to test the hypotheses that players' choices of player-roles and the self-reported cognitive and social benefits of MMO play reflect their social values and their political orientation. These data have several strengths, as discussed in further detail in the previous chapter. As a summary: I secured a high completion rate (≈80%) of 5,847 mostly currently active (*RuneScape*) players (88% to 94% across the player-roles) who exhibited differences in demographic characteristics consistent with previous reports of MMORPGs (Griffiths et al., 2004; Williams et al., 2008; Yee, 2006a, 2006b)

I found only limited differences in social value orientation of respondents who self-identified as 'Skillers', 'Killers', 'Questers' or 'Others', with at least 65% of each player-role being classified as having a prosocial outlook (Van Lange, De Bruin, et al., 1997). No doubt, this reflects my sample being drawn from a long-established MMORPG, with a strong and well-recognised community ethic. However, respondents who self-identified as Killers did show a marginal increase in the number classified as individualists or competitors, possibly reflecting their preferences for combat aspects of MMORPG play. That respondents who reported individualist values reported the least benefits of MMOs possibly suggests an unwillingness to engage with others in ways that foster skill and relationship development in a multiplayer gaming context.

The limited differences in patterns between social and economic conservatism scores across the *RuneScape* player-roles is consistent with the broad position that these two dimensions capture aspects of a single construct of political ideology (Henningham, 1996). Nonetheless, my findings show that – within a sample of players exhibiting broadly prosocial social value

orientations – players who self-identified as Killers tended to be the most socially and economically conservative whilst Questers tended to be the most liberal. So, preferences for combat activities seem to be linked to the cognitive and learning processes that prioritise order, structure, certainty and sometimes dogmatism (in conservatism) whilst questing seems linked to tolerance of ambiguity, complexity and openness to new experiences (in liberalism) (Everett, 2013).

The interaction between social and economic conservatism suggests the association between the benefits of MMOs and political ideology is moderated in complex ways. My categorisation of sub-groups of respondents who scored in the top or bottom quartiles of social and economic conservativism as 'Liberal-Left', 'Libertarian', 'Authoritarian', or 'Conservative-Right', in line with the Nolan Chart, attempted to explore this relationship further. Out of all four groups, it was the Libertarians who reported the strongest benefits in terms of positive transfer of MMO skills to offline achievements and, especially, in terms of online relationships benefiting offline relationships, whilst the Liberal-Left respondents reported the least. Further work is required to examine whether these findings remain stable and explore how the interplay between social and economic conservatism-liberalism affects accrued or perceived benefits from play. Possibly, as economic conservatism tends more towards support of the free market – a fiscally 'neoliberal' position which could be seen as a form of liberal thinking – the interaction between both socially liberal and economically neo-liberal views promotes actual or perceived benefits from play, as seen in the Libertarian group.

As discussed in the previous chapter, the kind of study reported here naturally has inherent limitations and inevitably leaves areas of uncertainty. In addition to the more general

limitations I discussed there, measurements of liberalism-conservatism that rely on individual responses to ‘peripheral’ issues such as family values, abortion, and gun ownership etc. have a finite ‘shelf-life’ (Everett, 2013; Henningham, 1996), so that my findings reported here will lose their relevance as political discourse changes over time and new ‘peripheral’ issues emerge.

Notwithstanding the above uncertainties, my findings provide a new slant upon the choices players make within MMORPGs and the factors that determine the benefits that players believe they derive from these choices, including positive skill transfer to offline lives and positive transfer from online to offline relationships. Studies of this nature can aid in understanding the diversity of social values in MMORPG players, and can inform discussion of the broader impacts of MMOs including game-evoked aggression inside and outside gaming environments (Anderson et al., 2010; Tear & Nielsen, 2013), gender stereotyping (Burgess et al., 2007; Kaye & Pennington, 2016), and the ethical status of in-game choices (Whitty et al., 2011). They can also inform discussion of the cultural impacts of MMORPG narrative content (Schaap & Aupers, 2016) that include claims, for example, that, as they attempt to mirror the material world, MMORPGs act as tools of hegemony, reinforcing political norms (Weihl, 2015).

Chapters 1 and 2 highlight the variation between both player-roles in MMORPGs and self-reported benefits as a function of hostility, social values, and political ideology. In the next two chapters, I switch focus from the large, time-intensive, and broadly social environment of MMORPGs to the more neglected realm of casual games, with the aim of characterising associations between gaming behaviours and self-reported benefits (on the one hand) and cognitive and attentional factors (on the other).

Chapter 4: Casual games, daydreaming frequency, action identification, and gaming motivations

Chapters 2 & 3 investigated interpersonal, social and political factors relating to Massively Multiplayer Online Role-Playing Games (MMORPG) players' gaming preferences and experiences, focusing on their self-reported benefits. In this Chapter, I address another important aspect of gaming: players' conceptions of their behaviour and attentional focus. Here, I explored this aspect in the domain of more casual games, where players tend to be less invested in one particular game over a long period of time.

Casual games have been described within the industry as *"Games that generally involve less complicated game controls and overall complexity in terms of gameplay or investment required to get through game"* (Wallace & Robbins, 2006). They are typically easy to pick up and offer quick feedback/reinforcement (Kuittinen et al., 2007). Casual games cover a wide variety of different genres; puzzle, role-playing (RPG), arcade, strategy, and action to name but a few (Kultima, 2009; Wallace & Robbins, 2006). Casual games are the most popular type of gaming (Limelight Networks, 2019), with 71% of American gamers playing them (Entertainment Software Association, 2019). Mobile and browser game revenues combined are estimated to be $72bn in 2019 (Wijman, 2019). Despite this, casual games have been under-studied in academia in favour of MMORPGs, RPGs, and first-person shooters (FPSs) (Chess & Paul, 2019; Consalvo, 2009)

Despite their moniker of being 'casual', 27% of players of casual games spend on average more than 10hrs per week playing them (Eklund, 2017). Whilst the games themselves may be termed 'casual' in nature, requiring little time-commitment, it is important to emphasise that players of casual games are not necessarily casual in their playing patterns (Chess & Paul,

2019; Consalvo, 2009; Kuittinen et al., 2007; Kultima, 2009; Russoniello & Parks, 2009). Other data indicate that casual games are more commonly associated with female players (GamesIndustry International, 2006; Kuittinen et al., 2007; Kultima, 2009; Wallace & Robbins, 2006; Wohn, 2011), leading to suggestions that description of such games, and the players who play them, as 'casual' is rooted in sexism (Chess & Paul, 2019; Eklund, 2017). Possibly, this reflects women being more likely to play casual games due to having more fragmented free time (Kultima, 2015; Winn & Heeter, 2009). Players of casual games also tend to be older than amongst the wider gaming community, with women between 35-50 years old being highlighted as one particularly large demographic (Kuittinen et al., 2007; Wallace & Robbins, 2006), alongside older or retired individuals (GamesIndustry International, 2006; Russoniello & Parks, 2009). However, older and younger players' motivations to play games are mostly congruent, exhibiting motivations including challenge, escapism, relaxation, and completionism (Possler et al., 2017).

Potential beneficial uses of casual games include improved mood and reduced stress (GamesIndustry International, 2006; Russoniello et al., 2009; Russoniello & Parks, 2009). There is some limited evidence that casual game play could be used as a treatment method for state anxiety (Fish et al., 2018) and clinical depression symptoms (Russoniello et al., 2013), including treatment-resistant depression symptoms (Russoniello et al., 2019).

Daydreaming and casual games

Whilst gaming in general is seen as a highly immersive experience (Brown & Cairns, 2004; Cairns et al., 2014; Christou, 2014), some casual games require less attentional focus than traditional games (Kultima, 2009) and thus could be played as a secondary activity whilst engaging in stimulus-independent thought (Smallwood & Andrews-Hanna, 2013). High

levels of engagement with video games are associated with positive-constructive styles of daydreaming which promote problem-solving (Dauphin & Heller, 2010). In this chapter, I examine the relationships between casual games and frequency of daydreaming. A distinction can be made between the more general concept of mind-wandering – which can act as somewhat of a barrier to engaging in sustained attention (Allan Cheyne et al., 2009) – and daydreaming. In the latter, topics arising from self-generated thoughts can be maintained to create a train of mental activity, rather than as mere interruptions (Smallwood, 2013b). Daydreaming can largely involve prospective thought (D'Argembeau et al., 2011), especially when the task at hand does not require undivided attention (Smallwood et al., 2009), and is often related to an individual's current concerns, enabling anticipation and planning for future goals (Mooneyham & Schooler, 2013). Hence, it is possible that frequent daydreamers may seek out casual games which they can engage in in parallel to their other tasks.

Equally, daydreaming is associated with enhanced levels of creativity (Dietrich, 2007; Singer & McCraven, 1961), including incubation (Mooneyham & Schooler, 2013). Previously, I found that, in a sample of MMORPG players, those choosing an in-game role which involved puzzles and narrative challenges (Questers) were more frequent daydreamers than players with other preferences for combat or skill-acquisition (C. Smith et al., 2019), and so individuals who play casual games may also show a preference for casual games with a focus on the same sort of content. Here, I sought to test this conjecture.

Action identification and casual games

Action identification theory holds that behaviours can be represented in a number of ways, from low-level composite actions which make up the behaviour, through to superordinate structures of high-level goals to which the behaviours are directed (Vallacher & Wegner,

1987). The level of identification adopted by an individual for any different behaviour will depend on contextual cues based on task complexity in order to balance understanding of required actions with effective maintenance of those actions. Hence, completion of complex tasks is aided by representation in low-level terms to promote understanding, whilst completion of simple tasks is aided by specification in high-level terms which facilitate mastery (Bandura & Schunk, 1981; Pham & Taylor, 1999; Ritts & Patterson, 1996; Stock & Cervone, 1990; Vallacher & Wegner, 1987). Critically for my purposes, individuals show a stable tendency to represent behaviours in more action- or goal-oriented terms relative to each other, and this can be measured by means of the Behavior Identification Form (BIF) (Vallacher & Wegner, 1989).

Previously, I showed that MMORPG players with a preference for puzzles and narrative challenges tended to be more action-oriented in their behaviour attributions than other players (C. Smith et al., 2019). Simultaneously, goal-orientation was associated with increased enjoyment of in-game activities. This was particularly the case amongst players with a focus on collecting or using in-game resources to gain competence in non-combat in-game skills through often repetitive, low-demand tasks which offer settings in which players can socialise (Skillers), and also amongst players who engage in a mixture of these non-combat tasks, combat, and engaging in narrative challenges. Hence, players of casual games who are more action-oriented may seek out different genres of games – perhaps in a similar way to more frequent daydreamers – whilst more goal-oriented players may choose to engage in a wider variety of genres (C. Smith et al., 2019).

This is supported by other research in the gaming domain, which has shown that the tendency to identify behaviours in terms of goals is positively associated with increased gaming time,

participation in a greater number of gaming subgenres (Ewell et al., 2018), greater perceived skill level in RPGs (Matthews, 2015) and success in FPSs (Ewell et al., 2018). In line with goal-orientation promoting mastery, 'expert' game players view in-game behaviours more in terms of goals than do novices (Ewell et al., 2018).

Goal-orientation is related to increased self-reported skill development and social benefits from Massively Multiplayer Online game (MMO) play, but also to placing a lower importance on in-game achievements. This is true regardless of the individual's chosen in-game preferences in terms of MMORPG player-role and activities – be it for non-combat tasks, combat, narrative challenges, or the aforementioned hybrid of all three (C. Smith et al., 2019). Hence, a tendency to view behaviours in lower- or higher-level terms appears strongly relevant to individuals' self-reported benefits of gaming over the longer-term. It would thus be interesting to explore whether the same holds true amongst players engaging in a different type of gaming in which extended time-commitments and complexity of controls are more minimal.

Motivations for play

Research on how gaming motivations relate to gameplay have primarily focused on MMOs, particularly MMORPGs and their forerunners Multi-User Dungeons (MUDs) (Bartle, 2010), with a plethora of different models of motivations in existence (Boyle et al., 2012), including those derived from Bartle's (1996) theoretical 'types of players' (Yee, 2006c, 2019; Yee, Ducheneaut, & Nelson, 2012), uses & gratifications theory (Jansz et al., 2010; Lucas & Sherry, 2004), and self-determination theory (Deci & Ryan, 2000; Lafrenière et al., 2012; Ryan et al., 2006), amongst others sometimes derived from qualitative data collected from players (Boyle et al., 2012; Demetrovics et al., 2011; Frostling-Henningsson, 2009) (see

Chapter 1 for details).

Typically, models of gaming motivations include the excitement from in-game exploration/immersion, a sense of achievement from advancing through game structures or beating other players in combat, socialising, and escapism, amongst others (Bartle, 1996; Yee, 2006b, 2006c). Indeed, these motivational structures have been used to define theoretical 'types' of players (Bartle, 1996) drawn to certain content within games offering a variety of in-game activities. Subsequent research has highlighted that gaming motivations reflect choice of activity within a game (Yee, Ducheneaut, & Nelson, 2012), and that there are motivational differences between players of different genres of game, such as FPS players being more motivated by achievement, RPG players by immersion (Ghuman & Griffiths, 2012), and players of sports or fighting games being more driven by competition than are others (Sherry et al., 2006). Whilst the bulk of research has focused on MMO players, it is reasonable to suppose that these motivational differences could also be expressed in genre preferences and experiences of individuals playing casual games, a form of gaming where players spend less time on any one particular game.

The Gaming Motivation Scale (GAMS) (Lafrenière et al., 2012) is derived from Self-Determination Theory (SDT) (Deci & Ryan, 1985, 2000; Ryan et al., 2006) and assesses six types of an individual's motivation to play. These are: Intrinsic Motivation, whereby playing the game is its own reward; Integrated Regulation, where playing aligns with other life goals and the choice to do so is integrated in to a wider organisation of the self; Identified Regulation, where playing helps to achieve other goals or because it has personal meaning; Introjected Regulation, whereby playing helps to avoid/manage internal pressures such as anxiety, or where the absence of playing would cause irritation or restlessness; External

Regulation, whereby playing brings other rewards – be they in-game such as virtual currency or levels, or personal, such as admiration or recognition; and Amotivation, whereby an individual may no longer know why they play. An SDT-driven approach, being less strongly linked to specific opportunities offered by games than are some other models, could thus be particularly informative in guiding understanding of how players with differing motivations for gaming engage in casual games.

Here, I sought to explore the relationships between play of casual game genres and their self-reported benefits (on the one hand) and variation in daydreaming frequency, action identification, and gaming motivations with gaming behaviours and experiences amongst players of casual games (on the other hand). Across two web-based surveys linked to commercial casual gaming sites and discussion forums, I collected samples of players of predominantly browser-based casual games – one subset of the wider casual gaming sphere (Kultima, 2009).

In the absence of any widely accepted taxonomy of genres of casual games (Eklund, 2017; Kuittinen et al., 2007; Mortensen, 2009), I developed my own taxonomy used in these studies in collaboration with the owner of two online casual game hosting websites, Gaz Thomas (http://gazthomas.com/). The taxonomy consisted of: Combat; Sports; Arcade; Strategy; CCG (Collectible Card Game); Puzzle; Point-and-Click Adventure (PaCA); Simulator; Idle-Clicker; RPG. CCGs are games in which players acquire ‘cards’, adding them to their personal collection, then putting together a ‘deck’ which they can use to challenge other players or the AI (Artificial Intelligence) in a match. PaCAs are adventure games in which players solely use a point-and-click interface, such as a mouse, to interact with and move their character around in an environment, and collect items, with the player needing to figure

out when is the right time to use those items on other objects in the environment.

I conjected that: players of combat, sports, and arcade players would group together in an 'Action' category; strategy and CCG players in a 'Tactical' category; puzzle and PaCA players in a 'Problem-Solving' category; simulator and idle-clicker players in an 'Incremental' category; whilst RPG players would be somewhat separate. However, rather than impose my conjected groupings on the data, I chose to utilise a data-driven approach to forming groupings of players based on their chosen genres of casual games, similar to the successful identification of sub-groups of online gamblers from surveys of Internet gambling services (Lloyd et al., 2010).

Study 3

Method

The study was approved by the Bangor University School of Psychology research ethics committee. At the start of the survey questionnaire, respondents read a brief participant information page and indicated their consent by clicking a single radio-button.

Recruitment

By arrangement with Gaz Thomas, owner of two online casual game hosting websites – www.freegames.org and thegamehomepage.com – online casual game players were recruited through a banner placed on both sites. Participants were also recruited through forum posts on two other similar websites, these being www.kongregate.com and www.freeworldgroup.com. Recruitment was supported by an optional lottery draw for one prize of an Amazon Kindle Fire HD 10. Respondents who wished to 'opt-in' and enter the

draw provided their e-mail address on the final page of the survey. To preserve anonymity, survey responses and e-mail addresses were separated before data analysis.

Gaming questions

Respondents were asked to indicate how frequently they play casual browser/mobile format games of 10 different genres by indicating one of the following options: ‘Daily’; ‘Several times a week’; ‘About once a week’; ‘About once a month’; ‘A few times a year’; ‘Never’. The genres asked about were: Combat; RPG; Strategy; Puzzle; Simulator; Sports; CCG (Collectible Card Game); Point-and-Click Adventure; Idle-Clicker; Arcade.

Participants were also asked to indicate which of the above genres – if any – was their favourite in casual browser/mobile format, and how long they play their favourite genre for in an average play session. Participants could select one of: ‘Up to 30 minutes’, ‘30-60 minutes’; ‘60-90 minutes’; ‘90-120 minutes’; ‘2-3 hours’; ‘3-4 hours’; ‘4-6 hours’; ‘Over 6 hours’.

Participants were asked questions about their gaming behaviours and experiences.

First, the question of *“Have you played any multiplayer online games in the last 12 months, or solely single-player games?”*, using binary options of: ‘Multiplayer online games’; ‘Solely single-player games’.

Second, respondents answered *‘How important is gaming to you?’*, by indicating one of the following categorical answers: ‘Very unimportant’; ‘Fairly unimportant’; ‘Fairly important’;

'Very important'.

Third, respondents were asked to indicate *'How important do you regard your in-game achievements compared to achievements in other areas of your life?'* by choosing one of the following categorical options: 'Much less important'; 'Slightly less important'; 'No more or less important'; 'Slightly more important'; 'Much more important'.

Fourth, respondents also rated how much they agreed or disagreed with the statement *'The skills I have gained in casual browser/mobile format games have been useful in my life.'* using a 10-point Likert scale with anchor points of 'Strongly disagree' and 'Strongly agree'.

Demographics

Next, respondents answered questions regarding their gender, age, country of residence, educational attainment, and their current employment status.

Psychometric assessments

Participants then completed the Daydreaming Frequency Scale (DDFS) (Giambra, 1993; Appendix D), Behavior Identification Form (BIF) (Vallacher & Wegner, 1989; Appendix E), and the Gaming Motivation Scale (GAMS) (Lafrenière et al., 2012; Appendix F).

Daily Daydreaming Frequency Scale (DDFS). The DDFS (Giambra, 1993) – a subscale of the Imaginal Processes Inventory (Singer & Antrobus, 1970) – is a 12-item measure of daydreaming frequency which asks respondents how much they engage in daydreaming behaviours in various contexts, with participants selecting one of five frequencies for each item. For example, one question sentence starts with *"I lose myself in*

active daydreaming", with respondents choosing to finish the sentence with one of the following options: 'infrequently'; 'once a week'; 'once a day'; 'a few times during the day'; and 'many different times during the day'. Each item is scored 0-4 in increasing levels of daydreaming frequency, with the sum of all item scores as the final DDFS score on a scale of 0-48. The DDFS and its translated versions have been used to test the influence of aging on daydreaming frequency (Giambra, 1993), how culture influences mind-wandering (Martinon et al., 2019), the relationship between mind-wandering and risky driving (Albert et al., 2018), creativity (Preiss et al., 2016), mindfulness (Linares Gutiérrez et al., 2019), and depressive symptoms (Marchetti et al., 2014), as well as the extent to which dispositional mindful awareness mediates the relationship between mind-wandering and psychological well-being (Stawarczyk et al., 2012). The DDFS showed good reliability, with a Cronbach's α coefficient of .942, in line with other studies reporting scores of .91-.94 (Berntsen et al., 2015; Giambra, 1993; Martinon et al., 2019).

Behaviour Identification Form (BIF). The BIF (Vallacher & Wegner, 1989) is a measure of trait action identification, which presents respondents with choices between two descriptions of 25 behaviours, one which describes the act itself and one which describes the goal behind the behaviour. For example, one item asks respondents to pick the description which best represents the behaviour of reading, with choices of: 'Following lines of print' (low-level) and 'Gaining knowledge' (high-level). Low/action-level descriptions score 0, whilst the high/goal-level descriptions score 1, giving an overall BIF score of 0-25. The BIF has been used to test associations between action identification and mind attribution (Kozak et al., 2006), positive affect (Freitas et al., 2009), empathy (Levy et al., 2002), procrastination (Dewitte & Lens, 2000), visual perspective (Libby et al., 2009), moral judgments (Agerström & Björklund, 2013), electoral and consumer decision-making (Freitas et al., 2008), and

response to existential threat (Landau et al., 2011). The BIF also showed good reliability, with a Cronbach's α coefficient of .801, similar to previous studies reporting scores of .83-.85 (Levy et al., 2002; Vallacher & Wegner, 1989).

Gaming Motivation Scale (GAMS). The GAMS (Lafrenière et al., 2012) is an 18-item measure of gaming motivations, consisting of six subscales, each with three 7-point Likert scale items of the measure loading on them; participants rate their agreement with each statement from 1 ('Do not agree at all') to 7 ('Very strongly agree'). For each subscale, the respondent's score is their mean agreement across the 3 questions. These subscales, with example subscale items, are: Intrinsic Motivation (e.g. *"Because it is stimulating to play"*); Integrated Regulation (e.g. *"Because it is an extension of me"*); Identified Regulation (e.g. *"Because it is a good way to develop important aspects of myself"*); Introjected Regulation (e.g. *"Because I feel that I must play regularly"*); External Regulation (e.g. *"For the prestige of being a good player"*); and Amotivation (e.g. *"It is not clear anymore; I sometimes ask myself if it is good for me"*). The GAMS has been used to test the relationships between gaming motivations and, amongst other topics, problematic videogaming (Ballabio et al., 2017; Mills et al., 2018), well-being (Comello et al., 2016; Sterling, 2017), development of gamified educational content (Tavakkoli et al., 2014, 2015), gaming experiences and attitudes amongst women (Shaer et al., 2017), game aesthetics and continuance (Fabito & Cabredo, 2019), children's materialism (Surayya, 2016), and to predict depression and trait anxiety (Peracchia et al., 2019).

Cronbach's α coefficients for the subscales of the GAMS were: Intrinsic Motivation .692; Integrated Regulation .827; Identified Regulation .798; Introjected Regulation .778; External Regulation .755; Amotivation .780. These are approximately in line with validation and other

studies reporting coefficients of, respectively: .63-.91; .88-.93; .82-.84; .69-.88; .75-.92; .76-.89 (Lafrenière et al., 2012; Peracchia et al., 2019; Shaer et al., 2017).

Data Analysis

Data analysis was completed using Latent GOLD, SPSS, R, and aod (IBM Corp, 2016; Lesnoff & Lancelot, 2012; R Core Team, 2019; Statistical Innovations, 2016). Differences in demographics (gender, education, and occupation) between the two datasets were tested with omnibus χ^2 tests (Siegel, 1956), and differences between samples in terms of age, BIF, DDFS, and GAMS subscale scores using independent-samples t-tests. Since the two samples showed substantial differences in age, gender, occupation, BIF, DDFS, and GAMS (but not education), I analysed each sample separately.

I had planned to use a data-driven grouping method – Latent Class Analysis – to identify groups of respondents who played similar combinations of genres to each other, and then compare these data-derived groups based on their demographics, action identification, daydreaming frequency, and motivations for play. However, there were a very high number of inter-correlations between engaging in each of the different casual genres in each and across both samples, as illustrated in Table 4.1. Pairwise correlations between participation in genres were extensive, with 41 out of 45 statistically reliable, rendering dimension reduction impossible. Consequently, all LCA models showed significant differences to the dataset. For example, utilising my previously described conjecture-driven groupings for dimension reduction resulted in significant differences regardless of the number of clusters (4 Clusters: $L^2(8) = 23.848$, $p = .002$; other numbers of clusters produced results with an even greater level of significance). This was also the case when I used different frequency of play cut-offs (these being: several times a week; and once a month) for the game genres.

		Combat	Role-Playing Game (RPG)	Strategy	Puzzle	Simulator	Sports	Collectible Card Game (CCG)	Point-and-Click-Adventure (PaCA)	Idle-Clicker	Arcade
Combat	*r*	1	.342	.264	.061	.349	.189	.092	.292	.149	.184
	p		< .001***	< .001***	.157	< .001***	.033*	< .001***	< .001***	< .001***	< .001***
RPG	*r*		1	.309	.107	.405	.166	.147	.326	.237	.221
	p			< .001***	.013*	< .001***	< .001***	.001**	< .001***	< .001***	< .001***
Strategy	*r*			1	.240	.293	.149	.145	.196	.206	.234
	p				< .001***	< .001***	.001**	.001**	< .001***	< .001***	< .001***
Puzzle	*r*				1	.162	.125	.044	.229	.123	.168
	p					< .001***	.004**	.309	< .001***	.004**	< .001***
Simulator	*r*					1	.216	.076	.244	.278	.215
	p						< .001***	.078	< .001***	< .001***	< .001***
Sports	*r*						1	.184	.176	.139	.269
	p							< .001***	< .001***	.001**	< .001***
CCG	*r*							1	.151	.057	.121
	p								< .001***	.188	.005**
PaCA	*r*								1	.324	.298
	p									< .001***	< .001***
Idle-Clicker	*r*									1	210
	p										< .001***
Arcade	*r*										1
	p										

Table 4.1. Pearson correlations between play of genres as a binary value with at least once a week set as the minimum frequency, for respondents recruited via freegames.org and thegamehomepage.com.

I then attempted to use hierarchical cluster analysis to form groupings, utilising the Jaccard similarity coefficient and testing both nearest-neighbour and between-groups linkages (Finch, 2005; Rezankova et al., 2006; Sarstedt & Mooi, 2014), as I could not be sure whether to expect one large cluster with several smaller clusters, or multiple more equally-sized clusters. However, both approaches resulted in clustering unsuitable for my purposes, with at least 80% of participants in one cluster, and multiple clusters consisting of only a handful – or even 1 – participant, even when reducing to a very small number of clusters.

I thus concluded that it may be that there were no meaningful clusters of players within this dataset or that any such differentiation between sub-groups is relatively modest compared with individuals' broad use of multiple and common genres of casual games. Hence, I chose to analyse the data solely focusing on how individual respondents' responses to a variety of questions about their gaming behaviours and experiences related to their demographics, daydreaming frequency, action identification, and gaming motivations.

Forward regressions. To do this, I recoded the response categories of the questions which used ordinal variables in to binary variables, selecting cut-off points to identify positive responses and negative responses. For average session length playing their favourite genre, the cut-off was at least 1 hour. For gaming importance, 'Fairly important'; and, for in-game achievement importance, 'No more or less important'.

I also recoded two demographic variables – education and occupation – in to binary variables, again aiming to get a roughly 50:50 split with a meaningful differentiation. For education, participants were split based on whether they had obtained a university degree (at any level) or not; for occupation, on whether they were in employment (either full-/part-time

or self-employed) or not. Preliminary-tests found that in some cases demographic variables were consistent predictors of outcome variables; in these cases, the relevant demographics were added to base models.

I then ran a series of forward binary logistic regressions with self-reported average session length, gaming importance, and in-game achievement importance as binary outcome variables. I also ran forward multiple regressions, with the number of genres a participant played at least once per week, and the extent to which they felt that the skills they had gained from casual games had been useful, as outcome variables. All sets of models adhered to the following structure: Model 1 included any relevant demographics found through preliminary-tests; Model 2 added DDFS and BIF; and Model 3 added the six GAMS subscales. I ran χ^2 tests and F-change likelihood-ratio tests to compare each model against its predecessor on the basis of goodness-of-fit. For convenience, I report statistically significant associations with their corresponding Wald χ^2 or t-value at the 5% ($p < .05$) level throughout. For significant logistic regression predictors, I also report odds ratios predicting membership of one of the two categories as the exponential of the raw coefficients, expressed as 'Exp(B)'. The datasets from freegames.org and thegameshomepage.org were analysed separately. To offer some control over multiple comparisons and Type I errors, I focused upon associations that were statistically reliable across both datasets, offering a form of internal replication across what turn out to be quite different samples of casual game players.

Tables of these models were produced using the stargazer package for R (Hlavac, 2018).

Results

Of 704 completed questionnaires, 122 were discarded for having been submitted by children younger than 18, 6 for being duplicates from the same IP address, 2 for entering 'joke' information, and a further 13 for possibly unreliable survey responses (e.g. single-value or stereo-typed patterns of responding). Due to low sample sizes for 'other' gender (*N*s = 1 & 7), these participants were excluded from the main analyses; their removal does not affect the pattern of results. This left a total of 561 usable participants. Of these, only 11 came from kongregate.com, 4 from freeworldgroup.com, and 4 for whom a referral URL could not be obtained. Due to the low sample sizes for these groups, these further participants were discarded, leaving a total of 542 participants; 275 from freegames.org and 267 from thegamehomepage.com.

Demographics

There were significant differences between the two samples in terms of age ($t(496.152) = 20.588$, $p < .001$) and gender ($\chi^2 (4, N = 542) = 40.523$, $p < .001$), with freegames.org respondents much older and more likely to be female (Table 4.2). The two groups were matched in terms of being educated to university degree level ($\chi^2 (1, N = 542) = 0.687$, $p > .4$) (Table 4.2), but differed in their current employment, with the older freegames.org group being more likely to be retired ($\chi^2 (1, N = 542) = 37.586$, $p < .001$) (Table 4.2).

The two samples differed in terms of DDFS ($t(540) = -8.639$, $p < .001$), and BIF ($t(540) = 3.590$, $p < .001$) scores. Respondents from freegames.org were less prone to daydreaming and more goal-oriented, as indicated by DDFS and BIF scores (Table 4.3). Participants from freegames.org also showed lower gaming motivations (and amotivation) across all subscales of the GAMS (Intrinsic: $t(534.352) = -4.752$, $p < .001$; Integrated: $t(519.300) = -5.050$, $p <$

.001; Identified: t(540)= -3.074, p = .002; Introjected: t(530.232) = -3.170, p = .002; External: t(540) = -6.514, p < .001; Amotivation: t(528.141) = -2.649, p = .008) (Table 4.3).

	freegames.org (N= 275)	thegamehomepage.com (N= 267)
Mean Age (±SD)	63.927 (12.883)	37.225 (16.971)
Gender (M:F:Other)	74:200:1	136:124:7
Education		
None (%)	6 (2.18)	5 (1.87)
Primary (%)	21 (7.64)	14 (5.24)
Secondary (%)	46 (16.73)	46 (17.23)
Sixth-form (%)	83 (30.18)	77 (28.84)
Undergraduate degree (%)	54 (19.64)	79 (29.59)
Postgraduate degree (%)	65 (23.64)	46 (17.23)
Employment		
Employed full-time (%)	42 (15.27)	94 (35.21)
Employed part-time (%)	19 (6.91)	29 (10.86)
Self-employed (%)	18 (6.55)	23 (8.61)
Unemployed (%)	14 (5.09)	29 (10.86)
Pre-university student (%)	3 (1.09)	17 (6.37)
Undergraduate student (%)	5 (1.82)	27 (10.11)
Postgraduate student (%)	2 (0.73)	8 (3.00)
Retired (%)	160 (58.18)	34 (12.73)

Table 4.2. Means (plus standard deviations) for age, and counts of gender, educational attainment (%s in brackets), and employment status (%s in brackets), by referral website.

	freegames.org (N= 275)	thegamehomepage.com (N= 267)
Mean DDFS (±SD)	16.607 (10.988)	24.708 (10.837)
Mean BIF (±SD)	16.244 (4.524)	14.813 (4.756)
Mean Intrinsic Motivation (±SD)	3.828 (1.507)	4.406 (1.320)
Mean Integrated Regulation (±SD)	2.427 (1.354)	3.072 (1.608)
Mean Identified Regulation (±SD)	2.727 (1.471)	3.127 (1.559)
Mean Introjected Regulation (±SD)	1.869 (1.194)	2.213 (1.329)
Mean External Regulation (±SD)	2.463 (1.489)	3.328 (1.603)
Mean Amotivation (±SD)	2.846 (1.482)	3.206 (1.673)

Table 4.3. Means (plus standard deviations) for DDFS, BIF, and gaming motivations, by referral website.

Number of genres played per week

Respondents' participation in different genres of casual games (freegames.org: $M = 3.405$, $SD = 2.463$; thegamehomepage.com: $M = 3.631$, $SD = 2.538$) was not substantially associated with either action identification or daydreaming frequency for either group (see Tables 4.4 & 4.5). Respondents in the freegames.org sample who had a degree tended to play fewer genres per week compared with other respondents ($t(273) = 3.180$, $p = .002$). This effect disappeared, however, upon inclusion of the GAMS subscales in Model 3 ($t(265) = 1.476$, $p > .1$).

In the freegames.org sample, the number of genres played was lower in individuals with high levels of identified regulation ($t(265) = -2.216$, $p = .028$), but higher in individuals with high levels of external regulation ($t(265) = 2.552$, $p = .011$) (see Table 4.4). In thegamehomepage.com sample, the total number of different genres played was also increased in individuals with high levels of external regulation ($t(258) = 2.031$, $p = .043$) (see Table 4.5).

freegames.org

	Number of genres played at least once a week		
	Model		
	(1)	(2)	(3)
Constant	3.813*** (0.195)	4.508*** (0.611)	2.005** (0.719)
Degree Status	-0.939** (0.295)	-0.940** (0.296)	-0.440 (0.298)
DDFS		0.001 (0.013)	-0.010 (0.013)
BIF		-0.044 (0.032)	-0.010 (0.033)
Intrinsic Motivation			0.139 (0.147)
Integrated Regulation			0.325 (0.194)
Identified Regulation			-0.358* (0.161)
Introjected Regulation			0.120 (0.197)
External Regulation			0.356* (0.140)
Amotivation			0.165 (0.102)
F-Change Statistic		0.910 (df = 2; 270)	6.373 (df = 6; 264)
F-Change *p*		p > .4	p < .001
R^2	0.036	0.042	0.163
Adjusted R^2	0.032	0.032	0.135
F Statistic	10.110** (df = 1; 272)	3.975** (df = 3; 270)	5.732*** (df = 9; 264)
Note:			*p<.05; **p<.01; ***p<.001

Table 4.4. Models predicting number of genres played at least once a week for players on freegames.org.

thegamehomepage.com

	Number of genres played at least once a week		
	Model		
	(1)	(2)	(3)
Constant	3.631*** (0.157)	3.864*** (0.695)	1.169 (0.841)
DDFS		-0.004 (0.015)	-0.016 (0.014)
BIF		-0.009 (0.034)	0.012 (0.032)
Intrinsic Motivation			-0.045 (0.165)
Integrated Regulation			0.202 (0.170)
Identified Regulation			0.175 (0.167)
Introjected Regulation			0.254 (0.149)
External Regulation			0.252* (0.124)
Amotivation			0.099 (0.095)
F-Change Statistic		0.062 (df = 2; 257)	8.660 (df = 6; 251)
F-Change *p*		p > .9	p < .001
R^2	0.000	0.0005	0.172
Adjusted R^2	0.000	-0.007	0.146
F Statistic		0.062 (df = 2; 257)	6.513*** (df = 8; 251)
Note:			*p<.05; **p<.01; ***p<.001

Table 4.5. Models predicting number of genres played at least once a week for players on thegamehomepage.com.

Average session length while playing favourite genre

A majority of respondents in both the freegames.org (55.5%) and the thegamehomepage.com (67.7%) samples reported on average playing their favourite genre of casual game for no more than 1 hour per session. Respondents with degree-level education were less likely to play sessions of their favourite casual gaming genre for more than 1 hour compared with other respondents (freegames.org: Exp(B) = 0.434, Wald $\chi^2(1) = 10.581$, $P(> \chi^2) = .001$; thegamehomepage.com: Exp(B) = 0.575, Wald $\chi^2(1) = 4.187$, $P(> \chi^2) = .041$). In the thegamehomepage.com sample, however, the effect of holding a degree also disappeared with inclusion of the GAMS (Exp(B) = 0.722, Wald $\chi^2(1) = 1.187$, $P(> \chi^2) > .2$). In the freegames.org sample, women were more likely to play sessions of over 1 hour than were men (Exp(B) = 2.282, Wald $\chi^2(1) = 7.848$, $P(> \chi^2) = .005$). However, once again, session length was not strongly associated with either action identification or daydreaming frequency in either sample (see Tables 4.6 & 4.7).

Associations between session length and GAMS sub-scale scores showed conflicting results. In the older freegames.org sample, session length was positively associated with intrinsic motivation (Exp(B) = 1.325, Wald $\chi^2(1) = 4.124$, $P(> \chi^2) = .042$) (see Table 4.6), whereas, in the thegamehomepage.com sample, this was true of introjected regulation (Exp(B) = 1.440, Wald $\chi^2(1) = 5.505$, $P(> \chi^2) = .011$) (see Table 4.7).

Additional tests against alternative cut-offs for average session length of 30 minutes and 2 hours did not produce markedly different patterns of results to those reported here.

freegames.org

	Average Session Length for Favourite Genre		
	Model		
	(1)	(2)	(3)
Constant	-0.480 (0.270)	-0.160 (0.589)	-0.931 (0.731)
Gender	0.825** (0.294)	0.828** (0.298)	0.817** (0.310)
Degree Status	-0.835** (0.257)	-0.851*** (0.259)	-0.658* (0.279)
DDFS		0.006 (0.012)	0.004 (0.012)
BIF		-0.026 (0.028)	-0.025 (0.032)
Intrinsic Motivation			0.282* (0.139)
Integrated Regulation			-0.056 (0.182)
Identified Regulation			-0.172 (0.153)
Introjected Regulation			-0.128 (0.183)
External Regulation			0.259 (0.132)
Amotivation			-0.056 (0.096)
χ^2 Statistic		1.255 (df = 2)	13.539 (df = 6)
χ^2 *p*		p > .5	p = .035
Log Likelihood	-179.032	-178.404	-171.635
Note:			*p<.05; **p<.01; ***p<.001

Table 4.6. Models predicting average session length (as binary possibilities of up to vs. over 1 hour) for play of favourite genre for players on freegames.org.

thegamehomepage.com

	Average Session Length for Favourite Genre		
	Model		
	(1)	(2)	(3)
Constant	-0.491** (0.176)	-0.304 (0.598)	-2.469** (0.879)
Degree	-0.554* (0.271)	-0.552* (0.271)	-0.325 (0.298)
DDFS		0.005 (0.012)	-0.004 (0.014)
BIF		-0.020 (0.029)	-0.012 (0.032)
Intrinsic Motivation			0.088 (0.171)
Integrated Regulation			0.093 (0.162)
Identified Regulation			0.139 (0.158)
Introjected Regulation			0.365* (0.143)
External Regulation			0.039 (0.124)
Amotivation			0.010 (0.094)
χ^2 Statistic		0.725 (df = 2)	33.855 (df = 6)
χ^2 *p*		p > .6	p < .001
Log Likelihood	-161.454	-161.092	-144.164
Note:			*p<.05; **p<.01; ***p<.001

Table 4.7. Models predicting average session length (as binary possibilities of up to vs. over 1 hour) for play of favourite genre for players on thegamehomepage.com.

Skill acquisition from casual gaming

Respondents generally reported fairly low levels of agreement with the statement that "*The skills I have gained in casual browser/mobile format games have been useful in my life"* (freegames.org: $M = 3.894$, $SD = 2.489$; thegamehomepage.com: $M = 3.777$, $SD = 2.529$). Within the freegames.org sample, females were more likely than males to report that they had gained skills from casual games which had been useful to them in life ($t(273) = 2.323$, $p = .021$) (see Table 4.8). Contrastingly, within the thegamehomepage.com sample, males and females did not differ reliably.

Interestingly, for thegamehomepage.com sample, whilst Model 2 – which included daydreaming frequency and action identification – did not significantly improve the model, both of these predictors became significant in Model 3, with inclusion of the GAMS subscales. In Model 3, respondents who daydreamed more frequently were less likely to agree that they had gained useful skills relative to other respondents ($t(258) = 2.047$, $p = .042$). Also, goal-oriented respondents reported greater agreement that they had gained useful skills than action-oriented respondents ($t(258) = 2.419$, $p = .016$) (see Table 4.9). Neither factor showed any relation with level of agreement with the statement in the freegames.org sample.

In both samples, individuals with high levels of identified regulation agreed more that they had gained skills in casual games which had been useful to them (freegames.org: $t(265) = 7.468$, $p < .001$; thegamehomepage.com: $t(258) = 7.934$, $p < .001$) (Figure 4.1).

freegames.org

	The skills I have gained in casual browser/mobile format games have been useful in my life.		
	Model		
	(1)	(2)	(3)
Constant	3.324*** (0.287)	3.396*** (0.688)	1.467* (0.662)
Gender	0.781* (0.336)	0.751* (0.339)	0.606* (0.283)
DDFS		-0.015 (0.014)	-0.014 (0.011)
BIF		0.012 (0.033)	-0.024 (0.030)
Intrinsic Motivation			0.038 (0.131)
Integrated Regulation			-0.136 (0.174)
Identified Regulation			1.068*** (0.143)
Introjected Regulation			-0.150 (0.175)
External Regulation			0.085 (0.120)
Amotivation			-0.014 (0.090)
F-Change Statistic		0.704 (df = 2; 270)	22.474 (df = 6; 264)
F-Change *p*		p > .4	p < .001
R^2	0.019	0.025	0.354
Adjusted R^2	0.016	0.014	0.332
F Statistic	5.397* (df = 1; 272)	2.264 (df = 3; 270)	16.098*** (df = 9; 264)
Note:			*p<.05; **p<.01; ***p<.001

Table 4.8. Models predicting agreement that skills gained via casual gaming have been useful for players on freegames.org.

thegamehomepage.com

	The skills I have gained in casual browser/mobile format games have been useful in my life.		
	Model		
	(1)	(2)	(3)
Constant	3.777*** (0.157)	3.078*** (0.689)	0.178 (0.683)
DDFS		-0.003 (0.015)	-0.023* (0.011)
BIF		0.052 (0.034)	0.063* (0.026)
Intrinsic Motivation			0.030 (0.134)
Integrated Regulation			-0.132 (0.138)
Identified Regulation			1.077*** (0.136)
Introjected Regulation			0.021 (0.121)
External Regulation			0.146 (0.101)
Amotivation			-0.112 (0.077)
F-Change Statistic		1.327 (df = 2; 257)	33.559 (df = 6; 251)
F-Change *p*		p > .2	p < .001
R^2	0.000	0.010	0.451
Adjusted R^2	0.000	0.003	0.433
F Statistic		1.327 (df = 2; 257)	25.753*** (df = 8; 251)
Note:			*p<.05; **p<.01; ***p<.001

Table 4.9. Models predicting agreement that skills gained via casual gaming have been useful for players on thegamehomepage.com.

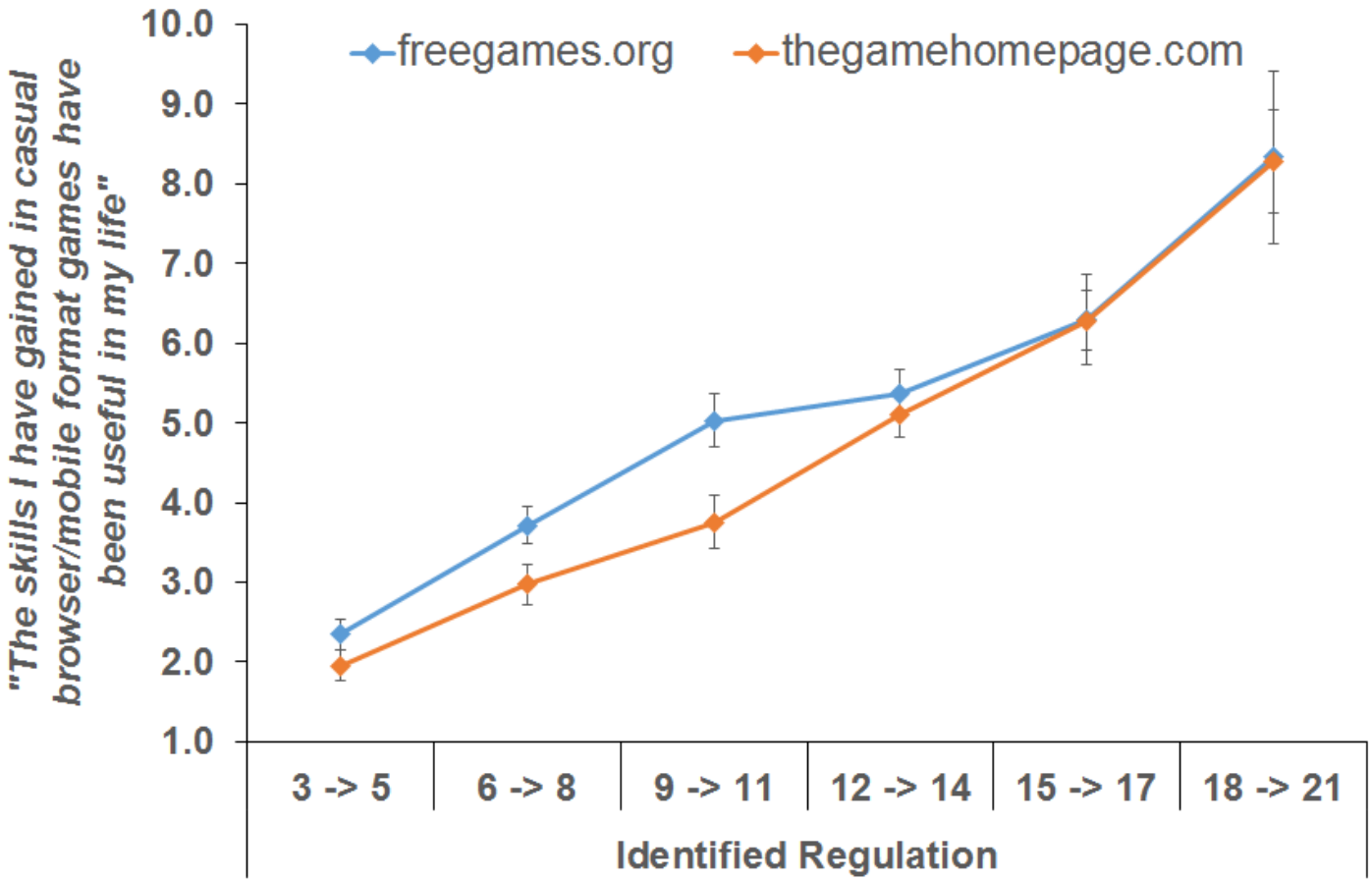

Figure 4.1. Agreement with the statement "*The skills I have gained in casual browser/mobile format games have been useful in my life"* by Identified Regulation, as measured by the Gaming Motivation Scale (Lafrenière et al., 2012), in two samples of casual game players; mean ± standard errors.

Multiplayer online gaming

Respondents in the freegames.org sample were less likely (12.4%) than those in the thegamehomepage.com sample (40.0%) to play multiplayer online games, as opposed to solely single-player online games.

Age was a factor for both samples, with older respondents less likely to play multiplayer online games (freegames.org: Exp(B) = 0.952, Wald $\chi^2(1) = 15.356$, $P(> \chi^2) < .001$; thegamehomepage.com: Exp(B) = 0.974, Wald $\chi^2(1) = 10.959$, $P(> \chi^2) < .001$), although this association was weakened amongst thegamehomepage.com respondents upon inclusion of gaming motivations in Model 3 (Exp(B) = 0.985, Wald $\chi^2(1) = 2.278$, $P(> \chi^2) > .1$) (see Tables 4.10 & 4.11). Amongst participants from thegamehomepage.com, women were also less likely than men to play multiplayer online games (Exp(B) = 0.452, Wald $\chi^2(1) = 8.910$, $P(> \chi^2) = .003$) (see Table 4.11). Neither daydreaming frequency nor action identification were related to multiplayer online game participation in either sample.

In both the freegames.org and thegamehomepage.com samples, multiplayer online game participation was associated with integrated regulation (freegames.org: Exp(B) = 1.734, Wald $\chi^2(1) = 3.981$, $P(> \chi^2) = .046$; thegamehomepage.com: Exp(B) = 1.481, Wald $\chi^2(1) = 6.005$, $P(> \chi^2) = .014$) (see Tables 4.10 & 4.11). In the freegames.org sample, multiplayer participation was also more likely in individuals with higher levels of external regulation (Exp(B) = 1.753, Wald $\chi^2(1) = 8.955$, $P(> \chi^2) = .003$) and lower introjected regulation (Exp(B) = 0.382, Wald $\chi^2(1) = 8.868$, $P(> \chi^2) = .003$) (see Table 4.10).

freegames.org

	Multiplayer Online Gaming		
	Model		
	(1)	(2)	(3)
Constant	1.030 (0.751)	1.508 (1.056)	1.324 (1.498)
Age	-0.049*** (0.013)	-0.051*** (0.014)	-0.047** (0.017)
DDFS		-0.011 (0.018)	-0.010 (0.019)
BIF		-0.009 (0.042)	-0.019 (0.049)
Intrinsic Motivation			-0.290 (0.232)
Integrated Regulation			0.550* (0.276)
Identified Regulation			0.055 (0.219)
Introjected Regulation			-0.962** (0.323)
External Regulation			0.561** (0.188)
Amotivation			-0.060 (0.148)
χ^2 Statistic		0.472 (df = 2)	19.906 (df = 6)
χ^2 *p*		p > .7	p = .003
Log Likelihood	-95.198	-94.962	-85.009
Note:			*p<.05; **p<.01; ***p<.001

Table 4.10. Models predicting participation in multiplayer online gaming for players on freegames.org.

thegamehomepage.com

	Multiplayer Online Gaming		
	Model		
	(1)	(2)	(3)
Constant	0.941** (0.347)	0.864 (0.649)	-1.069 (0.935)
Gender	-0.795** (0.266)	-0.815** (0.269)	-0.809** (0.291)
Age	-0.027*** (0.008)	-0.024** (0.009)	-0.015 (0.010)
DDFS		0.006 (0.013)	0.0002 (0.014)
BIF		-0.011 (0.031)	-0.008 (0.033)
Intrinsic Motivation			0.190 (0.164)
Integrated Regulation			0.392* (0.160)
Identified Regulation			-0.272 (0.163)
Introjected Regulation			0.145 (0.142)
External Regulation			0.126 (0.119)
Amotivation			-0.084 (0.094)
χ^2 Statistic		0.357 (df = 2)	26.945 (df = 6)
χ^2 *p*		p > .8	p < .001
Log Likelihood	-164.808	-164.630	-151.157
Note:			*p<.05; **p<.01; ***p<.001

Table 4.11. Models predicting participation in multiplayer online gaming for players on thegamehomepage.com.

Importance of gaming in general

Roughly half of each of the freegames.org (43.4%) and thegamehomepage.com (51.5%) samples saw gaming as at least fairly important to them. Respondents with degree-level education in both samples were less likely to see gaming as important to them relative to others (freegames.org: Exp(B) = 0.519, Wald $\chi^2(1) = 6.830$, $P(> \chi^2) = .009$; thegamehomepage.com: Exp(B) = 0.562, Wald $\chi^2(1) = 4.898$, $P(> \chi^2) = .027$) (see Tables 4.12 & 4.13). These associations weakened when including gaming motivations as predictors (freegames.org: Exp(B) = 0.758, Wald $\chi^2(1) = 0.903$, $P(> \chi^2) > .3$; thegamehomepage.com: Exp(B) = 0.605, Wald $\chi^2(1) = 1.976$, $P(> \chi^2) > .1$). Amongst thegamehomepage.com participants, age also showed an effect, with older participants placing less importance on gaming (Exp(B) = 0.974, Wald $\chi^2(1) = 11.410$, $P(> \chi^2) < .001$), though again this factor lost significance upon inclusion of the GAMS (Exp(B) = 0.984, Wald $\chi^2(1) = 1.754$, $P(> \chi^2) > .1$). This effect was not present in the freegames.org sample, however. Neither daydreaming frequency nor action identification were substantially related to the importance respondents placed on gaming in either sample (see Tables 4.12 & 4.13).

Gaming importance showed different associations with gaming motivations across the two samples. Amongst freegames.org players, those who regarded gaming as at least fairly important to them tend to report higher intrinsic (Exp(B) = 1.360, Wald $\chi^2(1) = 4.615$, $P(> \chi^2) = .032$), integrated (Exp(B) = 1.469, Wald $\chi^2(1) = 4.178$, $P(> \chi^2) = .041$), and external regulation (Exp(B) = 1.536, Wald $\chi^2(1) = 8.989$, $P(> \chi^2) = .003$) scores, but lower introjected regulation scores (Exp(B) = 0.534, Wald $\chi^2(1) = 10.053$, $P(> \chi^2) = .002$) (see Table 4.12). By contrast, amongst thegamehomepage.com respondents, gaming importance was only increased with intrinsic (Exp(B) = 1.675, Wald $\chi^2(1) = 6.125$, $P(> \chi^2) = .013$) and integrated regulation (Exp(B) = 2.655, Wald $\chi^2(1) = 20.105$, $P(> \chi^2) < .001$) scores (see Table 4.13).

freegames.org

	Gaming Importance		
	Model		
	(1)	(2)	(3)
Constant	0.013 (0.161)	0.567 (0.517)	-1.153 (0.702)
Degree Status	-0.656** (0.251)	-0.649* (0.252)	-0.277 (0.291)
DDFS		-0.006 (0.011)	-0.011 (0.013)
BIF		-0.028 (0.027)	-0.046 (0.033)
Intrinsic Motivation			0.307* (0.143)
Integrated Regulation			0.385* (0.188)
Identified Regulation			-0.012 (0.158)
Introjected Regulation			-0.627** (0.198)
External Regulation			0.429** (0.143)
Amotivation			-0.018 (0.103)
χ^2 Statistic		1.282 (df = 2)	49.243 (df = 6)
χ^2 *p*		p > .5	p < .001
Log Likelihood	-184.071	-183.430	-158.808
Note:			*p<.05; **p<.01; ***p<.001

Table 4.12. Models predicting importance placed on gaming (as binary possibilities of at least fairly important vs. less important than this) for players on freegames.org.

thegamehomepage.com

	Gaming Importance		
	Model		
	(1)	(2)	(3)
Constant	1.323*** (0.330)	1.274* (0.635)	-3.506** (1.182)
Age	-0.026*** (0.008)	-0.025** (0.009)	-0.016 (0.012)
Degree Status	-0.576* (0.260)	-0.581* (0.262)	-0.503 (0.357)
DDFS		0.002 (0.013)	-0.020 (0.018)
BIF		-0.002 (0.030)	-0.008 (0.040)
Intrinsic Motivation			0.516* (0.208)
Integrated Regulation			0.976*** (0.218)
Identified Regulation			0.277 (0.189)
Introjected Regulation			-0.324 (0.193)
External Regulation			0.028 (0.154)
Amotivation			-0.082 (0.121)
χ^2 Statistic		0.038 (df = 2)	132.940 (df = 6)
χ^2 *p*		p > .9	p < .001
Log Likelihood	-170.164	-170.146	-103.674
Note:			*p<.05; **p<.01; ***p<.001

Table 4.13. Models predicting importance placed on gaming (as binary possibilities of at least fairly important vs. less important than this) for players on thegamehomepage.com.

Importance of in-game achievements

A minority of respondents in both the freegames.org (34.3%) and thegamehomepage.com (22.7%) samples saw their in-game achievements as at least as important as achievements in other areas of their lives. Amongst both samples, respondents holding a degree were less likely to see their in-game achievements as at least as important as their other achievements (freegames.org: Exp(B) = 0.443, Wald $\chi^2(1) = 8.887$, $P(> \chi^2) = .003$, thegamehomepage.com: Exp(B) = 0.488, Wald $\chi^2(1) = 5.389$, $P(> \chi^2) = .020$) (see Tables 4.14 & 4.15). As in previous series of models, these effects lost their significance upon inclusion of gaming motivations (freegames.org: Exp(B) = 0.616, Wald $\chi^2(1) = 2.503$, $P(> \chi^2) > .1$; thegamehomepage.com: Exp(B) = 0.674, Wald $\chi^2(1) = 1.218$, $P(> \chi^2) > .2$). Older respondents in the freegames.org sample reported placing more relative importance on their in-game achievements than did younger respondents (Exp(B) = 1.034, Wald $\chi^2(1) = 8.014$, $P(> \chi^2) = .005$). This was not the case amongst the – overall, younger – thegamehomepage.com sample.

Once again, importance showed divergent associations with gaming motivations. In the freegames.org sample, viewing in-game achievements as at least as important as achievements in other areas of life was increased in individuals reporting higher external regulation as a gaming motivation (Exp(B) = 1.507, Wald $\chi^2(1) = 7.738$, $P(> \chi^2) = .005$) (see Table 4.14). In contrast, in the thegamehomepage.com sample, respondents regarding in-game achievements as at least as important reported higher intrinsic (Exp(B) = 1.539, Wald $\chi^2(1) = 3.952$, $P(> \chi^2) = .047$) and identified regulation (Exp(B) = 1.679, Wald $\chi^2(1) = 7.921$, $P(> \chi^2) = .005$) scores (see Table 4.15).

freegames.org

	In-Game Achievement Importance		
	Model		
	(1)	(2)	(3)
Constant	-2.477** (0.776)	-1.735 (0.924)	-3.561** (1.145)
Age	0.033** (0.012)	0.035** (0.012)	0.047*** (0.014)
Degree Status	-0.814** (0.273)	-0.821** (0.277)	-0.485 (0.306)
DDFS		-0.007 (0.013)	-0.007 (0.014)
BIF		-0.046 (0.030)	-0.059 (0.035)
Intrinsic Motivation			0.079 (0.149)
Integrated Regulation			0.038 (0.194)
Identified Regulation			0.255 (0.166)
Introjected Regulation			-0.313 (0.198)
External Regulation			0.410** (0.147)
Amotivation			-0.153 (0.108)
χ^2 Statistic		2.693 (df = 2)	29.797 (df = 6)
χ^2 *p*		p > .2	p < .001
Log Likelihood	-167.712	-166.365	-151.467
Note:			*p<.05; **p<.01; ***p<.001

Table 4.14. Models predicting relative importance placed on in-game achievements (as binary possibilities of at least as important as other achievements vs. of less importance) for players on freegames.org.

thegamehomepage.com

	In-Game Achievement Importance		
	Model		
	(1)	(2)	(3)
Constant	-0.921*** (0.189)	-0.226 (0.663)	-4.120*** (1.117)
Degree Status	-0.718* (0.309)	-0.710* (0.310)	-0.394 (0.357)
DDFS		-0.010 (0.014)	-0.034* (0.017)
BIF		-0.031 (0.033)	-0.040 (0.039)
Intrinsic Motivation			0.431* (0.217)
Integrated Regulation			-0.093 (0.189)
Identified Regulation			0.518** (0.184)
Introjected Regulation			0.235 (0.158)
External Regulation			0.075 (0.146)
Amotivation			0.027 (0.113)
χ^2 Statistic		1.185 (df = 2)	55.774 (df = 6)
χ^2 *p*		p > .5	p < .001
Log Likelihood	-136.439	-135.846	-107.959
Note:			*p<.05; **p<.01; ***p<.001

Table 4.15. Models predicting relative importance placed on in-game achievements (as binary possibilities of at least as important as other achievements vs. of less importance) for players on thegamehomepage.com.

Discussion

In these surveys, I sought to test the hypotheses that casual game genre preferences would relate to variation in daydreaming frequency, action identification, and gaming motivations. I also sought to explore the further relationships involving self-reported benefits amongst players of casual games. Participation in casual game genres was highly inter-correlated, meaning that I was unable to identify different groups of players based on their patterns of genre preferences as I had intended from these data.

Whilst there was a considerable degree of variation in patterns of results from my two samples, some associations between gaming behaviours/experiences and motivations were consistent. I found that higher levels of external regulation are associated with playing a more diverse selection of casual game genres. Individuals reporting higher levels of identified regulation also feel more than others that they have gained skills from casual games which have been useful to them in life. Additionally, individuals with higher levels of integrated regulation were more likely to play multiplayer online games and to report that gaming was at least fairly important to them in their lives. Higher levels of intrinsic motivation also predicted placing greater personal importance on gaming. Strikingly, I found no consistent associations whatsoever with either action identification (as measured by the BIF; Vallacher & Wegner, 1989) or daydreaming frequency (as measured by the DDFS; Giambra, 1993).

These two datasets demonstrate how associations between demographics, gaming behaviours/experiences, and gaming motivations do not replicate across samples collected from two different casual game hosting websites. Hence, the results of studies of the kind reported here can be taken as indicative of associations which are present in the population of players of casual games, but are not representative of that population as a whole. The

demographics of the two samples were very different. The freegames.org sample matched existing observations of players of casual games being older and more likely to be female (GamesIndustry International, 2006; Kuittinen et al., 2007; Kultima, 2009; Russoniello & Parks, 2009; Wallace & Robbins, 2006; Wohn, 2011). However, the thegamehomepage.com sample showed a more equal gender-split of roughly middle-aged players. Some associations involving demographics are unsurprising, such as older age negatively predicting playing multiplayer online games, in line with the aforementioned observations that players of casual games are typically older than of other games. Equally, it makes sense that some associations are present in one sample from one of the gaming sites but not the other. For example, amongst the freegames.org sample, with a mean age roughly around retirement age, regarding in-game achievements as at least as important as achievements in other areas of life was positively associated with age. Older individuals from the freegames.org site were likely to have retired, and so were perhaps more likely to only compare the importance of in-game achievements to achievements they have made in other post-retirement hobbies, as opposed to those from thegamehomepage.com, where the average age is some 27 years younger. Together with the differences in age, employment, daydreaming and action-identification, these divergences in the two samples illustrate the diversity of individuals who play casual games and their varying cognitive and attentional functions.

Gaming motivation subscales showed a number of significant relationships with gaming behaviours and experiences which were consistent across samples. External regulation positively related to an increased number of genres played per week, possibly representative of a desire to receive more in-game rewards achieved through playing more – different – games. Unsurprisingly, identified regulation positively predicted the perception of having gained useful skills from playing casual games, fitting with the subscale being representative

of playing to achieve other goals. Integrated regulation positively predicted both likelihood of playing multiplayer games and on placing a higher importance on gaming. Again, these potentially fit with the subscale measuring to what extent a player's choice to play is integrated in to a wider sense of the self; multiplayer online games can give rise to social groups and communities which promote identity formation (Crowe, 2009). Hence, it may be that these two findings are highly linked, such that within a wider sample of players of casual games, the GAMS integrated regulation subscale was particularly relevant to that subset who play multiplayer online games and whose participation and socialisation with others in these games contributes to their sense of self.

Previous data has suggested that individuals who report gaming as important to them also report higher levels of intrinsic and extrinsic motivations of all types (Shaer et al., 2017). Here, intrinsic motivation was linked to placing a greater importance on gaming in both samples (of the four extrinsic motivations, this was only also the case for integrated regulation). Intrinsic motivation represents an individual's feeling that doing an activity is inherently fun or satisfying (Ryan & Deci, 2000), and is associated with the satisfaction of autonomy, competence, and relatedness needs from gaming (Ryan et al., 2006). It is thus unsurprising that these data replicate previous findings that individuals high in intrinsic motivation to play report gaming as more important to them.

There were many other instances of the GAMS subscales showing an effect in one sample, but not in the other. Some of these may be Type I errors. One set of these associations, though, is potentially of particular note. External regulation positively predicted playing multiplayer online games and placing both a higher importance on gaming and on in-game achievements amongst the older freegames.org sample, but not for thegamehomepage.com

respondents. One possible interpretation here is that these are reflective of how older adults in particular can benefit from playing MMORPGs through increased social capital (Zhang & Kaufman, 2015), and providing a way to maintain and develop friendships virtually (Zhang & Kaufman, 2016). Hence, the availability of such opportunities could be particularly important for older adults, along perhaps with the recognition of achieving things in this online community. Possibly, the GAMS picked up more of gaming motivations relating to MMO play than to play of casual games, particularly given that these same patterns were not seen in the younger thegamehomepage.com sample. Possibly, the GAMS is finer-tuned to capture motivations of those playing more time-intensive, multiplayer games than casual games. Whilst the full spectrum of 25 games played by participants of the original GAMS development and validation study was not listed, the four which were mentioned were MMOs or had multiplayer modes (Lafrenière et al., 2012). Thus, the scale may need to be modified for use in a casual gaming context; for example, the items relating to external regulation relate to 'rare' items and the "prestige of being a good player", concepts which apply better in an MMO context.

Previously, I found that self-reported benefits from gaming were strongly associated with daydreaming frequency and action identification. Higher levels of daydreaming frequency and goal-orientation predicted – in a sample of MMORPG players – self-reporting that the skills they had gained from playing MMOs had helped them to achieve major things in their lives, and that their online relationships had helped their offline relationships (C. Smith et al., 2019). Surprisingly, I found no such relationships here for skill transfer in a sample of players of casual games.

Possibly, the links between benefits from play and both daydreaming frequency and action

identification are such that they are more prevalent in individuals who are more deeply engaged in gaming. I primarily recruited my MMORPG sample through the game forum and a game update post, such that my respondents would have been engaged not just in playing the game, but also interested in wider community discussion and staying abreast of updates. As such, in a second wave of data collection, I sought to broaden my sample from a small number of casual game hosting websites to an Internet discussion board populated by fans and players of casual games. Reddit (https://www.reddit.com/) is a social news aggregation and discussion website in which users can submit content such as links, text posts, and images, which are then voted (up or down) and commented on by members. Posts are organised in to 'subreddits' which cover a wide variety of topics; members can subscribe to individual subreddits which are of interest to them. Submissions with more 'up-votes' appear higher up the subreddit, individuals' personalised homepage based on their subreddit subscriptions, and ultimately can appear on the front page of the site as a whole. Thus here, in a survey of two subreddits, I sought a further test of the hypothesis that casual gaming is linked to daydreaming frequency and action identification.

Study 4

Method

The study was approved by the Bangor University School of Psychology research ethics committee. At the start of the survey questionnaire, respondents read a brief participant information page and indicated their consent by clicking a single radio-button.

Recruitment

Participants were recruited through two subreddits – r/WebGames and r/incremental_games – of the Internet social news aggregation and discussion site Reddit. Recruitment was supported by an optional lottery draw for one prize of an Amazon Kindle Fire HD 10. Respondents who wished to 'opt-in' to the draw provided their e-mail address on the final page of the survey. To preserve anonymity, survey responses and e-mail addresses were separated before data analysis.

Gaming questions, demographics, and psychometric assessments

All measurements were broadly the same as previously. As in Study 3, respondents were asked about their frequency of play of different genres of casual games, their favourite genre, their average session length when playing their favourite genre, whether they play multiplayer games, and to what extent they feel that they have gained skills from playing casual games. Participants then provided their demographics and completed both the DDFS (Giambra, 1993) and BIF (Vallacher & Wegner, 1989). In order to keep the questionnaire shorter, I omitted the GAMS and questions relating to gaming importance.

Here, the DDFS and BIF showed internal consistency Cronbach's α scores of .927 and .762 respectively.

Data Analysis

Data analysis was completed using R and aod (Lesnoff & Lancelot, 2012; R Core Team, 2019). For around a third of my sample, I was unable to collect a referral URL with which to confirm from which subreddit they were recruited through (possibly, they clicked on the survey link from their personalised homepage, rather than the subreddit, or in some cases

may have copied and pasted the URL directly in to their browser). These formed a third group in my preliminary tests of demographics. Differences in demographics (gender, education, and occupation) between the two datasets were tested with omnibus χ^2 tests (Siegel, 1956). Differences between samples in terms of age, BIF and DDFS scores were tested using between-subjects analysis of variance (ANOVA).

As in Study 3, I had originally hoped to group participants based on their genre preferences to determine any demographic, action identification, or daydreaming frequency differences between types of players of casual games. However, I encountered the same difficulties with high numbers of pairwise inter-correlations between gaming genres as in Study 3. This is illustrated in Table 4.16, which shows 28 out of 45 comparisons displayed weak to moderate correlations which were statistically significant, indicating that the differences in internal structure of these data was likely to be subtle compared to their shared characteristics. Therefore, I followed a similar procedure of forward binary logistic and multiple regressions as described in Study 3.

		Combat	Role-Playing Game (RPG)	Strategy	Puzzle	Simulator	Sports	Collectible Card Game (CCG)	Point-and-Click-Adventure (PaCA)	Idle-Clicker	Arcade
Combat	*r*	1	.263	.201	.094	.176	.047	.121	.020	.171	.160
	p		< .001***	< .001***	.055	< .001***	.331	.013*	.683	< .001***	.001**
RPG	*r*		1	.243	.136	.284	.167	.138	.090	.299	.162
	p			< .001***	.005**	< .001***	.001**	.004**	.066	< .001***	.001**
Strategy	*r*			1	.188	.294	.168	.118	-.005	.176	.136
	p				< .001***	< .001***	.001**	.015*	.921	< .001***	.005**
Puzzle	*r*				1	.100	.009	.072	.254	.003	.237
	p					.040*	.861	.139	< .001***	.953	< .001***
Simulator	*r*					1	.136	-.002	.066	.268	.146
	p						.005**	.972	.177	< .001***	.003**
Sports	*r*						1	.040	.036	.003	.135
	p							.411	.466	.952	.006**
CCG	*r*							1	-.019	.075	.106
	p								.693	.126	.030*
PaCA	*r*								1	.076	.064
	p									.122	.191
Idle-Clicker	*r*									1	.099
	p										.043*
Arcade	*r*										1
	p										

Table 4.16. Pearson correlations between play of genres as a binary value with at least once a week set as the minimum frequency, for respondents recruited via Reddit.

I ran two pairs of binary logistic regression models with whether average session length when playing their favourite genre was up to vs. over 1 hour, and whether they play multiplayer online games or not, as dependent variables. I also ran two forward multiple regressions with the number of genres a participant played at least once a week, and to what extent they felt they had gained useful life-skills from playing casual games, as dependent variables. In Model 1, I included any demographic variables shown to be relevant during preliminary-tests, and in Model 2 I added both DDFS and BIF scores. For significant logistic regression predictors, I report odds ratios as the exponential of the raw coefficients, expressed as 'Exp(B)'.

Tables of these models were produced using the stargazer package for R (Hlavac, 2018).

Compared with the respondents of Study 3, the three groups showed relatively small, albeit significant, differences in an unsystematic manner. Therefore, to maximise power, I analysed the three samples together.

The threshold for statistical significance was set at the 5% ($p < .05$) level throughout.

Results

Of 449 completed questionnaires, 22 were discarded for having been submitted by children younger than 18, and 6 for entering 'joke' information. This left a total of 421 usable participants, with 171 from the r/WebGames subreddit, 95 from the r/incremental_games subreddit, and 155 from an unknown source URL. Due to low sample sizes for 'other' gender ($N = 6$), these participants were excluded from the main analyses; their removal does not affect the pattern of results.

There were some differences between respondents referred from r/WebGames, r/incremental_games, and those for whom no referral URL could be collected ('Unknowns'), in terms of age ($F(2,418) = 4.198$, $p = .016$) and gender (χ^2 (2, $N = 415$) = 11.315, $p = .003$). Respondents from r/WebGames were on average ~2 years younger compared to r/incremental_games respondents ($p = .015$) and Unknowns ($p = .016$). Those from r/incremental_games were more likely to be male compared to Unknowns (partitioned χ^2 (1, $N = 248$) = 9.950, $p = .002$) (Table 4.17).

There was again no significant difference in terms of being educated to university degree level between participants across groups (χ^2 (2, $N = 421$) = 0.175, $p > .9$) (Table 4.17), though they did differ in terms of whether they were currently in employment (χ^2 (2, $N = 421$) = 12.948, $p = .002$), with participants from r/WebGames being somewhat less likely to be employed than those from the other two samples (partitioned χ^2 (1, $N = 421$) = 11.5837, $p < .001$) (Table 4.17).

There were differences between the three samples in terms of DDFS ($F(2,418) = 3.524$, $p = .030$), but not for BIF ($F(2,418) = 0.733$, $p > .4$). Respondents from r/incremental_games were less prone to daydreaming than those from the other two samples (r/WebGames: $p = .018$; Unknowns: $p = .027$) (Table 4.18).

	r/WebGames (N= 171)	r/incremental_games (N= 95)	Unknowns (N= 155)
Mean Age (±SD)	24.573 (6.938)	26.863 (7.162)	26.548 (7.843)
Gender (M:F:Other)	148:19:4	90:5:0	123:30:2
Education			
None (%)	0 (0.00)	3 (3.16)	1 (0.65)
Primary (%)	7 (4.09)	2 (2.11)	7 (4.52)
Secondary (%)	20 (11.70)	12 (12.63)	23 (14.84)
Sixth-form (%)	74 (43.27)	38 (40.00)	57 (36.77)
Undergraduate degree (%)	57 (33.33)	30 (31.58)	51 (32.90)
Postgraduate degree (%)	13 (7.60)	10 (10.53)	16 (10.32)
Employment			
Employed full-time (%)	55 (32.16)	37 (38.95)	67 (43.23)
Employed part-time (%)	12 (7.02)	9 (9.47)	16 (10.32)
Self-employed (%)	4 (2.34)	5 (5.26)	12 (7.74)
Unemployed (%)	23 (13.45)	14 (14.74)	17 (10.97)
Pre-university student (%)	25 (14.62)	16 (16.84)	13 (8.39)
Undergraduate student (%)	40 (23.39)	5 (5.26)	23 (14.84)
Postgraduate student (%)	12 (7.02)	4 (4.21)	3 (1.94)
Retired (%)	0 (0.00)	3 (3.16)	1 (0.65)
Taking care of the house (%)	0 (0.00)	2 (2.11)	3 (1.94)

Table 4.17. Means (plus standard deviations) for age, and counts of gender, educational attainment (%s in brackets), and employment status (%s in brackets), by referral subreddit.

	r/WebGames (N= 171)	r/incremental_games (N= 95)	Unknown (N= 155)
Mean DDFS (±SD)	27.322 (10.157)	24.074 (10.576)	27.26 (10.576)
Mean BIF (±SD)	11.930 (4.417)	12.526 (4.829)	12.426 (4.353)

Table 4.18. Means (plus standard deviations) for DDFS and BIF, by referral subreddit.

Number of genres played per week

The number of different genres of casual games (M = 3.072, SD = 2.036) respondents participated in at least once a week was not substantially associated with any demographic variables. Neither daydreaming frequency (as DDFS scores) nor action identification (as BIF scores) showed associations with the number of casual game genres respondents played (see Table 4.19).

Average session length while playing favourite genre

A considerable majority of subreddit respondents (71.8%) reported on average playing their favourite genre of casual game for no more than 1 hour per session. Session length while playing their favourite genre of casual game was not markedly associated with respondent demographics, daydreaming frequency, or action identification (see Table 4.20). Using alternative cut-offs of 30 minutes or 2 hours for session length does not affect the pattern of results reported here.

Reddit

	Number of genres played at least once a week	
	Model	
	(1)	(2)
Constant	3.072*** (0.100)	2.791*** (0.387)
DDFS		-0.007 (0.010)
BIF		0.038 (0.022)
F-Change Statistic		1.710 (df = 2; 412)
F-Change *p*		p > .1
R^2	0.000	0.008
Adjusted R^2	0.000	0.003
F Statistic		1.710 (df = 2; 412)
Note:		*p<.05; **p<.01; ***p<.001

Table 4.19. Models predicting number of genres played at least once a week for respondents recruited via Reddit.

Reddit

	Average Session Length for Favourite Genre	
	Model	
	(1)	(2)
Constant	-0.935*** (0.109)	-0.937* (0.429)
DDFS		0.016 (0.011)
BIF		-0.036 (0.025)
χ^2 Statistic		4.646 (df = 2)
χ^2 *p*		p = .098
Log Likelihood	-246.827	-244.504
Note:		*p<.05; **p<.01; ***p<.001

Table 4.20. Models predicting average session length (as binary possibilities of up to vs. over 1 hour) for play of favourite genre for respondents recruited via Reddit.

Skill acquisition from casual gaming

As in Study 3, respondents generally reported fairly low levels of agreement with the statement that "*The skills I have gained in casual browser/mobile format games have been useful in my life"* (M = 3.773, SD = 2.286). Older participants tended to report less that casual gaming had helped them to develop useful skills ($t(419) = -3.145$, $p = .002$) (see Table 4.21). Neither daydreaming frequency nor action identification showed substantial associations with the extent to which respondents felt that the skills they had gained from casual games had been useful to them.

Multiplayer online gaming

A large majority (75.6%) of respondents also played multiplayer online games, rather than solely single-player games. Female respondents were less likely to play multiplayer online games than were males (Exp(B) = 0.383, Wald $\chi^2(1) = 9.670$, P(> χ^2) = .002). Additionally, younger respondents were also more likely to play multiplayer online games than were older respondents (Exp(B) = 0.948, Wald $\chi^2(1) = 12.184$, P(> χ^2) < .001) (see Table 4.22). Neither daydreaming frequency nor action identification were related to the chance respondents played multiplayer games.

Reddit

	The skills I have gained in casual browser/mobile format games have been useful in my life.	
	Model	
	(1)	(2)
Constant	4.996*** (0.404)	5.288*** (0.572)
Age	-0.047** (0.015)	-0.050** (0.015)
DDFS		-0.016 (0.011)
BIF		0.017 (0.025)
F-Change Statistic		1.361 (df = 2; 411)
F-Change *p*		p > .2
R^2	0.023	0.030
Adjusted R^2	0.021	0.023
F Statistic	9.890** (df = 1; 413)	4.210** (df = 3; 411)
Note:		*p<.05; **p<.01; ***p<.001

Table 4.21. Models predicting agreement that skills gained via casual gaming have been useful for respondents recruited via Reddit.

Reddit

	Multiplayer Online Gaming	
	Model	
	(1)	(2)
Constant	2.685*** (0.432)	2.445*** (0.598)
Gender	-0.960** (0.309)	-0.984** (0.312)
Age	-0.053*** (0.015)	-0.052*** (0.015)
DDFS		0.010 (0.011)
BIF		-0.004 (0.026)
χ^2 Statistic		0.817 (df = 2)
χ^2 *p*		p > .6
Log Likelihood	-218.920	-218.512
Note:		*p<.05; **p<.01; ***p<.001

Table 4.22. Models predicting participation in multiplayer online gaming for respondents recruited via Reddit.

Discussion

As in Study 3, there were high levels of inter-correlations between play of casual game genres, so that I was again unable to form data-driven groups of players based on their genre preferences. Further, as before, the number of casual game genres played at least once per week, average session length, multiplayer online gaming, and self-reported benefits from play were not reliably associated with either daydreaming frequency or action identification.

As before, older respondents were less likely to play multiplayer online games. However, differently, from Study 3, but possibly reflecting the more restricted age range of these data, older respondents were associated with having less of a perception that they had gained useful skills from casual games.

My sample from Reddit was somewhat younger and more likely to be male than previously reported demographics of players of casual games (GamesIndustry International, 2006; Kuittinen et al., 2007; Kultima, 2009; Russoniello & Parks, 2009; Wallace & Robbins, 2006; Wohn, 2011), being predominantly males in their 20s. In addition, the sample showed considerably more of a tendency to identify behaviours in terms of actions than did the (older) samples in Study 3, or in my previous MMORPG sample, with lower BIF means indicating that the sample may have suffered from a restricted range on this metric. Together, Study 3 and Study 4 demonstrate that, in contrast to previous reports of MMORPGs, RPGs, and FPSs (Ewell et al., 2018; Matthews, 2015; C. Smith et al., 2019), casual gaming behaviours and self-reported benefits are not strongly associated with daydreaming frequency or action identification.

Chapter Discussion

Here, I reported two surveys in which I collected information about gaming preferences from two casual game-hosting websites and two discussion sites for fans and players of such games. The latter sources offered an opportunity to learn more from individuals who are strongly interested in casual games. I had intended to use a data-driven approach to categorise respondents in to groups based on the genres of casual games they play – in a way that has been done with samples of online gamblers (Lloyd et al., 2010) – but found that high levels of inter-correlation between play of genres prevented this. Thus, I tested the hypotheses that the relationships between gaming behaviours and experiences amongst players of casual games relate to demographic characteristics, attentional experiences (as daydreaming frequency), representations of behaviour (as action identification), and gaming motivations. These datasets benefit from large sample sizes of a minimum of over 400 participants.

In these data, participation in casual game genres showed moderate but extensive inter-correlations, indicating that it will be hard to identify markedly distinct groups of players based on their self-reported frequencies of play of different genres. Rather, it appears that players – at least as encountered in freegames.org, thegamehomepage.org, r/WebGames, and r/incremental_games – dip and sample across multiple genres of casual games at a frequency of at least once a week. Casual games do not involve as great time commitments as MMOs (Kuittinen et al., 2007; Wallace & Robbins, 2006), allowing players to try out games in genres that they may be less interested in investing a more significant amount of time in. Casual game players may thus be more ‘generalist’ than ‘specialist’ MMORPG players who choose to adopt specific player-roles in games that are time-intensive.

At the current time, there is no validated taxonomy for casual game genres (Eklund, 2017;

Kuittinen et al., 2007; Mortensen, 2009). While the one I used in these surveys may have failed to adequately capture the differentiating characteristics of casual games, it was developed in partnership with an experienced game developer, Gaz Thomas (http://gazthomas.com/). Many casual games consist of arguably a blend of genres, in ways which make it difficult to determine reliably that one game fits within one class or genre while another, similar in at least some ways, does not. This may mean that a more mechanistic approach – referencing game mechanics such as the linearity of level design, difficulty, 'winning' condition, and visual variation (Nacke & Lindley, 2008) – could be of use in attempting to differentiate between types of casual games on the market (Green et al., 2017; Johnson, Wyeth, et al., 2013); future research could investigate this possibility further.

Collectively, these data demonstrate that surveys of gaming behaviours and experiences against demographic and psychological characteristics on one gaming site can diverge wildly from those of another, setting limits of the generality of findings arising from investigations of this kind. Only one sample – of players from freegames.org – exhibited demographics in line with those described by existing literature; that of them being predominantly middle-aged to retirement age, and consisting more of women (GamesIndustry International, 2006; Kuittinen et al., 2007; Kultima, 2009; Russoniello & Parks, 2009; Wallace & Robbins, 2006; Wohn, 2011). This indicates that individual gaming sites can attract and retain different populations of players who may then show quite different self-reported experiences and associations with psychological determinants.

Some associations between gaming choices, demographics, and gaming motivations support the validity of these findings. That older respondents were less likely to play multiplayer online games is in line with previous data showing that populations of casual gamers are

typically older than those of other forms of gaming (GamesIndustry International, 2006; Kuittinen et al., 2007; Russoniello & Parks, 2009; Wallace & Robbins, 2006). Similarly, the association between placing greater personal importance on gaming and intrinsic motivation is in line with previous data (Shaer et al., 2017).

Study 3 provides new information about the relationships between casual games and motivations framed within a self-determination theory approach, as assessed with the Gaming Motivation Scale (GAMS; Lafrenière et al., 2012). Individuals with higher levels of identified regulation – where playing helps to achieve other goals or because it has personal meaning – were more likely to report gaining useful skills from casual games. This suggests that casual gaming can be helpful for some individuals in achieving other goals, possibly through the potential for gaming to promote problem-solving skills (Adachi & Willoughby, 2013; Buelow et al., 2015). Individuals who reported higher levels of external regulation – whereby playing brings other rewards such as virtual currency, levels, or admiration from peers – also reported playing a greater number of genres of casual game per week, enabling access to more varied rewards. On some casual game hosting websites – though admittedly not the ones I recruited from here – individuals can form accounts and receive achievements from playing games which allow them to 'level-up' their public profile on the website. Playing a more diverse selection of genres would promote wider achievement gain in this sense. Finally, individuals reporting higher levels of integrated regulation – where playing aligns with other life goals and doing so is integrated in to a wider organisation of the self – were more likely to play multiplayer games and to report that gaming had greater importance to them. These data suggest that the motivations of casual gaming and MMORPGs include identity formation through contacts with social groups and communities (Crowe, 2009), promoting gaming as a part of respondents' wider sense of self.

Finally, however, these data convincingly suggest that gaming behaviours and experiences are not strongly associated with daydreaming frequency as a way to access incubation (Mooneyham & Schooler, 2013) or, indeed, vulnerability to psychological distress as rumination (Giambra & Traynor, 1978; Marchetti et al., 2014; Stawarczyk et al., 2012). Nor was there any evidence of associations with tendencies to represent behaviours more in terms of actions or goals (Vallacher & Wegner, 1989). Since such associations are substantial in MMORPGs (C. Smith et al., 2019), and in some RPG and FPS games (Ewell et al., 2018; Matthews, 2015), my data suggest that casual games can attract a subtype of players with distinct motivations and psychological experiences.

A limitation of these findings is that I recruited respondents from PC browser-based casual gaming websites and subreddits heavily focused on the same, rather than on players of mobile-format casual games. Though I included the latter in the question format, mobile games make up the dominant share of the casual game market; browser-based gaming is thought to contribute 'only' $3.5bn of the wider $72bn casual game market (Wijman, 2019). Further research could investigate directly how these two groups may differ in their demographics, behaviours, experiences, and any accompanying relevant psychometric factors.

Potential future avenues of research aside, the data here suggest that neither daydreaming frequency nor action identification are relevant concepts in relation to gaming behaviours and experiences within the realm of (browser-based) casual games, whilst gaming motivations and demographics help to explain variance in a few such metrics. The GAMS may not,

however, be the best tool for measurement of motivations for engaging in casual, rather than MMO, games.

Chapter 5: Action identification in a clicker game

Whilst Chapter 4 indicated that action identification theory is not a relevant concept in terms of gaming benefits in the realm of casual games, I previously showed – as part of my MSc – that goal-identification is selectively associated with increased enjoyment of in-game activities in MMORPGs, particularly amongst players with a focus on skilling and those who engage in a mixture of skilling, killing, and questing (C. Smith et al., 2019).

Research outside of the realm of gaming links action identification theory with task enjoyment (Vallacher et al., 1989). Therefore, in the context of play of casual games, perhaps action identification links to enjoyment, rather than judgements about gaming experiences. Previous research suggests that an individuals' enjoyment and efficiency of a task can be increased when there is congruence between its complexity and its specification in terms of actions or goals (Bandura & Schunk, 1981; Pham & Taylor, 1999; Ritts & Patterson, 1996; Stock & Cervone, 1990; Vallacher & Wegner, 1987). Specifically, completion and enjoyment of complex tasks can be aided by their being specified in terms of component actions – aiding problem-solving – whilst satisfactorily completing simpler tasks can be aided by their specification in high-level terms, as goals, facilitating mastery. Contrastingly, mismatches between task complexity and specification in terms of actions versus goals can impede success and hinder enjoyment (Dewitte & Lens, 1999; Y. L. Ferguson & Sheldon, 2010; Seidel et al., 1998; Vallacher et al., 1989, 1992).

My MSc data also suggested that MMORPG players who additionally play idle-clicker games may express particularly action-oriented representations of behaviour in comparison to those who do not (C. Smith et al., 2019). I found that BIF scores were lower in MMORPG players who played idle-clickers (M = 13.849, SE = 0.193) than those who did not (M =

15.402, *SE* = 0.066), a greater difference than for any other genres tested: combat; RPG; strategy; puzzle; simulator; sports; collectible card game; point-and-click adventure; arcade. Idle-clickers – also known as idle or incremental games – reduce gameplay to a single repetitive interaction, typically operationalised using partial reinforcement schedules, and can allow the player to progress while 'idling' – not actively playing the game (Purkiss & Khaliq, 2015). The fact that the game structure involves behaviours with very few actions – and no complex problem-solving – suggests that enjoyment of idle-clickers will be greatest in individuals who tend to identify behaviour in goal-oriented terms (Vallacher et al., 1989). Given that my MSc project found the opposite, it poses an interesting question in of whether enjoyment of – and preferences for – idle-clickers reflect behaviour specification in action- or goal-oriented terms. Study 5 tested between these possibilities.

Idle-clickers can trace their roots back to bots, automated computer programs designed to play the game independently of a human agent being present (Alharthi et al., 2018). These bots gained notoriety in MMORPGs such as *RuneScape* (Jagex, 2004) and *World of Warcraft* (Blizzard Entertainment, 2004), with players using them to automate resource collection (Bilir, 2009). In response, developers entered in to an arms-race to try to prevent this 'cheating' (Hilaire et al., 2010; Stefan et al., 2009). They also, however, gave rise to games specifically designed to be played non-interactively, such as *Progress Quest* (Fredricksen, 2002), and later games such as *Cookie Clicker* (Thiennot, 2013). These merged automated features with the clicker mechanic of the semi-satirical, but seminal, clicker game *Cow Clicker* (Ian Bogost, 2010), in which players could click on a cow once every 6 hours in order to receive a point (Alharthi et al., 2018). Some idle-clicker games are incredibly popular. *Clicker Heroes* (Playsaurus, 2014) – one popular idle-clicker game – generated a peak of 65,560 players simultaneously playing it on the Steam game distribution platform

(Carboneras Mas, 2016) as one of the platform's top 10 most played games of 2015 (Alharthi et al., 2018), and at the time of writing has been played 33,788,374 times on the game-hosting site Kongregate (Kongregate, 2014).

In the case of more idle-focused games such as *Progress Quest*, the user may not need to interact with the game at all beyond an initial setup period (Alharthi et al., 2018; Deterding, 2016). Progress can be automated through the purchase of in-game upgrades which allow game responses independent of player behaviour, making any continued interaction optional (Purkiss & Khaliq, 2015). Coupled with the fact that there is often no end-point in an idle-clicker game (Fizek, 2017; Purkiss & Khaliq, 2015), the dominant academic discourse on idle-clicker games has been as to whether they constitute 'real' games (Deterding, 2016; Fizek, 2017; Khaliq & Purkiss, 2015). Indeed, one game developer and theorist, Ian Bogost – the creator of *Cow Clicker* – described the resultant experiences of such games as *"more like [Skinner] boxes, like behaviourist experiments with rats"* (Bogost, 2010; Tyler, 2015). Bogost later removed the cows from the game in what he dubbed a '*Cowpocalypse*' – players donated $700 to delay this game update for almost two months – eventually leaving just an empty patch of grass for players to click, with no reinforcement (Tanz, 2011).

The maintenance of behaviour in playing clicker games can indeed be understood through fundamental principles of operant learning theory, as originally tested with rats and pigeons (Skinner, 1957). Behaviours can be reinforced through operant conditioning, whereby behaviours which produce rewards are maintained, depending on the characteristics of their reinforcement schedules as they affect response rates. Behaviours which are only intermittently rewarded (for example, as sustained by variable ratio schedules) – as opposed to behaviours that are reinforced every time – are maintained for longer when reinforcement

is removed; i.e. they tend to take longer to extinguish (Skinner, 1957).

These partial reinforcement schedules are utilised in clicker games, using predominantly fixed-ratio schedules – where rewards are issued after a set number of 'clicks' – which adjust upwards as players progress, requiring greater levels of participation in order to receive reinforcement. This drives engagement in much the same way as previously discussed in MMORPGs (Thorens et al., 2012; Yee, 2002). Reinforcement schedules can also be chained, such that repetition of one behaviour is reinforced on one schedule by access to a second schedule, which may in turn lead to still another schedule, or another final reinforcer (if the terminal schedule in the chain). Rates of response at the first schedule of the chain tend to be lower (Nevin et al., 1981), as the behaviour exhibited at that stage is more distant from the final reward in the terminal schedule of the chain. Chained partial reinforcement schedules could thus be seen as a hierarchy of actions and goals, such that the sequence of schedules in the chain offer higher representational levels as they approach the final reward.

Here, I sought to take Bogost's comparison between clicker games and Skinner boxes one step forward by creating a simple game which utilises solely the core mechanic of repetitive clicking (Alharthi et al., 2018). I used chained fixed-ratio schedules to produce an analogue of a hierarchy of actions and goals, and then manipulated operant schedules to explore the relationship between individuals' enjoyment of a clicker game and their tendency to identify behaviours in terms of actions or goals. I developed a clicker game – the most interactive form of game in this genre (Purkiss & Khaliq, 2015) – which does not include 'idle' progression, but rather forces the user to actively engage in a repetitive action in order to progress (Alharthi et al., 2018). Specifically, my simplified, abstracted clicker (*simplex*-clicker) game implemented a hierarchy of actions and goals achieved by concurrent, chained

fixed-ratio schedules that allowed me to degrade the game specifically at the level of actions or goals by substituting in variable-ratio schedules to introduce transient uncertainty. Rewards were entirely nominal; my game had no accompanying narrative – for example, cookies (Thiennot, 2013) or meth batches cooked across expanding collections of meth labs (as in *Clicking Bad*) (Meier, 2013) – that might have supported or confounded responding.

I sought to test between the two hypotheses that individuals' enjoyment of a simple clicker game is associated with their tendency to identify behaviours in action- or goal-level terms. I also hypothesised that enjoyment of the game would be disturbed more by disruption of the action-level behaviours in individuals with low scores on the BIF (i.e. who code their behaviour in action-based terms), but more by disruption of the goal-level behaviours in individuals with high scores on the BIF (i.e. who code their behaviour in goal-based terms).

Study 5

Method

The study was approved by the Bangor University School of Psychology research ethics committee. Participants were provided with an information sheet and provided written, informed consent prior to the start of the study.

Participants

171 undergraduate & postgraduate psychology students at Bangor University were recruited through the School of Psychology's student participant panel (SONA), and were rewarded with course credits for their participation.

Design

The study used a simple between-subjects design with three participant groups. In addition, the design was double-blind, so that the experimenter was not aware of which participants were allocated to which group at the time of testing. Participants were split equally, with N = 57 in each of the three groups.

Demographic and gaming information

After completing the *simplex*-clicker game (see below), participants completed a short questionnaire. Participants were asked to provide demographics of their gender, age, subject & year of study (undergraduate and post-graduate).

They were then asked to indicate *"In the last year, how frequently have you played casual browser/mobile format idle-clicker games?"* with the options: 'Daily'; 'Several times a week'; 'About once a week'; 'About once a month'; 'A few times a year'; 'Never'.

Psychometric assessments

Participants then completed the Behavior Identification Form (BIF) (Vallacher & Wegner, 1989), as discussed in Chapter 4. I conducted a test of internal consistency on the data collected in this questionnaire, showing a Cronbach's α of .834.

***Simplex*-Clicker Game**

Participants took part in a *simplex*-clicker game in which they were presented with three buttons, only one of which would be active/highlighted at any one time, the others being greyed out (see Figure 5.1).

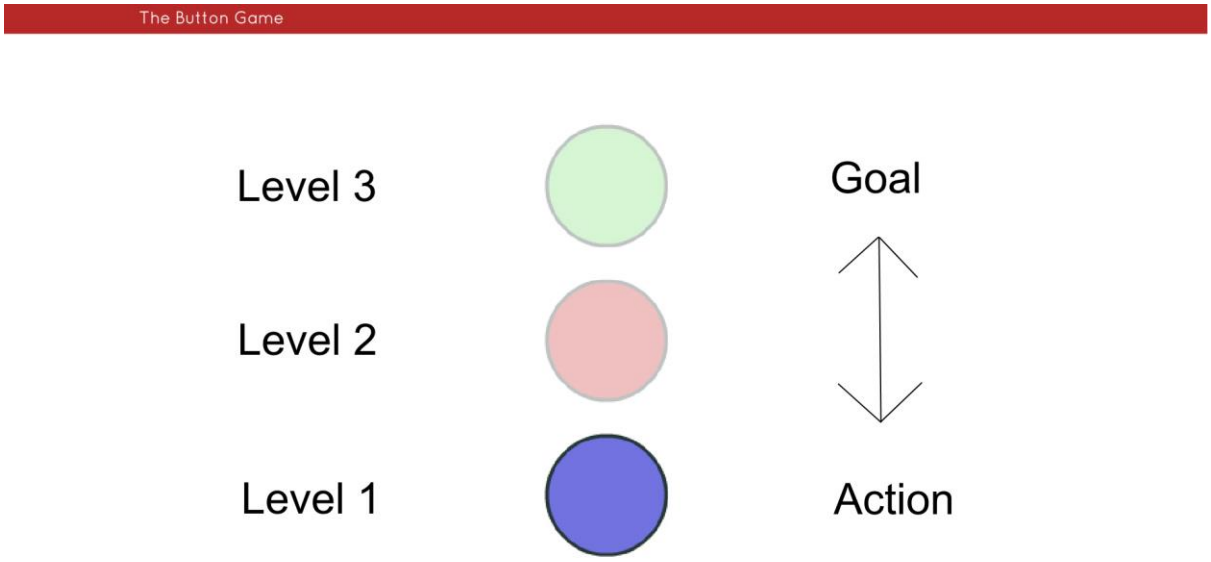

Figure 5.1. A schematic for the *simplex*-clicker game of Study 5. Participants were instructed that, to progress through the game, they needed to click whichever button was highlighted, and that they would be asked to rate their enjoyment of the game every now and then whilst playing. In this instance, the highlighted blue circle indicates that the lowest-level button (B1) is operative.

The game consisted of concurrent fixed-ratio (FR) schedules, which represented a hierarchy of actions and goals. Participants responded with single mouse-clicks to move through each schedule. At the lowest-level button (B1), participants responded on an FR5 schedule (reinforcement occurring after every five clicks) with the reward of activating (highlighting) the next level of button (B2) for one click (see Figure 5.1). At the next level up, B2 also operated on an FR5 schedule, with the reward being activation of B3. The highest-level button (B3) operated on an FR1 schedule (reinforcement occurring after one click). To promote the B2 and B3 schedules as offering higher-order goals than B1, a short ‘ding’ sound was played after each click of its FR5 schedule. Thus, the levels of the game offer actions (at B1) and then higher-order goals (at B2 and finally B3). Assignments of colours across all three levels were counter-balanced across the three groups.

One round of the game consisted of a single completion of all three schedules, from B1 through to B3. After 12 rounds, participants allotted to the action-degradation group were shifted on to a variable-ratio (VR) schedule for B1 (VR5±2; reinforcement occurring after either the third, fourth, fifth, sixth, or seventh click in an unpredictable manner), while B2 continued to operate under an FR5 schedule. The participants allocated to the goal-degradation group were shifted on to a variable-ratio schedule for B2 (VR5±2), while B1 continued to operate under an FR5 schedule. For those in the control group, both B1 and B2 remained on FR5 schedules throughout. The game ended once 24 rounds had been completed.

Momentary enjoyment ratings

Participants provided ratings of how much they were enjoying the game every three rounds of the game (T1 through to T8) (see Table 5.1) using a simple 9-point scale consisting of a sad face at one end and a smiley face at the other. This was done with single mouse-clicks (see Figure 5.2).

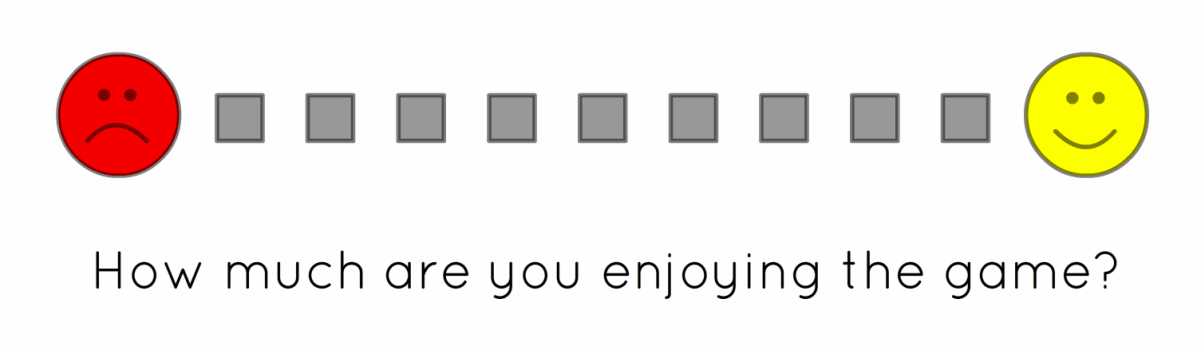

Figure 5.2. The Likert scale presented to participants for them to provide their current enjoyment of the game.

	Timepoint							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Phase	Baseline				Test			
After Round #	3	6	9	12	15	18	21	24

Table 5.1. Timepoints at which momentary enjoyment ratings were collected throughout the game, indicating after which round the collection occurred, and during which phase of the game the collection took place. One round of the game consisted of completion of all three schedules (i.e. one 'click' of B3).

Data Analysis

Data analysis was completed using R and lme4 (Bates et al., 2015; R Core Team, 2019; Winter, 2013). Group matching of gender, age, frequency of idle-clicker play, and BIF score was completed using χ^2 tests and between-subjects analysis of variance (ANOVA) with the single between-subjects factor of group (action-degradation, goal-degradation, and control).

Variation in enjoyments ratings as a function of BIF score and degradation of action or goal schedules were first tested with two forward linear mixed-effects analyses. The threshold for statistical significance was set at the 5% ($p < .05$) level for all models.

Baseline (pre-shift) enjoyment ratings. In the base Model 1, enjoyment was set as the outcome variable, with intercept-by-subject included as a random-effect and timepoint (T1 to T4) included as a fixed-effect. I excluded the random slope for subjects as some models did not converge when this was included (D. J. Barr et al., 2013). Then, in Model 2, I added BIF score. In Model 3, I added participant group as a categorical predictor (with control group as the 'referent'), and, in Model 4, I added the interaction term between BIF and participant group. All of these additions were added as fixed-effects. Finally, I ran χ^2 tests to compare each model to its predecessor on the basis of goodness-of-fit.

Next, I used between-subjects ANOVA to check whether the three participant groups were matched on enjoyment rating at the final baseline stage (T4).

Post-shift enjoyment ratings. In a second set of models, I did the same as in the above series of models, but with the post-shift data (i.e. T5 to T8).

Pre-shift versus post-shift (ΔEnjoyment). Here, to assess the impacts of action- vs. goal-degradation, I used the changes in enjoyment ratings as the subtraction of the T4 rating from the T5 rating (T5-T4) as the dependent variable. T5 was the first enjoyment rating collected following participants in the action-degradation group being shifted to the VR5±2 for level B1 and the goal-degradations group being shifted to the VR5±2 for level B2. In Model 1, I included change in enjoyment (ΔEnjoyment) (i.e. T5-T4) as the outcome variable, with BIF and participant group as predictors (control group as referent). In Model 2, I added the interaction term between participant group and BIF. I compared models using F-change likelihood-ratio tests for goodness-of-fit.

The associations between enjoyment and age, gender, and idle-clicker play frequency were marginal or absent throughout. Thus, to maintain focus, they are not reported.

Tables of models were produced using the stargazer package for R (Hlavac, 2018).

Results

Group-matching

There were no significant differences between the demographics of the participants in our groups in terms of either age ($F(15, 155) = 0.827$, $p > .6$) or gender ($\chi^2(2, N = 170) = 3.031$, $p > .2$). In addition, the BIF scores of the three groups – action-degradation, goal-degradation and controls – were closely matched ($F(23, 147) = 1.192$, $p > .2$) (Table 5.2).

There was a small difference in idle-clicker playing frequency ($\chi^2(10, N = 171) = 18.626$, $p = .045$), largely driven by differences in participation between the control group and those in the two experimental groups (partitioned $\chi^2(5, N = 171) = 14.057$, $p = .015$), though in no clearly discernible pattern (Table 5.3).

	Control (N= 57)	**Action-Degradation (N= 57)**	**Goal-Degradation (N= 57)**
Mean Age (±SD)	21.158 (4.087)	21.053 (5.370)	20.035 (2.646)
Gender (M:F:Other)	9:48:0	13:44:0	6:50:1
Mean BIF (±SD)	13.614 (5.631)	14.544 (5.032)	14.386 (5.311)

Table 5.2. Counts of gender and mean (plus standard deviations) age and action identification (as measured by the Behavior Identification Form; Vallacher & Wegner, 1989), by randomly assigned group.

	Control (N= 57)	**Action-Degradation (N= 57)**	**Goal-Degradation (N= 57)**
Never (%)	12	7	13
A few times a year	12	22	20
About once a month	12	7	8
About once a week	15	5	7
Several times a week	5	10	6
Daily	1	6	3

Table 5.3. Frequency of play of casual browser/mobile format idle-clicker games in the last year, by randomly assigned group.

Baseline (pre-shift) enjoyment ratings

Participants' patterns of enjoyment ratings from T1 to T4 did not vary substantially with their BIF, their participant group, or the interaction term between their BIF score and participant

group (Table 5.4). Participants' enjoyment ratings did, though, tend to converge to the same overall value by T4 ($F(2, 168) = 0.225$, $p > .7$) (Figure 5.3).

	Enjoyment Ratings from T1 to T4			
	Model			
	(1)	(2)	(3)	(4)
Constant	4.216***	3.715***	3.978***	3.392***
	(0.149)	(0.368)	(0.395)	(0.571)
Timepoint	-0.118***	-0.118***	-0.118***	-0.118***
	(0.031)	(0.031)	(0.031)	(0.031)
BIF		0.035	0.038	0.081*
		(0.024)	(0.024)	(0.038)
Group: Action-Deg			-0.408	0.231
			(0.306)	(0.870)
Group: Goal-Deg			-0.508	0.726
			(0.306)	(0.842)
Action-Deg*BIF				-0.047
				(0.058)
Goal-Deg*BIF				-0.088
				(0.056)
χ^2 Statistic		2.207 (df = 1)	3.062 (df = 2)	2.467 (df = 2)
χ^2 *p*		p > .1	p > .2	p > .2
Log Likelihood	-1,131.190	-1,130.087	-1,128.556	-1,127.322
Note:				*p<.05; **p<.01; ***p<.001

Table 5.4. Linear mixed effects models predicting enjoyment ratings from T1 to T4, including the random-effect of intercept-by-subject.

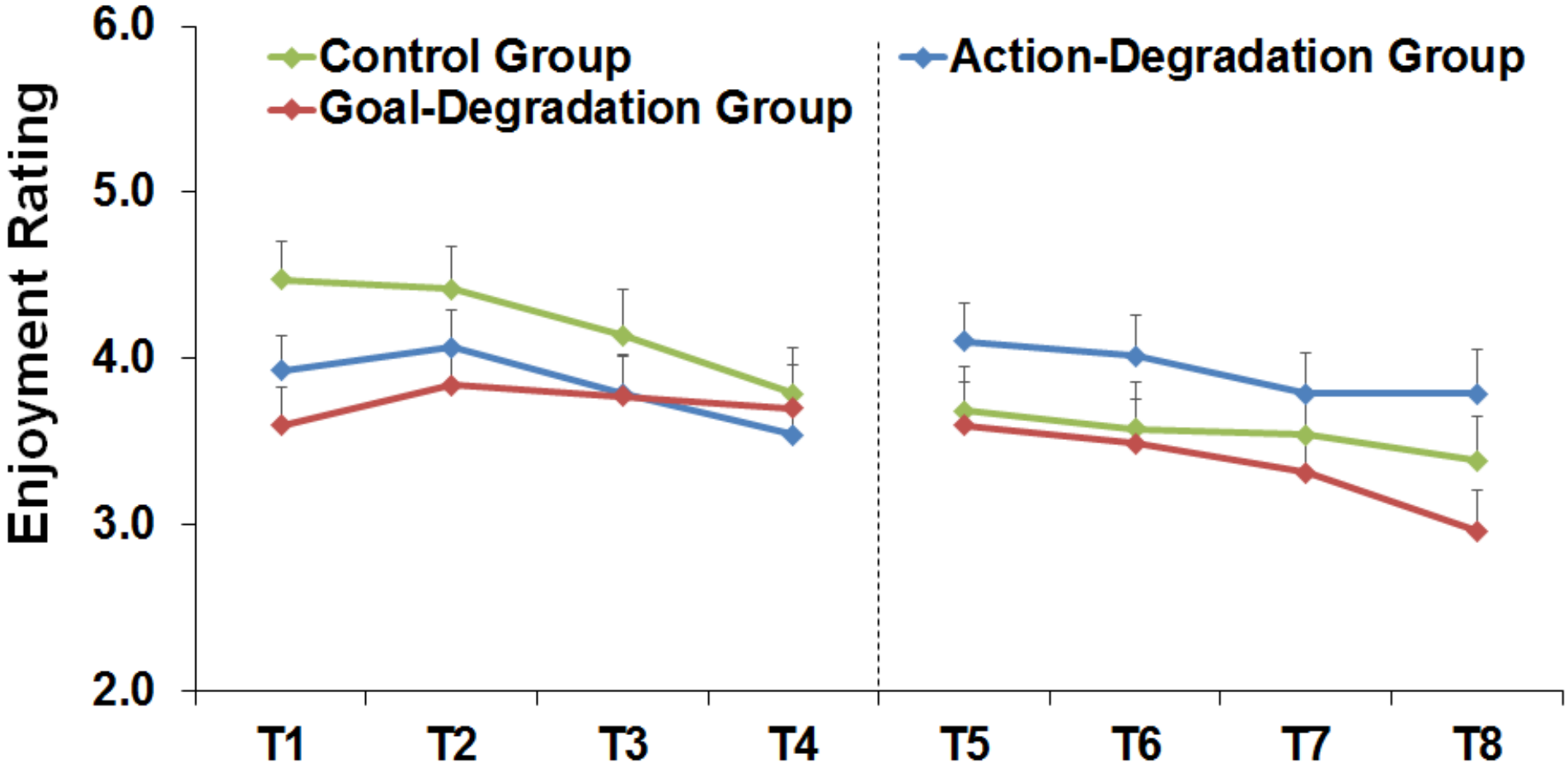

Figure 5.3. Enjoyment ratings across groups of a *simplex*-clicker game at different time points, dashed line denotes change from pre- to post-shift; mean + standard errors. Control group shown in green, action-degradation in blue, and goal-degradation in red.

Post-shift enjoyment ratings

Overall, the same pattern as above emerged during the test phase; enjoyment did not vary with BIF score, participant group, or the interaction term between BIF and participant group (Table 5.5).

	Enjoyment Ratings from T5 to T8			
	Model			
	(1)	(2)	(3)	(4)
Constant	3.953***	3.316***	3.296***	2.613***
	(0.155)	(0.404)	(0.434)	(0.630)
Timepoint	-0.139***	-0.139***	-0.139***	-0.139***
	(0.026)	(0.026)	(0.026)	(0.026)
BIF		0.045	0.044	0.094*
		(0.026)	(0.026)	(0.043)
Group: Action-Deg			0.336	1.060
			(0.340)	(0.964)
Group: Goal-Deg			-0.240	1.218
			(0.339)	(0.933)
Action-Deg*BIF				-0.053
				(0.064)
Goal-Deg*BIF				-0.104
				(0.062)
χ^2 Statistic		2.888 (df = 1)	2.894 (df = 2)	2.793 (df = 2)
χ^2 *p*		p = .089	p > .2	p > .2
Log Likelihood	-1,046.536	-1,045.092	-1,043.645	-1,042.248
Note:				*p<.05; **p<.01; ***p<.001

Table 5.5. Linear mixed effects models predicting enjoyment ratings from T5 to T8, including the random-effect of intercept-by-subject.

ΔEnjoyment (i.e. T5-T4)

Interestingly, in Model 1, enjoyment was elevated in the action-degradation group upon transfer to the VR5 schedule at level B1 compared with the control group participants (t = 3.788, $p < .001$; see Table 5.6 for B and SE). Enjoyment was not changed amongst the goal-degradation participants, nor by BIF (both *p*s > .7). Changes in enjoyment in participant groups, with the shifts from FR5 to VR5 schedules, were not moderated by participants' BIF scores (Table 5.6 & Figure 5.4). Note, however, that the participants in the action-degradation group (marked in blue) reported increased enjoyment ($M = 0.561$, $SD = 1.210$) with the shift to the VR5 schedule (Figure 5.4).

	ΔEnjoyment from T4 to T5 (T5-T4)	
	Model	
	(1)	(2)
Constant	-0.173	0.089
	(0.221)	(0.326)
Group: Action-Deg	0.662***	0.251
	(0.175)	(0.501)
Group: Goal-Deg	-0.004	-0.443
	(0.175)	(0.485)
BIF	0.005	-0.014
	(0.013)	(0.022)
Action-Deg*BIF		0.029
		(0.033)
Goal-Deg*BIF		0.032
		(0.032)
F-Change Statistic		0.601 (df = 2; 165)
F-Change *p*		p > .5
R^2	0.105	0.112
Adjusted R^2	0.089	0.085
Residual Std. Error	0.931 (df = 167)	0.933 (df = 165)
F Statistic	6.544*** (df = 3; 167)	4.148** (df = 5; 165)
Note:		*p<.05; **p<.01; ***p<.001

Table 5.6. Models predicting change in enjoyment from T4 to T5.

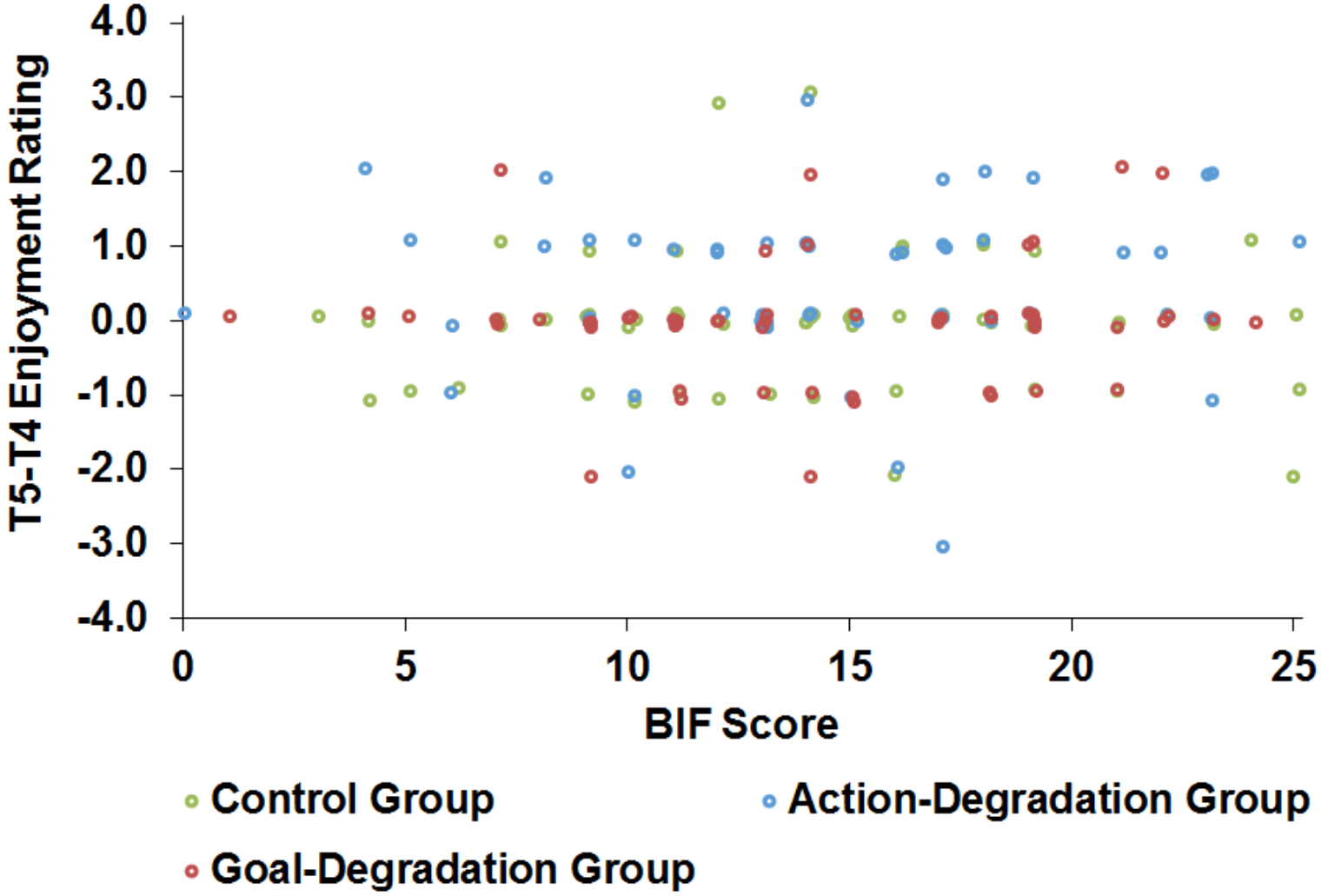

Figure 5.4. Change in enjoyment rating after from pre- to post-shift, relative to BIF score, across groups. Control group shown in green, action-degradation in blue, and goal-degradation in red.

Discussion

In this study, I tested between the two hypotheses that enjoyment of a *simplex*-clicker game would be associated with individuals' tendency to represent their behaviours in action vs goal-directed terms. On the one hand, I expected to find that enjoyment might be elevated in goal-oriented individuals – as would fit with established theory regarding the importance of a match between task complexity and specification in enjoyment (Vallacher et al., 1989). On the other hand, enjoyment might be elevated in action-oriented individuals, consistent with my MSc observation that action identification, as BIF scores, were lower in MMORPG players who also played idle-clickers (C. Smith et al., 2019). I also hypothesised that enjoyment of the game would be disturbed more by degradation of action-level behaviours in individuals with low scores on the BIF (i.e. who code their behaviour in action-based terms) but more by degradation of the goal-level behaviours in individuals with high scores on the BIF (i.e. who code their behaviour in goal-based terms).

These hypotheses were not supported. Enjoyment levels were not associated with participants' BIF score in either the baseline (pre-shift) phase or the test (post-shift) phase. Similarly, any change in enjoyment in degradation of the low-level contingencies of the game (B1) or the higher-order contingencies (B2) were largely independent of participants' BIF scores.

However, in the third set of models – in which I examined the change in enjoyment from just before the intervention (T4) (when participant groups were closely matched) to just afterward (T5) – I observed a rise in enjoyment of the game – which was maintained – for action-degradation participants. Other data indicates that partial reinforcement schedules – such as variable-ratios – can support operant responding on the basis of increased expectancy of

rewards (Skinner, 1957), and can induce polydipsia with alcohol (Falk et al., 1972) and hyperphagia (Wilson & Cantor, 1987). Furthermore, uncertainty – in both Pavlovian conditioning procedures (Anselme et al., 2013) and operant schedules (Zeeb et al., 2017) – enhances the incentive salience of reward-related cues (Anselme et al., 2013; Robinson et al., 2015) and increases risky choice for high value rewards (Zeeb et al., 2017). Possibly, exposure to partial reinforcement schedules can promote sensitisation to reward-inducing stimuli (Zack et al., 2014). Study 5's data here suggests that transitions to uncertain or unpredictable lower-level game mechanics can enhance enjoyment of simplified idle-clicker models.

This finding was unexpected. So, in a short online protocol, Study 6, I sought to replicate it using an online sample. I utilised Amazon's Mechanical Turk crowdsourcing marketplace, a platform shown to produce data as valid and reliable as other Internet data collection methods or in-person lab-based college samples (Buhrmester et al., 2011; Casler et al., 2013; Gardner et al., 2012; Horton et al., 2011), whilst providing more socio-economically and ethnically diverse samples (Buhrmester et al., 2011; Casler et al., 2013). Study 6 was specifically focused on the changes in enjoyment (ΔEnjoyment) with transitions from FR5 to VR5±2 schedules. To this end, I added some self-report items to test individuals' awareness of these changes.

Study 6

Method

Ethical approval was provided by the Bangor University School of Psychology research ethics committee. At the start of the survey questionnaire, respondents read a brief participant information page and indicated their consent by clicking to proceed.

Participants

30 US-based users of Amazon's Mechanical Turk were initially recruited to complete a pilot study. Subsequently, following some adjustments, 150 US-based users completed the study proper. Participants were required to have a 95+% rate of payment based on providing good data in previous Mechanical Turk surveys. In my study, participants were asked to complete the Mechanical Turk protocol using a mouse and with their audio turned on.

Design

The study used the same between-subjects design as in Study 5, with three participant groups (action-degradation, goal-degradation and control). Participants were automatically randomly assigned to a group upon starting the survey – hosted as a web-based survey on Qualtrics (https://www.qualtrics.com/uk/). As a result, group sizes were unequal (Control: $N = 59$; Action-Degradation: $N = 38$; Goal-Degradation: $N = 53$), though not significantly so (χ^2 (2, $N = 150$) = 4.680, $p = .096$).

Demographic and gaming information

In addition to their age and gender, participants were asked for their highest educational or training qualification, current occupational status, and marital status. For education, the following categories were available: 'Some high school'; 'High school diploma / GED'; 'Some college'; 'Bachelor's degree'; 'Master's degree'; and 'PhD'. For occupational status, participants could choose from: 'Employed full-time (30 hours per week or more)'; 'Employed part-time (less than 30 hours per week)'; 'Self-employed'; 'Unemployed'; 'School student'; '12th Grade student'; 'Undergraduate student'; 'Postgraduate student'; 'Retired'; 'Taking care of the house'. For marital status, the following options were offered:

‘Married/in a Civil Partnership’; ‘Divorced’; ‘Widowed’; ‘Separated’; ‘Single’; ‘A member of an unmarried couple’.

Following completion of the *simplex*-clicker game and BIF questionnaire, an item asked participants *“While playing, did you notice the game change at all?”*, with binary ‘Yes’/’No’ response options. If participants reported that they had, they were asked a series of questions about their perception of how the game had changed. First, participants were asked *“At what point did the game change?”*, with the options: ‘At the beginning’; ‘A quarter of the way through’; ‘Halfway through’; ‘Three quarters of the way through’; and ‘At the end’. Next, participants were asked to answer *“To what extent did the game change?”* using an 11-point (0-10) scale with anchor points of ‘Not at all’ and ‘Completely’. Participants were then asked *“In what way did the game change?”*, and were presented with a list of options: ‘I had to click the first button more times to activate the second button’; ‘I had to click the first button fewer times to activate the second button’; ‘The amount of times I had to click the first button to activate the second button become more variable’; ‘I had to click the second button more times to activate the third button’; ‘I had to click the second button fewer times to activate the third button’; ‘The amount of times I had to click the second button to activate the third button become more variable’; ‘I had to click the third button more times to be asked my enjoyment of the game’; ‘I had to click the third button fewer times to be asked my enjoyment of the game’; and ‘The amount of times I had to click the third button to be asked my enjoyment of the game become more variable’.

Participants were then asked a final time *“How much did you enjoy the game?”*, using the same 9-point scale format as participants were presented with during the game.

As in Study 5, participants were asked to indicate *"In the last year, how frequently have you played casual browser/mobile format idle-clicker games?"* with the options: 'Daily'; 'Several times a week'; 'About once a week'; 'About once a month'; 'A few times a year'; 'Never'.

Finally, participants were asked about how they had completed the Mechanical Turk 'job', to ensure compliance with my request to play with a mouse as the input device and to ensure their audio was turned on, as the former could affect enjoyment of the game, given that it is click-intensive, whilst the latter was to preserve my attempt to ensure that the higher-level buttons were seen as such, using the 'ding' sounds mentioned in Study 5. Specifically, participants were asked *"What type of device did you use to complete this job?"*, with options of: 'Desktop'; 'Laptop'; 'Mobile'; 'Tablet'; and 'Other' (with an open-text box). This was followed by *"What input device did you use to click during this job?"*, with possible options of: 'Mouse'; 'Touchpad'; 'Touchscreen'; and 'Other' (again with an open-text box). Then, participants were asked *"Did you have your audio turned on during this job?"*, with binary 'Yes'/'No' response options.

To check for/trace any potential issues participants could have experienced during the survey, I also asked participants *"Which browser did you use to complete this job?"*, with options of 'Chrome'; 'Firefox'; 'Internet Explorer', 'Microsoft Edge'; 'Safari'; 'Opera'; 'UC Browser'; and 'Other' (with an open-text box). This was followed by *"Did you experience any technical issues while completing this job? (e.g. repeated long image loading times)"*, with options of 'Yes (please state)' and an open-text box, and 'No'.

Psychometric assessments

As in Study 5, participants completed the Behavior Identification Form (BIF) (Vallacher & Wegner, 1989), with it once again showing good internal consistency; the data used here produced a Cronbach's α of .934.

Simplex-Clicker Game

In the pilot study, 30 participants completed the same *simplex*-clicker game as described in Study 5, with the same number of rounds and enjoyment ratings taken every third round. This time, I found that over half of participants reported an enjoyment rating of only 0 or 1 at the final baseline (pre-shift) rating (T4), whilst over two-thirds did so at the first post-shift enjoyment rating (T5). Therefore, for the main data collection, I shortened the length of the *simplex*-clicker game to a total of 12 rounds, with the shift from FR5 to VR5 for the action-degradation and goal-degradation groups occurring after the sixth round. Since enjoyment ratings were still collected after every third round, a total of four ratings were collected, with the final baseline rating collected at T2 and first post-shift rating at T3.

Since presenting the *simplex*-clicker game's buttons in a vertical format risked participants failing to see the entire display and having to scroll to see the final button on some devices/monitors, the buttons were reoriented and presented horizontally, with the lowest-level button on the left, proceeding to the highest-level on the right. The game was otherwise the same as in Study 5.

Participants were asked an attention check question straight after being shown the instructions of how to play the game. This question was: *"What will you be asked about every now and then as you play the game?"*, with options of: 'Which button you just

pressed'; 'Your enjoyment of the game'; 'Your favourite colour'; 'How you would best describe the game'.

Data Analysis

Data analysis was completed using R, SPSS, and G*Power 3.1 (Faul et al., 2009; IBM Corp, 2016; R Core Team, 2019). Group comparisons of gender, age, frequency of idle-clicker play, and BIF score were completed using χ^2 tests and between-subjects analysis of variance (ANOVA) with the single between-subjects factor of group (action-degradation, goal-degradation, and control).

As in Study 5, I used ANOVA to check that the participant groups were matched on enjoyment rating at the final baseline stage (T2). I then used between-subjects ANOVA to test differences in ΔEnjoyment, calculated as the change from the end of the baseline period (T2) to the first post-shift enjoyment rating (T3); i.e. T3-T2.

As Study 6 is primarily concerned with attempting to replicate the unexpected finding of an elevation in enjoyment from pre- to post-shift to a variable-ratio schedule for the lower-level game mechanics, I did not conduct the same analyses of pre- and post-shift patterns of enjoyment ratings as in Study 5. I did, though, test to see if the possible increase in salience of action identification – after respondents completed the BIF and answered about their awareness of any changes occurring during the game – had differential effects on ΔEnjoyment. I ran two forward multiple regressions to test differences in ΔEnjoyment, calculated as the subtraction of the T4 rating (end of the game) from the T5 rating (end of the survey) (T5-T4), as the dependent variable. In Model 1, I included BIF score and participant group as a categorical predictor with control group as the referent. In Model 2, I added the

interaction term between BIF and participant group.

As in Study 5, associations between enjoyment and age, gender, and idle-clicker play frequency were marginal or absent throughout. Thus, to maintain focus, they are not reported. In the absence of any theoretical basis for doing so, no analysis of other – peripheral – demographics were conducted here. Additional analysis of only participants who reported noticing a change (or, for the controls, reported no change) during the game did not produce patterns of results markedly different from those reported here.

The threshold for statistical significance was set at the 5% ($p < .05$) level for all analyses.

Tables of models were produced using the stargazer package for R (Hlavac, 2018).

Results

Of the 150 Mechanical Turk users recruited, 40 were discarded. Twenty failed the attention check question, 14 reported not using a mouse as their input device, and a further 6 had not had their audio turned on. With these exclusions, final group numbers were: Control: $N = 43$; Action-Degradation: $N = 25$; Goal-Degradation: $N = 42$.

Group-matching

There were no significant differences between the group demographics of the participants in our groups in terms of either age ($F(2, 107) = 0.505$, $p > .6$) or gender ($F(2, 107) = 0.310$, $p > .7$), nor was there a significant difference of BIF score ($F(2, 107) = 0.115$, $p > .8$) (Table 5.7).

Expected cell counts were too low to run an appropriate test on any differences in idle-clicker

play frequency across participant groups, but all groups showed the same pattern of frequencies; the vast majority of respondents did not play idle-clicker games more than a few times a year (Table 5.8).

	Control (N= 43)	**Action-Degradation (N= 25)**	**Goal-Degradation (N= 42)**
Mean Age	35.49	36.48	37.64
Gender (M:F)	27:16	18:7	27:15
Mean BIF	16.09	16.56	15.67

Table 5.7. Demographics and mean action identification (as measured by the Behavior Identification Form; Vallacher & Wegner, 1989), by randomly assigned group.

	Control (N= 43)	**Action-Degradation (N= 25)**	**Goal-Degradation (N= 42)**
Never	17	10	22
A few times a year	14	7	12
About once a month	4	2	3
About once a week	6	2	1
Several times a week	1	3	3
Daily	1	1	1

Table 5.8. Frequency of play of casual browser/mobile format idle-clicker games in the last year, by randomly assigned group.

Awareness of schedule degradation

Only 52% (13/25) of participants in the action-degradation group noticed that the game changed whilst they played it, whilst for those in the goal-degradation group this fell to 38% (16/42), almost identical to the 35% (15/43) in the control group who erroneously reported a change. These differences were not reliable (χ^2 (2, N = 110) = 2.033, p > .5). These numbers were even further reduced in terms of those who could correctly identify how the game changed; in the action-degradation group, 48% correctly identified that it was B1 which underwent a change in reinforcement schedule, whilst only 14% of those in the goal-degradation group realised that for them the B2 schedule changed. These figures fell further still to just 24% (action-degradation) and 5% (goal-degradation) respectively in terms of

those identifying the correct button and that reinforcement had become more variable, rather than simply either more or less frequent.

ΔEnjoyment (i.e. T3-T2 and T5-T4)

Just prior to the shift in schedules, the action-degradation participants reported lower mean enjoyment ratings compared with the goal-degradation participants and the control participants at T2 (Action-degradation: $M = 2.480$, $SD = 2.104$; Goal-degradation: $M = 3.167$, $SD = 2.659$; Control: $M = 3.233$, $SD = 2.617$), though this difference was not significant ($F(2, 107) = 0.791$, $p > .4$).

Contrary to Study 5, there was no difference in ΔEnjoyment between groups from baseline to post-shift to the variable-ratio schedules (VR5) ($F(2, 107) = 1.009$, $p > .3$) (Figure 5.5). Post-hoc power analysis, however, revealed low power to detect this difference, of just .222. Further, there were no associations between BIF score or participant group and the change in enjoyment from completion of the *simplex*-clicker game, nor did the interaction between BIF and participant group explain change in enjoyment ratings from T4 to T5 (Table 5.9). However, here too, post-hoc power analyses revealed very low power of just .095.

	ΔEnjoyment from T4 to T5 (post-completion of the BIF) (T5-T4)	
	Model	
	(1)	(2)
Constant	0.369	0.216
	(0.232)	(0.322)
Group: Action-Deg	-0.188	0.183
	(0.225)	(0.589)
Group: Goal-Deg	0.032	0.249
	(0.194)	(0.455)
BIF	-0.001	0.008
	(0.012)	(0.018)
Action-Deg*BIF		-0.023
		(0.033)
Goal-Deg*BIF		-0.014
		(0.026)
F-Change Statistic		0.276 (df = 2; 104)
F-Change *p*		p > .7
R^2	0.010	0.015
Adjusted R^2	-0.018	-0.032
Residual Std. Error	0.896 (df = 106)	0.902 (df = 104)
F Statistic	0.349 (df = 3; 106)	0.317 (df = 5; 104)
Note:		*p<.05; **p<.01; ***p<.001

Table 5.9. Models predicting change in enjoyment from T4 to T5.

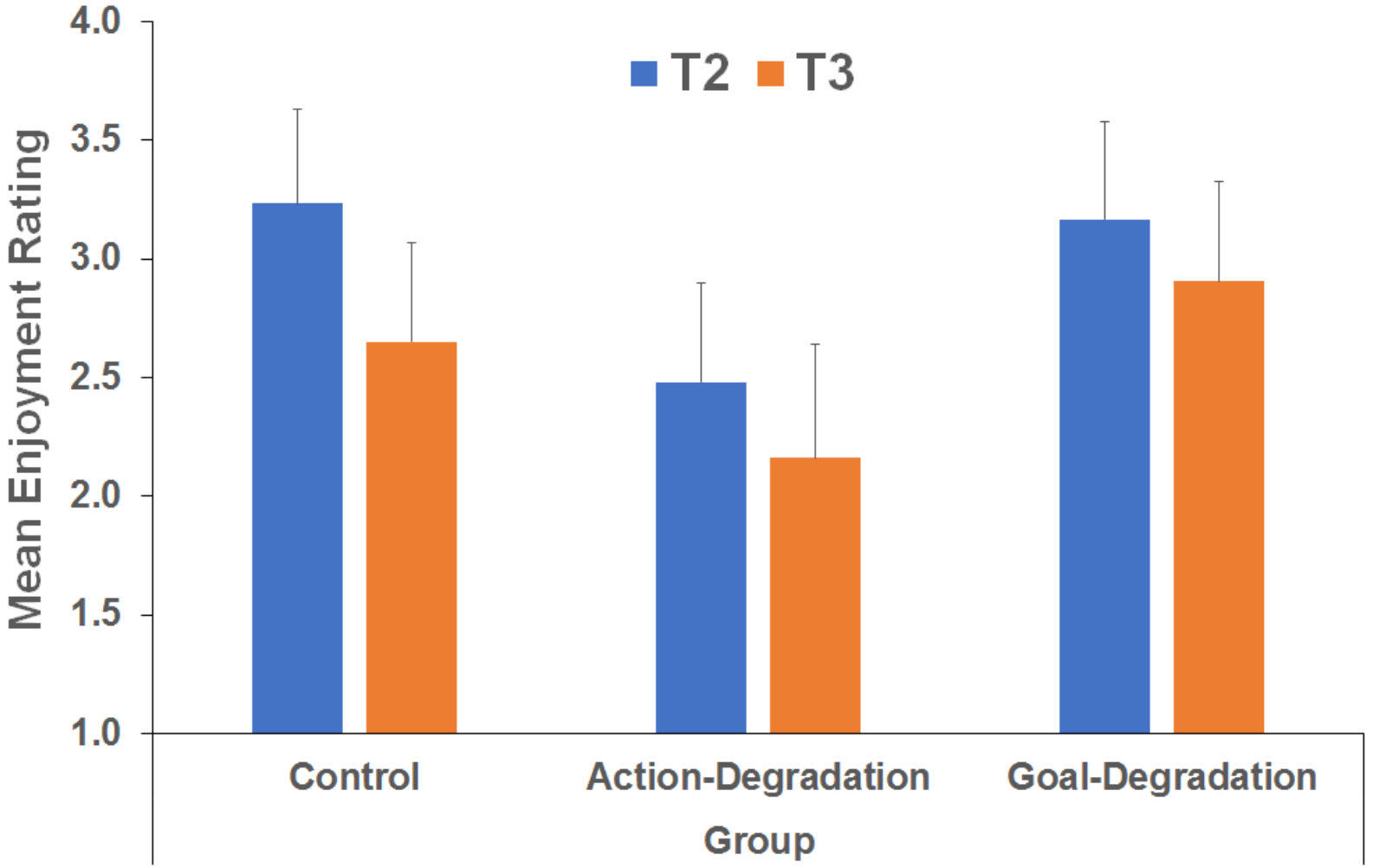

Figure 5.5. Enjoyment ratings from pre- to post-shift in a *simplex*-clicker game, from the final baseline rating (T2) to first post-shift rating (T3); mean + standard errors. Note the small changes in enjoyment relative to variation make direct plotting of the T3-T2 variable unsuitable for presentation in a figure.

Discussion

These findings fail to replicate Study 5's observed increase in enjoyment when action-based schedules were degraded by shifts to a variable-ratio schedule. These findings do, though, corroborate those from Study 5 in not supporting my initial hypothesis that enjoyment of a simplified, abstracted clicker game is related to individuals' representation of behaviour in action- or goal-based terms, with reported final enjoyment of the game showing no association even after increasing the saliency of these representations.

However, some problems arose. First, the enjoyment ratings recovered from Study 6 remained low compared with ratings recovered in Study 5, even once I had edited the game to just 12 rounds of the action→goal structures. In fact, enjoyment ratings were lower at the end of the game in Study 6 (M = 2.264, SD = 2.580) than they were in Study 5 after twice the number of rounds (M = 3.380, SD = 1.980). Second, possibly my experimental manipulations were too subtle. Only 52% and 38% of participants noticed any changes during the game in the action-degradation and goal-degradation groups respectively, barely above the 35% of those in the control group who erroneously reported a change in schedule. This suggests that the degradations I employed were not potent enough. It may be that for behaviour representation to play a role in enjoyment, the degradation in reward schedule needs to be more obvious. Further studies in this area could utilise progressive ratio schedules such as increasing FR schedules (Killeen et al., 2009). These are used in many games through their levelling-systems, in which the amounts of experience points required to increase in level also steadily increase as players level higher. In any future studies with progressive ratios and their increasing response loads, it would be important to be mindful of the floor effects seen here in my piloting data. It may also be that the web-based presentation of the *simplex*-clicker, supported by varying platforms and audio-visual experiences, mitigated enjoyment

relative to those of standardised laboratory conditions of Study 5.

Setting aside these comments, these broadly null results and the failure to replicate the effect of action-degradation elevating enjoyment ratings seen in Study 5 suggest that the latter is a Type I error.

Chapter Discussion

Here, I reported two studies in which I tested the hypotheses that enjoyment of a simplified, abstracted clicker game is associated with individuals' tendency to identify behaviours in action- or goal-level terms (C. Smith et al., 2019; Vallacher et al., 1989; Vallacher & Wegner, 1989), and that changes in enjoyment would relate to differential sensitivity to the degradation of these actions or goals in a *simplex*-clicker game. I also attempted, unsuccessfully, to replicate the unexpected finding in Study 5 that the hypothesis that specific degradation of the action-level component of this game would increase enjoyment.

Overall, these hypotheses (although plausible) were not supported. I found that enjoyment of the *simplex*-clicker game was not elevated for individuals with higher or lower BIF scores (Vallacher & Wegner, 1989), and that changes in enjoyment following degradation of the respective aspects of the game did not map on to BIF scores. Hence, the results indicate that enjoyment of clicker games does not relate strongly to action identification, nor to degradation of components of a clicker game through low level actions or higher-order goals.

My studies began with sample sizes of a minimum of 150 participants (before exclusions). However, engagement amongst the Mechanical Turk participants in Study 6 was disappointing. The number of participants who failed to follow instructions about how to

complete the protocol or did not pay attention, as seen through the attention check question, led to a high number of exclusions. This led to Study 6 having very low power, meaning that I am unable to confidently rule out the possibility that the null findings in these data are not Type II errors.

My previous MSc data showed that MMORPG players who played idle-clickers report more action-orientation (lower BIF scores) than those players who did not play idle-clickers (C. Smith et al., 2019). Perhaps, it is not so much enjoyment of clicker games that relates to the tendency to represent behaviour**s** in terms of actions or goals, so much as their being drawn to the genre of game in the first place. Hence, action-orientation may be a contributory factor in getting an individual 'through the door' of playing the game, but be unrelated to the experiences of players once actually playing. More generally, it is possible that action identification is more potent in the context of time-invested MMORPG settings than casual idle-clicker games, played within narrow, comparatively impoverished, narratives.

Alternatively, my *simplex*-clicker game, which was intended to afford opportunities to degrade certain components of its structure, may have been too abstracted from real game experiences. Possibly, the narrative content of such games – which I excluded from this game – sustains play more than I had imagined. This would suggest that the operant features seemingly so vital to the construction of idle-clickers are less central to their enjoyment value. Further, it may specifically be the idling component – not captured in my *simplex*-clicker game – that appeals to goal-oriented individuals. If so, my simple game's omission of an idling component – that would allow individuals to proceed through a game's structure without actually responding (Alharthi et al., 2018) – meant that it failed to engage action identification as a mediating mechanism.

Finally, it is also possible that my hierarchy of actions/goals, represented through a spatial arrangement of buttons, was either too abstract or too subtle to engage with behavioural representation constructs. In Study 5, I arranged the buttons vertically, in a manner which might better support my intended hierarchy of actions/goals, whereas, in Study 6, the web-based presentation meant that this was not possible, leading me to use a horizontal arrangement. This may explain the low numbers of participants in Study 6 who could correctly identify both that there was an experimental change, and what that change was. Perhaps relatedly, enjoyment ratings were higher in Study 5 than in Study 6.

Notwithstanding these possibilities, my data here suggest – at the least – that action identification theory does not play a significant role in individuals' enjoyment of operant-based clicker games.

Chapter 6: General Discussion

Extant research in the gaming sphere has highlighted that gaming can promote a wide variety of cognitive and social skills (Adachi & Willoughby, 2013; Ducheneaut & Moore, 2005; Gallup et al., 2017; Yee, 2006a), and that play of Massively Multiplayer Online Role-Playing Games (MMORPGs) can lead to gains in social capital (Molyneux et al., 2015; Reer & Krämer, 2014; Williams et al., 2006). The extent to which players experience these positive outcomes is modulated by their motives for play (Dalisay et al., 2015; Domahidi et al., 2014). Simultaneously, research has highlighted that there are risk factors – such as hostility – associated with developing patterns of play which may be detrimental to health and well-being (Stavropoulos et al., 2017). My prior research conducted during my MSc additionally revealed that there are links between individuals' choice of in-game MMORPG role, enjoyment, and self-reported benefits from play (on the one hand) and their representations of behaviours as actions or goals and their attentional focus as daydreaming (on the other) (C. Smith et al., 2019).

My research in this thesis extends this literature by demonstrating that choices and benefits can depend on individuals' social attitudes and values, and wider political viewpoints. It also provides new information about casual gaming and its motivational structure, and the apparently limited roles of behaviour representation (in terms of actions vs. goals) and attentional focus (as daydreaming) in relation to gaming experiences, including cognitive benefits.

Major findings and what they mean

In Study 1, I found that trait hostility is relevant to choice of player-role in an MMORPG, such that players' choices within MMORPGs can sometimes reflect adverse attitudes to

others. Players self-identifying as Killers reported the highest levels of hostility, at a level comparable to those of Others, whilst Skillers and Questers reported lower levels. I additionally found that more hostile players consistently report the most positive outcomes from playing MMOs, both in terms of skills gained through play enabling them to achieve major things in their offline lives, and in reporting beneficial effects of their online relationships for their offline relationships. The beneficial transfer of relationships was somewhat moderated by player-role, with Questers – who favour the most single-player core MMORPG activity – showing a weaker (though still present) positive relationship between hostility and relationship benefits than do players who favour other in-game content. Additionally, players with the most hostile attitudes towards others reported placing greater relative importance on their in-game achievements than players expressing lower levels of hostility, this being true regardless of their choice of in-game player-role.

In Study 2, I found that players identified as individualist in terms of their social value orientations reported the least cognitive and social benefits from MMO play, particularly with regard to relationships, though not compared to the other proselfs: competitors. Moving further along this continuum to more broad attitudes, I demonstrate that choice of player-role relates to political ideology, further suggesting that players' choices within MMORPGs are related to their attitudes about the world and others. Killers reported the highest levels of economic and, particularly, social conservatism, whilst Questers reported more liberal stances on both of these metrics. It should be noted, though, that these findings are in a context of high levels of prosociality – relative to previously reported populations (Au & Kwong, 2004) – regardless of choice of player-role, with only marginal differences between the Killers and other player-roles. Political ideology showed complex relationships with cognitive and social benefits, though post-hoc analyses found that players categorised as libertarian – showing

low levels of social conservatism and high levels of economic conservatism – gained the most from MMO play. The opposite was true for Liberal-Left players. Possibly, the combination of socially liberal and economically neoliberal views (i.e. as in 'the freer the market, the freer the people') promotes experiencing greater benefits from play; MMORPG environments are, after all, virtual worlds in which individuals have greater personal and economic freedom.

Studies 3 and 4 involved a switch towards casual games, with the intention of testing associations in action identification and daydreaming on the basis of casual game genre selections, methodology previously used in online gambling research (Lloyd et al., 2010). However, high numbers of inter-correlations between engaging in each of the different casual game genres prevented this approach. Players of casual games participate in games of multiple genres over the frequency of a week, suggesting that they are more generalist in their approach than many gamers in MMORPGs, who choose to adopt specific player-roles.

In Study 3, I found that several gaming motivations related to gaming behaviours and experiences. External regulation (whereby playing brings other rewards, such as virtual currency, levels, or admiration from peers) tended to predict participation in a greater number of casual game genres, possibly allowing access to more varied rewards or achievements which contribute to their public profile on some casual game sites. Respondents with high levels of identified regulation (playing to help achieve other goals or because it has personal meaning) reported greater transfer of useful skills from casual games to the rest of their life. This may be through the already-documented potential for gaming to promote problem-solving skills (Adachi & Willoughby, 2013; Buelow et al., 2015). Individuals reporting greater levels of integrated regulation (where playing aligns with other life goals and is

integrated in to a wider organisation of the self) were more likely to play multiplayer online games and view gaming as more important to them. The same two associations were also present for external regulation, but only in the case of my oldest sample of respondents. Intrinsic motivation (whereby playing the game is its own reward) was also consistently associated with higher levels of personal gaming importance. By contrast, I found no associations between daydreaming frequency or action identification in relation to behaviours or experiences in the domain of casual games. This was the case for both samples of casual game players recruited directly from casual game hosting websites (Study 3), and from an Internet discussion board (Reddit) populated by fans and players of casual games (Study 4).

In Studies 5 and 6, I sought to test the competing hypotheses that enjoyment of an abstracted, simplified '*simplex*-clicker' game was linked to a tendency to represent behaviours more in terms of either actions or goals. These hypotheses were decisively rejected. Additionally, changes in enjoyment while playing this *simplex*-clicker game were not linked to any differential sensitivity in degradation of the hierarchy of actions and goals through shifting to variable-ratio reinforcement schedules. Inducing uncertainty by shifting from a fixed-ratio schedule to a variable-ratio schedule for either action- or goal-level behaviours did not disturb enjoyment differentially for individuals who code behaviours in action- or goal-based terms. Finally, although I unexpectedly found that degradation at the action-level (but not goal-level) of the *simplex*-clicker game elevated enjoyment ratings, this did not replicate in Study 6, and thus may have been a Type I error. More broadly, Studies 5 and 6 suggest that enjoyment of idle-clicker games is not derived from the underlying operant structure of instrumental actions engaging individuals' representations of behaviours in terms of actions or goals. Rather, it may be the more purely acquisitive aspects of these games, collecting points over time even without actions (through an idling component), or even the narrative

base, which draws players to these games and sustains their enjoyment.

Where my research fits in the literature

Hostility in MMORPG player-roles and experiences. Trait hostility has been identified as a risk factor for problematic patterns of play, sometimes defined as 'gaming addiction' (Chiu et al., 2004; Gentile et al., 2011; Ko, Yen, et al., 2009; Stavropoulos et al., 2017; Yen et al., 2007, 2008, 2011). Some researchers interpret this as indicating that hostility promotes hazardous playing patterns as a maladaptive escape/avoidance-based coping strategy (Kuss, 2013; Stavropoulos et al., 2017; Yen et al., 2007), and that this in turn could impede cognitive and social adjustment, further elevating levels of hostility (Stavropoulos et al., 2017). My finding that player-roles involving combat in MMORPGs are associated with greater levels of hostility could potentially suggest that these online spaces do indeed offer an environment in which individuals can express hostility in a way they are unable to in offline settings (Stavropoulos et al., 2017). In turn, that hostility is associated with placing greater relative value on in-game achievements could suggest problematic patterns of play.

On the other hand, my findings are striking in showing that hostility is also associated with perceiving greater cognitive and social benefits from playing MMOs in ways which transfer positively in to their offline lives through helping them achieve goals and improve offline relationships. This is contradictory to the view that gaming acts as a harmful feedback loop for vulnerable individuals. Rather, it supports a more compensatory, holistic view of the role of gaming (Johnson, Wyeth, et al., 2013; Kardefelt-Winther, 2014). MMOs appear to offer individuals experiencing potentially difficult social experiences offline ways in which they can improve their problem-solving and social skills through game structures and

communities, be they tricky combat encounters, quests, clans, or unstructured relationships and collaborations with other players (Adachi & Willoughby, 2013; Buelow et al., 2015; Ducheneaut & Moore, 2005; Gallup et al., 2017; Visser et al., 2013). That games can offer positive outcomes for vulnerable individuals facing difficult social experiences can also explain the greater relative importance placed on in-game achievements. It is perhaps through these achievements in-game that individuals have been able to grow and develop in ways which they may find more difficult in other settings.

Indeed, MMOs appear to provide a source of coping or social compensation in which relatedness needs are successfully met (Colwell, 2007; Reer & Krämer, 2017; Wack & Tantleff-Dunn, 2009), promoting healthy functioning for those who would otherwise find it difficult to attain the same level of needs satisfaction (Gallup et al., 2017; Martončik & Lokša, 2016). It is logical that for those whose compensatory satisfaction needs are particularly great, this may promote excessive levels of play (Kardefelt-Winther, 2014, 2016; King & Delfabbro, 2014; Wan & Chiou, 2006b). My research suggests that potentially vulnerable MMO players perceive their play as providing ways for them to develop and become better able to satisfy their needs in offline settings, promoting long-term well-being. Interestingly, this promotion of cognitive and social benefits appears to be the case – albeit in some cases to varying extents – regardless of in-game choice of player-role.

Political ideology and social values in MMORPG player-roles and experiences.

Belief systems on the liberal-conservative continuum can reflect tolerance of ambiguity and openness versus a preference for structure, order and certainty (Everett, 2013). My research suggests that choice of player-role – in particular those relating to combat and questing – reflect these psychological characteristics. This builds on existing research, which shows

openness is associated with role-playing (Jeng & Teng, 2008), to demonstrate that such associations between game activities also reflect wider political ideology. Both the findings in Studies 1 and 2 also support claims and research that it is possible to identify 'types' of players who differ from each other in meaningful ways (Bartle, 1996; Kahn et al., 2015), here utilising an existing taxonomy used by *RuneScape* players.

It is important to note that these findings indicate an online context of broadly prosocial value orientations, with only limited differences between player-roles. These high levels of prosociality – relative to other reported samples (Au & Kwong, 2004) – possibly reflect the strong community ethic of long-established MMORPGs. Social value orientations play an important role in how people interact with social partners (Au & Kwong, 2004; Van Lange, Agnew, et al., 1997; Van Lange, De Cremer, et al., 2007). In turn, motives for play, including being social, affect the amounts of social capital players derive from MMORPG gaming (Dalisay et al., 2015; Domahidi et al., 2014), as do actual in-game behaviours such as levels of communication with other players and participation in guilds (Ang & Zaphiris, 2010; Kahn et al., 2015; Reer & Krämer, 2014; Vella et al., 2015; Zhong, 2011). Social value orientations are involved in the derivation of benefits from play, with proselfs – particularly individualists – experiencing lower levels of social benefits from play, perhaps indicating differences in their motives for play and subsequent socialisation patterns in-game compared to other players.

Casual game players as a less differentiated population. The population of players of casual games tends to be older and more likely to be female than amongst the wider gaming community, consisting to a greater degree of middle-aged women and retired individuals (GamesIndustry International, 2006; Kuittinen et al., 2007; Russoniello & Parks,

2009; Wallace & Robbins, 2006). Of my three large samples of casual game players, only one of them exhibited demographics akin to those described previously. Associations between gaming behaviours and benefits, demographics, and gaming motivations differed between samples. My data demonstrate that findings from one sample of players of casual games can diverge wildly from those of another. Hence, it is important to note that whilst studies utilising samples of players of casual games can be taken as indicative of the experiences of at least a subset of the wider population of such players, they are not necessarily representative of that wider population as a whole.

Gamers who report that gaming is important to them have been seen to exhibit higher levels of intrinsic motivation and extrinsic motivations of all types than other gamers (Shaer et al., 2017). In my sample of players of casual games, however, whilst intrinsic motivation showed the same association, of the extrinsic motivations only integrated regulation did so consistently. Possibly, the Gaming Motivation Scale (GAMS) (Lafrenière et al., 2012) is more finely-tuned to motivations in the context of MMOs and other multiplayer games.

Associations between both integrated regulation and external regulation with likelihood to play multiplayer online games and regard gaming as personally important are easily understood as capturing the value of MMO play in terms of identity formation (Crowe, 2009) and, in older adults, the accrual of social capital and maintenance of friendships (Zhang & Kaufman, 2015, 2016). MMOs can promote and sustain the development of close friendships through shared experiences which form trust (Skoric & Kwan, 2011; Smyth, 2007; Yee, 2006a, 2006b), becoming part of a community through participation in clans/guilds (Ang & Zaphiris, 2010; Reer & Krämer, 2014; Williams et al., 2006; Zhong, 2011), and the resultant availability of recognition of the player's achievements through these networks.

Outside the specific context of casual games, goal-orientation is positively associated with participation in a greater number of different gaming genres (Ewell et al., 2018). Previously, I also showed that action identification and daydreaming frequency are related to a variety of gaming behaviours and experiences, including choice of player-role, self-reported benefits from play, and relative importance placed on in-game achievements (C. Smith et al., 2019). My data in Studies 3 and 4 suggest that in the context of casual games, or the subtype of gamers who engage in them, behavioural representation and attentional focus are not factors which influence gaming behaviours or experiences.

Mismatches between task complexity and specification in terms of actions or goals can impede enjoyment (Vallacher et al., 1989). My *simplex*-clicker data poses an interesting paradox in that behavioural representation tendencies were unrelated to enjoyment of what was a very simple, operant-based game. This runs counter to both extant research, which suggests that this would be positively related to goal-orientation, and data I collected during my MSc which indicated that individuals drawn to idle-clickers are more action-oriented than are other players. So, too, was my finding that manipulation of action- and goal-level mechanisms within the game did not produce differential effects on enjoyment based on individual variation in behavioural representation. My prior research shows that goal-orientation is predictive of greater levels of enjoyment in an MMORPG context (C. Smith et al., 2019), so, possibly, my *simplex*-clicker game was too abstracted from real scenarios – through the lack of a narrative or idling component (Alharthi et al., 2018) – and the mechanisms too subtle in order to sufficiently tap in to action or goal orientations. This could explain the unexpected disparity between my findings here and expectations based on extant

research.

Strengths and weaknesses

My research reported here has a number of strengths. Five of my studies have benefitted from high numbers of participants, with a minimum of 171 recruited participants, and Studies 1 and 2 enjoying respondent numbers in the thousands. Studies 1 through 4 all rely on respondents recruited directly from either gaming websites themselves, or sites catering for players with a specific interest in the style of games I sought to study. My studies provide insights in to how gamers' player-role choices reflect their attitudes towards others and the world, an area lacking in previous study. They also make an important contribution to gaining an understanding of the holistic effects of gaming, such as investigating, for the first time, how a risk factor for hazardous play relates to self-reported benefits from play. This research additionally highlights that casual gaming and players of such games may represent a distinct realm of gaming which contrasts with MMORPG gaming in terms of the (lack of) relevance of psychometric factors relating to behavioural representation and daydreaming frequency.

As with any body of work, there will be a number of limitations. These are acknowledged here. Some relate to methodological difficulties, whilst others concern wider findings and generalisability.

In Studies 1 and 2, my sample was voluntary, and so I cannot be absolutely confident that my sample reflects the wider playerbase. There may be systemic or player-role based differences between those willing to engage with the research and those who did not participate. This bias may have differentially affected the findings of Study 2, in which I observed very high levels of prosocial value orientations. I did, though, endeavour to recruit players of the game

through a variety of mediums (Twitter, *RuneScape*'s forum, a game update post on *RuneScape*'s website), and to promote participation through a prize draw, something which the vast majority of participants took part in. I am also reassured by the fact that the demographics of my sample did appear to match those of previously reported MMORPG samples (Griffiths et al., 2004; Williams et al., 2008; Yee, 2006a, 2006b).

Secondly, I only recruited participants of one MMORPG, *RuneScape*. MMORPGs differ in what emphasis they place on different in-game activities (Meredith et al., 2009; Suznjevic et al., 2008; Yee, Ducheneaut, & Nelson, 2012), which relates to the composition of their intended playerbases (Bartle, 1996, 2010). As such, the characteristics of my respondents will reflect those for whom *RuneScape* is the most appealing. It is thus possible that my findings do not generalise to players of other MMORPGs. However, whilst there will most likely be players who exhibit different characteristics playing other MMORPGs which place emphasis on different activities, *RuneScape* is a popular MMORPG with a historically large following worthy of study.

Additionally, Studies 5 and 6 aside, my designs rely on self-report data, such that I must trust the information provided by my respondents, and am unable to verify it. Their stated enjoyment levels of core in-game activities – as reported as part of my previous research (C. Smith et al., 2019) – do, though, indicate a very high degree of similarity between self-reported player-role and self-reported enjoyment of in-game activities. Further work might corroborate self-reported benefits with third-party qualitative interview data, such as with family members.

Due to the exploratory nature of my project, in some cases – such as Studies 3 and 4 – I

conducted a large number of statistical tests, and on occasion – such as in Study 6 – conducted post-hoc analyses. Naturally, this will have increased my family-wise error rate. Contrastingly, whilst Studies 1 to 5 all benefitted from relatively large sample sizes, Study 6 showed clear low power due to a large number of necessary exclusions of participants not following study instructions. As a result, the null findings of Study 6 could be down to Type II errors.

In Study 2, I utilised a measurement of liberalism-conservatism (Everett, 2013) which relies on responses to 'peripheral' issues such as family values, gun ownership, etc. Attitudes to such issues will change over time, such that my findings here may have a finite 'shelf-life' before the issues measured are inevitably replaced by other political dividing lines as discourse changes (Everett, 2013; Henningham, 1996). That said, if the differences in choice of player-role and benefits from play do relate to underlying preferences for order, structure etc. versus tolerance to ambiguity, rather than merely the peripheral issues captured by the scales of liberalism-conservatism, then the associations reported here are likely to remain relevant.

My respondents in Studies 3 and 4 were recruited through PC browser-based casual game hosting websites, and subreddits which are oriented towards the same. Browser-based gaming is less dominant – albeit still estimated to generate $3.5bn in revenue in 2019 – relative to the mobile-format games in the casual gaming market (Wijman, 2019). It is possible that individuals who play casual games through different formats also differ in characteristics and patterns of gaming experiences and motivations, though this does not eliminate the importance of studying players of browser-based casual games.

Implications

My thesis suggests that MMORPG players with higher levels of a risk factor for hazardous play – trait hostility – also self-report receiving the most cognitive and social benefits from play. This highlights the importance of taking a holistic approach to the study of gaming experiences – an approach which has been previously advocated (Johnson, Wyeth, et al., 2013; Kardefelt-Winther, 2014) – to consider the compensatory processes that link to hazardous, or excessive, levels of play. Better understanding of the benefits of play for hostile players, and an exploration of the processes or aspects of MMOs that facilitate these positive effects, could help guide interventions for supporting individuals whose gaming has become hazardous. Equally, further research is needed in order to investigate if other vulnerable groups report enhanced benefits from play, and if such benefits are achieved through the same processes or aspects. Qualitative research could also investigate the complex associations between political ideology and benefits from MMO play, particularly why it is that players expressing libertarian ideologies in particular report higher levels of benefits than do liberal-left players. Future research could also clarify if political ideology is linked with risk for problematic patterns of play, and what compensatory processes may be being sought by these individuals if this is the case. Understanding these processes has the potential to help guide healthcare providers in providing appropriate treatment for patients who also present with MMORPG playing patterns at problematic levels.

Individuals' choice of playing style appears associated with their attitudes towards the world and others through hostility and political ideology, though not social values. It may also be the case that individuals experiencing other life situations which could – potentially – encourage gaming through compensatory processes are drawn to specific player-roles. This is

something which future research could investigate. Understanding these patterns could enable game developers to better understand how they can aid particular groups of players in their development process, by targeting content to suit (some) players' underlying needs.

In the domain of casual gaming, players appear to show broadly similar – but non-selective – choices of genres, at least as identified by weekly play. However, they do vary, not just in terms of their demographics, but their gaming motivations and how these relate to their behaviours and experiences, including self-reported benefits. Possibly, findings observed from one sample may not reflect the wider population of players of casual games. It also indicates that existing metrics to understand gaming motivations which were developed and validated using players of multiplayer games – such as the GAMS (Lafrenière et al., 2012) – may need to be modified for use in the context of casual games. Further research in this domain may also benefit from the development and validation of a taxonomy of casual game genres, perhaps taking an approach that focuses on their game mechanics (Green et al., 2017; Johnson, Wyeth, et al., 2013) in order to identify different kinds of players. In the absence of validated categories of players, further research might focus upon the benefits experienced by general gamers of casual games – with broad involvement in a number of genres – vs. specialist MMORPG players.

Conclusion

This thesis is the first to investigate how trait hostility, a risk factor for hazardous MMORPG play, also relates to cognitive and social benefits, contributing to a holistic understanding of gaming experiences. This thesis also, for the first time, links choice of player-role in MMORPGs with attitudes towards others and the world, both in terms of resentment and suspicion (as hostility) and also political ideology. These studies further suggest that gaming

motivations, behavioural representations, and attentional focus do not show the same (or any) associations in sub-groups of players of casual games as previously seen in MMORPG players. Findings of this nature tell us more about the experiences of an ever-growing number of individuals engaging in a hugely popular pastime. Critically, MMORPGs appear to enable individuals to grow in to the persons they want to be offline as well as online, through opportunities to develop valued social and cognitive skills which some individuals may find more difficult to develop in offline environments.

Appendix A: Hostility Subscale of the Buss-Perry Aggression Questionnaire

Rate each of the following items in terms of how characteristic they are of you.

	Extremely uncharacteristic of me 1	2	3	4	Extremely characteristic of me 5
I am sometimes eaten up with jealousy					
At times I feel I have gotten a raw deal out of life					
Other people always seem to get the breaks					
I wonder why sometimes I feel so bitter about things					
I know that ‘friends’ talk about me behind my back					
I am suspicious of overly friendly strangers					
I sometimes feel that people are laughing at me behind my back					
When people are especially nice, I wonder what they want					

Appendix B: Van Lange Social Value Orientation Instrument

An Instrument to Measure Social Value Orientation

In this task we ask you to imagine that you have been randomly paired with another person, whom we will refer to simply as the "Other." This other person is someone you do not know and that you will not knowingly meet in the future. Both you and the "Other" person will be making choices by circling either the letter A, B, or C. Your own choices will produce points for both yourself and the "Other" person. Likewise, the other's choice will produce points for him/her and for you. Every point has value: The more points you receive, the better for you, and the more points the "Other" receives, the better for him/her.

Here's an example of how this task works:

	A	B	C
You get	500	500	550
Other gets	100	500	300

In this example, if you chose A you would receive 500 points and the other would receive 100 points; if you chose B, you would receive 500 points and the other 500; and if you chose C, you would receive 550 points and the other 300. So, you see that your choice influences both the number of points you receive and the number of points the other receives.

Before you begin making choices, please keep in mind that there are no right or wrong answers—choose the option that you, for whatever reason, prefer most. Also, remember that the points have value: The more of them you accumulate, the better for you. Likewise, from the "other's" point of view, the more points s/he accumulates, the better for him/her.

For each of the nine choice situations, circle A, B, or C, depending on which column you prefer most:

		A	B	C
(1)	You get	480	540	480
	Other gets	80	280	480
(2)	You get	560	500	500
	Other gets	300	500	100
(3)	You get	520	520	580
	Other gets	520	120	320
(4)	You get	500	560	490
	Other gets	100	300	490
(5)	You get	560	500	490
	Other gets	300	500	90
(6)	You get	500	500	570
	Other gets	500	100	300
(7)	You get	510	560	510
	Other gets	510	300	110
(8)	You get	550	500	500
	Other gets	300	100	500
(9)	You get	480	490	540
	Other gets	100	490	300

Note. Participants are classified when they make 6 or more consistent choices. Prosocial choices are 1c, 2b, 3a, 4c, 5b, 6a, 7a, 8c, 9b; individualistic choices are 1b, 2a, 3c, 4b, 5a, 6c, 7b, 8a, 9c; and competitive choices are 1a, 2c, 3b, 4a, 5c, 6b, 7c, 8b, 9a.

Appendix C: 12 Item Social and Economic Conservatism Scale (SECS)

"Please indicate the extent to which you feel positive or negative towards each issue. Scores of 0 indicate greater negativity, and scores of 100 indicate greater positivity. Scores of 50 indicate that you feel neutral about the issue."

1. Abortion (reverse scored). (S)
2. Limited government. (E)
3. Military and national security. (S)
4. Religion. (S)
5. Welfare benefits (reverse scored). (E)
6. Gun ownership. (E)
7. Traditional marriage. (S)
8. Traditional values. (S)
9. Fiscal responsibility. (E)
10. Business. (E)
11. The family unit. (S)
12. Patriotism. (S)

Appendix D: Daily Daydreaming Frequency Scale (DDFS)

1. I daydream
A. infrequently.
B. once a week.
C. once a day.
D. a few times during the day.
E. many different times during the day.

2. Day dreams or fantasies make up
A. no part of my waking thoughts.
B. less than 10% of my waking thoughts.
C. at least 10% of my waking thoughts.
D. at least 25% of my waking thoughts.
E. at least 50% of my waking thoughts.

3. As regards daydreaming, I would characterize myself as someone who
A. never daydreams.
B. very rarely engages in daydreaming.
C. tends towards occasional daydreaming.
D. tends towards moderate daydreaming.
E. is a habitual daydreamer.

4. I recall or think over my daydreams
A. infrequently.
B. once a week.
C. once a day.
D. a few times during the day.
E. many different times during the day.

5. When I am not paying close attention to some job, book or TV, I tend to be daydreaming
A. 0% of the time.
B. 10% of the time.
C. 25% of the time
D. 50% of the time.
E. 75% of the time.

6. Instead of noticing people and events in the world around me, I will spend approximately
A. 0% of my time lost in thought.
B. less than 10% of my time lost in thought.
C. 10% of my time lost in thought.
D. 25% of my time lost in thought.

E. 50% of my time lost in thought.

7. I daydream at work (or school) [Note: Work is defined as any kind, not just for pay.]
A. infrequently.
B. once a week.
C. once a day.
D. a few times during the day.
E. many different times during the day.

8. Recalling things from the past, thinking of the future, or imagining unusual kinds of events occupies
A. 0% of my waking day.
B. less than 10% of my waking day.
C. 10% of my waking day.
D. 25% of my waking day.
E. 50% of my waking day.

9. I lose myself in active daydreaming
A. infrequently.
B. once a week.
C. once a day.
D. a few times during the day.
E. many different times during the day.

10. Whenever I have time on my hands I day dream
A. never.
B. rarely.
C. sometimes.
D. frequently.
E. always.

11. When I am at a meeting or show that is not very interesting, I day dream rather than pay attention
A. never.
B. rarely.
C. sometimes.
D. frequently.
E. always.

12. On a long bus, train, or airplane ride I daydream
A. never.
B. rarely.
C. occasionally.
D. frequently.

E. a great deal of the time.

Scoring for each answer: A = 0; B = 1; C = 2; D = 3; E = 4.

Appendix E: Behavior Identification Form (BIF)

Any behavior can be described in many ways. For example, one person might describe a behavior as "writing a paper," while another person might describe the same behavior as "pushing keys on the keyboard." Yet another person might describe it as "expressing thoughts." This form focuses on your personal preferences for how a number of different behaviors should be described. Below you will find several behaviors listed. After each behavior will be two different ways in which the behavior might be identified.

For example:

1. Attending class
    - sitting in a chair
    - looking at a teacher

Your task is to choose the identification, a or b, that best describes the behavior for you. Simply place a checkmark next to the option you prefer. Be sure to respond to every item. Please mark only one alternative for each pair. Remember, mark the description that you personally believe is more appropriate for each pair.

1. Making a list
    - Getting organized*
    - Writing things down
2. Reading
    - Following lines of print
    - Gaining knowledge*
3. Joining the Army
    - Helping the Nation’s defense*
    - Signing up
4. Washing clothes
    - Removing odors from clothes*
    - Putting clothes into the machine
5. Picking an apple
    - Getting something to eat*
    - Pulling an apple off a branch
6. Chopping down a tree
    - Wielding an axe
    - Getting firewood*
7. Measuring a room for carpeting
    - Getting ready to remodel*
    - Using a yard stick
8. Cleaning the house
    - Showing one’s cleanliness*

- Vacuuming the floor

9. Painting a room
    - Applying brush strokes
    - Making the room look fresh*
10. Paying the rent
    - Maintaining a place to live*
    - Writing a check
11. Caring for houseplants
    - Watering plants
    - Making the room look nice*
12. Locking a door
    - Putting a key in the lock
    - Securing the house*
13. Voting
    - Influencing the election*
    - Marking a ballot
14. Climbing a tree
    - Getting a good view*
    - Holding on to branches
15. Filling out a personality test
    - Answering questions
    - Revealing what you're like*
16. Toothbrushing
    - Preventing tooth decay*
    - Moving a brush around in one's mouth
17. Taking a test
    - Answering questions
    - Showing one's knowledge*
18. Greeting someone
    - Saying hello
    - Showing friendliness*
19. Resisting temptation
    - Saying "no"
    - Showing moral courage*
20. Eating
    - Getting nutrition*
    - Chewing and swallowing
21. Growing a garden
    - Planting seeds
    - Getting fresh vegetables*
22. Traveling by car
    - Following a map
    - Seeing countryside*
23. Having a cavity filled
    - Protecting your teeth*
    - Going to the dentist
24. Talking to a child
    - Teaching a child something*
    - Using simple words
25. Pushing a doorbell

- Moving a finger
- Seeing if someone's home*

* Higher level alternative.

Total score is the sum of higher level alternative choices.

Appendix F: Gaming Motivation Scale (GAMS)

Why do you play video games?

Rate each statement in terms of how much you agree with it.

GAMS1
Because it is stimulating to play *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS4
Because it is an extension of me *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS7
Because it is a good way to develop important aspects of myself *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS10
Because I feel that I must play regularly *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS13
To acquire powerful and rare items (e.g., armors, weapons) and virtual currency (e.g., gold pieces, gems) or to unlock hidden/restricted elements of the game (e.g., new characters, equipment, maps) *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS16
It is not clear anymore; I sometimes ask myself if it is good for me *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS2
For the pleasure of trying/experiencing new game options (e.g., classes, characters, teams, races, equipment) *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS5
Because it is an integral part of my life *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS8
Because it is a good way to develop social and intellectual abilities that are useful to me *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS11
Because I must play to feel good about myself *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS14
For the prestige of being a good player *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS17
I used to have good reasons, but now I am asking myself if I should continue *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS3
For the feeling of efficacy I experience when I play *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS6
Because it is aligned with my personal values *

	1	2	3	4	5	6	7	

Do not agree at all	○	○	○	○	○	○	○ Very strongly agree

GAMS9

Because it is has personal significance to me *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS12

Because otherwise I would feel bad about myself *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS15

To gain in-game awards and trophies or character/avatar's levels and experience points *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

GAMS18

Honestly, I don't know; I have the impression that I'm wasting my time *

	1	2	3	4	5	6	7	
Do not agree at all	○	○	○	○	○	○	○	Very strongly agree

Scoring:

Intrinsic Motivation: Mean of GAMS 1-3

Integrated Regulation: Mean of GAMS 4-6

Identified Regulation: Mean of GAMS 7-9

Introjected Regulation: Mean of GAMS 10-12

External Regulation: Mean of GAMS 13-15

Amotivation: Mean of GAMS 16-18

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