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A Qualitative Exploration of Factors Affecting Group Cohesion and Team Play in Multiplayer Online Battle Arenas (MOBAs)

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Abstract Previous research examining the social psychology of video-gaming has tended to focus on Massively Multiplayer Online Role Playing Game environments, such as World of Warcraft. Although many online group processes have been examined using this game, this genre does not enforce cooperative play and studies tend to be based on very large groups. Newer genres are being developed and played which have so far not been studied. The genre known as Multiplayer Online Battle Arenas (MOBAs) are attracting large numbers of players and success depends on effective team playing within smaller groups. The study reported here explores team play within MOBAs. Due to the lack of literature examining this genre, Corbin and Strauss' (Basics of qualitative research: techniques and procedures for developing grounded theory, 3rd edn, Sage, London, 2008) grounded theory was used to analyse participants' subjective experiences of playing MOBAs to create a conceptual model. A focus group pilot study informed the development of questions and then semi-structured interviews took place with twelve participants; 1 female and 11 male students aged between 18 and 21 years. Participants were required to have recent and frequent MOBA exposure, but with different preferences regarding roles and experience. Data was analysed using open, axial and selective coding and the resulting model depicts a scale, as optimal team performance was linked to a balance between factors. The core category "Communication" was heavily influenced by the relationship between teammates (friends or strangers). The balance of "Communication" affected the balance of the final three categories: "Team Composition", "Psychological State" and "Level of Play". The conceptual model is critically linked with traditional group processes, such as Belbin's (Team roles at work, Butterworth-Heinemann, Oxford, 1993) team roles, Tuckman's (Psychol Bull

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64(6):384–399, 1965) model of group development and the perceptions and behaviour during the state of deindividuation (Taylor and MacDonald 2002). The model has real-world application in both social and professional virtual environments, whilst contributing more broadly to research in Cyberpsychology and Social Psychology. Further research is suggested which will test predictions based on a predictive model.

Keywords Group cohesion · Online teams · Multiplayer videogames · Cyberpsychology · Social psychology · Virtual groups

1 Introduction

1.1 Rationale

Social and business groups are becoming more reliant on online communication (Monzani et al. 2014) and there is a need to explore group processes in online environments, to identify ways that they are similar and different to offline contexts. There are numerous definitions of a 'traditional' group, each stressing different aspects: some stress identity (Brown 1999), whereas others focus on purpose (Mills 1967). In terms of researching group cohesion and team play, the most appropriate definition can be drawn from Cartwright and Zander (1968): defining a group as a collection of individuals who are interdependent. An effective group is more than a set of skilled individuals: according to Steiner (1972), a group's productivity is equal to their potential productivity minus the losses due to faulty group processes. Therefore to enable an online group to perform at an optimal level, the faulty group processes need to be reduced, and cohesion increased. Research on these processes has extended into Massively Multiplayer Online Role Playing Games (MMORPGs) as collaboration, competition and social ability in these environments are of huge importance (Christou et al. 2013). MMORPGs are online games where players create and control avatars to play and interact with potentially millions of other players (Steinkuehler and Williams 2006). The most popular MMORPG is World of Warcraft (WoW) with 7.8 million monthly active subscribers (Grubb 2014). Despite this, it is possible to play WoW as a single player (Chang and Lin 2014). Aside from completing Dungeons and Raids, teamwork and co-operative play is never enforced and it is not difficult to achieve the highest level in the game avoiding these interactions. Therefore participants that respond in studies exploring the social aspects of MMORPGs have elected to work as a team voluntarily, where playing alone doesn't impede achieving set goals. This suggests that MMORPGs are not the most appropriate environment to explore group processes.

There are other online game environments where team members have to work together. In Multiplayer Online Battle Arenas (MOBAs), the game objective cannot be completed whilst playing alone. There has been no psychological research within this genre thus far, despite being an ideal environment to explore group processes. Therefore this article addresses a gap in the literature by studying group processes in MOBAs—an appropriate online gaming environment. Due to the absence of

literature, this study will utilise Corbin and Strauss' (2008) grounded theory. The inductive bottom-up approach will allow generation of a theory to accurately reflect the team play experiences of the participants within the MOBA environment. This could potentially add new concepts regarding online group play and processes to the literature. After covering the basic premise of MOBAs, the group theory 'Social Identity Theory' will be outlined, discussing its relevance to the online gaming environment, with reference to Belbin's (1993) team role theory. This will lead to a discussion of key group processes with emphasis on how they are affected by being online.

1.2 Background of MOBAs

Stemming from a Warcraft III modification, Defence of the Ancients 2 (DotA 2) is an example of a MOBA. In 2014 DotA 2 had 7.86 million monthly players (Grubb 2014), surpassing WoW. DotA 2 is the most played game on the desktop gaming client 'Steam', peaking at 1 million concurrent players. The number of people exposed to DotA 2 alone shows the need to begin conducting research within MOBAs; however DotA 2 is not the most played MOBA. League of Legends has 67 million monthly active players, peaking at 7.5 million concurrent players (Grubb 2014). Unlike MMORPGs, MOBAs are very similar to each other. MOBA matches consist of two teams of five players, typically lasting from 45 min to an hour. At the beginning of each match, the team enters a 'planning phase' which normally lasts 1 min. During this, players select their champions, which lane they will start in and what strategy the team will adopt. LoL currently has 123 Champions to select from. Each champion has a different role and stats. They all have three unique abilities and one 'ultimate' ability. Players have to be dependent on each other's skills and make sure their team has a variety of abilities. The teams' objective is to destroy the opposing team's core structure, whilst defending their own. In LoL this is the 'Nexus'. MOBAs typically have the same default map layout which consists of the teams' core structures being in the top right and bottom left corners respectively, with three lanes joining them generally referred to as 'top', 'mid' and 'bot' (represented in Fig. 1).

In each lane, there are three towers belonging to each team. Behind the tower closest to the base are the barracks. Behind these, there are two towers protecting the core structure. Towers fire at enemy units. For every minute of gameplay, the barracks spawn groups of non-player characters (NPCs) which fight their way to the enemy towers. Players can attack enemy structures and NPCs to gain experience (XP). The player that 'last hits' the enemy NPC will gain gold and XP. When an enemy structure collapses, the whole team gains gold and XP. XP results in the player levelling up, and with each level up they can acquire or upgrade their abilities, ultimate ability or stats. The gold can be used to buy items which can be of benefit to the individual or the whole team. Finally, there are 'camps' of NPCs within the 'jungle', which is the area between lanes. Like NPCs in the lanes, they can be killed for gold or XP. This is referred to as 'jungling'. There is usually a 'boss' NPC which in order to be killed, generally needs to be attacked by a team, rather than an individual. Upon its death, the entire team gains bonus XP and gold.

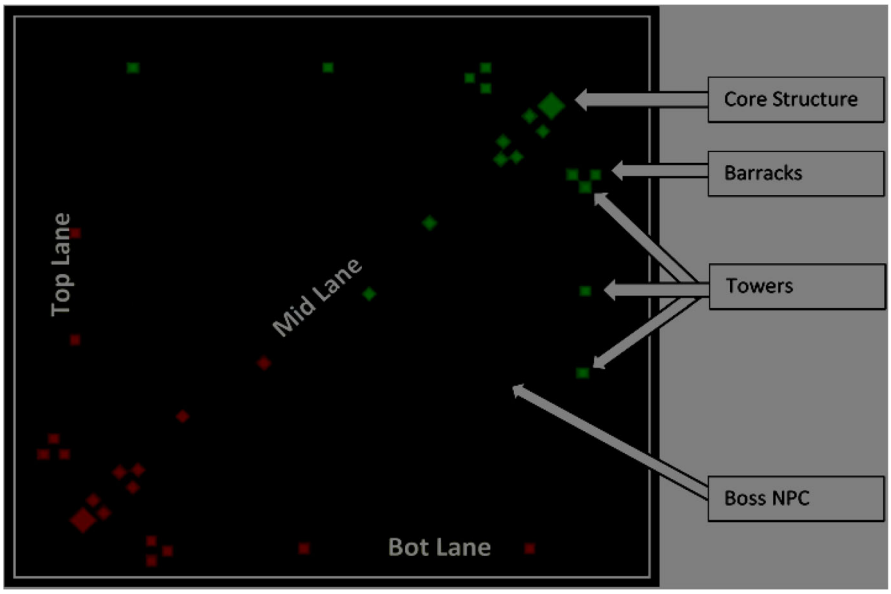

Fig. 1 Typical default map layout for MOBAs

1.3 Group Theories

Social Identity Theory (Tajfel and Turner 1979) predicts intergroup behaviours based on the perceived status of individuals within the group. Hogg and Tindale (2005) differentiate between personal and social identity by positing that the former is an evaluation of oneself in regards to idiosyncratic personal attributes, whereas the latter is in regards to shared attributes that define a specific group membership. Although these two identities overlap, there is a discontinuity in behaviour when alone than when in a group. Therefore it is possible that MOBA players will behave differently in-game than when offline. For example, in WoW the role of the avatar is often an expression of the group's needs, rather than a vehicle for self-expression (Gabbiadini et al. 2014). This may be reflected in MOBAs: players may assume a role the team needs, rather than what they personally would want to play.

Belbin (1981, 1993) developed a theory of team roles, which outlined nine different roles, each with unique strengths and weaknesses. 'Team Role' was defined as the inclination to contribute, behave and relate to others in a certain way. The 'Team Role Balance Hypothesis' states that for optimal team performance, there should be a balance of team roles, each being carried out by a capable individual. Each individual has both a preferred and secondary role, which will elicit their best performance. This theory can be applied to online games. In WoW, players create avatars to fit into a group's available role (Gabbiadini et al. 2014). This may arise in MOBAs—perhaps players will pick a champion which will fit into the team's available role. Despite this, MOBAs typically consist of five players on

each team—as such, Belbin's (1993) model will not be directly applicable to this genre, as all nine roles cannot be simultaneously utilised. Moreover MOBAs have their own 'roles' predefined (such as carry, support, jungler etc.). Building on Belbin's assumption, optimal team performance will result from having a variety of these roles in game. Despite the success of Belbin's theory, it is not without criticisms. Although Broucek and Randell (1996) acknowledge the valuable research contribution of Belbin's theory, they state that the study of team performance is more anecdotal than statistically grounded. Moreover, Belbin's model is solely focused on which team roles will best achieve a goal; it does not discuss the interpersonal relationships between team members. For example, a mixture of team roles may be the most likely to achieve optimal performance, but this is no indication that the team will be socially compatible and be cohesive as a result. Therefore perhaps a variation of team roles within MOBAs will not be sufficient to reliably produce an effective team.

1.4 Online Group Processes

Technology has numerous effects on communication and group processes. In an online environment, inequalities of participation and influence are decreased, causing an 'equalisation phenomenon' which can reduce social loafing as group members contribute the same amount (Dubrovsky et al. 1991). Despite this, this phenomenon may not result from the online environment directly, but because the individual's contribution is more visible to other team members. WoW provides an example of this. When a team enters a 'Raid' [a group Player vs Environment (PvE) battle], team members are assigned roles. The skill variation between different avatars teaches WoW gamers to be dependent on one another whilst promoting a good understanding of teamwork, as certain goals can only be completed by players with certain abilities (Cole and Griffiths 2007). Thus, if the healer isn't healing, the team will become aware of this very quickly. This distribution of responsibilities is similar in Belbin's (1993) theory, which states the most successful teams have a mixture of these roles. Through this assignment of specific roles with the potential evaluation from teammates, social loafing can decrease (Harkins and Jackson 1985). Like WoW, team-members have specific roles in MOBAs and all team members can access each other's scores. As such this could potentially influence group processes that are found within MOBAs.

A further possible faulty group process is unfriendly communication. This has been previously analysed by Bales' Interaction Process Analysis (IPA) method and model, which identifies interpersonal and task elements of group interaction (Bales 1950). Fahy (2006) applied the IPA to an online group and found less disagreement and negative social interactions than Bales (1950) found in offline groups. Despite this, as social psychological influences that are normally present in face to face (F2F) communication are often absent in online communication (Ho and McLeod 2008), there are often excessively negative, aggressive and flaming behaviours which can damage a person's self-image (Suler 2004). 'Flaming' describes all kinds of disinhibited online behaviour (Moor et al. 2010), and generally is a hostile interaction often with the intention of provoking an emotional response. Leung and

McBride-Chang (2013) indicated that cyber-bullying is present in online gaming environments: a finding which is well replicated (Yang 2012; Li 2006). Therefore, Fahy's study may have only shown less negative social interactions online due to the regular involvement of an instructor. Moreover participants in this study were not anonymous whereas gamers generally are. Finally, although an accepted model, it could be argued that Bales' IPA is too exclusive in its categories. This is amplified by the fact that technology has developed drastically since the model's publication; it may not be appropriate to explore online communications using this model.

The unfriendly communication in online gaming may be caused by anonymity. In face to face research, Diener et al. (1976) demonstrated the link between anonymous conditions and the concept of deindividuation to explain why people in groups can act in anti-normative ways. This phenomenon can explain why groups of players in online games exhibit negative communication. For example, WoW players are only known by their avatar name, which is rarely their real name. This anonymous environment may encourage negative behaviours. Building on this, Hughes and Louw (2013) found that aggressive messages were sent once every ten minutes in competitive game situations; however in co-operative games no aggressive messages were sent. This shows anonymity is not the only cause of unfriendly communication in team environments. In WoW, players opt-into servers which are PvP (Player vs Player) and many quests are PvE. It is therefore more frequently a co-operative than competitive environment. MOBAs always consist of two teams competing: so gameplay is both co-operative and competitive. Thus it is unclear if unfriendly communication will arise in a MOBA setting, as there is no psychological research outlining whether aggressive messages will be sent between members of cooperative teams in a competitive environment. If aggressive communication occurs between allied players, this demonstrates intragroup conflict: where members of the same team exhibit negative behaviours towards one another. This significantly influences the group's effectiveness (de Wit et al. 2012). Intragroup conflict was developed into Tuckman's (1965) model of small group development. It is comprised of four stages; 'Forming', when the group members are beginning to get to know each other; 'Storming', where intragroup conflict begins; 'Norming', where agreement and cohesion occurs; and 'Performing', when the team is clear on their goal and are being productive. It has since been revisited by Tuckman and Jensen (2010) to include a fifth stage of Adjourning, which is group disbandment. Beltgens (2010) demonstrated that these stages still exist in an online environment, but take longer to occur. On the other hand, as Beltgen's (2010) study was time limited, only the first few stages were demonstrated; therefore Tuckman's model could not be replicated. Moreover, in Tuckman's original sample, there was an over representation of therapy groups. Thus, there is limited reliable and valid evidence to suggest that Tuckman's model exists in the online gaming environment. Evidence of these stages could potentially occur within MOBAs, but have so far not been studied.

1.5 Summary

It is clear from the research discussed that being online can have both positive and negative effects on group processes, and the group theories addressed could potentially be applied to online gaming environments. Being able to work in an online group is becoming vital to the workplace, therefore research in this area has important implications for both social and occupational psychology. Group processes have been researched in games such as WoW, but as outlined above co-operative play is not essential. In many social and work contexts co-operation is essential, therefore researching group processes in MOBAs will help develop understanding. The LoL game has over six times more active players than WoW and simply due to the number of people who invest a significant amount of time within MOBA environments, it is an important area for psychological research.

2 Method

2.1 Participants

For the pilot study, three frequent MOBA players were recruited from a local Gamers Society to take part in a focus group to inform the development of the interview schedule. The requirement was that participants had played any MOBA regularly for an average of at least 15 h per week to ensure they were knowledgeable of MOBAs and had both frequent and recent exposure. They were 19–21 year old males, with a preference of playing DotA 2.

For the main study, an undergraduate sample from one University was recruited using theoretical sampling. This data collection method involves the researcher coding and analysing the data as it is collected, then deciding what data to collect next, and where best to find it. This enables the theory to be developed as it emerges and thus "[The] process of data collection is controlled by the emerging theory" (Glaser 1978, p. 36). This method of recruitment was used as it is a critical feature of constant comparative analysis as described by Corbin and Strauss (2008). As the research aim was specifically around the team play in MOBAs, the initial sample identified was reflective of the typical MOBA player. This is a male League of Legends player, aged between 16 and 30, who is enrolled at university (Lyons 2012). It was suggested in the pilot study to interview individuals who had different preferred roles within game; so the initial four participants preferred to play tank, support, jungler and carry respectively. They all played MOBAs between 21–26 h per week. These participants were contacted through a University Gamers Society. As the iterative process continued, participants who played other MOBAs were recruited. These included DotA 2, Heroes of the Storm and Dawngate. To aid the recruitment process of such specific individuals, the ethics form was amended in order to offer an incentive to participants. In the final set of participants, two played 0–5 h per week, three played 11–15 h per week, six played 21–25 h per week, and one played 26–30 h per week. Of the final twelve participants recruited, they were aged between 18 and 21 and eleven were male and one was female. This gender

split is representative of the MOBA community, which is 90 % male. As the female participant did not present any new codes relevant to the research aim, no other female participants were recruited. Data saturation was reached at twelve participants. As an incentive, participants were offered entry into a draw to receive £10 of Riot Points (the in-game currency of League of Legends), or a cosmetic item for a champion in DotA 2.

2.2 Procedure

Following ethical approval, the participants were invited to a small, private room at the University where the focus group (for the pilot study) or the semi-structured interviews would be conducted. This location was chosen so participants would be in a comfortable and familiar setting, which was both quiet and private. This is ideal for both recording and their confidentiality. Participants were given a briefing form and asked to sign a consent form. Participants were informed that the session would be recorded, but the audio file would be protected and destroyed upon transcription. They were also informed that they could retract their contribution to the study at any time during the procedure, and up to 2 weeks following the interview or focus group date. Both the interviews and focus group lasted between 10 and 25 min, and the full procedures lasted around 30 min. The focus group and interviews were concluded with a participant de-brief and provided with the researcher's contact details.

A pilot study took place to test the wording of the questions and to ensure they elicited participants' personal narratives. The pilot used a focus group as numerous researchers have successfully done in exploratory phases of research projects (Barbour 2008). The focus group was split into two sections: during the first phase, participants were asked the preliminary questions that were going to be used in the final interviews. This was to demonstrate whether the interview schedule gathered the right information and if the questions were clear. During the second phase, participants were invited to discuss the questions and suggest any amendments. This enabled participants to be involved in the research process, and allowed them to discuss any parts of MOBA play that were not accessed by the interview questions.

Once the transcript from the pilot study was analysed, the interview schedule for the main research study was amended with participants' suggestions. The interview schedule consisted of 10 questions, with the first five acting as 'fact-finding' questions. These include demographic information such as typical weekly play hours and preferred role. The questions specifically tailored to eliciting personal narratives were asked in the middle of the interview, as suggested by Leech (2002). This is to ensure there was enough time for participants to respond, but also to help gain a rapport by easing them in with the easier questions first. All the questions are open and non-presuming. This methodology of interviewing was used as it encourages personal narratives. The interviews were semi-structured to allow participants to go into detail where they feel necessary, and avoids 'pre-judging' what concepts will be of importance. Using semi-structured interviews limited the researcher's own preconceptions from interfering with the interview schedule, keeping the data grounded in the participants' own experiences.

Key ethical considerations during the research included confidentiality, informed consent and the right to withdraw. Participants were made aware that they were being recorded and the audio file were destroyed immediately after transcription. As MOBAs are sometimes considered 'toxic' where players can be offensive, participants may become distressed during the interview and if this occurred, participants would have the option to skip the question, or terminate the interview without consequence.

3 Analysis and Results

3.1 Qualitative Analysis

Corbin and Strauss' (2008) grounded theory was used to guide the research process. As a theory, it is based on participants' subjective perspectives where the researcher's role is essential to the process. The rigorous iterative process involves being contextually sensitive, as well as being reflexive as a researcher. As a method, it is the identification of concepts that are grounded in the data. The qualitative analysis software 'NVivo' was used for the analysis process. Three main steps were followed during the analysis process after data collection (as prescribed by Corbin and Strauss): open coding, axial coding and selective coding. During open coding, the data was examined on a line by line basis looking for themes, concepts or categories. During this constant comparative analysis, the data was grouped together and labelled in a meaningful way. Then the data was analysed through axial coding, where the codes were developed further through the development of hypothetical relationships between categories. There were a few instances of focused coding to refine categories, where the concepts' complexities were developed by purposely searching for additional examples and counter-examples. Once data saturation was reached, a core concept emerged through the process of selective coding. Through theoretical integration, the conceptual model was developed. During the analysis process, descriptions of each concept and the links between them were kept on concept cards.

To keep track of how the researcher affected this process, both generic and theoretical memos were maintained throughout the analysis. These document the full analysis process, including thoughts and interpretations and enable clarity over how the researcher shaped the data analysis. As a female MOBA player who engages in gameplay on a daily basis, it is unavoidable that researcher identity would have some influence on the process, e.g. a preference playing the support role could have altered perception of participants' opinions about this role. To remain aware of potential interferences, memos were kept to enable reflexivity throughout the analysis. As an expert in the area, participants did not need to explain gameplay terminology and this enabled the interviews to focus more around the research aim, rather than digressing into explanations. As such, the interview schedule used language which demonstrated knowledge of the MOBA genre, which would not be the case if the researcher was a non-experienced MOBA player.

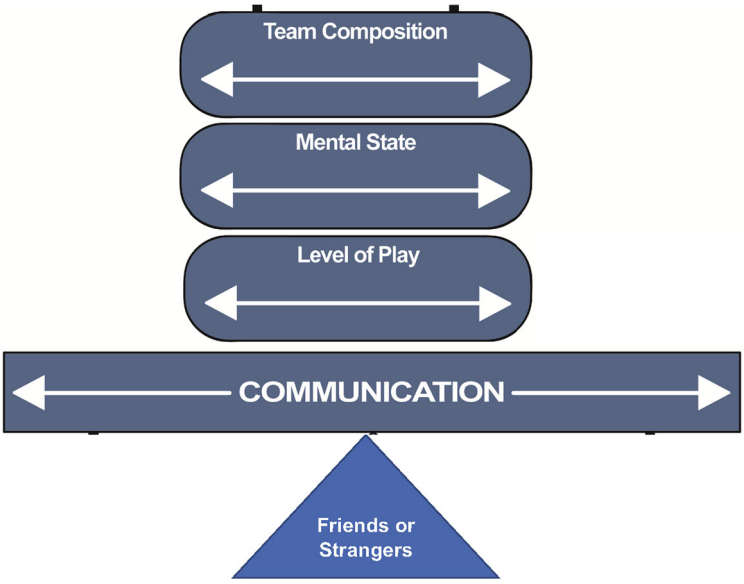

Fig. 2 Conceptual model of the data

3.2 Model Outline

The conceptual model of the data, shown in Fig. 2, reflects the balance of factors required for optimal team play and cohesion in MOBAs. Reaching optimal team play is "all about balance" (P6. 44). The model is therefore represented as a set of scales.

Through the process of open coding, five categories emerged from the data. These are "Friends or Strangers", "Communication", "Level of Play", "Psychological State" and "Team Composition". During axial coding, it became clear that "Friends or Strangers" (denoting how the players know each other) had a direct relationship with all aspects of communication. Through Selective Coding, "Communication" emerged as the core concept. In the figure, this is represented as the bar which other concepts rest upon—as "Communication" becomes more imbalanced, it becomes harder to balance the other categories. It is directly affected by "Friends and Strangers", so is balanced upon that category. A balance in all other categories results in optimal team play and cohesion. When one category becomes imbalanced, it becomes more challenging to reach the overall balance of optimal team play. "Friendliness to Toxicity", "Social to task based", "Quantity" and "Communication Method" are sub-categories of "Communication".

3.3 Core Category: Communication

The core category of "Communication" rests upon "Friends and Strangers", and the remaining concepts are balanced on it; as such, it represents how much

teammates are communicating. If they are communicating too little, it can be detrimental to the team: "if they don't say anything at all then they usually are not a good teammate" (P13. 148–149). Equally, if they communicate too much, it can cause players to die: "I have been in games where I have been typing to someone and I have been killed because of that." (P7. 33–34). This demonstrates that too much or too little communication can be detrimental to the team; too little and players are less able to co-operate ("they will…play their own game" P13. 149), but if there's too much players can get distracted. This negatively impacts their 'Level of Play'. Therefore the quantity of "Communication" can affect team play and group cohesion. Team play is further affected by how teammates communicate.

There are three media for communication while playing MOBAs and these are represented by the sub-category "Communication Method". The most basic form of communication is "pinging" (P8. 90), where a player makes an icon flash on allied players' mini-maps. These are generally used to indicate danger, alert teammates, or express a desire to attack or defend structures. Although regarded as a method of communication, they are sometimes seen as insufficient ("mini-map blinking can only allow for so much communication, talking is important." P5. 76–77). Therefore for optimal team performance, more sophisticated forms of communication should be used in addition to pinging. This is because there are certain commands which are not available via the ping system, for example "If you are trying to tell the team to group up, you have to type, 'group up please.' The ping system is not efficient" (P8. 94–95). This leads to the second "Method of Communication": text chat. This is where players type messages to their allies, or in some cases their opponents. Although the text chat system accommodates for issues that can arise with the ping system, it can cause problems of its own:

> You're having to move your hands off the mouse, which can never be good for you playing the game…very often you see people standing still, and you're like, you just died because you were talking…if you've muted them…that wouldn't happen. (P4. 200–204)

This not only demonstrates the negative aspects of a high quantity of communication, but also the specific drawbacks of text chat. Through too much communication, players can exhibit a lower "Level of Play" (by unnecessarily dying) which can result in lower group cohesion. This occurs because text chat ("distracts you" P4. 200). It also shows that sometimes not communicating at all (i.e. 'muting') is seen as superior to too much communication, even though it has been established that a certain amount of communication enhances team play and cohesion. This further shows why the concept is depicted as a scale. The final communication method discussed by participants is voice chat. This is generally seen as the best form of communication ("Voice talk is superior to text talk" P5. 79), because "on voice communication you can tell them immediately what's happening" (P7. 34–35). The "free flowing, quick, fluid communication" (P4. 45) increases the cohesion of a team by being the fastest and least distracting method of communication. As such, it is clear that optimal team play occurs when voice chat is used because "they may not see a ping" (P7. 112). Despite this, it does have some negative implications: "when someone's on mic, there's…a very thin line

between using it constructively and…flaming people'" (P4. 38–39). This leads to the final sub-category of "Communication", which is "Friendliness to Toxicity".

Although "Communication" is mostly seen as positive to team play ("it works a lot better if you have communication" P12. 117) it can be used negatively. Participants felt that for "all the times where the mics going to help communication, there's going to be two…more times when it's just a vehicle for abusing each other" (P4. 176–177). "Friendliness to Toxicity" refers to the quality of the communication. 'Toxicity' was a term used frequently by the participants, and is defined as the most extreme of unfriendly behaviour including flaming (a hostile interaction aiming to cause controversy), blaming and trolling (purposely playing badly): "Some people are just toxic and enjoy flaming people" P9. 135. Toxic players may try to exhort this behaviour in teammates. A word frequency query was run in NVivo, and every participant mentioned the toxicity of the MOBA environment to some degree. This supports Leung and McBride-Chang's (2013) finding that cyberbullying does exist in online game environments, but contrasts Hughes and Louw's (2013) findings, as players are toxic to both allied and enemy players. Friendly communication is when players talk to each other politely, whilst being constructive rather than rude in criticisms. Thus, "It's a scale of friendliness to toxicity" (P8. 85). Although "Toxicity" can occur in groups of friends, it is rarer than when playing with strangers, showing how the concept of "Communication" is affected by "Friends or Strangers". If a player is being friendly, players are more likely to create a good team composition, support each other, have a good Psychological state and ultimately play better. Toxicity can result in the opposite: "someone sent me rape threats over chat because I was doing badly…I decided to…never help them out again" (P10. 29–31). This is why it is part of the core category; as a part of "Communication".

Toxicity decreases the group cohesion and team play, and similar to excessive communication is generally seen as worse than no communication: "People who are quiet…aren't the best but they aren't the worst because they don't flame" (P12. 190–191). Toxicity can cause a complete halt in communication—"if someone is proper kicking off and flaming I'll probably just mute them" (P9. 26–27). It is also affected by the method of communication they are using, as it is a "lot harder to control your emotions when you can just press the button and speak as opposed to having to type out everything" (P4. 40–41). Therefore, although team play and cohesion increases through communication with voice chat, perhaps it is more ideal for groups to communicate a moderate amount through text chat. This limits deaths due to typing, and then the "situation can't escalate" (P13. 38). This would cause optimal team performance in a group of strangers. Despite this, when a group is made of up friends, "Communication" is quite different. There is a lesser chance of toxicity and players normally use voice chat. Therefore for optimal team performance in a group of friends, voice chat is the best communication method.

3.4 Friends or Strangers

This concept refers to whether the participant is playing the game with 'friends' or 'strangers'. A 'friend' is defined as someone who frequently plays MOBAs with

them. Friends are often people the participant knows in real life (IRL) or friends of people they know IRL, but although unusual, a friend can also be someone met online. Strangers are people randomly allocated to the same team.

When playing with friends, players are more likely to use voice chat ("If I'm playing with friends…I use voice chat." P8. 97–98). When playing with strangers voice chat is very rarely used ("it's really unlikely that you're going to actually have any sort of voice chat" P10. 201–202), or language barriers can occur ("if someone's foreign that'll get on people nerves a lot" P4. 171). This inhibits communication and thus the team's cohesion ("working with strangers you don't know what they do…they would just out of nowhere…change direction" P6. 36–37). Through less communication, the team composition and level of play can also be affected:

> …stack of 5 provides a full experience playing as a team together whereas if you miss…members of the team you get some random players who may not understand you, your style of play, your language and your actions and the reason behind them. (P5. 23–25)

If strangers don't understand the style of play of their teammates, it will be difficult for a team to be cohesive. This will make working together more challenging, causing a decline in "Level of Play". Therefore it could be argued that the lack of understanding due to limited communication stops the group reaching the 'norming' stage of Tuckman's (1965) model; which stops the group reaching the 'performing' stage of optimal team performance. This further demonstrates why "Communication" is the core concept, but also why it is greatly affected by whether friends or strangers are playing. When playing with friends toxicity is less likely to occur and this may occur because there is no anonymity between friends and players are not deindividuated. Thus communication is more friendly and polite. This explains why the concept of "Communication" is balanced upon "Friends or Strangers" in the model; who the participant is playing with affects the communication method, as well as its quantity and friendliness.

However, optimal team performance does not always occur when playing with friends. Primarily, the same negative consequences can occur in response to toxicity: "there are times when my mates especially lose temper, that and just end up making more mistakes and screw-ups which leads to losing the game" (P5. 116–118). In this sense, there is no advantage to being with friends. Secondly, when playing with friends, there are other goals present than just winning the game—"obviously you want to win—but it's more about having fun." (P8. 18–20). This can reduce the productivity of the team in terms of achieving the goal of winning; which does not occur when playing with strangers.

> sometimes you can get a bit trolly with friends and have a bit of fun…if you were to do it to some random person it can be perceived as…you're just being…a douche-bag (P12. 36–39).

When playing with friends, players can 'troll', which is defined as exhibiting a significantly worse Level of Play on purpose. This can be seen as a faulty group process, as it stops the group achieving the intended goal of winning the match. The

relationship between "Friends or Strangers" and "Level of Play" is represented by the black arrow on the model (Fig. 2). This relationship potentially occurs due to players being more concerned with social cohesion (team members getting along and enjoying each other's company) rather than task cohesion (completing the set goal). When players are with people they know, they can "end up messing about and trying to do stupid team combinations" (P9. 15–16). Therefore, although a group of friends generally have good communication and high levels of cohesion, it may become the wrong kind of cohesion. Overall, friends will achieve optimal team performance more easily than strangers; however in some cases they can digress from the task goal.

3.5 Level of Play

'Level of Play' refers to how well a team member is performing relative to their teammates. This is represented as a scale: one side representing someone who plays considerably worse than their teammates, and the other representing someone playing considerably better. Positive team experiences are more likely to occur when all members of the team are considered as skilful as each other. A high "Level of Play" occurs when players are considered to have good knowledge and understanding of the game, which is often a result of experience. It can also be determined by Kill-Death-Assist ratio (kDa), mechanical skill (reaction times, ability to play the game well) or becoming "fed" (having a disproportionately larger amount of XP than other players). If someone is playing considerably better than their teammates, they can get bored and potentially quit ("if my teammate are crap I'll get fed up" P11. 101–102), or their teammates can get angry ("the team thought they had the right to rage at me because they fed and I was doing well" P7. 102–103). This results in a decline of group cohesion. On the opposing side of the scale, if someone is playing considerably worse than their teammates, the team can get angry and blame them: "it's…their fault we're losing because they're feeding the other team" (P11. 105–106). For a cohesive team with good team play, team members need to be of a similar "Level of Play": "when you have people who have quite large skill differences…arguments break out" (P12. 64–66). This could be due to the equalisation phenomenon that typically occurs in other online environments (Dubrovsky et al. 1991). Due to this phenomenon typically occurring online generally (rather than specifically in online games), players may be expecting all members of the team to contribute and be of a similar skill level. When this is not the case, the group cohesion decreases. Alternatively, this could occur due to teammates being more aware of individuals' contributions, so become less cohesive when they feel a teammate is not doing as well comparatively. "Level of Play" is affected by "Communication", as too much or the wrong type can cause players to make more mistakes as their focus is elsewhere.

3.6 Team Composition

MOBAs classify each champion as suitable to play one or many roles. The "Team Composition" refers to which roles are selected by the team in the 'planning phase'

(the first part of a match where players select their role), and the responsibilities of each player. The team composition can be good or bad. A good "Team Composition" is defined by having a variety of roles with at least one player willing to take on the supportive role ("It's all about balance. Supporters, healers and attackers. Equal there." P6. 44), and the players being competent at the role selected ("You stuck me in support…I'm terrible at it" P7. 88–89). Too much of one role or too little of another causes a bad team composition ("you need to pick for your team…if the entire team is AD…it won't be good for the team" P13. 57–59). Ultimately, a good team composition results in group cohesion: "picking your champions…on…how they can work together" (P14. 130–131). A good "Team Composition" is more easily achieved with positive quality and quantity of "Communication" as players can discuss which roles they are going to take on during the game ("without team organization you wouldn't be able to do anything" P12. 113–114). Good team compositions are therefore more often achieved with friends, as they generally have a higher level of communication than strangers. Therefore this concept does not have a direct relationship to "Friends or Strangers" as it is affected through "Communication". Participants felt that a "A good team comp….is very important" (P13. 62–64), which supports Harkins and Jackson's (1985) finding that assigning specific tasks to group members can increase cohesion and task focus. Perhaps this is because it decreases social loafing within the team, as all members have an in-game task.

The notion that a variety of roles is needed for an effective team is supported by Belbin's (1993) model of team types. Belbin argued that successful teams had a balance of team roles and an appropriate leader (Anderson and Sleap 2004). The 'Team Role Balance Hypothesis' assumes that if a team has a variety of roles, it will exhibit a superior performance to teams without this balance. This is demonstrated throughout the data within MOBAs: "you need a…variety of everything" (P11. 127). Moreover, to achieve optimal team performance, players would ideally be in a preferred role: "I never play support…I'm terrible at it" (P7. 88–89). This is also supported by Belbin's (1981) original model, as it was outlined that each individual will perform to their optimal level when in their primary or secondary preferred team role. The successful delegation of team roles could be argued to be within Tuckman's (1965) 'norming' stage of group development.

"Team Composition" has two sub-categories; the first is "Supporting Each Other". As part of "Team Composition", this sub-category is representative of the individual players' actions in the game, rather than the team's choice of champions. This concept is defined as showing a "willingness to support each other" (P5. 61) through actions such as offering advice on items, backing each other up, sharing Gold and XP, giving health potions, and defending each other against potential toxicity. It also includes increasing map awareness. Typically a supporter is responsible for buying 'wards' which enable the team to see enemy movements on the mini-map. As games are often won due to Map Awareness, a good team will share the responsibility of 'warding': "there's this concept that the support needs to buy all the wards…leads to…tension between players" (P10. 59–62). This demonstrates that cohesion is more likely to occur when responsibilities that are "for the good of the team" (P4. 154) are shared between players. This sub-concept

is directly affected by "Communication", as players are more inclined to support teammates who are friendly towards them.

The second sub-category is "Shot-caller". The "Shot-caller" is the player who essentially leads the group, and is a "very fundamental part of the game" (P13. 113). Although not present in every game, a shot-caller helps the team become more cohesive ("until that call, there's always a disconnect" P4. 117). They are often the member who the rest of the team consider as having a high "Level of Play" (often determined through kDa and mechanics) and have demonstrated a thorough knowledge of the game ("It's all skill based" P6. 49). Although a debated opinion, the majority of participants felt the champion role most suited for this responsibility is either the Jungler or Support, as they have the highest map awareness. For a shot-caller to occur, the team has to be communicating and listening to each another ("works a lot better if you have communication" P12. 117). Therefore, this sub-concept is influenced by communication: "It starts with…friendliness" (P11. 56). The shot-caller is not formally selected; it is simply a player who gives orders which are listened to and followed by the team. For a shot-caller to occur there has to be a high level of communication—as such, it is more likely to occur in a group of friends. The shot-caller can lead to a higher level of cohesion: "If you're willing to talk and listen to each other's ideas…can link in with the leader role" (P14. 131–132). This links in with previous literature: Van Vugt (2006) discussed how encouraging group cohesion and cooperation was one of the fundamental functions served by group leaders. This demonstrates that the 'Shot-Caller' in MOBAs can be likened to Lewin et al. (1939) 'Democratic Leadership' style which can result in higher motivation and equality of participation, as team members participate in the decision-making process. This appears to extend into MOBAs. It could be further argued that a group deciding on a leader could be representative of the team reaching the 'norming' stage of Tuckman's (1965) model, as a group hierarchy has been established.

3.7 Psychological State

"Psychological State" refers to whether the player has a positive or negative outlook on the game. This can be determined by emotions, stress, confidence and tiredness: "It depends on…what your mental state is…if I'm tired, you tend to be more negative, you lose imagination" (P4. 181–182). The sum of their cognitive and emotional state affects the player's willingness to be cohesive with the team. Players with a positive "Psychological State" will often try harder, not give up and be open to new creative ways to win ("they tend to get more confident and they actually play better" P9. 86–87); whereas players with a negative "Psychological State" may not try as hard or concentrate ("if you're not confident you're hesitant to do anything…you don't…fight back" P9. 98–101). Some participants felt that the Psychological state of the players was one of the most important factors in determining the task outcome.

> If you give first blood up…and they're like 'Oh my god, you gave first blood up this early, we're definitely going to lose'…and it's like, well we're definitely going to lose now. (P10. 153–155).

Despite this, players' "Psychological State" can be too positive. As such the concept is represented as a scale, as optimal team performance occurs when it is neither too high nor low. Players whose Psychological state is too positive may be too confident and not listen to others: "They won't listen to you, they think they know a lot" (P6. 37–38). They may appear "straight up arrogant" (P8. 85) and "think they are essentially God" (P7. 61–62). This can reduce team cohesion. A player whose Psychological state is too negative may give up, resulting from their own "internal sabotage" (P4. 83). Therefore for optimal team performance, players must have a positive "Psychological State"; but not so much that it can alienate other team members. This leads to higher team cohesion. The balance of this concept is affected by "Communication": if a player speaks in an unfriendly way to a player, they can cause them to get into a negative "Psychological State". On the other hand, if teammates praise another player or speak to them in a positive way, their "Psychological State" can improve.

The notion that the positivity of teammates can affect the group supports previous literature. West et al. (2009) analysed 101 teams, finding team optimism is an important predictor of newly formed teams' cohesion and task outcome. It is clear that this phenomenon can extrapolate to an online gaming environment. The individual's Psychological state can be strongly affected by the team: "a negative outlook just puts everyone down" (P14. 77–78). This could be due to the process of emotional contagion: the transfer of emotional states from person to person, which can occur in many social contexts (Czarna et al. 2015). Totterdell (2000) found this result in cricket teams, demonstrating that it can occur within games. Therefore it could be argued that this phenomenon can occur in online game environments—such as MOBAs. Although it is important for the team overall to have a balanced Psychological state, it is also important for each individual. This is because they can affect the team's Psychological state as a whole and thus the overall team cohesion and performance.

4 Discussion

4.1 Overview

The conceptual model created demonstrates five factors required for a MOBA team to be cohesive and perform at an optimal level. Rather than resulting from the presence or absence of these factors, optimal team performance occurs when each factor is balanced, i.e. not in deficit or excess. For a MOBA team to typically operate at optimal level, they should: be a group of friends communicating in moderation through voice chat in a friendly manner, and they should be at a similar level and be willing to perform different team roles. An excess or deficit of any role will result in team performance decreasing. Teammates should have a positive psychological state, but not so positive that they become overconfident and "think they are…God" (P13. 29). The model produced will be critically linked to existing research and models and the real-world applications outside of MOBAs will be highlighted, such as the implications for occupational psychology regarding

workplace team formation and effectiveness. The method used will be critically evaluated, outlining strengths and limitations of the study. Finally, a predictive model will be proposed and potential areas for future research will include testing predictions based on this model.

4.2 Links Between the Conceptual Model and Previous Research

The conceptual model derived from the data both supports and contradicts previous literature. When the model is balanced, the team is cohesive and functioning at optimal level. This is indicative of reaching the 'performing' stage of Tuckman's (1965) model of small group development. According to Tuckman, to reach the balance of optimal performance the group needs to develop through the stages of 'forming', 'storming' and 'norming'. When players start a typical 45 min MOBA game, they are automatically placed in five-person teams and enter the 'planning phase'. This can be likened to Tuckman's 'forming' stage, where the group is assembled, gets organized, and sets the task behaviour boundaries (Bonebright 2010). These are all accomplished in the 'planning phase' of MOBAs, as players have to choose their champion and which lane to play in. This choice restricts the task behaviour that individuals can undertake, as champions are only suitable for certain roles. For a balanced "Team Composition", players need to pick champions capable of assuming differing team roles. This is more likely to be achieved if a team has good "Communication". Therefore for optimal team performance, the team needs to have a successful 'forming' stage whereby they communicate with each other, leading to a balanced "Team Composition". This shows that to some extent, the model crated is compatible with Tuckman's model. MOBA teams differ from the groups Tuckman observed as the 'forming' stage is restricted to the 'planning phase', which typically lasts up to one minute. The team gets forced into the next stage of group development regardless of their readiness. This contradicts Beltgen's (2010) finding that the stages of group development take longer online; in some contexts, being dictated by online environments can decrease the duration of group development. The groups that Tuckman observed met numerous times (Hare 1967), whereas MOBA teams comprised of strangers only meet in one instance. Therefore although Tuckman's model can be supported to some extent within these results, they also demonstrate its non-generalizable nature. Perhaps modifications are needed to represent groups who do not recurrently meet, or have time restrictions. Such modifications would be useful to the study of professional groups in occupational psychology, as often projects are undertaken where groups are required to reach optimal performance quickly. As Tuckman created the model using therapy groups, there were no time constraints for them to achieve optimal performance. Despite this criticism, the results show that the balance of "Team Composition" and "Communication" are heavily influenced in the first stage of group development.

MOBA teams comprised of friends rather than strangers are more often cohesive and reach optimal performance. As a toxic environment between friends occurs infrequently, a decrease in the group's effectiveness due to intragroup conflict (de Wit et al. 2012) is less likely. The toxic environment that forms could be likened to

Tuckman's 'Storming' stage: where group members become hostile towards one another (Bonebright 2010). This stage can be seen as an imbalance of the core category "Communication"; as a result, when groups do not move past this stage of development, they will not reach optimal performance. Groups of friends rarely have this imbalance or have the 'storming' stage. As such, although the model of group performance produced is applicable to groups of friends and strangers, perhaps Tuckman's model is not. A group of friends undertaking a new task still have to develop as a group, but due to their already developed relationship, hostility is less likely to take place. Therefore Tuckman's model is arguably only applicable to groups of strangers. Groups of strangers within MOBAs are often toxic towards each other. As this rarely occurs within groups of friends, it is unlikely to be a direct result of the MOBA environment. As toxicity occurs in many online environments, it is more plausible that the toxic communications seen in MOBAs are an extension of those seen in other online communication, facilitated by deindividuation and anonymity (Ho and McLeod 2008). These interactions in MOBAs support Leung and McBride-Chang's (2013) finding that cyber-bullying is present in online games. As toxicity is more common through online communication than F2F communication, the regulation of "Communication" is key in online groups. Without balanced "Communication", other factors which result in optimal team performance are less likely to balance. Poor "Communication" is indicative of the 'storming' stage, and without regulating this to ensure progress to the 'norming' stage, teams are less likely to succeed. Fahy (2006) found less negative interaction online than Bales (1950) found offline; which is inconsistent with other online communication findings. This may have occurred due to the involvement of an instructor who reduced anonymity by being able to identify team members. As such, to ensure online groups achieve balanced "Communication" and leave the 'storming' stage, perhaps a supervisor needs to be present. Unfortunately this is not possible in MOBAs, but this finding is applicable to other professional or social groups using online communication. The most successful way to balance communication in MOBAs is for the team to be comprised of friends. This is important as negative communication between strangers can imbalance the "Psychological State".

During intragroup conflict players can decline in Psychological state due to other players' toxicity. If a player has a negative outlook on the game, they often do not remain task-focused or they feel that the goal is not accomplishable. An imbalance in "Psychological State" on an individual basis can affect the whole team through emotional contagion. This phenomenon has been found in offline games such as cricket (Totterdell 2000) and other social contexts (Czarna et al. 2015). Therefore it is important to ensure all team members have a balanced "Psychological State": if an individual has a negative outlook, this could affect the whole team and stop them reaching the 'performing' stage of group development. Equally, a Psychological state which is too positive can result in over-confidence, which can alienate group members, making the group regress to the 'storming' stage. To ensure the group has a balanced Psychological state, the group members should not be toxic towards each other and the goal needs to seem achievable. This is a finding which can be extrapolated to the workplace: team managers need to make sure that they are not

allocating a task which seems infeasible to groups. Alternatively if it is a substantial task, the work load should be split into smaller, more manageable goals. This should stop individuals declining into a negative Psychological state, potentially affecting the entire team. Thus if all team members have a balanced Psychological state, the overall team should be able to operate at optimal level.

In addition to having a similar Psychological state, team members should ideally have a similar "Level of Play". If individuals are considered to be playing significantly better or worse than teammates, intragroup conflict can arise. This negative "Communication" can then imbalance other factors. Extrapolating this to a professional situation, if a group needs to perform at optimal level, they need to have similar capabilities. Replicating this outside of the game environment is problematic: if every person in the group has taken on a different role, it will be difficult to compare their capabilities in a reliable way. Generally, in online games every success and failure a player has is digitally recorded. As such, there is a feasible way to find their "Level of Play". Outside of gaming, this is not the case. Therefore although this finding can be extrapolated to other group scenarios, a process of balancing the capabilities of team members cannot be feasibly implemented. Conversely, this does have implications for internships or new group members. One of the prevailing methods of education is Vygotsky's (1978) approach, which theorises that learners can achieve more under the guidance of an expert. It is clear from current findings that although new group members may learn more when in a group of experts, such learning is more appropriate on a one-to-one basis, rather than immersing a learner into the group. If immersed, not only will the team's performance suffer, but the learner's presence may cause some intragroup conflict, which can result in a decline of their Psychological state. Thus for optimal team performance, group members should have similar capabilities, or "Level of Play" in MOBAs.

Although a group of friends typically becomes the most optimal group, there are instances where the group can digress to a lower "Level of Play" and start trolling. Although this can by definition only occur online, the action of sabotaging a task can occur in any environment. This arguably occurs in Tuckman's stage of 'norming', where the group is cohesive and roles and norms have been established (Bonebright 2010). A group of friends can sometimes become more concerned with social cohesion than task cohesion, with can lead to trolling, or task disruption. This demonstrates that cohesion and optimal team performance are not mutually exclusive and one can occur without the other. The model created demonstrates that although a group of friends is the most likely to achieve optimal team performance, this is not always the case. This has further implications for groups of professionals; a group of friends will achieve optimal performance quicker, but it is likely they will need supervision to ensure they remain task-focused. Conversely, this model has not shown under what circumstances this focus shift occurs: the furthest justification seen in the data is to "have a bit of fun" (P12, 36). Therefore this could be due to boredom or an imbalance in the team's "Psychological State". As this did not reoccur within the data, this may not be the only causal factor. Therefore future research should attempt to find why this group focus shift occurs and how to reduce the likelihood of it happening. This will hopefully enable groups in the workplace to

reach optimal team performance by forming teams of friends, without the danger of them going off-task. If this outcome were avoided, the team would leave Tuckman's stage of 'norming' and enter the ideal 'performing' stage.

When in a group with friends, players are more willing "to concede playing a role (they) don't really want to play" (P4, 18–19). The distribution of roles is represented by the "Team Composition" category and is indicative of Tuckman's 'norming' stage. Although the role of each player is heavily influenced in the 'planning phase' (likened to Tuckman's 'forming' stage), their in-game behaviour dictates the role they have assumed. For example, a particular champion may be capable of playing a support role and a jungle role—if a player buys items which benefit the whole team, it is clear they have elected to play a support role. Therefore in order to reach a balanced "Team Composition", the players need to have balanced "Communication" which continues outside the 'forming' stage so it is clear who is undertaking which role. The fact that players did not always play the role which the team needed contradicts Tajfel and Turner's (1979) Social Identity Theory. Rather than assimilating to the role the team needs in all circumstances, this mainly occurred between groups of friends. When in a team of strangers, players mostly opted to play their role of preference. This could be due to an imbalance in "Communication": in MOBAs players typically only use voice chat when playing with friends. Without communication, players may not be able to adapt to the identity the group needs as it may be unclear. Moreover, players stated they were more likely to be cooperative with the group if they were communicating in a friendly manner—as such, toxic groups or those that are not communicating are less likely to achieve a balanced "Team Composition", as players may not shift from their personal identity to a social identity; in line with the findings of Taylor and Taylor (2009).

4.3 Further Research Using a Predictive Model

To help direct further research we developed a predictive model (see Fig. 3) to highlight the potential relationships between the five factors identified in this research. The model highlights the link between level of acquaintance on various aspects relating to communication quality and quantity. The subsequent effects of such communication on level of play, psychological state and team composition result in factors that are either supportive on unsupportive of optimal team play. Further research is planned by the authors to test the effect of manipulating the quality of communication to identify how it relates to team performance through the effects on level of play, psychological state and team composition. However, as can be seen by the model many other relationships could be predicted and tested by other researchers.

4.4 Application of Research

Unlike previous research studying group processes in online games such as WoW, MOBAs are an environment where effective team play is crucial to success: as such,

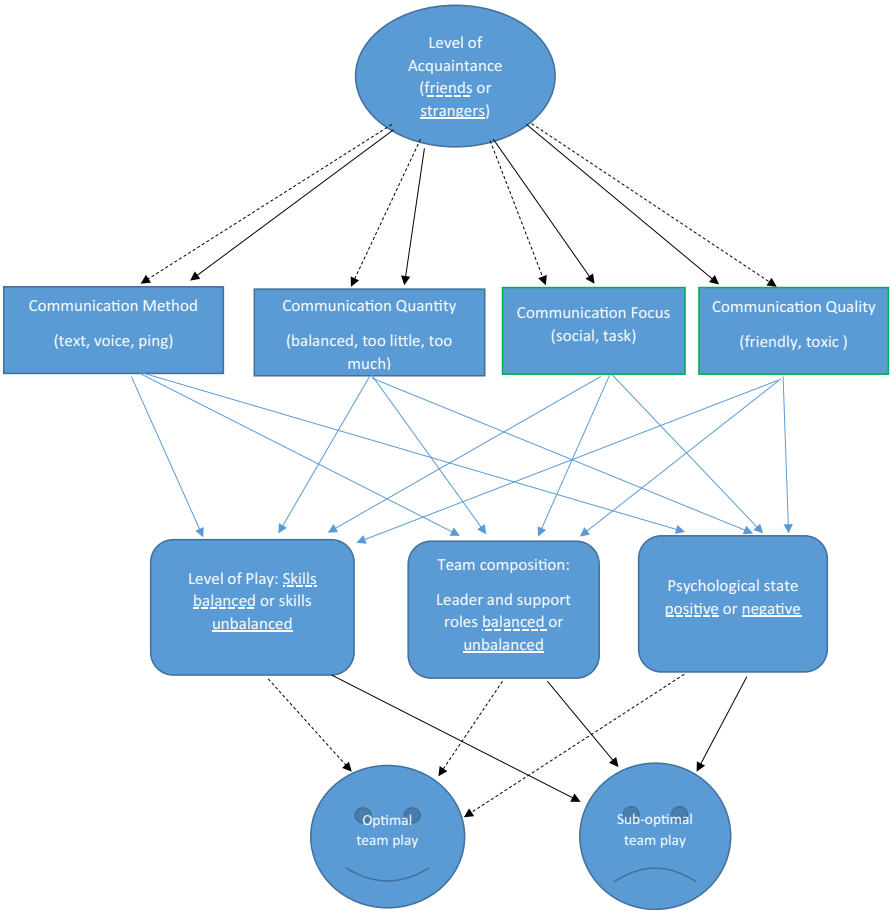

Fig. 3 Predictive model highlighting potential relationships between communication and team composition, level of play and psychological state to predict optimal and sub-optimal team play

this article addresses a gap in the literature. Moreover, achieving effective team performance and positive group cohesion has real-world applications for online communication in the workplace, as well as in online games. The research results are applicable to social and occupational psychology, whilst highlighting the potential for this online game genre for studying group processes. Two scenarios were identified where supervision may be needed to improve group performance: ensuring a group of friends remain task-focused; and limiting any potential unfriendly or toxic communication. The findings also suggested that if a group needs to be operating at optimal level, the individuals need to be of similar capabilities: contrary to Belbin' work Although links were made to Tuckman's model, it was clear that for groups of existing friends this model was less relevant.

4.5 Summary

The use of grounded theory as a methodology for this study allowed a systematic approach to provide rich data and the constant comparative analysis provided rigor for the model produced, keeping the results grounded in the participants' subjective experiences. While recognising the possibility of researcher familiarity bias, the analysis was also aided due to understanding of terminology and environment familiarity. Memos were kept throughout the analysis process to ensure clarity over how the research process may have been affected. To further ensure the validity of the model produced, a similar analysis should be undertaken by a researcher unfamiliar with MOBAs. This research created a model of team performance depicting how to achieve optimal team performance and group cohesion in MOBAs. While qualitative methods are excellent in model development in novel areas, to take forward this work we recommend adopting an empirical perspective using quantitative methods. To assist the next stage of research a predictive model was developed and as highlighted in Sect. 4.2 there are many potential areas of further study. Using the predictive model we will be testing the effect of varying communication to identify how it relates to team performance through effects on the level of play, psychological state and team composition.

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