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Abstract

Online gaming is part of contemporary life, with a range of influences on gamer's behaviour. The convergence and alignment of an individual's attitude and behaviour with features and characteristics of their in-game representation (i.e., their avatar), is conceptualized as the 'Proteus effect' (PE). In the massively multiplayer online role-playing game *World of Warcraft* (*WoW*), the Draenei ('exiled ones') are one type of in-game character faction. In the present study, the interplay between choosing the class of Draenei, experiencing game-related immersion, along with the gamer's biological gender was examined in relation to PE behaviours among 404 *WoW* gamers (males = 299; 74%; females = 104; 26%). Participants completed the Proteus Effect Scale and the Immersion sub-scale of the User-Avatar Questionnaire. A hierarchical regression analysis indicated a significant positive association between immersion and PE behaviours. Furthermore, mediation and moderated mediation analyses suggested that being a Draenei was positively associated with the level of game-related immersion, which in turn associated to higher PE behaviours offline, independent of participants' gender. Results indicate that gamers who are more immersed within the gaming world tend to exhibit elevated PE behaviours. Moreover, being a Draenei in *WoW* appeared to relate with higher game-immersion experiences, which resulted in higher PE behaviours offline.

Keywords: Proteus effect; Immersion; Avatar; Online gaming; World of Warcraft; Gaming gender

Understanding the Relationship Between the Proteus Effect, Immersion, and Gender among World of Warcraft Players: An Empirical Survey Study

1. Introduction

Online gaming constitutes an everyday life feature for many individuals, with worldwide participation increasing across diverse ages (especially for socially-interpersonally played games; Anderson, Steen & Stavropoulos, 2017; Domahidi, Breuer, Kowert, Festl, & Quandt, 2018; Montag et al., 2019). This has partly been attributed to gaming advancements that, among others, enable gamers to create an in-game representation of their game character (i.e., their avatar), which is customisable according to user preferences (Blinka, 2008; Buisine, Geugan, Barré, Segonds & Aoussait, 2016). Gaming has many potential benefits including cognitive, motor-coordination, creativity, socialization-friendship and mental health gains (Bowman, Kowert, & Cohen, 2015; Halbrook, O'Donnell, & Msetfi, 2019; Nuyens, Kuss, Lopez-Fernandez & Griffiths, 2018; Jones, Scholes, Johnson, Katsikitis & Carras, 2014; Ratan, Beyea, & Graciano, 2019; Verheijen, Stoltz, Van den Berg, & Cillessen, 2019), but for a small minority can also facilitate negative wellbeing due to disordered gaming (Adams, Stavropoulos, Burleigh, Liew, Beard & Griffiths, 2018; Anderson et al., 2017; Brand & Todhunter, 2017; Hastings, 2015; Pontes, Schivinski, Brzozowska-Woś, & Stavropoulos, 2019). Such diverse and significant effects have prompted questions considering (i) how, and to what extent gaming can impact the human condition in real life and; (ii) what are the factors that differentiate adaptive from maladaptive gaming, including those concerning user-avatar relationships (Breuer, Vogelgesang, Quandt, & Festl, 2015; Kothgassner et al. 2017; Liew, Stavropoulos, Adams, Burleigh &

Griffiths, 2018; Stavropoulos, Beard, Griffiths, Burleigh, Gomez & Pontes, 2018; Ratan et al., 2019).

However, there are many conflicting findings concerning gaming effects on behaviour, prompting a significant number of scholars to recommend further focused research (e.g., Ash, 2016; Bowman et al., 2015; Ferguson, Bowman, & Kowert, 2017; Elson, Breuer, Van Looy, Kneer, & Quandt, 2015; Elson & Quandt, 2016; Nowak & Fox, 2018; Mancini & Sibilla, 2017; Stavropoulos, Griffiths, Burleigh, Kuss, Doh & Gomez, 2018). Indicatively, while some empirical evidence has supported game-related behavioural effects (i.e., sexist behaviours; Gabbiadini, Riva, Andrighetto, Volpato, & Bushman, 2016; Stermer & Burkley 2015; physiological arousal; Barlett, Harris, & Bruey, 2008; mental health and wellbeing effects; Coyne, Warburton, Essig, & Stockdale, 2018), other literature has been contradictory (i.e., non-significant game-related sexist behaviour effects; Ferguson, & Donnellan, 2017; Von Salisch, Vogelgesang, Kristen, & Oppl, 2011; non-significant game-related physiological arousal effects; Anderson & Carnagey, 2009; non-significant game-related mental health and prosocial behaviour effects; Ferguson, 2015; Ferguson & Wang, 2019). Methodological biases (i.e., the use of partial effect sizes in meta-analysis; Valkenburg, 2015; the use of publication bias controls [i.e., trim and fill] for meta-analyses; Ferguson & Kilburn, 2009), the complexity of human-computer interaction nurturing several potential confounding factors (i.e., factors related to the gamer, the game, and the gamer's real context-with gamer-related effects requiring increased attention; Ferguson et al., 2017), as well as the complexity of the game activity itself, accommodating multiple sources of behavioural effects (i.e., game content and game pace; Elson 2015; modification ["modding"] of several game aspects has been supported in experimental studies showing such differences; Elson & Quandt, 2016). Similarly, several authors have

contended the consideration of the interplay between various factors regarding game-related effects on behaviour (Ferguson et al., 2017; Nowak & Fox, 2018; Elson et al., 2015; Elson & Quandt, 2016). Aiming to capture such complexity, Valkneburg and Peter (2013) introduced the Differential Susceptibility to Media Effects Model (DSMM). The DSMM defines three different media-susceptibility channels, the "dispositional" (i.e., individuals are differentially predisposed to be affected), the "developmental" (i.e., susceptibility to media effects varies over development), and the "social" (individuals' susceptibility additionally depends on their social surrounding/context). These are envisaged as precipitating and perpetuating a combination of diverse potential cognitive, emotional, and excitement responses/behaviours to gamers. On this basis, the interplay between gamer characteristics/features with game characteristics/features within a specific real context (also possessing specific characteristic and features) has been used to explain the differential behavioural responses of gamers to gaming exposure and participation (instead of just the game itself; Stavropoulos et al., 2018). Interestingly, researchers have been inclined to support more attention to be allocated on gamer-related factors (Ferguson et al., 2017; Tang, Reer, & Quandt, 2019).

To address such considerations, especially in the light of recent literature implicating the gamer-avatar association (as the area of interest of the present study) to both e-health applications, as well as disordered gaming behaviours, the present study expands upon relevant knowledge and aspires to increase the understanding of the optimized utilization of the user-avatar association; Burleigh et al., 2018; Griffiths, Kuss, & de Gortari, 2017; Johnson, Deterding, Kuhn, Staneva, Stoyanov & Hides, 2016; Rehm et al., 2016; Stavropoulos, Gomez, Mueller, Yucel, & Griffiths, 2019).

1.1 Understanding the User-Avatar relationship

Several constructs stemming from diverse theoretical backgrounds (e.g., psychoanalysis, cyberpsychology, and communication science) have been applied in describing the User-Avatar Relationship (UAR; Blinka, 2008; Liew et al., 2018; Kaye, Pennington & McCann, 2018; Zendle, Cairns, & Kudenko, 2018). For instance, some perceive the UAR as integrating the functions of immersion, identification, and compensation that bond gamers with their avatars (Blinka & Mikuska, 2014). Others envisage the UAR as comprising body, emotional, and personal identity associations developed between the gamers and their in-game personas, as reflected by use of the terms 'proto', 'core' and 'self-presence' (Ratan, 2013). Similarly, Mancini and Sibilla (2017), favouring those calling for more emphasis to be given to the player (Ferguson et al., 2017), examined the association between the gamer's personality and the avatar's conduct (in Massively Multiplayer Online Role-Playing Games; MMORPGs). Their findings supported four diverse and distinct profiles (of the User-Avatar association). These profiles comprised the "idealised" (i.e., personality discrepancy between the user and the avatar, and favouring the avatar), "actualised" (i.e., the avatar presenting with higher social desirability to the real-self, but without being as improved as one's ideal self), "alter ego" (i.e., the avatar presenting as not being as socially desirable as the gamer offline, and concurrently more distant to the gamer's ideal self), and "negative hero" (i.e., the avatar appearing not as socially desirable as the gamer offline, although closer to the gamer's ideal, and indicating the repression of likely anti-social desires in real life). Although useful, these constructs (to the best of the author's knowledge) primarily illustrate the effects of gamers on their avatars and not the other way around, which is rather limited, given the complex and bi-directional nature of the UAR (Liew et al., 2018). For instance, recent literature has envisaged the user-avatar link as a tetradic interactive space,

treating the interaction between two gamers and their avatars as a layer of interactions between four discrete and interrelated social agents (i.e. player 1-player 2; player 1-avatar of player 1; player 1-avatar of player 2; avatar of player 1 with avatar of player 2; Banks & Carr, 2019).

Given this significant limitation, and the emphasis in the present study is on how avatar features might affect the gamer's real-life behaviour, and utilizes the 'Proteus effect' (PE) to investigate the UAR (Liew et al., 2018; Yee, 2007). At this point, it should be noted that several different theoretical constructs have been introduced to describe effects of the avatar on the gamer's behaviour, such as Game Transfer Phenomena (GTP; Dindar & Ortiz de Gortari, 2017) and Priming (Ash, 2016). GTP have been described as automatic-non planned/non-intentional behavioural phenomena related to gaming participation. Such phenomena have been assumed to effect the gamer's behaviour-experience offline and might involve game induced/affected perceptions, cognitions, and actions (i.e., altered physiological sensations whilst gaming and game-influenced behavioural manifestations; Ortiz de Gortari, Pontes, & Griffiths, 2015; Ortiz de Gortari, Oldfield & Griffiths, 2016). Relevant to GTP, "priming", as a communication science term, describes how media exposure (such as gaming) may generate effects on individuals (Cacciatore, Scheufele, & Iyengar, 2016; Kaye et al., 2018; Matthews, 2019; Zendle et al., 2018). More specifically, media exposure could introduce perceptions (cognitive input), which in turn inform relevant memory preconceptions (i.e., interconnected nodes triggered by real-life reference similarities) that interfere with decision/judgment-making processes (i.e., a positively perceived game figure/condition that may inform thoughts, feelings, and finally influence behaviours in relation to a similar and/or related real-life stimulus; Cacciatore et al. 2016; Kaye et al., 2018; Matthews, 2019; Zendle et al., 2018).

GTP were not selected (in comparison to PE) as the theoretical construct of reference for the examination of avatar-related behavioural effects in the present study (despite the availability of a relevant psychometric scale; Ortiz, Pontes & Griffiths, 2015) for two compelling reasons: (i) not offering an avatar-specific construct (Ortiz de Gortari et al., 2015) and; (ii) to secure higher comparability with the extant literature (due to the lower international use/impact of the GTP compared to relevant conceptualizations such as priming and PE; Kaye et al., 2018; Matthews, 2019; Zendle et al., 2018). Similarly, "priming" was not selected here over PE because (i) it is not as avatar-specific as PE; (ii) empirical evidence supports the higher applicability of PE (compared to priming) when it comes to avatar-related effects (Ash, 2015); and (iii) the presence of priming in games has been contested (i.e., gamers have been assumed to ignore in-game concepts, instead of possessing them, because they tend to emphasize the rules and the structure of the game; Juul, 2011; Kirkpatrick, 2011). Finally, PE was selected (as the construct of reference to avatar-related behavioural effects in the present study) because recent meta-analytic findings favour its reliability, providing a range of small to medium effect sizes (which is higher than meta-analytic findings related to the examination of other media effects; Greitemeyer & Mügge, 2014; Ratan et al., 2019).

1.2 Proteus effect

The Proteus effect (PE) occurs when an individual's attitude (online or offline) becomes patterned after features that represent their avatar (Liew et al., 2018). Consequently, a gamer's identity may converge with their avatar (Yee & Bailenson, 2007). This transfer of behaviours from the online to the offline world may influence face-to-face interactions (Yee, Bailenson & Ducheneaut, 2009). Interestingly, the PE appears not only to affect an individual's actions, but also their cognitive functions (e.g., self-perception; Buisine et al., 2016; Yee & Bailenson, 2007).

Such behaviour transference effects have provided the basis for 'gamification' features of e-health applications that aim to change offline behaviours for the better by introducing online behavioural changes (Yee, 2014).

The PE relies on three major mechanisms (Yee & Bailenson, 2007) – behavioural confirmation, self-perception, and deindividuation. *Behavioural confirmation* refers to the way that an individual's (the perceiver's) expectations result in other individuals (the targets) to behave themselves in a manner that validates the perceiver's expectations (Yee & Bailenson, 2007). Accordingly, it has been demonstrated that perceivers can sway the way in which a target acts in an online environment based on presentation (i.e., behaving calmly, due to being perceived by others as peaceful on the basis of an angelic appearance; Yee & Bailenson, 2007). *Self-perception* refers to how individuals may ascertain the cause of their behaviour by finding the attitudes that serve to give meaning to their preferences (i.e., participants wearing black behave more aggressively; Bem, 1972; Frank & Gilovich, 1988). Self-perception effects have also been replicated in studies where gamers using taller avatars behaved more confidently (Yee & Bailenson, 2007). *Deindividuation* refers to individuals detaching from themselves whilst being enveloped into a bigger group setting (i.e., feeling like their in-game avatar and not their real selves; Reber, Allen & Reber, 2009). Not surprisingly, based on the above, the PE has been associated with a variety of behavioural links developed between the gamer and their avatar. Among these, immersion has been defined as critically important (Blinka, 2008).

1.3 Integrative conceptual framework

The present study focuses on the online game *World of Warcraft* (*WoW*) and integrates Douglas et al.'s (2008) model of understanding online behaviours with elements from the DSMM (Valkenburg & Peter, 2013) to assess these links. Douglas' model (2008) proposes that

the interaction between 'push and pull factors' defines the intensity of the online-related behaviours experienced. Accordingly, the user's real characteristics and contextual features (i.e., family, school) could 'push' to higher online engagement, alongside the attractive features of web applications, such as gaming, which may 'pull' the user online. Furthermore, the DSMM (Valkenburg & Peter, 2013) illustrates the differential and individual susceptibility of the gamers in media, such as gaming, effects. By integrating these aspects, the present study views PE behaviours dimensionally, in relation to the interplay of one potential 'push' factor (i.e., the gamer's biological gender), and two 'pull' factors (i.e., game-immersion and the *WoW* in-game race of Draenei ('exiled ones'). This conceptualization takes into consideration literature emphasising the characteristics of the gamer, whilst concurrently acknowledging the complexity and the variations in-game-related effects (accounting in the calculations conducted for the likely confounding effects of age and gender; Elson & Quandt, 2016; Elson et al., 2015; Ferguson et al., 2017).

1.4 World of Warcraft

Scholars argue that the genre of Massively Multiplayer Online Role-Playing Games (MMORPGs) provides the ideal context for user-avatar behavioural ties (e.g., PE) to be studied (Burleigh, Stavrpoulos, Liew, Adams & Griffiths; Liew et al., 2018). MMORPGs are played concurrently online by masses of gamers, who interact with others through their selectively developed avatars. Such games are continuous, that is, the game-world and all its features, evolve regardless of the player being online (Billieux, der Linden, Achab et al., 2013; Stetina, Kothgassner, Lehenbauer & Krispin-Exner, 2011). Additionally, MMORPGs uniquely combine features that may accommodate engagement and absorbance and thus, likely PE behaviours (Billieux et al., 2013; Liew et al., 2018). These include: (i) progressive avatar customisation for

the player's betterment; (ii) massive online socialisation platform and; (iii) distribution of a systematic method of rewards and challenges through in-game quests (Billieux et al., 2013; Silva & Mousavidin, 2015; Snodgrass et al., 2011). Given that around 20 million players worldwide engage in MMORPGs the need of targeted relevant research (immersion, PE) is additionally emphasised (MMOdata.net [2012] as cited in Billieux et al. [2013]).

From the many MMORPGs that currently exist, *WoW* was chosen for the present study for a number of reasons (Hastings, 2015). With eight million subscribers gaming within Blizzard Entertainment's fabricated world of Azeroth, it is not surprising that *WoW* is considered one of the most popular MMORPGs (Billieux et al., 2013; Jones et al., 2014). *WoW* releases an expansion around every two years, enabling players to progress further by introducing new features such as new races to play as (virtual gaming identity characteristic) and raising the level cap (Blizzard Entertainment, 2018). Concurrently, it offers the opportunity for players to join guilds (online groups), which serve as an additional social aspect (Billieux et al., 2012), forging new friendships and providing a sense of purpose and belonging (Captain, Williams & Yee, 2009). Not surprisingly, research has demonstrated that *WoW* is particularly absorbing, partially due to its embodied user-avatar functions, making it a potentially accommodating context for PE-related behaviours to be studied (Billieux et al., 2012; Murcia-López & Steed, 2016; Snodgrass et al., 2011; Waltermate, Gall, Roth, Botsch & Latoschik. 2018).

1.5 Immersion

Immersion has consistently been defined as a pivotal behavioural tie between the user and their avatar (Blinka, 2008; Jin, 2009). Immersion occurs when players dedicate a large amount of their attention towards playing games which may result in players becoming incognizant to their real-life surroundings (Jennet et al., 2008). Research has shown that

immersion in games comprises three stages (i.e., engagement, engrossment, total immersion) that involve differing levels of how much an individual can be immersed (Brown & Cairns, 2004). The first stage, *engagement*, can be considered a pre-immersive state that opens the doorway to immersion itself. Players who can navigate their way around a game and be pleased with the game components, must be able to devote resources (i.e., effort and time) towards the game to bring themselves to the next stage, *engrossment*. This stage involves players becoming less aware of their physical surroundings whilst becoming more emotionally attached towards the game. The final stage, *total immersion,* occurs when players may adopt their avatar's identity, which can result in the player having a greater affinity to their avatar's environment compared to reality (Cheng et al., 2017). Lee (2007) suggested that gamers who played for extended periods of time had a greater chance of identifying with their avatars and thus, one assumes, behaving like them. Therefore, it follows that PE behaviours could be maximised due to a higher level of in-game immersion (Quick, 2016). Despite the acknowledged importance of such associations, there is limited empirical evidence available and further research into the topic has been repeatedly called for (Wilson & Soranzo, 2015; Zuromski, Fedyniuk & Maria, 2018).

1.6 Draenei

The association between the Proteus-Effect and immersion is investigated here in regards to the Draenei race of in-game characters, which is a pivotal aspect of an individual's *WoW* identity (Blizzard Entertainment, 2018b). Avatar customization in *WoW* involves the selection of three main virtual identity features, based on the way a gamer's avatar is defined in game terms (Obst, Zhao, White, O'Connor & Longman, 2018; Rapp, 2018; Rapp, 2017a, b). These features progressively entail the faction, the race, and the class (Morcos et al., 2019; Rapp, 2017a, b, 2018). The faction refers to one of two competing camps, the 'alliance' and the 'horde'. Each

faction/camp includes different races (e.g., the alliance camp involves the races of dwarves, gnomes, humans, night elves, Draeneis, Worgens, etc.; the pandaren are considered a neutral race). Each of the races allows the selection (additional specification) of specific classes, which in turn define limited/specific activity/skill options/roles (e.g., the Draenei race enables the class-choices of hunters, mages, the paladins, priests, rogues, shamans, etc.; Lakkaraju, Sukthankar, & Wigand, 2018). The emphasis at the race level was chosen here (being the middle level, out of the three layers of *WoW*-avatar identity available) because it appears to be concurrently more definitive for the looks, the starting point (i.e., specific races are allowed to start from different levels), the racial traits, the faction, and the class that an avatar may possess, which could in turn interfere with PE behaviours (Lakkaraju et al., 2018; Morcos et al., 2019). The emphasis at a race belonging to the alliance faction (i.e., the good ones; the camp where the humans belong) was informed by literature suggesting that more human (interest)-related avatars (such as those included in the alliance faction compared to the horde) tend often to attract a stronger sense of user-avatar connection (Guitton, 2010). The Draenei race was especially chosen here for a number of reasons that could accommodate the transference of virtual behaviours in reality through the expression of the PE (Ash, 2015). A considered interpretation of the available literature suggests that the Draenei narrative/history and skills could be particularly inviting, and thus influential and immersive, for a proportion of gamers (Nardi, 2010). Furthermore, empirical evidence supports the association of the selection of the race of Draeneis in *WoW* with higher compensation tendencies (i.e., users might compensate via the selection of this particular race for skills and attitudes that they may have been missing in their real life; Blinka 2008) that could indeed increase game engagement (Morcos et al., 2019). Considering their narrative, Draeneis (the “exiled ones”) are described as a “mythical horse-like alien race” that was introduced in

WoW's first expansion – The Burning Crusade (Blizzard Entertainment, 2007; Gregory, 2011). Their backstory represents that of tragedy, persecution, migration, survival, and resilience (Blizzard Entertainment, 2018a). They initially left their homeland-world of Argus to save-themselves by being corrupted by the demonic Legion (whilst part of the Argus population complied). In their journey for a new home, they were guided by a prophet and the influence of the divine 'naaru' (the Holy Light; the naaru characters constitute the most genuine expression of the Holy Light that fights the Great Dark, and are committed to bring peace and hope and to fight for the good), until they settled on their second home Draenor (meaning the 'exiles' refuge'). Nevertheless, the legion (that initially prosecuted them from Argus) later invaded Draenor, where they massively slaughtered and prosecuted the Draeneis, that had to hide until they fled again on the Exodar, a ship provided by the naaru, which brought them to Azeroth, where they allied with the rest of the alliance-faction races to fight evil. The draeinei's culture and conduct involves the Holy Light of creation and magic, that provides them with noble intentions and superhuman abilities. Therefore, they are uniquely related with the good and concurrently possess superficial powers, whilst they tend (as a race) to choose either religious (such as priests or paladins), or magical classes/professions (such as the mage). Indicatively, some Draeneis (i.e., the Auchenai) can even interact with the dead (Blizzard Entertainment, 2018a). This narrative of trauma-prosecution, resilience, and commitment to the good, alongside magical and often healing qualities (especially when they chose the priest or shaman classes) may attract players who somehow identify with the Draenei's trauma history, while they wish to have had their resilience and commitment to fight for the good in their real-life (Burleigh et al., 2018; Blinka 2008; Calleja, 2010; Nowak & Fox, 2018). Furthermore, Draeneis represent to some extent the archetype of the injured, yet resilient and committed fighter of the good (Carroll, 2014; Ip, 2011;

Shadraconis, 2013), thus potentially attracting projections of the idealized and simultaneously socially desirable-self of the gamers (idealised avatars; Mancini-Sibilla, 2017). Regarding their skills, the Draenei's link to the 'Gift of the Naaru', that grants the players with the ability to heal themselves and others without having to necessarily be a priest class (which is primarily chosen for the ability to heal (Blizzard Entertainment, 2018a) may also accommodate transitional object/phenomena processes that could accommodate higher gamer-avatar ties (e.g., treating someone the way they would like to have been treated themselves when being in a similar position and gaining satisfaction through identifying with their relief-satisfaction; Gulerce, 1991; Schaap-Jonker, 2019). Overall, the combination of the specific narrative and the skills of the Draeneis may precipitate and perpetuate "active escapism" behaviours (Kuo, Lutz & Hiler, 2016). Because active escapism has been defined a form of media-related behaviour that engages fantasy and role-play as a means of coping with difficulties (Kuo et al. 2016), it endorses individuals with affirmation and empowerment via projective fantasy experiences (i.e., game-role-play) and presence/immersion into a virtual context (Kuo et al., 2016). This suggests that being a Draenei could grant individuals, who have been traumatised and prosecuted in their real-lives, with a compensatory sense of determination-commitment and idealized effectiveness in their virtual-life, and therefore inviting immersive processes and likely positive PE related real-life behaviours. To lend credence to this, Yee, Ducheneaut, Yao and Nelson (2011) demonstrated how in an online gaming context, gamers tend to be enveloped in their avatar's identity (over their real life identity), when they are expected by their gaming group to meet the role that their avatar is stereotyped as. For example, females are usually stereotyped as having avatars that heal other players (Yee et al., 2011). Here, deindividuation may occur because their 'traumatised yet resilient', 'committed to the naaru (i.e. Holy Light)' and 'superficial-fighter identity' may be

prioritised over their real offline identity due to the tendency to fulfil role-related expectations (as imposed by their *WoW* group). Overall, idealized intentions, trauma-resilience, faithfulness, superficial magical skills, and healing skills related to the Draenei character may induce immersive tendencies that could in turn enhance PE behaviours.

1.7 Gender

Gender-bending online, that is, acting online as the opposite gender, may interfere with the immersion and PE association among the Draenei's (Gregory, 2010). Research has shown that those who play *WoW* tend to prefer "aesthetically pleasing" races, defined on the basis of Western standards (e.g., being muscular or thin; Yee, 2010 as cited in Gregory, 2011, p.29). Interestingly, Draeneis, along with two other races, makes up for 75% of the cases in which males seem to gender-bend in *WoW* (Yee, 2010). Furthermore, being a gender-bended Draenei could potentially be attributed to players desiring an ideal (Gregory, 2010). Coneliuseen (2009) expands upon this notion by detailing how male avatars are constructed to be glorified by having a large, bulked muscle appearance, while female avatars are constructed to meet a glorified notion of being slim. This indicates how – in the online world – character hyper-sexualisation may heavily influence the way in which players shape their avatars, in the hopes of experiencing a glorified appearance instead of a realistic one (Gregory, 2010). Accordingly, being a Draenei could intertwine with gender-bending and thus, vary the level of immersion experienced and how the latter associates to PE behaviours.

1.8 The Present Study

Previous literature has emphasized the need to look at components in the real and virtual world when contemplating online gaming-related behaviours, such as the PE, as well as the prospect of benefit and/or harm these may entail (Liew et al., 2018). Expanding this area of

knowledge could better inform the fine line between optimized online use effects and negative outcomes (Burleigh, Stavropoulos, Liew, Baxter & Griffiths, 2017). Data collected from a sample of *WoW* gamers is used in the present study to investigate the associations between selecting a Draenei avatar, experiencing immersion, and PE behaviours offline. Gender-associated differences of these potential links are also examined. Accordingly, it was hypothesised that:

H_1: Highly immersed *WoW* players would exhibit higher PE behaviours.

H_2: Being a Draenei would be associated with higher immersion and in turn stronger PE behaviours offline.

H_3: Gender variations would exist in the associations between being a highly immersed Draenei character and in turn offline PE behaviours.

2. Method

2.1 Participants

The present study comprised 404 *WoW* players (M = 25.56 years, SD = 7.61; see Table 1 for real and virtual demographics). The maximum estimated sampling error with a sample of 404 is +/- 4.88 at 95% confidence level (p<=.05). To discern missing values prior to the final sample, Little's Missing Completely at Random (MCAR) test was used (X^2=31.91, p>.001; Little, 1988).

2.2 Instruments

2.2.1. Proteus Effect Scale

To assess PE behaviours, an adjusted form of the Player Identification Scale known as the Proteus Effect Scale (PES) was used (Van Looy, Courtois, De Vocht & De Marez, 2012). The PES comprises six items which load onto a singular variable that ascertains the effect games have on behaviour (e.g., "*I see things differently when I play with another character*"). The

initial scale assessed how much a player identifies with their character and the influence this has on them whilst online. Nonetheless, necessary modifications were made to adapt the scale to the present study. This included assessing the effect a gamer's character has on the player in real life. This was achieved by asking the same six items with reference to a physical setting (e.g., "*Please respond to the answer that best represents your behaviours and feelings in your real life*"). The PES contained a 5-point Likert scale (e.g., 1 "*Strongly Disagree*" to 5 "*Strongly Agree*"). To determine a final score on the PES, the scores ranged from 6 to 30 in which higher scores showed stronger PE behaviours. The internal consistency of the scale was very good with a Cronbach's alpha score of .89 (see Table 2 for 'if item removed').

2.2.2. Immersion Subscale, User-Avatar Questionnaire

To assess immersion, the relevant subscale derived from Blinka's (2008) UAR Questionnaire was used. The full-scale comprised 12 items assessing the player's attitude and connection towards their avatars (e.g., "*Both me and my character are the same*"). It embraces three constructs; (i) compensation (e.g., "*I would rather be like my character*"); (ii) identification (e.g., "*My character compensates my own skills and abilities*") and; (iii) immersion (e.g., "*Sometimes I feel proud of my character*"). Immersion was focused upon as it was most relevant to the present study. Participants rated their responses on a 5-point Likert scale (e.g., 1="*Strongly disagree*" to 5="*Strongly agree*"). To acquire a finalized immersion score, all the five relevant items were added up, ranging from 5 to 25, with higher scores indicating higher levels of immersion. In the present study, internal consistency was acceptable with a Cronbach's alpha of .74 (see Table 2 for 'if item removed').

2.3 Procedure

The Human Research Ethics Committee (HREC) of the researchers' institution authorized data collection. The present study utilized an online cross-sectional survey method and was conducted via *Survey Gizmo* and *Survey Monkey* in which participants were recruited through posts made on relevant online gaming forums and advertisements on social media sites (e.g., *Facebook*). The use of traditional 'paper-and-pencil methods' was not preferred as literature suggests data gathering online is more practical and reaches individuals in "hard-to-reach" locations (Griffiths, 2010; Pettit 2002; Weigold, Weigold & Russell, 2013). To meet the eligibility criteria, participants had to have been *WoW* players aged 18 years and above. If these criteria were met, participants were directed to an online link, where they were introduced to the Plain Language Information Statement (PLIS). The PLIS clarified that participation in the survey was completely voluntary and that withdrawal prior to completion was an available (without additional explanations) and non-penalised option. Data were collected from June 2017 to August, 2018.

2.4 Statistical analysis

To test the first hypothesis, a two-step hierarchical linear regression analysis was conducted to ascertain whether immersive behaviours predicted the presence of offline PE behaviours, controlling for the effects of age and gender. Accordingly, age and gender (dummy coded, 0=females, 1=males) were inserted as predictors of offline PE behaviours in the first step, while immersion was used as a predictor of offline PE behaviours in the second step.

To test the second hypothesis, a mediation analysis was conducted in which immersion was used as a mediating variable in the relationship between being a Draenei (predictor; 0=not being a Draenei, 1=Being a Draenei) and offline PE behaviours (outcome).

Finally, the third hypothesis was tested using a moderated mediation model in which the effects of gender on the prior mediation were determined to assess potential gender-related variations in the mediating association of being a Draenei, experiencing immersion, and manifesting offline PE behaviours (see H_2). Both the second and third hypotheses were tested by applying PROCESS model number 4 and 59 respectively, as these were introduced on SPSS by Hayes (2013)[1].

3. Results

A two-step hierarchical linear regression was performed to test the association between immersion and offline PE behaviours. To ensure no confounding effects of age and gender were present, as these have been indicated in the relevant literature (e.g., Anderson, Steen & Stavropoulos, 2016), these were entered independently into SPSS at the first step. Immersion was entered as the predictor while offline PE behaviours was entered as the outcome for the second step. The complete two-step model (encompassing the first and second step) indicated the regression line's slope was significant, $F(3,344)=12.83$, $p<.001$. Furthermore, the slope of the regression line of immersion only was also significant, $R^2_{Change}=.09$, $F_{change(1, 344)}=33.15$, $p<.001$, with 9% (out of 10.1% for the full model) of the variance of offline PE behaviours being explained by the inclusion of immersion at the second step. Additionally, as a point of increase was made on the immersion subscale, scores on the PES increased by .43 ($b=.43$, $SE_{(b)}=.08$, $\beta=.29$ $t=5.76$, $p<.001$).

To assess whether being a Draenei was associated with offline PE behaviours, and whether the level of immersion online mediated this relationship, Hayes Model 4 (using PROCESS; see Figure 3) was used. Furthermore, bootstrapped bias correction and accelerated confidence intervals on 5000 resamples (exceeding recommended minimum sample; Bland &

Altman, 2015) were used. Being a Draenei was significantly associated with levels of immersion online, *b*=2.171, *p*=.035, 95% CI[.156, 4.187]. Accordingly, the mediation model's *path a* was supported. Likewise, *path b* of the mediation model was supported as evidenced by the significant relationship between the level of immersion online and offline PE behaviours, *b*=.428, *p*<.001, 95% CI[.279, .577]. Additionally, the unstandardized indirect effect was .928, bootSE=.461, bootstrapped 95% CI[.122, 1.929], indicating the level of immersion online serving as a mediating pathway was significant. Contrarily, *path c* (direct unstandardized effect) was not supported because no direct significant relationship existed between being a Draenei and offline PE behaviours, *b*=.904, *p*=.533, 95% CI[-1.947, 3.754]. In accordance with literature recommendations, an *indirect-only mediation* is present as a mediated effect exists (*path a*b*) in conjunction with a non-significant direct effect (Zhao, Lynch Jr & Chen, 2010).

-Figure 1. About here-

To examine possible gender differences (i.e., gender may have a cofounding affect in relation to UAR aspects based on relevant literature; Dunn & Guadagno, 2012), a moderated mediation model (i.e., Hayes Model 59; see Figure 4) was performed. More specifically, the model assessed if biological gender moderated the mediating effect of the level of immersion online on the association between being a Draenei and offline PE behaviours. Gender differences were found. The mediation model was not significant for females as evidenced by the bootstrapped 95% CI[-.366, 2.072], but was significant for males, bootstrapped 95% CI[.028, 2.072]. However, this difference between genders was deemed not significant overall, as shown by the Index of Moderated Mediation which was .246, bootSE =.950, bootstrapped 95% CI[-1.965, 1.851]. The rationale behind the index is, supposedly, to apply the simple slopes concept to indirect effects. Using the present example, the difference in the slope of Model 59 was found

by taking the indirect effect coefficients for females (.719) and males (.965) and subtracting them from each other which equated to the index itself (.246).

4. Discussion

The present study used a sample of *WoW* gamers assessed online, aspiring to examine the associations between choosing the races of Draenei, immersion experiences, and PE behaviours exhibited. These associations were further assessed in the light of differences based on the gamer's biological gender (in line with literature suggesting higher emphasis on the gamer; Ferguson et al., 2017). Regression, mediation, and moderated mediation analyses (accounting for basic demographic confounding factors; Elson et al., 2015) found that: (i) higher experienced game immersion predicted higher PE behaviours; and (ii) choosing a Draenei avatar predicted higher immersion, which resulted in higher PE behaviours, independent of the gamer's biological gender. Findings imply that game demographics (i.e., being Draenei in *WoW*), associate with the levels of game immersion experienced influencing behaviour transference (PE) from the avatar to the gamer. These findings illustrate the complexity of game-related behavioural effects (that are neither exclusively nor primarily related to the game content itself, but rather to the interplay between game, gamer, and contextual factors; Douglas, 2008; Elson & Quandt, 2016; Elson et al., 2015; Ferguson et al., 2017; Stavropoulos et al., 2018, 2019; Valkenburg & Peter, 2013). Consequently, these findings may have significant implications in enhancing e-health applications involving avatars, as well as reducing potential negative behavioural consequences on gamer's behaviour offline (due to their gaming; Rapp 2018; 2017a;b; Ratan et al., 2019; Rehm et al., 2016).

4.1 Immersion

Results supported the hypothesis that more immersed *WoW* players exhibited greater PE behaviours offline. This corresponds with past research showing that PE behaviours intensify the deeper someone progresses through the stages of immersion (Brown & Cairns, 2004), that is, the way a gamer transitions from *engagement* to *engrossment* to reach *total immersion*, the higher the PE propensity becomes (Cheng et al., 2017; Lee, 2007). Such transitions could explain the difference between a player thinking about their avatar (*engrossment*) outside of a game to actually experiencing their avatars identity as their own, and therefore, behaving as such (total immersion; Blinka, 2008; Cheng, et al., 2017; Liew et al., 2018). This finding suggests that being immersed while gaming may exacerbate *self-perception* processes (i.e., behaving according to avatar traits) and *deindividuation* processes (i.e., detaching from one's identity to attach to their virtual one) influencing PE behaviours (Reber et al., 2009). These inevitably solidify the bond between gamers and their avatars (Yee & Bailenson, 2007; Lee, 2007; Liew et al., 2018). Similarly, game playing time, a necessary element of game progression, has been positively correlated to game-immersion experiences (Billieux et al., 2013).

4.2 The interplay between being a Draenei, immersion, and Proteus effect

Choosing the race of Draenei associated with higher immersion, which appeared to result in higher PE behaviours, thus confirming H_2. This finding aligns with previous research demonstrating that *WoW* races, such as Draeneis, may contribute to PE related manifestations, primarily as a result of how an individual 'embodies' their avatar (Ash, 2015). Avatar embodiment refers to the extent that players perceive their avatar's attributes to influence their in-game behaviour (Ash, 2015). This inevitably strengthens *self-perception* effects which have been identified as a critically formative PE mechanism (Lee, 2007; Liew et al., 2018; Yee & Bailenson, 2007).

This finding could be interpreted on the basis of how being a Draenei may accommodate stages of immersion alongside PE-inducing mechanisms (Cheng et al., 2017; Yee & Bailenson, 2007). More specifically, the tragic survival story of the Draeneis, combined with their faith to the naaru (i.e., the Holy Light), their commitment and determination to fight against evil, their superficial skills (and often healing capacities) and their prosocial, idealized, and desirable gaming conduct, may invite daydreaming (in real life, which could lead to *engrossment* and progressively to *total immersion*) about possessing Draenei characteristics by a small proportion of less offline fulfilled gamers (i.e., individuals who may have gone through prosecution experiences in a less sufficient way; Burleigh et al. 2018; Gregory, 2011; Guitton, 2010; Ip, 2011; Mancini & Sibilla, 2017; Nardi, 2010). Active immersion behaviours related to their in-game Draenei character could be reinforced in the context of their effort to engage with fantasy and Draenei in-game role-play, as a means of coping with real life struggles (Kuo et al. 2016). Such behaviours could provide them with affirmation and empowerment (via their projective fantasy in-game experiences) enhancing immersion into a virtual context, whilst at a later stage encouraging PE behaviours in real life (Kuo et al., 2016). Furthermore, transitional object processes, in the means of transitioning-projecting one's ideal self into the Draenei, and then acting towards others the way they would have liked to have been addressed while in a similar position could also apply (Carroll, 2014; Gulerce; 1991; Ip, 2011; Shadraconis, 2013; Kuo et al., 2016). Such gamers could be far more enveloped in their avatar's identity (over their real life one) and far more willing to fulfil the Draenei-associated role, therefore detaching real life identity and attaching to that of a Draenei. These subsequently increase *deindividuation* tendencies, which may facilitate higher susceptibility to PE behaviours (Cheng et al., 2017; Coneliussen, 2009; Gregory, 2010; Yee & Bailenson, 2007).

4.3 Gender effects

Contrary to the first two hypotheses, H_3 was not supported suggesting the gamer's biological gender does not significantly moderate the association between selecting a Draenei race, the level of immersion experienced, or the level of PE behaviours exhibited. However, it should be noted that mild (insignificant) gender differences were found. These differences indicated that male (regarding biological gender) Draeneis presented insignificantly higher immersion tendencies, which resulted in stronger PE behaviours, compared to their female counterparts. This is in line with previous research suggesting that behaviours such as excessive gaming and game absorbance are more prominent in male than female gamers (Homer, Hayward, Frye & Plass, 2012; Tang, Koh & Gan, 2017). Furthermore, this non-significant finding aligns with the gender-bending (i.e., acting online as the opposite gender [Gregory, 2010]) and idealisation possibilities for Draeneis, who classify as males regarding their biological gender for a number of reasons. For instance, males who swap genders via their Draenei avatar, might aim to be more 'aesthetically pleasing' or to closely adhere to gender sexual stereotypes (Coneliussen, 2009; Gregory, 2011; Yee, 2010).

Nevertheless, the magnitude of this finding could be non-significant due to the diverse population of Draeneis in *WoW* who appear to swap genders, and thus, other demographic factors may confound with gender differences, presenting them weaker than they really are (Yee, 2010). Furthermore, it is likely that need for an idealised presentation via the avatar is so strong for immersed gamers who present with PE behaviours, that it overarches gender differences in the association examined (Coneliuseen, 2009; Gregory, 2010). Overall, the preliminary nature of this

finding, the specific association examined, and the discrepancy between males and females reported in the present sample warrants further studies.

4.4 Limitations and future research

The present study contributes an understanding to the association between immersion and PE behaviours. Furthermore, the present study provides further empirical evidence to the UAR by informing how real and virtual traits may relate to the PE. However, limitations exist. Firstly, the data collected does not reflect the new variant of Draenei's released in *WoW's* latest expansion – *Battle for Azeroth* (Blizzard Entertainment, 2018c). Secondly, the nature of causality of the associations studied cannot be ascertained due to the use of cross-sectional data. Thirdly, self-report instruments were employed and this could compromise the quality of participant responses, due to subjectivity issues, mood, and other conditional factors (Constantiou & Legarth, 2012; Liew et al., 2018). However, of more concern is that of potential dishonesty in participants reporting their gender. More male participants may have existed under the guise of a female participant as research shows that males may have a preference to swap genders more than females because female avatars supposedly comes with beneficial attributes in a virtual social environment populated with male avatars (Hussain & Griffiths, 2008). However, as there were few females in the study, this claim is questionable. In addition, variations in critical avatar parameters, including anthropomorphism, form realism, behavioural realism, and perceived agency, that have been implicated with gamers' behaviour, have not been emphasised here (Nowak & Fox, 2018). Similarly, a series of other potential confounding factors referring to the interplay between the gamer and the game-avatar within a specific context have also not been emphasized (i.e., game pace; digital penetration rate; age of the gamer; developmental history of the gamer; Breuer et al., 2015; Douglas et al., 2008; Elson & Quandt, 2016; Elson et al., 2015;

Ferguson et al., 2017; Valkenburg & Peter, 2013) dictating caution in the generalizability of the findings.

Despite these limitations, the present study contributes knowledge in regards to behaviour transference in the UAR and also validates past recommendations for further research as well as clinical emphasis given in the interpretation of the critical relationship between the gamer and their avatar (Morcos et al, 2019; Rapp 2017; 2018a, b; Ratan et al., 2019; Rehm et al. 2016;).

More specifically, the present study explored the interaction of PE behaviours and experiencing immersion in regards to adopting a Draenei avatar, and how this may differ according to biological gender in a *WoW*-playing context. It was shown that higher game-immersion predicted higher PE behaviours, and that choosing a Draenei avatar associated with higher immersion, which resulted in higher PE behaviours, independent of the gamers' biological gender. In addition, the present study contributes to understanding into how games with immersive properties like *WoW* can amplify behaviour transference between the user and their avatar. The findings of the present research could be applied to gamers susceptible to PE in regards to their presentation online. Accordingly, e-health interventions and a reduction of the transference of in-game aggressive behaviours to reality could potentially be created from the findings of the present study.

Therefore, it is suggested that e-health applications which target positive behavioural changes through the employment of avatars need to emphasize increasing related immersive experiences (Rapp 2017; 2018a, b; Rehm et al., 2016). This is important in the light of an increasing body of evidence supporting virtual reality, including games, as a means for health advancements and treatment, expanding traditional regimens in a range domains (involving indicatively physical activity, diet, behavioural-rehabilitation, exposure therapy, and autism spectrum-related

difficulties; Ahn & Fox, 2017; Gutiérrez-Maldonado, Ferrer-García, Dakanalis, & Riva, 2017). Second, it is suggested that avatar qualities such as the narrative and skills (as with the Draeneis in the present case), can influence the level of immersion and the PE behaviours exhibited and therefore, need to be further emphasized in order to improve the potential behavioural outcomes on gamers (Rapp 2018a, b). Third, it is suggested that considering cases of excessive gaming involvement, the user-avatar interplay should be explored (in the clinical interview context) to assess potential compensation and active immersion tendencies as either precipitating and/or perpetuating factors that may underpin excessive game engagement. This aligns with past therapeutic recommendations suggesting the avatars could light the pathway to the user's unfulfilled desires that need to be addressed and supported in order to reduce excessive game involvement (Tisseron, 2009). Fourth, considering further research, the present findings suggest that simplified and variable-focused conceptualizations overemphasizing in the role of games and ignoring the complexity of the interplay between the gamer and the game, alongside contextual influences should be challenged (Breuer et al., 2015; Douglas et al., 2008; Elson & Quandt, 2016; Elson et al., 2015; Ferguson et al., 2017; Valkenburg & Peter, 2013).

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Note 1: Analyses Assumptions: The assumption of independent errors was upheld following recommendations of conservative Durbin-Watson benchmarks proposed by Field (2013). The assumption of normality was violated, as the histogram displayed a positive skewness, furthermore, the normal P-P plot reinforces this as it showed systematic deviation of residuals. At this point, and before referring to further analyses' assumptions, it should be noted that the deviation from the normality assumption was addressed with the use of bootstrapping, in line with past literature recommendations (de Boer, van Der Voet, Bokkers, Bakker & Boon, 2009). The assumption of homoscedasticity was upheld as the residuals on the scatterplot roughly showed that variance was equally spread across the entire level of the predictor. The assumption of linearity was upheld as the scatterplot showed a comparable spread of residuals with little systematic deviation around the zero point. The assumption of multicollinearity was upheld as tolerance values did exceed 0.2 and Variance Inflation Factor statistics were below 10. Furthermore, the Condition Index value was below 15 (if above 15 possible collinearity problems may exist; greater than 30 indicates serious problems; Thompson, Kim, Aloe & Becker, 2017). This suggests that there were no significant suppression effects (due to multicollinearity) that could have confounded the analysis. Using a case-wise cut-off value of 2.5 a single univariate outlier (2.529) was discovered. Multivariate outliers were detected as Mahalanobis distance (57.11) surpassed the chi-square distribution value ($p = .05$, based on three predictors [namely age and gender as the controlled covariates and Immersion as the predictor of interest] was 7.81; Tabachick & Fidell, 2012, as cited in Field, 2013). Furthermore, Cook's distance (.038) was assessed to uncover whether outliers influenced the model. The value was below one which suggests that outliers held no significant influence over the model, therefore the analysis retained them (Cook & Weisberg, 1982 as cited in Field, 2013). Please see appendix graphs and tables.

Table 1 to be added, under construction.

Table 2. Cronbach's alpha and descriptive statistics of measurement items.

Instrument	Minimum	Maximum	Mean	Standard Deviation	Cronbach's Alpha: 'if item removed'
P1_Offline	1.00	5.00	2.31	1.341	.901
P2_Offline	1.00	5.00	1.96	1.215	.881
P3_Offline	1.00	5.00	2.43	1.408	.880
P4_Offline	1.00	5.00	2.50	1.463	.880
P5_Offline	1.00	5.00	2.08	1.325	.880
P6_Offline	1.00	5.00	2.13	1.305	.875
ID_5	1.00	5.00	2.18	1.361	.629
ID_6	1.00	5.00	3.28	1.269	.706
ID_7	1.00	5.00	1.97	1.139	.667
ID_8	1.00	5.00	1.56	1.027	.723
ID_9	1.00	5.00	3.21	1.418	.708

Note: P1 (-6) _Online (and Offline) is the Proteus Effect Scale. ID_5 (-9) is the Immersion Subscale.

 Mediation Pathway

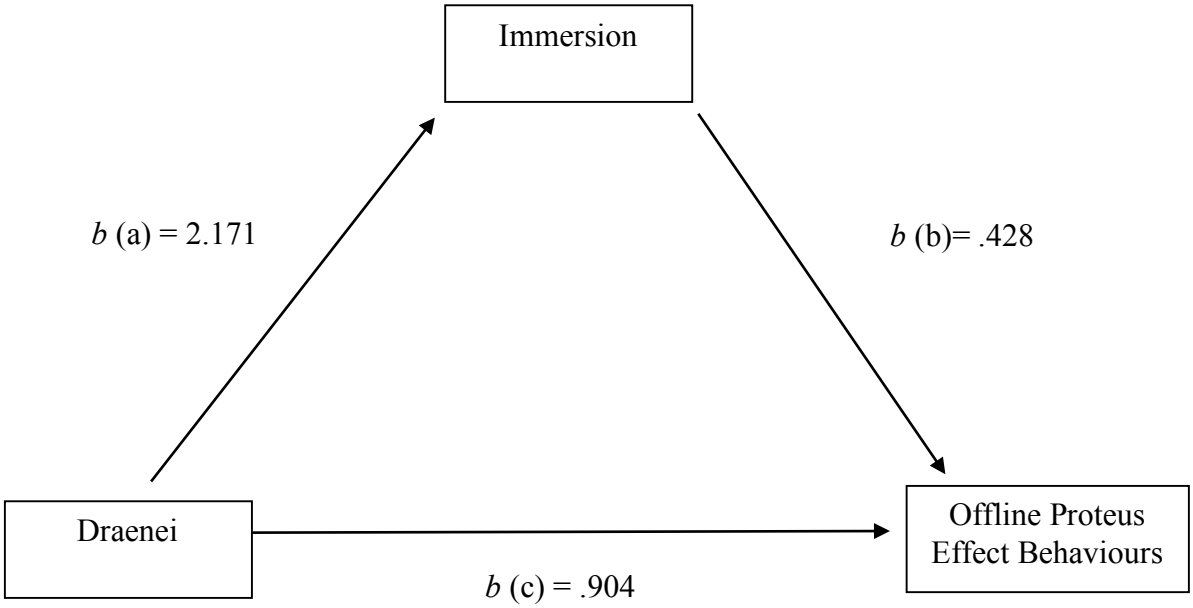

Figure 1. The mediating impact of being a Draenei, Immersion, and offline Proteus effect behaviours.

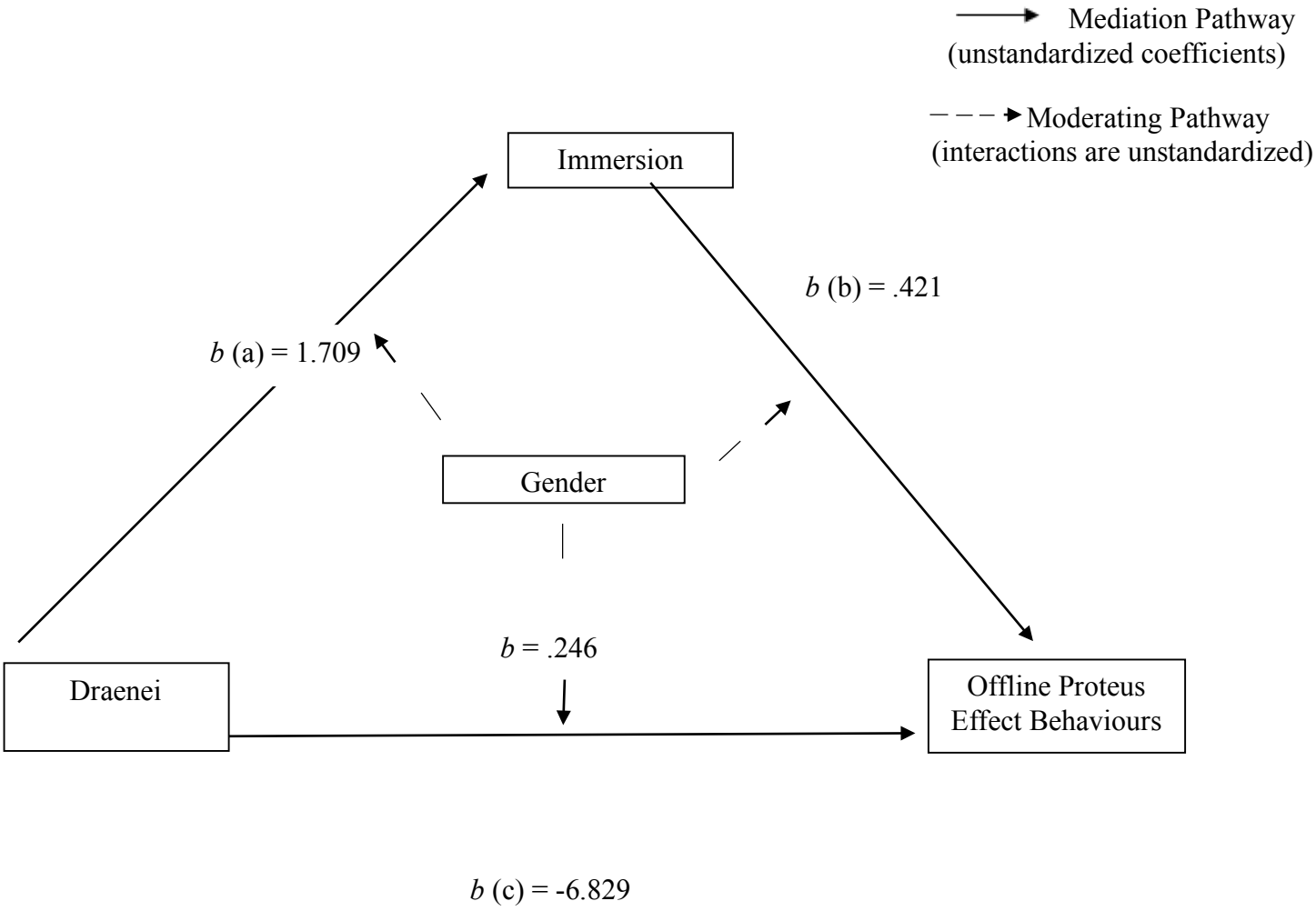

Figure 2. The moderating effect of gender on the mediating interplay between being a Draenei, Immersion and offline Proteus effect behaviours