

# Do primal instincts explain engagement in location-based games?

## A hypothesis-forming focus group study on territorial behavior

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**Abstract.** Location-based games (LBGs), where the user's physical location is a central part of gameplay, have become popular since the commercial success of Pokémon Go. The extant literature has focused to explain the success of LBGs by focusing on aspects of gratification and reasons to start, continue and quit playing. This study departs from the previous work by using a focus group method and hypothesizing that primal instincts developed during the evolutionary period of hunter-gatherer living—such as territorial behavior—can play a role in players' actions, potentially enhancing engagement and motivation. The manifestation of territorial behavior in LBGs can occur via persistent need to control specific virtual locations in the game world. Initial results indicate that territorial behaviour could impact player engagement in the games. This study presents a conceptualization on how territorial instincts influence player engagement in LBGs and provides a theoretical background for future studies.

**Keywords:** Location-based Games, Primal Instincts, Engagement, Territorial Behavior, Evolutionary Psychology

## 1 Introduction

Location-based games (LBGs) rose to prominence in 2016 with the launch of *Pokémon GO* even though some LBGs had already gained popularity previously, such as *Zombies, Run!* [34] and *Ingress* [15]. LBGs are often referred to as augmented reality (AR) games as they create a virtual world on top of the real world [11]. The immersion of the virtual game world can be increased by, for example, using real maps in the game, using the mobile device's camera to display game objects in the real world and connecting virtual points of interests (PoIs) with real world objects [19, 35].

Having the two world exist in parallel, the real and the virtual, has many peculiarities and properties, including affordances for social interaction [8] and encouraging

exercise [34] but also safety and security issues [2]. In LBGs player's actions are not confined within the game world but influence reality [22]. Thus, in addition to LBG developers and players, also other groups such as restaurant owners have been interested in understanding the games as a phenomenon to boost their business [26, 25].

Previously, for instance Alha et al. [1], Hamari et al. [11] and Rasche et al. [31] have studied why people play LBGs. The studies conducted surveys targeting specifically *Pokémon GO* players and then extrapolated their findings to cover similar other games. Alha et al. [1] used open replies from 2,612 participants to derive answers to why players start playing, keep playing and quit playing *Pokémon GO* following the study by Rasche et al. [31]. Hamari et al. [11] on the other hand, identified seven dimensions of gratification (enjoyment, challenge, competition, nostalgia, socializing, outdoor activity and trendiness) and measured correlations to identify player's intentions to reuse to explain player engagement.

As LBGs augment a virtual world on top of the paramount reality [22], it has been theorized that the games are capable of leveraging human instincts in a unique way to keep players engaged [23, 27]. Nevertheless, only a few studies have addressed or discussed the possibility of primal instincts influencing player engagement in LBGs, and, are not included in the popular previously suggested and verified models [1, 11, 31]. This motivates this study, which aims to *understand whether primal instincts or unconscious impulses, with a focus on territoriality, play a role in LBG player engagement*.

To investigate this research objective, we follow the process proposed by Lewis [21]: this study uses a focus group method [17] in order to create falsifiable hypothesis on primal instincts influence on LBGs' engagement. The focus group discussion addresses primal instincts in relation to the game mechanics—as defined by Sicart [33]. The findings are interpreted by using theories and principles of *evolutionary psychology* [6]. The most popular LBGs — *Ingress*, *Pokémon Go* and *Harry Potter: Wizards United (HPWU)* — in terms of generated revenue, amount of active installs and their playing communities are observed.

The rest of this paper is structured as follow. Section 2 reviews the work on evolutionary psychology, which defines the basis for this work. Section 3 reviews the research approach and Section 4 the results. Sections 5 and 6 gives discussion and conclusions of the study, respectively.

## 2 Background

Evolutionary psychology explores the human mind from the presumption that as we have evolved, our brain has adapted for survival in those environments our ancestors lived in [3]. Many theories arise from this axiom, however, they can be difficult to verify with conventional studies [9]. Whether evolutionary psychology is falsifiable branch of science has been a source of constant debate since its conception and despite studies arguing for evolutionary psychology as a science [16], criticism towards it remains [9]. However, evolutionary psychology has been successfully utilized in creating testable hypothesis [21] and can give insights and ideas into how the human brain could work.

Evolutionary psychology has been suggested to be a meta-theory to explain why games have been played all over the world for centuries [12]. Playing and games are not merely tricks to fool our brain, but playing is in fact natural human behavior through which important life skills can be learned [30]. Game developers can use the principles of evolutionary psychology to create game mechanics that leverage the unconscious part of the human mind to keep players engaged. One particularly popular approach is to look at what kinds of instincts might have developed when living in hunter-gatherer societies.

The hunter-gatherer society past of humans has been used to generate theories regarding territorial behavior and social relationships among others [10]. When discussing games that are location-based, territoriality is particularly relevant. Compared to territorial behavior in animals, humans are more complex with various interpretations on human territoriality circulating in psychology [7]. There exists many definitions for the term, with psychologists defining it as (1) defending a geographical area, (2) reserving resources in certain location for the exclusive use of their own group and (3) any space-related intolerance [7]. In his work from 1970, Pastalan talks about territorial behavior in humans as follows: "A territory is a delimited space which an individual or group uses and defends as an exclusive preserve. It involves psychological identification with the place, symbolized by attitudes of possessiveness and arrangements of objects in the area" [28].

Recent studies have provided evidence that the human mind may be more attuned to remembering locations related to survival, such as locations of food sources and nutrition [24]. Consequently, it can be suggested that LBG players are likelier to remember real world locations where they find digital goods in the virtual world, which can contribute to the observed increase in place attachment of LBG players [25]. Many popular LBGs such as *Pokémon GO* and *Ingress* contain gameplay about controlling virtual objects located in the real world, and, to test how this affects players, Papangelis et al. [27] introduced a game about controlling virtual areas and interviewed the twelve participants afterwards. In their study, participants started to refer to the territory close to their residence as their "home territory" or "home base" and protect it from other players.

On top of these findings, enjoyment with the game and social relationships in LBGs have been found to positively influence place attachment of LBG players [25]. Neural science has shown the human brain to learn to predict future rewards based on prior positive experiences [32], providing another viewpoint on how place-attachment and territorial behavior in LBGs can emerge. Thus, due to the way the human brain has evolved, LBG game mechanics affording players to control virtual objects can lead to an impulse to protect objects located in perceived home turf, and boost engagement as a result.

### 3 Research approach

#### 3.1 Research process

The aim of this work is to explore and understand how the hunter-gatherer evolutionary history of humans might have birthed instincts which explain a part of player engagement in LBGs, complementing the results and findings of previous studies on player engagement in LBGs [1, 11, 31]. Particular focus is on territorial behavior, which LBGs can invoke in a unique way compared to other games [23, 27].

*Focus group method*, as guided by Kontio et al. [17], is used as a vehicle to explore how LBGs may invoke primal instincts. We used a computer-aided single focus group consisting of nine participants. The focus group discussion was moderated by the first author of the study and the group discussion observations were written down by the moderator. Drawing from the ethnographic observations and interpretations of the participants, each of them was asked whether they have witnessed identified behaviour personally in each of the studied game in themselves, their team members and in members of the enemy teams.

All focus group participants were active players and members of local LBG communities. The background of the focus group was varied, involving both males and females, players from both *Ingress* teams, players from all three *Pokémon GO* teams and included both high performing players and casual players. The age of the participants was between 20s and 50s, and all had experience from at least one of the studied LBGs, whereas three had played all three of them including *HPWU*. Furthermore, each participant had at least two years of experience with LBGs with many having participated in in-game social events and community-wide joint-efforts.

During the discussions, various potential human instincts which can be harnessed for increasing engagement were raised for discussion. These included social impulses such as the fear of missing out, and other unconscious impulses such as enjoyment from uncertainty, in addition to the already discussed territoriality. The most commonly agreed themes were then queried from all members individually whether they had personal experience of observed actions. Based on the discussions, the one primal instinct that gained the most support and was identified to be unique to LBGs in comparison to other video games was the *territorial protection* instinct.

#### 3.2 Case games

In this study, we focus on the three most popular, measured by total turnover [20] LBGs: *Ingress*, *Pokémon GO* and *Harry Potter: Wizards Unite*. All of these games are produced by the same company, Niantic, Inc., and they use the same geographical point-of-interest database [18], which makes the games more comparable with one another.

In *Ingress*, PoIs called portals are captured. Three portals can be linked together to form fields. The area inside the field turns to the colour of the players' team. The portals can be destroyed by the enemy, or they can decay naturally in the course of a week.

However, portals can be recharged by players and holding them and controlling virtual geographical areas is one of the primary goals of the game.

*Pokémon GO* offers more varied gameplay. The main idea of the game can be seen to move around to find Pokémon and engage in a minigame to capture them. Some of the PoIs in the game are called gyms, which players can fight over and control. For the interested reader, the game mechanics of *Pokémon GO* are explained in more detail, for example, in the following studies [1, 11].

*HPWU* is the latest of the three observed games and was released in summer 2019. Similarly to *Pokémon GO*, the game is about moving around to find traces which can be collected once clicking them and completing a minigame. However, contrary to the other observed games, the game contains only cooperative multiplayer features and generic usage of PoIs, with no game mechanics allowing players to control virtual objects.

Finally, it is important to make a distinction between controlling territory because the game instructs to do so, and controlling territory as a personal, derived goal from the game mechanics. Thus, territorial behavior was defined as feeling a sense of ownership over a virtual location and taking action in defending simply for the sake of controlling the object— even feeling anxiety when it was held by the other team. Consequently, territorial behavior could be observed via circumstantial evidence such as players' movement patterns over periods longer than a month, but also more directly by hearing players discuss their feelings related to the subject.

## 4 Results

The focus group agreed there were two levels of variance in player behavior and propensity in LBGs. First, playing patterns varied between players. Second, there was day-to-day variance in the movement of the same players. Despite this, certain propensity patterns emerged and a list of raw observations made by the focus group about players' geographical propensity are listed below:

- Players' movement patterns in the game remained relatively static from day to day.
- Areas of play were tied to the location of players' residence and recurring daily activities.
- Players showcased a sense of ownership over specific virtual locations.
- Players avenged either alone or together with team members if their perceived 'home area' was attacked.
- Players changed their playing area sometimes based on in-game events or personal or cooperative endeavors.
- Players reacted differently on losing a virtual location based on who the attacker was.

Several members of the focus group had observed that active *Ingress* players had recurring routes and relatively fixed areas of play. The playing areas were strongly influenced by the location of the players' residence and recurring daily activities, which aligns well with previous studies [5, 14]. Both *Ingress* and *Pokémon GO* players were found to change their playing location based on events in the augmented game world.

**Table 1.** Observed territorial behavior based on ethnographic observations of the researchers

Observed behavior	Pokémon GO	Ingress	HPWU
Own territorial behavior	7/9	6/6	0/3
Territoriality in own team	8/9	6/6	0/3
Territoriality in the enemy team	7/9	6/6	0/3

At least pokestops, gyms, Pokémon spawns and raids were found to effect the routes of *Pokémon GO* players, whereas *Ingress* provided more complex reasons for changing routes including both individual and cooperative endeavours.

Especially in *Ingress*, but to some degree also in *Pokémon GO*, players sought to gain control of a geographical territory and protect it. Cases were observed in both games where players changed their regular movement patterns to recapture a PoI from the opposing team when they had invaded their territory or even avenge an enemy player by attacking their territory in the game. The manifestation of this kind of territorial behavior varied between games.

A few focus group members argued that before the gym system of *Pokémon GO* was reworked in June 2017, and before the game added cooperative possibilities between members of different teams, a stronger divide and a stronger sense of ownership over virtual locations existed. Observations were presented about “wars” in *Pokémon GO* between players and teams, which mostly ended after the gym system was changed. Both *Pokémon GO* and *Ingress* had examples of players rallying teammates to their help to protect territory or avenge lost territory.

Territorial behaviour was divided into three categories in the discussion: territorial behavior in (1) participants themselves, (2) their teammates and (3) members of the enemy team. Most focus group members, as shown in Table 1, agreed that both *Ingress* and *Pokémon GO* had provoked territorial protection instincts whereas no territorial behavior was observed among *HPWU* players. These results highlight the importance of game mechanics for player behavior and show that it is problematic to generalize results on a single LBG to cover all seemingly similar games.

Both *Pokémon GO* and *Ingress* game mechanics allowed cooperative fighting over virtual locations. On some occasions players battling over the same areas were even witnessed to ask their opponents to switch teams and join their side. There were also moments recorded where players were hostile towards each other due to conflict over a virtual location. Players who felt ownership over certain locations and defended them with pride felt joyful when successful but resentment towards their opponent when unsuccessful.

Not all LBGs induce territorial behavior as empirically observed in the current study. *HPWU* uses mostly the same PoIs as *Ingress* and *Pokémon GO*, but the game only gave very generic purposes for them. Without any unique characteristics of PoIs or the ability to capture and “hold” the PoI in the player’s name, the feeling of an enemy invading territory did not manifest in players. Other factors influencing the magnitude of the territorial protection instinct can be (1) perceived importance of location, (2) the quality of the virtual object and (3) attachment to the place [19, 25]. The reasons for territorial

behavior given by the players with whom the focus group members were in contact with, included: avenging lost portals, gaining advantage in-game and upholding their reputation.

## 5 Results

### 5.1 Key findings

We summarise our observations into the following three points:

- First, the results from the focus group discussions suggest primal instincts, primarily the territorial protection instinct, can be used to explain a part of player engagement in LGBs.
- Second, the results hint that not all LGBs can be treated equally at least in the context of the variable presence of the territorial protection instinct, which contest some of the generalizations of the extant literature.
- Third, the results provided preliminary empirical evidence that instincts evolved during the hunter-gatherer history of the human race can be harnessed by video game developers more broadly to engage and motivate players.

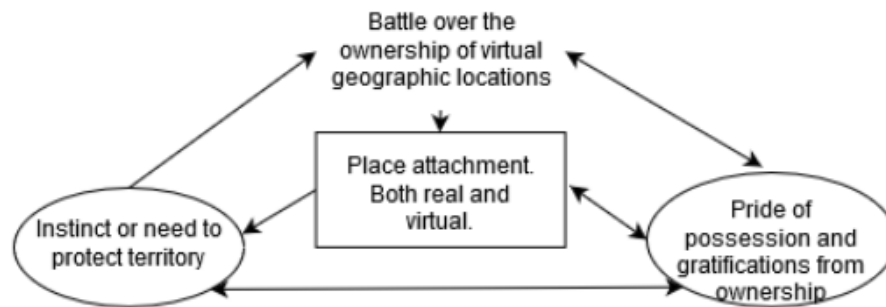
### 5.2 Limitations

The chosen research method [17] has several risks of bias. Firstly, the participants only obtain knowledge from their perspective which is limited by geographical, practical, social and other factors. Secondly, a positive confirmation bias, where researchers selectively see phenomenon supporting their initial perception can occur. Thirdly, only three LGBs were observed, and as territoriality was found to vary between the games, more research linking game mechanics to player propensity is required.

### 5.3 Generating a hypothesis and future work

Previous studies have used both qualitative and quantitative methods to study why people play the LBG *Pokémon GO* and extrapolated their findings to predict player engagement in other similar LGBs [1, 11, 31]. This study theorises that the extant literature could be expanded by involving unconscious impulses labeled primal instincts to explain a part of the engagement in LGBs. As particular focus of this study was on territorial behavior, further discussion on its relevance in modern society is required.

In current western society, despite humans occupying residencies which they perceive as theirs, ownership of streets, parks and other locations is shared. In fact, behavior where a person tries to take control over a public place for themselves is not accepted. While the virtual world and reality co-exist, players are able to behave in the virtual world in ways which would not be acceptable in the real world. This includes territorial behavior [27], which can cause negative feelings towards other players and in the worst possible cases, real life violence.



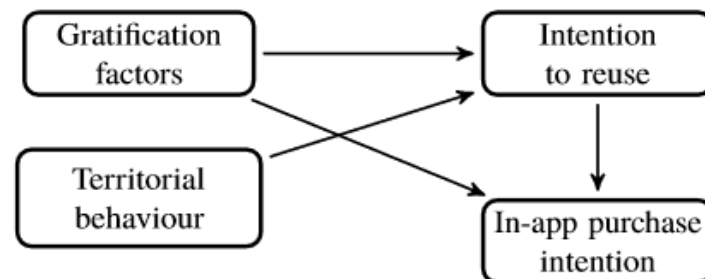
**Fig. 1.** Predicted relationships between territorial behaviour and observed phenomenon in LBG.

Evolutionary psychology suggests there can be many fine-tuned instincts which resonate with our brain, even without us being necessarily aware they exist, which can influence behavior and cause, for example, aggression [4]. Jungian psychology shares this epistemic belief [29] and provides examples of narratives which resonate with our consciousness. As stories and movies can display these narratives [29], so can games, especially when games involve reality in the gameplay as LBGs do. Despite the above mentioned negative side-effects of territorial behavior in LBGs, the competitive and motivating element it brings to the game might be a big factor in player engagement as predicted by previous studies [36].

Territorial instincts are proposed to explain some of the motivations to play that are unique to LBGs, and e.g. territorial behavior is something that players themselves can overlook as it is not an instinct modern humans are perhaps even aware they possess. Also, vice versa – the developers might not fully acknowledge its role in the design of LBGs. Based on the observations and subsequent analysis, the relationships surrounding place attachment and territorial behavior are formulated in Fig. 1. This model shows the empirically observed relationships between place attachment, territorial protection instinct, pride of possession of virtual objects and the conflict between players concerning those objects. Territorial instinct can lead to battle over the ownership of PoIs, which can result in place attachment and gratifications from conquering and owning the PoI. These two can further fuel the instinct to protect territory, as the sense of ownership players feel towards the locations increases.

The model presented in Fig. 1 serves as a starting point for creating a hypothesis of player engagement in LBGs involving primal instincts. Hamari et al. [11] studied the influences of the gratification elements into the intention to reuse and, therefore, intention for in-app purchases. We argue that previous work could be supplemented by including the influence of territorial behavior, and, therefore, propose an extension to Hamari's model as illustrated in Fig. 2. To test the proposal, we plan to conduct an online survey aimed at LBG players. This survey will be used, as guided by Lewis [21], to identify correlation values of the proposed model and consequently either verify or falsify the proposed addition to the LBG player engagement model. One particular issue





**Fig. 2.** A proposed extension to the gratification model, by Hamari et al. [11] of LBGs engagement.

for such a research is through what kinds of survey methods can territorial behavior be identified.

Finally, territorial protection instincts raise up the question of the LBGs' 'dark side', ie. unintentional unethical behaviour caused by the game design [13]. The focus group addressed cases of neglecting family or work due to the need to 'play' and 'protect territory'. It was also noted that some players had lost sleep, had been driving past speed limit and resorted to energy drinks to stay awake, all in the pursuit of territorial superiority over fellow players.

## 6 Conclusions

Due to the immersive design of LBGs where reality and the augmented world are mixed together, the games can invoke dormant primal instincts in players. This work addressed the objective to understand whether primal instincts explain a part of engagement in LBGs. The focus group study provided preliminary evidence in how territorial control instinct can influence the propensity of LBG players – and, consequently, also engagement in these games. Further work for addressing this goal is proposed. The game mechanics of *Ingress* and *Pokémon GO*—but not HPWU's—support gameplay which manifests as territorial behavior. Players are able to derive gratification from controlling virtual territory, and can be hostile towards players who challenge their territory. This hostility mostly manifests in the game world, however, cases were identified where in-game conflict caused players to think ill and talk negatively of their opponents. Finally, this study provided examples of how evolutionary psychology could be harnessed in the design of games to boost engagement and motivation and laid a theoretical foundation for future studies on territorial behavior among LBG players. It also reminds game designers and players of their biological reality and acts as cautionary commentary advising to be aware of the dormant instincts which still live inside us due to the complex process of evolution.

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