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Altruism or egoism – how do game features motivate cooperation? An investigation into user we-intention and I-intention

Marc Riar[a], Benedikt Morschheuser[b], Rüdiger Zarnekow[a] and Juho Hamari[c]

[a]Chair of Information and Communication Management, Technical University of Berlin, Berlin, Germany; [b]Information Systems (Gamification), Friedrich-Alexander-Universität Erlangen-Nürnberg, Nurmenberg, Germany; [c]Faculty of Information Technology and Communication Sciences, Tampere University, Tampere, Finland

ABSTRACT

Achieving cooperation between individuals is challenging and often driven by self-beneficial motives. On the other hand, people also seem capable of subordinating their personal interests and of engaging in cooperation for motives other than their own, i.e. out of altruistic impulses. One context in which both motivational facets can be observed is multiplayer online games. However, there is a lack of knowledge about how cooperation based on altruism and egoism develops in games, which also prevents us from transferring this knowledge as a form of gamification. In this study, we explore which game features are accountable for altruistic and egoistic sentiment, and how these distinctive demeanours induce cooperation in games, with the intent to also derive implications for gamification. We employ we-intention and I-intention theory and conduct a survey among players of the game Ingress ($N = 206$). Our findings imply that (1) cooperative game design can give rise to within-group altruism in form of enjoyment in helping others and cooperative goals, (2) altruism can lead to the formation of we-intentions, and (3) individualistic game features invoke I-intentions and self-centered motivations in games in the form of recognition-seeking. Theoretical and practical implications are provided for cooperative game and gamification design.

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Cooperation; collaboration; gamification; augmented reality game; we-Intention; altruism

1. Introduction

Altruism and egoism are two distinct phenomena that can lead to highly contrasting demeanours. While altruism is often associated with giving rise to desirable outcomes such as donations, charitable work, knowledge sharing, mutual support, and other beneficial behaviours (Gleasure and Feller 2016; Kollock 1999; Wasko and Faraj 2000) for sincere prosocial reasons, egoism is usually seen as a counterpart that involves intent out of self-centeredness (Batson and Shaw 1991). It is all the more interesting that these inherently different motivational concepts can also lead to the same prosocial behavioural outcomes, namely helping and cooperation (Batson 1990; Batson and Shaw 1991; Fehr and Fischbacher 2003). Prosocial behaviours are crucial for functioning societies as well as organisations and it is therefore not surprising that questions concerning the role of altruism and egoism in helping and cooperation have resulted in intriguing discussions within scientific literature (Batson 1990; Batson and Powell 2003; Batson and Shaw 1991; Cialdini 1991; Khalil, 2004; Lehmann and Keller 2006). While altruistic motivated cooperative behaviours are said to emerge for sincere and intrinsic motivations (e.g. because people enjoy it), cooperation based on egoism is understood to occur due to an expected self-benefit (Batson 1990; Batson and Shaw 1991; Kollock 1999; Wasko and Faraj 2000). One context in which both altruistic and egoistic motives can take shape and ultimately result in cooperation is multiplayer online games. In recent years, cooperative games (e.g. *Minecraft*, *Ingress*, *Portal 2*, *Harry Potter: Wizards Unite*) have been on the rise and while achieving cooperation has been a challenging task, for example, in organisational contexts, it seems that cooperative interaction evolves rather naturally in games. As a result, there has been an increased interest in explaining how games give rise to cooperation and how mechanisms known from games can be applied as a form of gamification in cooperative settings (Morschheuser, Maedche, and Walter 2017b; Riar 2020; Suh and Wagner 2017). Gamification refers to affording activities, services, or systems with gameful

CONTACT Juho Hamari juho.hamari@tuni.fi Faculty of Information Technology and Communication Sciences, Tampere University, Kanslerinrinne 1, Tampere 33100, Finland

experiences to motivate user engagement and positive behavioural outcomes (Hamari 2019). While gamification is becoming increasingly relevant in different settings, such as in creative ideation (Nivedhitha and Manzoor 2020), innovation communities (Morschheuser, Maedche, and Walter 2017b), pedagogical settings (Martínez-Cerdá, Torrent-Sellens, and González-González 2018; Papadakis et al. 2020; Papadakis 2021; Xezonaki 2022; Zourmpakis, Papadakis, and Kalogiannakis 2022), knowledge sharing systems (van Toorn, Kirshner, and Gabb 2020) and crowdsourcing systems (Feng et al. 2018; Morschheuser et al. 2017a; Weber, Riar, and Morschheuser 2023; Yang, Ye, and Feng 2021), it is noteworthy that literature has mostly centered around explaining how gamification can invoke individual or competitive motivations (e.g. Santhanam, Liu, and Shen 2016) and that less focus has been devoted to exploring prosocial and collectivistic motivational potentials of gamification (Koivisto and Hamari 2019; Morschheuser et al. 2017c). This raises the question of how gamification design features should be utilised to give rise to cooperation (Liu, Santhanam, and Webster 2017; Riar et al. 2022). Game research, on the other hand, has already produced some paramount studies that analyzed the effects of prosocial game content on cognition, affect (e.g. Gentile et al. 2009; Greitemeyer and Mügge 2014), and cooperative behaviour (Zheng et al. 2021). Games have been argued to evoke interdependence (Liao et al. 2020b), communication, and connectedness (Emmerich 2020). Cooperative games, in particular, have been found to be positively associated with social behaviour, willingness to help, and other prosocial outcomes (Greitemeyer 2022).

However, despite growing interest in the potentials of games and how we can harness these potentials outside of games, little research has inquired how game features can give rise to cooperation based on altruistic and egoistic sentiment and how we can apply this knowledge as a form of gamification. One theory that has enjoyed growing popularity for explaining collective action in online communities and that has been recognised as a promising conceptualisation for getting to the root of the actual underlying intentions for cooperation, is we-intention theory (Bagozzi 2000; Bagozzi and Dholakia 2002; Bagozzi and Lee 2002; Tsai and Bagozzi 2014; Tuomela 1995, 2006; Tuomela and Miller 1988). Whereas the more traditional individual intentions (I-intentions) originate from personal goals and a sense of performing actions individually, we-intentions involve shared goals and a sense of performing actions collectively (Tuomela 1995, 2006; Tuomela and Miller 1988). Prior literature offers that altruism may play a fundamental part in the emergence of we-intentions (Bagozzi 2000; Tuomela 1995), however, there is a lack of empirical support for this theorisation. A compelling question that arises from the suggestion that altruism may affect we-intentions is if egoism as a counterpart may play a role in evoking I-intentions. Since gamification is gaining ground as a phenomenon for organisations to achieve economic benefits and since games have shifted from being a mere medium for entertainment to being more and more used in settings of productivity (Vesa et al. 2017), it becomes increasingly relevant to better understand which and how features of games give rise to beneficial motivational and behavioural outcomes such as altruism and cooperation based on we-intentions and which features account for egoism and I-intentions.

The purpose of this study is, therefore, to empirically investigate which features in games are at the helm of invoking egoism and I-intentions and which features are accountable for giving rise to altruistic sentiment in groups and we-intentions. To answer this question, we conducted a questionnaire with users of the augmented reality game *Ingress* ($N = 206$), which supports both individual and cooperative interaction. In addition to contributing to a better understanding of how altruism and egoism emerge and what role these different motivational concepts play for cooperation in games, this study points toward crucial design implications for achieving cooperation by affording systems with gamification.

2. Theoretical background

2.1. Cooperation, I-intention and We-intention

Developing theories of cooperation has been an aspiration for scholars of different domains, including biology (Lehmann and Keller 2006), philosophy (Tuomela 1995, 2006) and social psychology (Johnson 2003; Johnson and Johnson 1996; Tajfel 1982). Cooperation is often described as involving two or more individuals who work together to achieve common goals (Johnson and Johnson 1996). Researchers formerly sought to unravel different modes of intentions when operationalising cooperation, which yielded in the concepts of I-intention and we-intention (Bagozzi and Lee 2002; Tuomela 2006; Tuomela and Miller 1988). I-Intentions refer to an individual's personal intention to perform actions solely and for individual reasons (Bagozzi and Lee 2002; Tuomela and Miller 1988). While this I-mode is less concerned with group aspects but rather involves personal goals, the we-mode involves a sort of group consciousness (Tuomela and Miller 1988). Individuals with we-intentions perceive themselves as members of a group

with shared goals and understand that there is a mutual agreement and a joint commitment to achieve these shared goals (Tuomela 1995, 2006; Tuomela and Miller 1988). From the perspective of two individuals, the we-mode can be expressed as 'We will perform X together' (Tuomela 2006, 36), whereas the I-mode only involves an individual intention that can be expressed as 'I intend to do X' (Bagozzi and Lee 2002). It is important to note that an individual with I-intentions may still engage in cooperative activity, however, the motivation for cooperation is based on personal goals and individualistic reasons (Bagozzi and Lee 2002; Tuomela and Miller 1988) and may thus be driven by egoistic sentiment.

Common theories to explain individual-level intentions are, for example, the theories of reasoned action and planned behaviour (Ajzen 1991; Fishbein and Ajzen 1975) or the technology acceptance model (Davis, Bagozzi, and Warshaw 1989), which are widely employed in the realm of information systems literature. In contrast to these theories stands the we-mode which includes group dynamics and which has become a promising concept for examining collective action in virtual communities (Bagozzi and Dholakia 2002, 2006; Dholakia, Bagozzi, and Pearo 2004). Since the inception of we-intention theory, scholars have become more sensitive with respect to differentiating between the we-mode and I-mode depending on the context and circumstance of the analyzed phenomenon. Prominent examples of contexts in which scholars have deemed it more apt to draw on we-intention theory include investigations into participation behaviour in social networking (Chen et al. 2020; Oliveira and Huertas 2015; Shen et al. 2021), participation in open source software projects and virtual communities (Bagozzi and Dholakia 2006; Dholakia, Bagozzi, and Pearo 2004; Tsai and Bagozzi 2014) as well as crowdsourcing (Shen et al. 2009; Shen, Lee, and Cheung 2014). Table 1 provides an overview of exemplary studies and contexts in which we-intentions have formerly been investigated in the information systems literature.

Social outcomes such as group norms (Cheung, Chiu, and Lee 2011; Dholakia, Bagozzi, and Pearo 2004; Oliveira and Huertas 2015; Tsai and Bagozzi 2014), joint commitment (Shen et al. 2009) and social identity (Bagozzi and Dholakia 2002, 2006; Dholakia, Bagozzi, and Pearo 2004; Oliveira and Huertas 2015) have previously been found to be important antecedents of we-intention in cooperative settings. In addition to these empirically investigated antecedents, cooperation theory states that altruistic sentiment in groups plays a relevant role for the formation of we-intentions (Bagozzi 2000), however, empirical evidence for this suggestion remains modest. Equally intriguing is the question of whether egoism, on the other hand, is responsible for the formation of I-intentions. It also remains unclear, which features in a system are responsible for invoking egoism and I-intentions and which features account for the formation of altruism and we-intentions. In the next section, we take a closer look at literature that conceptualises altruism and egoism.

Table 1. Exemplary studies in which we-intentions have been examined.

Source	Publication venue	Context
Bagozzi and Dholakia (2006)	Management Science	Open Source Software Communities
Bagozzi and Dholakia (2002)	Journal of Interactive Marketing	Virtual communities
Bélanger and James (2020)	Information Systems Research (ISR)	Co-owned (group) information privacy management
Chen et al. (2020)	Journal of the Association for Information Systems (JAIS)	Social networking
Dholakia, Bagozzi, and Pearo (2004)	International Journal of Research in Marketing	Virtual communities
Oliveira and Huertas (2015)	Computers in Human Behaviour	Social networking
Shen et al. (2011)	Information Systems Frontiers	Collaboration via instant messaging
Shen, Lee, and Cheung (2014)	Computers in Human Behaviour	Crowdsourcing
Shen et al. (2021)	Information & Management	Social networking
Tsai and Bagozzi (2014)	MIS Quarterly (MISQ)	Virtual communities

2.2. Underlying goal structures of altruism and egoism

Altruism, in its purest form, can be defined as 'a motivational state with the ultimate goal of increasing another's welfare' (Batson and Shaw 1991, 108). Altruistic motivated behaviours are a widely observed phenomenon in virtual space and online communities. People seem capable of subordinating their own interests and are often observed to opt for prosocial action over a purely selfish demeanour (Bapna et al. 2014). They answer questions of strangers in forums, share knowledge with each other (Wasko and Faraj 2005), provide open source software solutions (Bagozzi and Dholakia 2006) and even contribute to online fundraising initiatives (Gleasure and Feller 2016).

Theories of altruism have previously been categorised into rationalistic and normative perspectives (Khalil, 2004). The rationalistic view is mainly concerned with environmental incentives to explain altruistic behaviour while the normative view draws on 'inner or external norms or structures of the mind, culture, society, psyche, and so on' (Khalil, 2004, 99). One particular behaviour that has been strongly connected

with altruism is helping behaviour and it is argued that when people of a group help each other, it can turn into a form of cooperation (Lehmann and Keller 2006; Tuomela 2006). Pioneers in the field stress that seemingly altruistic behaviour, such as helping and cooperation should be viewed as a multi-faceted phenomenon, as the underlying goals of individuals who engage in such behaviours can differ. Batson and Shaw (1991) suggest that helping behaviour can be explained based on an altruistic or egoistic account, depending on the ultimate goal that the helper seeks to achieve. According to the authors, if an individual helps another person with the ultimate goal being a personal benefit (i.e. increasing one's own welfare), then the helping behaviour occurred out of self-interest and the resulting increase of someone else's welfare is merely an unintended consequence or instrumental goal. Examples of cooperating on an egoistic account could be to gain recognition or when a person expects a future benefit in return (Trivers 1971; Wasko and Faraj 2005). Hence, in this circumstance, cooperation takes place based on individualistic (I-)intention. On the other hand, if an individual enjoys helping others and provides help with the ultimate goal not being strictly a self-benefit but to achieve a benefit for someone else (i.e. increasing another's welfare), then the helping behaviour occurred on an altruistic account (Batson 1990; Batson and Shaw 1991). It should be noted that altruism in its most authentic form, which involves making the ultimate sacrifice for others without any self-rewarding intent, is a highly controversial matter in the literature (e.g. Batson and Shaw 1991; Cialdini 1991). In the present study, we adopt a more subtle notion of altruism, namely that of 'within-group altruism' (Bagozzi 2000, 392), which has been brought up in the context of we-intention theory and which can be defined as the readiness and shared commitment of individuals to provide help and mutual support to group members. In other words, individuals that are subject to within-group altruistic sentiment are capable of acting not only on behalf of their own interests and personal goals but also to benefit the collective welfare of the group and on behalf of achieving cooperative goals. Therefore, in this circumstance, cooperation takes place based on collective (we-)intentions.

Based on the rationale by Bagozzi (2000) as well as the definition outlined above by Batson and Shaw (1991), we conceptualise (within-group) altruism as a perceived enjoyment in helping others and a motivational state with the ultimate (cooperative) goal of increasing the group's (or any particular group member's) welfare. As a counterpart, we define egoism as a motivational state with the ultimate (independent) goal of increasing one's own welfare, where the attainment of group goals is a consequence and merely instrumental for achieving some self-benefit. Table 2 highlights this conceptualisation of egoism and within-group altruism based on previous work by Bagozzi (2000), Batson (1990), and Batson and Shaw (1991).

Table 2. Goal structure of within-group altruism and egoism.

Motivation	Goal structure	Explanation
Within-group altruism	*Cooperative goals* (increasing the group's welfare)	An individual who *enjoys helping others* and engages in joint actions to accomplish *cooperative goals* (i.e. to increase the collective welfare of the group or that of a particular group member)
Egoism	*Independent goals* (increasing own welfare)	An individual who is primarily concerned with achieving *independent goals* and engages in cooperative actions solely for gaining personal benefits (e.g. *recognition*)

2.3. Altruism and egoism in games

One particular context in which both egoistic and altruistic behaviour can be observed is multiplayer online games. In recent years, multiplayer online games such as *Ingress*, *PokémonGo* and *Harry Potter: Wizards Unite* gained immense popularity, entertaining a large number of people (Dunham et al. 2021; Hamari et al. 2019; Laato et al. 2020). However, games go beyond mere entertainment. They are increasingly used as systems with a functional intent (Hamari and Keronen 2017; Ketter et al. 2016; Liu, Li, and Santhanam 2013) and have even become a focal point for prosocial behaviour (Cole and Griffiths 2007; Gentile et al. 2009; Greitemeyer and Osswald 2011). A better understanding with regards to how altruistic sentiment and an underlying cooperative goal structure may evolve in games is therefore not only important for game research, but also for practitioners who seek to gain insights into design characteristics that may support prosocial behaviour in non-game settings, such as in crowdsourcing, computer supported collaborative work (CSCW) or learning (CSCL) environments.

Prosocial behaviour can be defined as such behaviours that aim at benefiting or helping others and it is therefore closely related with cooperation and altruism (Batson and Powell 2003; Gentile et al. 2009; Wang and Wang 2008). In the scientific literature, the majority of studies investigating behavioural outcomes of games have focused on violent games and negative outcomes. In a meta-analytical review of literature about the effects of games on behaviour, Anderson

and Bushman (2001) found that violent games may at least temporarily decrease prosocial behaviour. However, games also have the ability to foster social competence (Hendrix et al. 2009). Especially, playing multiplayer online games may be socially rewarding and meaningful in many ways (Laato et al. 2021b). Social interaction has been argued to be one of the central reasons for playing games (Cheah, Shimul, and Phau 2022; Yee 2006). Social play habits can foster collective engagement (Nivedhitha 2022) and intentions to continue playing collectively (Li and Suh 2021). Players can experience a sense of cohesion (Keith et al. 2018), empathy (Shin 2021), well-being (Laato, Islam, and Laine 2021a), they may form life-long friendships (Cole and Griffiths 2007), receive assistance and favours without the obligation to return the favour, or experience other gestures of goodwill (Nardi and Harris 2006). Altruistically aspired cooperative play, such as providing help for other gamers in need or defending other gamers that are under attack, has been found to be positively associated with satisfying needs for relatedness (Teng et al. 2022). Altruistic sentiment in games has also been found to be positively related with team or community identification (Laato et al. 2022), interdependence and network convergence (Teng 2015). These examples all highlight why inter-team competition, which involves inner-group cooperation, is often more preferable for players than pure competition (Morschheuser, Hamari, and Maedche 2019). In addition, it has been suggested that prosocial patterns in video games can have positive effects on prosocial behaviours even outside of games after playing (Gentile et al. 2009; Greitemeyer and Osswald 2011). However, as our search of the scientific game-based literature reveals, research committed to investigating the roles of altruism, egoism, and their underlying goal structures for invoking cooperation in games, has so far remained unassuming, which prevents us from transferring this knowledge to gamification approaches. Therefore, it seems an exciting and necessary venture to explore how altruism and egoism as well as their underlying cooperative or independent goal structures evolve in a gaming context. More importantly, with the rise of multiplayer online games as well as the fact that games and gamification have become more and more relevant in organisational contexts (Liu, Li, and Santhanam 2013; Nah et al. 2019; Riar, Hamari, and Zarnekow 2021; Suh et al. 2017; Suh and Wagner 2017; Vesa et al. 2017), answering the question how game features relate to altruism or egoism and how these motivational distinct concepts ultimately support cooperation, holds important insights for both theory and practice beyond games.

Next, we hypothesise the expected relationships between different game features, within-group altruism and egoism as well as the different intention modes (i.e. we-intention and I-intention). In line with the conceptualisation presented above in Table 2, which is based on Batson (1990) and Batson and Shaw (1991), we operationalised within-group altruism as *enjoyment in helping others* and *cooperative goals*, and egoism as *recognition*-seeking and *independent goals*. The research model and hypotheses are depicted in Figure 1.

2.4. Game features

Previous research offers that altruistic motives can emerge through cooperative gameplay and the exposure of prosocial game patterns (Dolgov et al. 2014; Greitemeyer and Mügge 2014; Nakajima and Lehdonvirta 2013). By analyzing a number of cooperative games, El-Nasr et al. (2010) identified a set of game patterns that promote cooperative play. Among their results are patterns such as shared goals and specific rules that facilitate cooperation as well as relationships of dependence, where skills of specific player roles complement each other. Moreover, Ewoldsen et al. (2012) suggest that team features are important to cultivate perceptions of a mutual membership in a group and for inducing helping behaviour. Other examples of features that have been argued to support altruistic motivation include virtual gift giving (Nakajima and Lehdonvirta 2013) or karma points (i.e. points that can be shared with others and that do not provide any benefit when kept) (Zichermann and Cunningham 2011). When considering the above-mentioned socially rewarding game features, it comes to no surprise that games and gamification are frequently associated with giving rise to intrinsically fulfilling outcomes (Koivisto and Hamari 2019; Malone 1981; Xi and Hamari 2019). Self-determination theory proposes that relatedness is a relevant precondition for intrinsic need satisfaction (Deci and Ryan 2002) and engaging with cooperative game features and thereby contributing to the welfare of another player or a group may lead to feelings of enjoyment, which is, according to altruism theory, a natural consequence of helping (Batson and Shaw 1991). At the same time, game features with cooperative or prosocial character may also be relevant for seeking status and approval from others (Goode et al. 2014). Helping and contributing to the welfare of others or a group, which in games are actions enabled via cooperative types of features, may therefore also comprise recognition effects. Following these suggestions, we expect that cooperative game features can invoke both, the altruistic sensation of enjoyment to help others

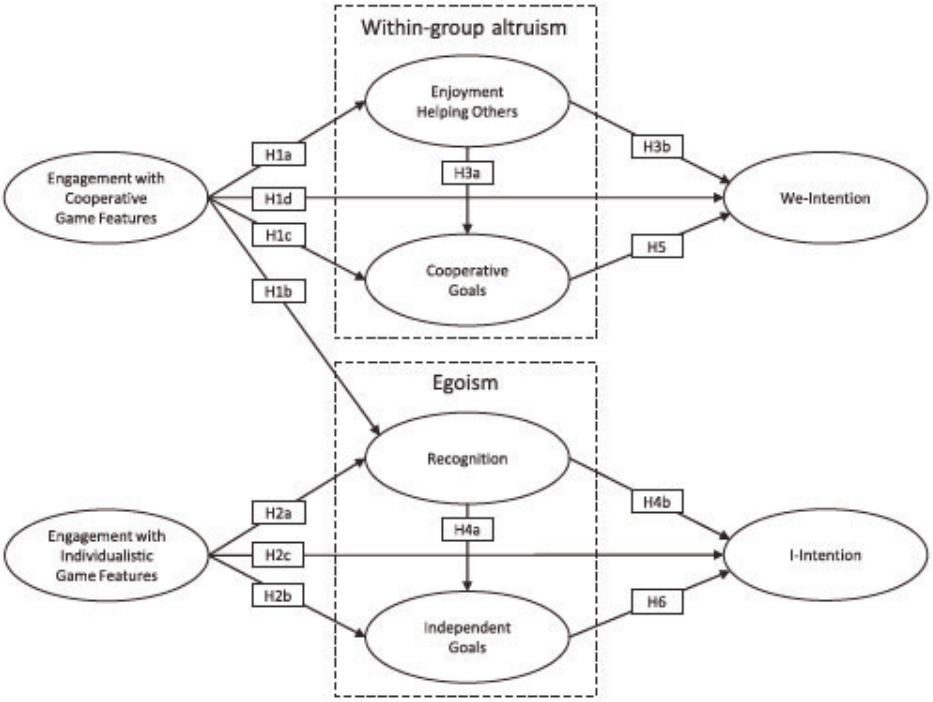

Figure 1. Research model.

but also the more self-centered motive to earn recognition. Accordingly, *we hypothesise that there will be a positive relationship between the engagement with cooperative game features and enjoyment in helping others as well as recognition in games.*

H1a. Engagement with cooperative game features positively relates to enjoyment in helping others in games.

H1b. Engagement with cooperative game features positively relates to recognition in games.

A common purpose, interdependent roles, mutual challenges, shared tasks, shared resources and shared information as well as mutual benefits and collective rewards, to name a few, are all considered important factors for invoking cooperative goals (Tjosvold 1998), all of which are aspects that can be addressed by cooperative game design (El-Nasr et al. 2010; Morschheuser, Maedche, and Walter 2017b; Rigby and Ryan 2011; Yee 2006). Substantial theoretical support for this notion is provided by social interdependence theory (Johnson 2003; Johnson and Johnson 2005). On the basis of social interdependence theory, game features have previously been arranged into individualistic, competitive and cooperative categories according to the goal structures that these different types of features invoke (Morschheuser, Maedche, and Walter 2017b). Engaging with cooperative features expresses goal congruence between individuals or a group (Morschheuser et al. 2017c) and thus, we hypothesise that *engagement with cooperative game features will be positively related with cooperative goals.* In addition, *we postulate that the engagement with cooperative game features directly influences we-intentions* as such features enable and facilitate intentions to cooperate (Morschheuser et al. 2017c). This assumption is in line with previous studies that suggest that games may be designed in a way so that players depend on each other, encouraging them to team up in order to work together (Cole and Griffiths 2007) and that cooperative game design can result in increased helping behaviour and cooperation (Dolgov et al. 2014; Greitemeyer and Mügge 2014; Morschheuser et al. 2017c; Rocha, Mascarenhas, and Prada 2008). Theories on technology-mediated cooperation (Johnson and Johnson 1996) support these assertions by postulating that system features with socialising tenets induce cooperation. Accordingly, we propose the following hypotheses:

H1c. Engagement with cooperative game features positively relates to cooperative goals in games.

H1d. Engagement with cooperative game features positively relates to we-intentions in games.

Striving for recognition is a core motivational driver and an important source for fun in games (Deterding 2015). In the light of self-determination theory, humans long for competence and acceptance, which are needs that are said to be relevant for producing intrinsic motivation (Deci and Ryan 2002; Ryan and Deci

2000). Games and gamification services commonly address competence needs with features such as challenges, point-systems, badges and levels, usually with the prospect of gaining recognition for these achievements and to signal competence to others (Hamari and Koivisto 2013; Richter, Raban, and Rafaeli 2015; Yee 2006; Zhang 2008). Thus, we *hypothesise that the engagement with and a perceived importance of individualistic game features is positively related with seeking recognition*. Morschheuser, Maedche, and Walter (2017b) suggest based on social interdependence theory (Johnson and Johnson 2005) that individualistic game features engage individuals on a personal level without influencing the goals and actions of other players, such as achieving the next level or collecting badges. Thus, such features commonly invoke goal structures that are independent, since there is no interdependence involved with others (Liu, Li, and Santhanam 2013; Morschheuser, Maedche, and Walter 2017b). Based on these theoretical suggestions, *we expect that the engagement with individualistic game features will be positively related to independent goals*. In addition, there is ample evidence that different foci in game design (e.g. individualistic, cooperative and competitive), can lead to different behavioural outcomes (Siu, Zook, and Riedl 2014; Vegt et al. 2015). According to the theoretical suggestions in terms of the emergence of the distinct intention modes (I-intention and we-intention), individuals with I-intentions perform actions independently from the group (Bagozzi and Lee 2002; Tuomela and Miller 1988). Since group aspects are neglected and instead individual interaction is in focus when engaging with individualistic game features, we propose that in this independent circumstance, I-intentions will be invoked rather than we-intentions. Based on these arguments, we derive the following hypotheses:

H2a. Engagement with individualistic game features positively relates to recognition in games.

H2b. Engagement with individualistic game features positively relates to independent goals in games.

H2c. Engagement with individualistic game features positively relates to I-intention in games.

2.5. Enjoyment in helping others

Games and gamification can be a powerful means to increase intrinsic motivation (Hamari and Koivisto 2015a; Malone 1981). Intrinsic motivation is regarded as engaging in an activity for its own sake because it is fun, interesting or satisfying rather than enforced by external rewards (Deci and Ryan 2002; Ryan and Deci 2000). According to self-determination theory, people may be intrinsically motivated by a deeply-rooted enjoyment for performing certain behaviours (Ryan and Deci 2000) and altruistic action (e.g. helping others) has formerly been suggested to be such an intrinsically fulfilling behaviour (Wasko and Faraj 2005). In the context of online games, prior research indicates that altruistically motivated individuals who enjoy helping others have needs for affiliation and interdependence (Huang et al. 2018; Teng 2015). Thus, they are likely to develop cooperative goal structures. Moreover, prior studies suggest that enjoyment in helping others positively affects collective actions (Kankanhalli, Tan, and Wei 2005; Lin 2007; Wasko and Faraj 2000; Wasko and Faraj 2005) and that such behaviours can best be explained by relying on the concept of collective intentions (i.e. we-intention theory) (Bagozzi and Dholakia 2002; Tuomela 2006; Tuomela and Miller 1988). On the basis of these theoretical suggestions, we hypothesise that *a perceived enjoyment in helping others in games is positively linked with we-intentions*. Further, keeping in mind our definition of within-group altruism based on Batson and Shaw (1991) and Bagozzi (2000), we assume that *altruistically motivated people who enjoy helping others are more likely to develop cooperative goal structures*, as they target to increase the group's welfare. Accordingly, we propose:

H3a. Enjoyment in helping others positively relates to cooperative goals in games.

H3b. Enjoyment in helping others positively relates to we-intentions in games.

2.6. Recognition

Besides altruistic motivation, helping behaviour and cooperation can take place for individual reasons and out of self-interest (Batson and Shaw 1991; Cialdini 1991). For example, cooperation on an egoistic account is commonly motivated by an individual's aspiration to gain recognition and to build a reputation (Fehr and Fischbacher 2003). The role of recognition for engaging in cooperative activities has been a topic in different domains and researchers observed that people are more likely to contribute to online communities if they can thereby enhance their status or reputation (Hars and Ou 2002; Wasko and Faraj 2000; Wasko and Faraj 2005). In this situation the reasons are self-centered, and the behaviour does not stem from collective intentions. Instead, this behaviour results from individual reasons and can best be explained through the notion of individual intentions (Bagozzi and Lee 2002; Shen et al. 2009; Tuomela 2006). From this, *we*

infer that the pursuit of recognition is positively related to I-intentions.

Gaining recognition and status is a key motivational factor for people to engage in games and gamification services (Hamari and Koivisto 2013, 2015a; Yee 2006). We argue that the motivation to gain recognition may prompt an individual to set challenging self-defined goals or follow pre-defined goals given by the system, with the expectation that it will bring prestige to the user when the goals are accomplished. Such goals may involve earning badges, a high number of points, or achieving a very high level in order to earn the recognition of others. Even though others can admire these achievements, they usually do not affect others nor do these personal achievements directly relate to group goals and should thus be regarded as independent goals (Morschheuser, Maedche, and Walter 2017b). The goal structure that is being addressed by recognition-seeking is therefore of independent nature. In accordance with these assertions, we propose the following hypotheses:

H4a. Recognition positively relates to independent goals in games.

H4b. Recognition positively relates to I-Intentions in games.

2.7. Goal interdependence

Social interdependence theory has become a popular approach for investigating cooperation (Johnson 2003; Johnson and Johnson 1996, 2005) and it seems to interlink well with the theory of we-intention. Social interdependence theory is grounded in the understanding that people will be cooperatively linked if their goal attainment is positively related (Johnson 2003; Johnson and Johnson 1996, 2005). Thus, this goal congruence between individuals seems to naturally induce we-intentions. In games and gamification, setting clear goals is regarded as an important ingredient and motivational factor (Hamari, Koivisto, and Sarsa 2014; Malone 1981) and it is not surprising that cooperatively held goals (Rocha, Mascarenhas, and Prada 2008) and social interdependence between players (Emmerich 2020; Tseng et al. 2018) have been recognised to be essential for the emergence of social experiences, connectedness, communication, and cooperation in games. Another theory that sheds light on the role of goals to direct action is goal-setting theory (Locke and Latham 2006). According to goal-setting theory goals can be set collectively, which once again relates well with the concept of we-intention theory. It is also more likely that task-related information will be shared between group members when there are collective goals in the picture (Locke and Latham 2006) and the readiness to share knowledge has often been explained by drawing on we-intention theory (Shen et al. 2009; Shen, Lee, and Cheung 2014). There is considerable theoretical support regarding the importance of common ground between people for invoking we-intentions. Predictors for we-intention that reflect a common ground between group members include mutual agreement, joint commitment (Shen et al. 2009) and social identity (Bagozzi and Dholakia 2002, 2006; Dholakia, Bagozzi, and Pearo 2004; Oliveira and Huertas 2015; Tsai and Bagozzi 2014). Another frequently used antecedent to predict we-intentions is group norms which refers to the internalisation of common values between group members (Dholakia, Bagozzi, and Pearo 2004; Tsai and Bagozzi 2014). Such common values may function as a catalyst for cooperatively held goals, since group norms capture the overlap between individual goals and goals held by others (Tsai and Bagozzi 2014). Foremost, Tuomela and Miller (1988, 367), strongly back the argument that cooperative goals predict we-intentions by suggesting that group intentions are usually invoked in situations where people act together 'with the purpose of achieving some joint goal'. *We therefore expect that cooperative goals have a positive relationship with we-intentions.* According to social interdependence theory, beside a positive and negative interdependence, there might be no goal interdependence between individuals. In these situations, goal attainment is unrelated to whether others achieve their goals or not and thus, there is neither a cooperative nor competitive interdependence involved (Johnson and Johnson 1996, 2005). In such situations where individual reasons guide a person's behaviour, it is more apt to draw on I-intentions (Bagozzi and Lee 2002; Tuomela 2006). Hence, *independent goals should be positively related to I-Intentions.* Based on these theoretical understandings, we posit:

H5. Cooperative goals positively relate to we-intentions in games.

H6. Independent goals positively relate to I-intentions in games.

3. The present study

3.1. Data

Data was gathered from the location-based augmented reality game *Ingress*, a trailblazer for games such as *Pokémon Go*, *The Walking Dead: Our World* or *Harry Potter Wizards Unite*. Ingress is played on mobile devices and functions via a map that extends the real

world with virtual objects. In the game, two teams (so called factions) compete for virtual portals that can be conquered and connected to each other with the goal to span fields that cover as much space as possible in order to gain points (mind units) for the team. Ingress is a highly cooperative game and players usually form smaller local groups with players from the same city, with whom they can play together. The game specifies cooperative goals and allows players to support each other. On the other hand, the game can also be played individually as there are individual goals and personal achievements that can be reached, such as levels, badges and other personal statistics. The analyzed game thus supports cooperative as well as individual play and is therefore suitable for this study. Participants of our survey were recruited via communities specifically dedicated to Ingress on social networking websites and forums. Our study (i.e. anonymous survey research) is non-interventional where ethics approval was not required and participants were informed about the goals of the survey, duration of data storage, etc. The survey ran for approximately four months. During this time period, a number of 206 participants from 15 different countries completed our questionnaire. The average age of the participants is 34.6 and of the 206 respondents 30.1% are female and 69.9% are male. The experience and use patterns of the participants in the game looks as follows: 68.4% of respondents played Ingress multiple times a day and in average for 48 h per month. 26.2% stated to have played Ingress for less than a year, 29.1% between 1 and 2 years, 26.2% between 2 and 3 years, and 18.4% three years and longer.

3.2. Measurement

The operationalisations for we-intentions, I-intentions, within-group altruism, egoism as well as cooperative and independent goals were all adopted from previous studies (see Appendix A). At the beginning of the survey, respondents were asked to identify a group of players (up to 10) with whom they usually play the game. This was important as different measurement items require respondents to mentally reflect on their group members. The items for cooperative and individualistic game features were developed according to the following procedure: Two of the authors of this paper played Ingress in order to get familiar with the game. After having the necessary knowledge about the game and its gameplay, we conducted semi-structured telephone interviews with eight experienced players of Ingress, of which five were male and three were female. Participants were recruited via Ingress communities on social media. The average age of the interviewees was 28 and they all had been playing the game for at least six months. On the basis of social interdependence theory (Johnson and Johnson 2005) and the classification framework by Morschheuser, Maedche, and Walter (2017b), the participants were asked to categorise the Ingress game features, which we derived from the official Ingress user guide, into cooperative, competitive or individual classes. This was done by guiding the participants through questions, in which they were asked on a 5-pt Likert scale (strongly disagree – strongly agree) to what extent they agree that a game feature is of cooperative, competitive or individualistic nature. The questions specified what main goal the users aim to achieve when engaging with the different game features (i.e. support the common goals of the group, obstruct the goals of others, or achieve personal goals). The interviews lasted for approximately 40 min and participants were asked to think out loud, so notes could be taken and the reasoning for their classification could be comprehended. As a result of the interviews, we classified thirteen game features as mainly cooperative and eight as individualistic (see Appendix B). A number of features were perceived by the interviewees as having both cooperative and competitive traits. For the features in question, we operationalised the items in our survey in a way so that the emphasis was put on the cooperative aspects. In a next step we developed the final items, which measure the engagement and importance of cooperative and individualistic game features. Since the items are not exchangeable and their effects stem from the use or perceived importance by the player (i.e. the causal relationship is directed from the indicator to the construct), we used a formative measurement model approach for the engagement with cooperative and individualistic game features. Existing literature that deals with formative measures suggests organising indicators into second order constructs, if there is a larger number of indicators and if there is a consistent way to arrange indicators into second order constructs (Cenfetelli and Bassellier 2009; Diamantopoulos, Riefler, and Roth 2008). In our case, we have a large number of items measuring engagement with individualistic and cooperative game features. Cenfetelli and Bassellier (2009) stress that in this circumstance, indicator weights will typically be lower as they 'compete' for explanatory power. This can lead to distortions, as indicators that may be significant for explaining the concept may show as insignificant and thus, creating second order constructs is one way to deal with this (Cenfetelli and Bassellier 2009). In addition, we have a consistent way to arrange the indicators into second order constructs. The items measuring both cooperative and individualistic engagement

with game features consist of (1) cooperative / individual *achievement-oriented features* and (2) cooperative / individual *interaction-related features*. In other words, *Individual Achievements* (e.g. personal stats) and *Individual Interaction* (e.g. completing a single-player mission) mutually conceptualise the *Engagement with Individual Game Features*, whereas *Cooperative Achievements* (e.g. team scores) and *Cooperative Interaction* (e.g. communicating with others) conceptualise the *Engagement with Cooperative Game Features*. These sub-dimensions are independent from one another and represent the overall meaning of the corresponding first order construct. Figure 2 below in subsection *3.3.1 Formative Constructs* illustrates the arrangement between the second order and first order variables.

All other measures were modelled as reflective. Prior to the main survey, a pre-study was conducted to test the appropriateness of the scales (Hair et al. 2014). A number of 110 users that were also recruited from Ingress communities on social media (other than the ones from the main study) participated in the pre-study. The pre-study revealed a high validity of the items and only minor adjustments had to be made with the newly developed constructs.

3.3. Validity and reliability

The research model was tested using component-based PLS-SEM in SmartPLS 3 (Ringle, Wende, and Becker 2015). Structural equation modelling (SEM) is a common approach for investigating relationships between latent variables. This approach seems suitable for our study, as it allows to test complex models that include 'multiple independent variables (IV) and multiple dependent variables (DV), chains of causal effects and indirect effects' (Lowry and Gaskin 2014, 127). Further, we chose to assess the research model via component-based PLS-SEM over covariance-based SEM, as component-based SEM is regarded to be superior for testing predictive studies (Anderson and Gerbing 1988) and for research models that contain both reflective and formative measures (Lowry and Gaskin 2014).

3.3.1. Formative constructs

The validity and reliability of formative and reflective measures is assessed via different methods. For the formative constructs (i.e. engagement with cooperative and individualistic game features), we examined the weights, *t*-values and variance inflation factors (VIFs) (Cenfetelli and Bassellier 2009). The weights and *t*-values indicate strong significance (i.e. $t > 1.96$) for all items (see Table 3). Assessment of VIFs is performed to uncover possible multicollinearity among the indicators, which for formative constructs should be low, as they are not interchangeable, but each particular indicator contributes to explaining the target construct. The recommended threshold for VIFs differs in the literature (Cenfetelli and Bassellier 2009). Some recommend a value as high as 10 (Diamantopoulos, Riefler, and Roth 2008), which is however commonly regarded as the maximum cut-off, whereas some recommend values below 5 or even as low as 3.3, which is considered excellent for formative constructs (Cenfetelli and Bassellier 2009; Diamantopoulos and Siguaw 2006). As revealed in Table 3, the VIFs are all well below 10 and even drawing on the most ambitious and lowest recommended threshold of 3.3, the values for *Engagement with Cooperative Game Features* are all below this number, whereas for the *Engagement with Individualistic Game Features* several items show values slightly above this threshold. However, according to the literature on the assessment of formative constructs, it is important not to prematurely disregard items even if they indicate multicollinearity. Rather, it is recommended to be cautious and ensure that the conceptual essence of the construct is not altered by removing items, and instead to consider retaining them to uphold the conceptual meaning of the construct (Cenfetelli and Bassellier 2009). Based on this recommendation, we retained the items with VIFs higher than 3.3, as in any case, this is the most ambitious threshold and because our formative

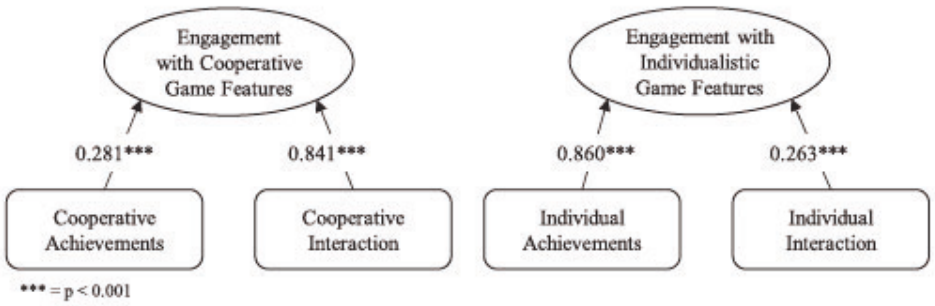

Figure 2. Measurement model of second-order constructs.

Table 3. Validity and reliability of formative constructs.

Engagement with cooperative game features				Engagement with individualistic game features			
Item	Weight	*t*-value	VIF	Item	Weight	*t*-value	VIF
CA1	0.520	38.436	2.707	IA1	0.213	22.431	5.681
CA2	0.536	35.015	3.104	IA2	0.170	18.993	2.052
CI1	0.084	3.707	1.487	IA3	0.092	5.186	1.712
CI2	0.132	6.033	3.217	IA4	0.204	21.523	5.200
CI3	0.116	6.102	1.985	IA5	0.188	19.531	1.994
CI4	0.098	4.387	1.922	IA6	0.176	19.870	2.030
CI5	0.119	6.182	2.021	IA7	0.093	6.165	1.641
CI6	0.114	5.758	3.179	IA8	0.186	16.240	2.395
CI7	0.136	7.973	2.530	II1	0.388	11.043	4.280
CI8	0.094	5.079	2.527	II2	0.261	5.889	1.498
CI9	0.130	6.461	1.693	II3	0.125	12.011	4.380
CI10	0.135	6.900	3.029	II4	0.288	6.573	1.539
CI11	0.147	9.190	2.350				
CI12	0.146	8.003	2.134				
CI13	0.080	2.948	1.761				
CI14	0.139	7.084	3.045				
CI15	0.146	8.375	2.678				
CI16	0.135	7.568	3.156				

Item codes for second-order constructs (refer to Appendix A for more information on the particular items): **CA** = Cooperative Achievements, **CI** = Cooperative Interaction, **IA** = Individual Achievements, **II** = Individual Interaction.

constructs aim at capturing user engagement with the features of the analyzed game in its entirety. Thus, removing items would alter the conceptual meaning of the constructs. Overall, the statistical assessment of the formative measures indicates acceptable validity and reliability. Concerning the path coefficients between the first- and second-order formative constructs (see Figure 2), our statistical analysis revealed that all path coefficients were significant ($p < 0.001$).

3.3.2. Reflective constructs

For assessing convergent validity, we reflected on composite reliability (CR) and average variance extracted (AVE). Table 4 summarises the results concerning validity and reliability. Convergent validity reveals how coherent indicators and the corresponding latent variables are. With one exception (AVE = 0.492 for independent goals is slightly below the threshold), all measures exceeded the acceptable thresholds (CR > 0.7, AVE > 0.5) (Fornell and Larcker 1981). Discriminant validity was assessed by verifying that the standardised explained variance (square root of the AVE) of each latent variable was greater than its correlation with any other construct in the research model (Fornell and Larcker 1981) and by verifying that each item had the highest loading with its corresponding latent variable rather than with any cross-loadings (Hair, Ringle, and Sarstedt 2011). In addition, we assessed discriminant validity with the heterotrait-monotrait (HTMT) criterion. The HTMT criterion is satisfied, as all values are below 0.85 (Henseler, Ringle, and Sarstedt 2015).

With the exception of the above-mentioned slightly lower value than the acceptable threshold of AVE for the independent goals construct, all criteria for convergent and discriminant validity are met. Validity and reliability of the measurement model is thus generally supported. In addition, several criteria for lower bounds of sample size for PLS-SEM are satisfied (Anderson and Gerbing 1988). Since data was collected from the same participants to measure the independent and dependent variables, we attempted to reduce the likelihood of a common method bias to emerge by randomising the order of the questions in the survey (Chang, van Witteloostuijn, and Eden 2010).

3.4. Results

The research model (see Figure 3) accounts for 31.3% of the variance of we-intention and 8.5% of the variance of I-Intention. As for the goal structures, 33.1% of the variance of cooperative goals and 7.0% of independent goals could be explained by the research model. The engagement with cooperative game features accounts for 24.8% of the variance of enjoyment in helping others whereas the engagement with cooperative and individualistic game features accounts for 35.7% of the variance of recognition.

The results reveal significant positive relationships between cooperative game features and enjoyment in helping others ($\beta = 0.498$, $p < 0.01$), recognition ($\beta = 0.146$, $p < 0.05$), cooperative goals ($\beta = 0.159$, $p < 0.05$) and we-intention ($\beta = 0.246$, $p < 0.01$) whereas individualistic game features were found to be positively related with recognition ($\beta = 0.516$, $p < 0.01$) and with I-Intention ($\beta = 0.216$, $p < 0.05$), but not with independent goals ($\beta = 0.045$, $p > 0.1$). Accordingly, H1a-H1d as well as H2a and H2c are supported by the results while H2b is not. In support of H3a, enjoyment in helping others has a significant positive relationship with cooperative goals ($\beta = 0.479$, $p < 0.01$), however, H3b could not be supported as the relationship with we-intention is non-significant ($\beta = -0.083$, $p > 0.1$). Recognition was found to have no significant relationship with either independent goals ($\beta = 0.049$, $p > 0.1$) or I-intention ($\beta = 0.016$, $p > 0.1$). H4a and H4b could therefore not be supported. As hypothesised, cooperative goals are positively related with we-intention ($\beta = 0.467$, $p < 0.01$) while independent goals are positively related with I-intention ($\beta = 0.169$, $p < 0.1$), supporting H5 and H6.

As for the modelled partial mediating effects, the following specific indirect effects could be observed: Cooperative goals have been found to significantly mediate the relationships between cooperative game features

Table 4. Validity and reliability.

	AVE	CR	Fornell-Larcker criterion							
			CGF	IGF	EHO	Recognition	Coop. goals	I. goals	We-intention	I-intention
CGF	n/a	n/a	n/a							
IGF	n/a	n/a	n/a	n/a						
EHO	0.733	0.892	0.498	0.294	0.856					
Recognition	0.725	0.888	0.384	0.583	0.334	0.851				
Coop. goal	0.534	0.773	0.397	0.279	0.558	0.337	0.731			
I. goal	0.492	0.718	−0.056	0.074	0.014	0.076	−0.141	0.701		
We-intention	0.884	0.958	0.390	0.098	0.300	0.174	0.518	−0.064	0.940	
I-intention	0.771	0.910	0.330	0.238	0.197	0.155	0.064	0.186	0.194	0.878
Heterotrait-monotrait criterion										
	EHO	Recognition	Coop. goals	I. goals	We-Intention	I-Intention				
EHO										
Recognition	0.404									
Coop. goals	0.817	0.511								
I. goals	0.227	0.088	0.276							
We-intention	0.342	0.197	0.707	0.125						
I-intention	0.240	0.178	0.111	0.131	0.227					

CGF = Engagement with cooperative game features, IGF = Engagement with individualistic game features, EHO = Enjoyment helping others.

and we-intention ($\beta = 0.074$, $p < 0.05$) as well as enjoyment in helping others and we-intention ($\beta = 0.224$, $p < 0.01$). Enjoyment in helping others was found to be a significant mediator only for the relationship between cooperative game features and cooperative goals ($\beta = 0.239$, $p < 0.01$) but not for the relationship between cooperative game features and we-intention ($\beta = -0.042$, $p > 0.1$). On the other hand, none of the constructs measuring egoism (i.e. recognition and independent goals) served as a mediator.

In addition to the complete model, we tested the direct relationships between the engagement with game features and the different intention modes without the altruism and egoism variables. As in the complete model the relationship between the engagement with cooperative game features and we-intention ($\beta = 0.409$, $p < 0.01$) as well as the relationship between the engagement with individualistic game features and I-intention ($\beta = 0.248$, $p < 0.01$) is significantly positive. Interestingly, the relationship between cooperative game features and I-intention ($\beta = 0.357$, $p < 0.01$) is significantly positive as well whereas the engagement with individualistic game features has a negative relationship with we-intention ($\beta = -.105$, $p > 0.01$) which is, however, not significant. The results are depicted and summarised in Figure 3 and Table 5.

4. Discussion

In this study, we sought to address the increasing demand in the information systems literature to better understand how cooperation develops in games and how we can employ features known from games (i.e. as a form of gamification) to support cooperation. It is perhaps the first in a gaming context to differentiate between both intention schemes (I-mode and we-mode) and thereby provides a relevant contribution to bringing together cooperation theory with game and gamification research. We empirically investigated how features in games affect altruistic and egoistic motivational outcomes and how these motivational states lead to cooperative activity among users. Specifically, we sought to answer if the engagement with cooperative game features leads to the emergence of within-group altruism and ultimately translates into we-intentions and if individualistic game features are accountable for the emergence of egoism and the formation of I-intentions. To answer these questions, we utilised data from a survey conducted with users from the augmented reality game *Ingress* ($n = 206$). The results of this study allow us to extend research on three fronts. First, our findings provide novel insights for research dedicated to understanding the emergence of

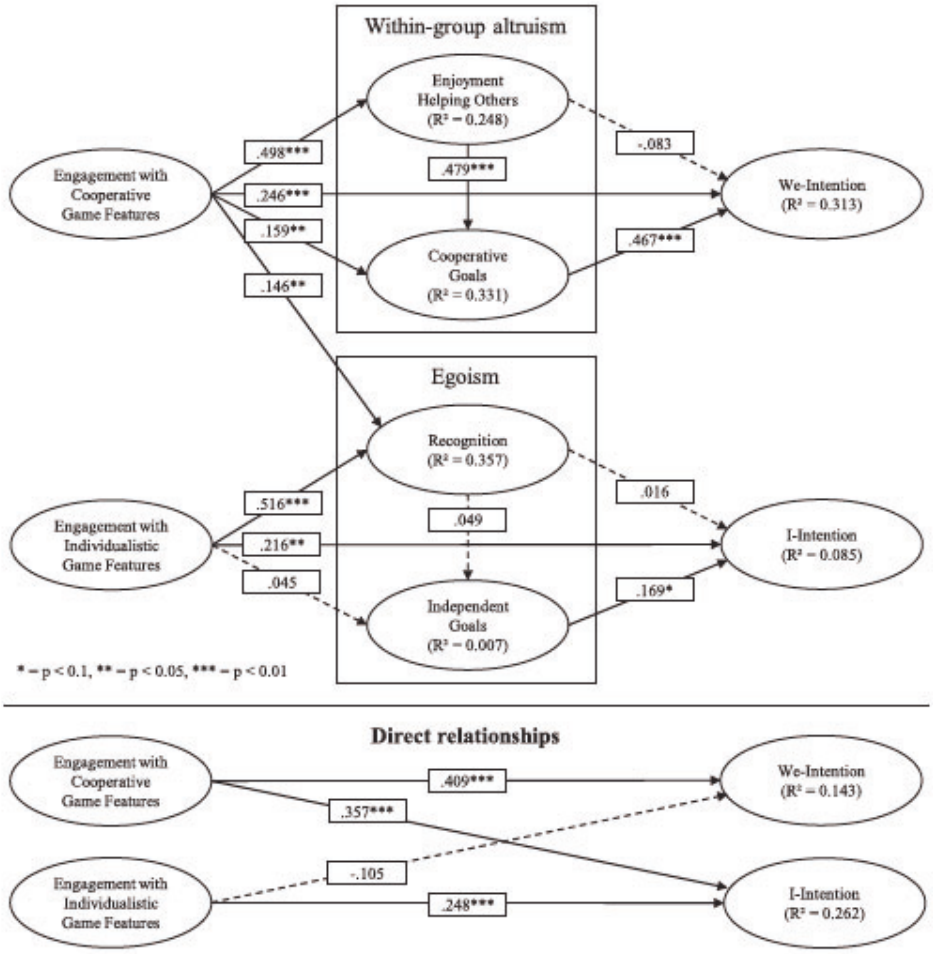

Figure 3. Results.

Table 5. Results.

Independent variable	Dependent variable	β	CI95 LO	CI95 HI	p
Engagement with cooperative game features	Enjoyment helping others	0.498	0.412	0.591	0.000
	Recognition	0.146	0.028	0.269	0.023
	Cooperative goals	0.159	0.015	0.313	0.041
	We-intention	0.246	0.123	0.377	0.001
Engagement with individualistic game features	Recognition	0.516	0.401	0.626	0.000
	Independent goals	0.045	−0.160	0.247	0.358
	I-intention	0.216	0.033	0.383	0.020
Enjoyment helping others	Cooperative goals	0.479	0.315	0.633	0.000
	We-intention	−0.083	−0.236	0.055	0.173
Recognition	Independent goals	0.049	−0.148	0.228	0.334
	I-intention	0.016	−0.163	0.205	0.442
Cooperative goals	We-intention	0.467	0.336	0.590	0.000
Independent goals	I-intention	0.169	−0.121	0.286	0.073

β = Standard regression coefficients, CI = Confidence interval, LO = Lower bound, HI = Higher bound.

cooperation, within-group altruism and egoism in games. Second, we provide a discussion on how we can harness the attained knowledge from this game context to derive implications for affording systems with gamification (see sub-section 4.2). Third, we contribute to cooperation theory by addressing the unresolved conceptual understanding on the emergence of we-intention and I-intention based on altruism and egoism. In the following, we discuss these contributions in more depth by providing theoretical as well as practical implications and point towards some possible future research avenues.

4.1. Theoretical implications

First, the findings of this study support the notion that the use of cooperative game design features can lead to the emergence of within-group altruism, which serves as a mediator for we-intentions and thus cooperation in games. According to altruism theory, a sense of enjoyment is a natural consequence of helping and our results highlight that individuals experience a feeling of enjoyment for their prosocial behaviour when engaging with cooperative game features. This is interesting, as it broadens our understanding with regard to how features of games evoke intrinsically fulfilling outcomes (Malone 1981; Xi and Hamari 2019) and shared goals (Morschheuser, Maedche, and Walter 2017b; Morschheuser et al. 2017c). An equally vital takeaway is that altruism can lead to the formation of we-intentions. This has been suggested in previous we-intention research (Bagozzi 2000; Tuomela 1995), however, to the best of our knowledge, no empirical tests of this theoretical suggestion have surfaced so far. Our results indicate that enjoyment in helping others is an important foundation for inducing cooperative goals, which are ultimately crucial for the formation of collective intentions. Thereby, the present study also provides novel insights that may be relevant for research that is dedicated to understanding social relationships in games (Liao et al. 2020b) and commitment to gaming communities (Liao et al. 2020a).

Second, our findings pertaining to the relationships between the engagement with game features, egoistic motivations and I-intention offer critical insights, especially when drawing parallels to the relationships between game features, altruistic motivations, and we-intention. The results showcase a strong relationship between the engagement with individualistic game features and recognition and a less considerable positive relationship between the engagement with cooperative game features and recognition. Features of individualistic nature, such as points, badges, levels, etc., thus seem to be the main motivational driver in terms of gaining recognition, arguably since these features display personal achievements to others. Cooperative game features, on the other hand, can also be appropriate for an individual's drive to gain recognition, presumably due to the awareness and appreciation that an individual anticipates from others for his or her cooperative actions. While the engagement with individualistic game features and independent goals influences I-intentions, surprisingly, no significant association between individualistic game features and independent goals as well as between recognition and independent goals could be found. Further, neither recognition nor independent goals are positively associated with I-intentions. This may be explained by the fact that a vast majority of individuals seem to prefer cooperative interaction rather than individual interaction when given the option (Morschheuser, Hamari, and Maedche 2019). Therefore, it seems that via successfully utilising cooperative game features, individuals may value helping the group, achieving group goals, and cooperating with others more than 'doing one's own thing' by following egoistic motives. This is interesting in so far, as many games and gamified systems are designed with the objective to motivate user engagement by means of achieving personal goals and individual rewards, such as gaining points or badges, moving up a level or being top of a leaderboard. Our findings, however, indicate that in a setting that allows for both individual and cooperative gameful engagement, group achievements or being able to prosocially interact with others may be more desirable than attaining personal goals and individual achievements. It seems that under these circumstances, altruistic motives and collective intentions overshadow egoistic motives and individual intentions. This also supports the suggestions from previous literature on the subject, in which it is argued that the concept of we-intention is more suitable for investigating participation behaviour in cooperative settings as compared to solely relying on the more traditional concept of I-intentions (Bagozzi 2007; Tuomela 2006). In addition, our results support the propositions stemming from we-intention theory that cooperative goals relate to we-intentions whereas independent goals relate to I-intentions. Thereby, this study's results add generalisability to the proposed different underlying goal structures of people who are subject to we-intentions and I-intentions (Bagozzi 2000; Tuomela 1995, 2006; Tuomela and Miller 1988).

Third, the direct relationships between the engagement with game features and the different intention modes offer critical insights. As already discussed, the engagement with individualistic game features has a significant positive relationship with I-intentions. Yet, engagement with cooperative game features was also found to have a substantial positive relationship with I-intentions. This may seem counterintuitive, since the engagement with cooperative features suggests that an individual is carrying out these actions on behalf of the group rather than for personal reasons. However, this is only true if the system design is aligned in a way that the engagement with such features only benefits the group. Most systems are hardly designed this way. If anything, users also often experience a personally rewarding outcome for their group contribution. For example, as per our results, by engaging

with cooperative features, users may also experience some sort of self-benefits such as gaining recognition. Shen et al. (2009) have shown that such personally rewarding outcome expectations are positively linked with I-intentions and hence, this relationship is less surprising as it may seem at first. Another reasonable explanation could be that users simply inherently enjoy engaging with cooperative game features and would even use them if other members of a group would not reciprocate a similar use intensity of these features. Therefore, it does not necessarily affect an individual's personal intention to use a system if the cooperation within a specific group is terminated, especially since in most social systems, it is fairly easy to establish new cooperative relationships. Rather, it seems that individuals could temporarily be subject to I-intentions until new cooperative relationships are established. Further, we found that we-intentions can be directly invoked via engaging with cooperative game features, while the engagement with individualistic game features does not relate to we-intentions or may even lead to the unfavourable effect of diminishing we-intentions. Considering the notion that different foci in system design (e.g. individualistic, cooperative or competitive) can result in contrasting behavioural outcomes (Siu, Zook, and Riedl 2014; Vegt et al. 2015), it seems adequate that the exposure of individualistic game features invokes I-intentions rather than we-intentions. Significant support for this notion is provided by researchers who previously investigated the effects of personal and community-related determinants on we-intentions and I-intentions (e.g. Bagozzi and Lee 2002; Shen et al. 2009). The empirical results of these studies go hand in hand with our results by showing that individual determinants are only significantly associated with I-intentions and not with we-intentions. This is important, as it points towards potential negative or disruptive effects that certain game features can have on cooperative relationships. We will address these and other issues in the next section and provide practical implications for gamification.

4.2. Practical implications for gamification

The findings of this study provide important insights for tailoring gamified systems better to address altruistic motivations and to meet the desired outcome of cooperation between individuals. Specifically, the results of this study allow us to derive design implications that can be transferred to technology-mediated group settings, such as crowdsourcing and innovation communities, knowledge management and social networking systems as well as other types of groupware. In many technology-mediated group contexts, practitioners face the challenge of overcoming social loafing (Chidambaram and Tung 2005) or a general lack of motivation to cooperate (Riar, Hamari, and Zarnekow 2021). Crowdsourcing communities and organisational performance, for example, depend on collective intentions and cooperative behaviour (Sanders 2007; Shen, Lee, and Cheung 2014) and gamification can be a meaningful approach for supporting such outcomes (Morschheuser, Maedche, and Walter 2017b; Morschheuser et al. 2017c). In addition, we can even apply the findings of this study to cooperative training and learning environments, which have garnered great attention in recent years (Knutas et al. 2019; Park et al. 2019), both in organisational contexts as well as in traditional virtual learning environments, not least due to the COVID-19 pandemic. The rise of online course offers which do not require physical presence anymore is increasingly leading to a situation in which individuals lack opportunity to socialise. Enriching information and communication technology with cooperative functions that also involve a motivational component, such as the use of game elements, seems therefore an important step towards addressing these issues.

Foremost, our results indicate that features of cooperative nature are essential enablers for the intrinsically rewarding perceptions of enjoyment in helping others. Thus, we recommend implementing features that encourage actions that benefit others with the goal to facilitate the experience of enjoyment in helping others. Examples for achieving this, to name a few, could involve implementing interdependent tasks or roles, making each team member an important asset for goal achievement, giving users the ability to complete tasks together and to share resources with one another or allowing for virtual gift-giving to signal appreciation. Our understanding is that there can be benefits in place that stretch beyond the limits of a system if the design successfully addresses altruistic motivations. For example, there are suggestions that prosocial ambiance in games can lead to prosocial behaviour outside of games after their use (e.g. Gentile et al. 2009; Greitemeyer and Osswald 2011; Keith et al. 2018). Practitioners who seek to achieve more cohesion in groups could thus find prosocial-oriented gamification similarly useful in order to support team building, helping behaviour and cooperation beyond the limits of a system. All in all, we deem cooperation based on egoism to be more fragile as there is always the chance that cooperative relationships can collapse as soon as personal benefits will fall short or if the rewards lose their appeal. Previous literature underlines these concerns, indicating that with status-based incentives,

engagement may suffer as soon as incentives are reached (Goes, Guo, and Lin 2016) and unsurprisingly, there is an increasing interest in finding ways to prevent decreasing use intensity (e.g. Huang, Jasin, and Manchanda 2019) as well as ways to use gamification effectively to establish strong group ties over weak ties (Li et al. 2021). We propose that enriching systems with gamification features that address altruistic motivations and intrinsically rewarding outcomes lead to stronger cooperative relationships and should be recognised as a more promising approach for inducing and upholding (long-term) cooperation than enriching systems with features that address egoistic motivations.

Design Implication 1: Enrich systems with features that allow benefiting others and that address intrinsically rewarding perceptions of enjoyment in helping.

Design Implication 2: Emphasise on cooperative features over individualistic features to achieve tenacious cooperation based on we-intentions.

It is vital to acknowledge that altruistic and egoistic motivations may overlap from time to time since people may strive to achieve different goals simultaneously (Cialdini 1991). For example, a person who enjoys helping others may also want to build a reputation and earn recognition. Designing a gamified system with the goal to address altruistic motivations but at the same time allow for individual rewards and achievements can be a non-trivial challenge with potential pitfalls that need to be taken into consideration. On the one side, we found that engagement with cooperative game features can influence within-group altruistic motivation and induce we-intentions, whereas on the other side, our results indicate that egoistic motivations have limited effects on intentions to participate in a cooperative setting and that the exposure of individualistic features may even negatively influence the emergence of collective intentions. This is something designers of gamified systems should be aware of, especially in situations where the goal is to support cooperation between users, as too much emphasis on individualistic features, such as features that support personal achievements, may jeopardise the emergence of collective intentions. Further, it has previously been argued that a small number of altruists can spark a large number of egoistically motivated individuals to work together, while on the other hand, a small number of individuals who display egoistic behaviour may prompt a large number of altruistically motivated individuals to stop cooperating (Fehr and Fischbacher 2003). This may be one explanation that individualistic game features do not invoke or may even impair the emergence of we-intentions, as the exposure and interaction with game features that benefit oneself rather than the group may be perceived negatively by others. Therefore, we advise to consider the following two angles concerning this issue: First, it seems that it would be beneficial if systems promote altruistic action and provide transparency of prosocial behaviour, as it may prompt others to act in a similar manner (e.g. by displaying prosocial actions of users to others via an activity log or a newsfeed). Second, it seems that perceptions of egoistic actions of individuals in a group may in reverse have negative effects on group cohesion and diminish willingness to cooperate. Features that address egoistic motivation may thus cancel out positive effects of features that address altruistic motivation. This possible pitfall should be acknowledged by practitioners and avoided. One way to address this issue could involve aligning personal goals with group goals so that there is a positive interdependence between users rather than having conflicting goals between individuals and a group (Johnson and Johnson 1996). For example, this could involve enriching a system with features that allow for team achievements rather than personal achievements. Another way could involve designing a system in a way that it provides more transparency of an individual's contribution to the group rather than of actions that are apparently egoistically motivated.

Design Implication 3: Align personal goal structures with group goal structures.

Design Implication 4: Provide transparency of altruistic actions (e.g. group contributions) and constrain transparency of egoistic actions.

Design Implication 5: Beware of the possible unintended outcomes of blending individualistic and cooperative features to avoid potential pitfalls, such as inhibiting cooperative relationships.

4.3. Limitations and future research

As is common with survey-based research, the data in this study is self-reported. A possible limitation of this study may involve that of a common method bias, even though measures were taken to diminish the likelihood of a common method bias by randomising the questions in our survey. Previous literature also indicates that spurious variance caused by self-report methods tends to be insignificant and often condemned as overly severe (e.g. Crampton and Wagner 1994). Further, the collected data may not represent the entire population of the analyzed game. It is especially likely that respondents of the questionnaire are highly engaged users, as they take a lot of interest in the game system and that less engaged users are less represented.

This study should be viewed as a starting point with respect to differentiating between the two intention schemes (I-mode and we-mode) for analyzing intentions as a result of utilising game features. Our understanding is that differentiating between these two concepts can result in a more accurate prediction of the motivational aspects and intentions to engage with a system. Therefore, we call for more work that draws on theories of we-intention and I-intention in gamified contexts. While the analyzed system supports both individual and cooperative interaction, the respondents of our survey perceived the use experience as generally more cooperative. It would therefore be especially interesting to replicate this study in a setting which focuses more on individualistic game features, in order to determine if under these circumstances, relationships between egoistic motivation and I-Intentions are more substantial than in our study. Similarly vital, we need to better understand how egoistic as well as within-group altruistic sentiment stemming from the engagement with individualistic and cooperative features relates to short- and long-term motivation. Previous empirical evidence indicates that, for example, status-based incentives, which represent typical self-centered incentives, have the effect that individuals often abruptly quit their engagement once the incentive is attained (Goes, Guo, and Lin 2016). We assume that individualistic gamification features and self-centered benefits are very relevant for initial motivation to participate (i.e. users may initially enjoy gaining points, moving up levels and accomplishing individual achievements and so on), however, the habit of being rewarded may curb the motivational effect and especially when goals are reached, participation may decline drastically. We assume that on the other hand, cooperative design and cultivating altruistic sentiment and collectivism via the use of cooperative design features is more relevant for retaining long-term motivation, as enjoyable and intrinsically rewarding cooperative relationships with others are not as easily terminated. To examine these assumptions further, we call for (e.g. longitudinal) empirical tests that evaluate how different types of features (e.g. individualistic, cooperative, competitive) and the underlying motivational outcomes of using these features relate to short- and long-term engagement. Such inquiries will likely hold important implications for designing systems that accommodate intrinsic user needs (e.g. needs for relatedness and competence) (Deci and Ryan 2002) while at the same time, results may hold crucial implications for both the scientific community and practitioners, for example, in terms of maximising use intensity, loyalty, continued use, and retaining users on a platform (Huang et al. 2022; Liao et al. 2020b; Sharma et al. 2022; Teng et al. 2022), which will ultimately be reflected in economic value (Huang, Jasin, and Manchanda 2019). This is relevant for both gamified systems as well as games, including location-based games, which are becoming increasingly popular and scrutinised for drawing economic implications (Pamuru, Khern-am-nuai, and Kannan 2021).

Pioneers in the field stress that altruism is a complex phenomenon and there has been much discussion about under what psychological and motivational conditions altruism emerges (Batson and Shaw 1991; Cialdini 1991; Khalil, 2004). There may be design features that on first sight seem to have no particular relevance for motivating helping behaviour and cooperation. For example, it has previously been suggested that role-playing (i.e. taking on a role of a character in the system) may result in the emergence of a sort of empathy-based altruism and willingness to help (Peng, Lee, and Heeter 2010). This may occur through the process of putting oneself into the shoes of a character role and by acting out certain behaviours that comply with the personality of the character. Questions regarding the effects of such user roles in gamified systems have so far remained underexamined, which calls for more research in this direction. This is just one example and other features known from games certainly exist that support altruism and cooperation and which have not been part of our analysis. Therefore, it would be misguided to assume that all the facets that game features have to offer for influencing altruism or egoism have been covered within the scope of this study. We deem it important that similar studies will be conducted in the future, which investigate a set of other game features in different contexts and report how these features relate to the emergence of altruistic or egoistic motivation.

Moreover, prosocial games have previously been found to positively impact prosocial behaviour even outside of games (Gentile et al. 2009; Greitemeyer and Osswald 2011). To the best of our knowledge, there have been no studies so far that attempted to investigate similar outcomes in a gamification context. It would be a fruitful venture, especially for practitioners who seek to cultivate a prosocial atmosphere within organisational teams, to determine if gamified systems that promote altruistic action can affect prosocial thoughts or willingness to help and cooperate even after their use.

Gamification literature (e.g. in the realm of knowledge management, crowdsourcing and innovation communities) could also benefit from investigating how altruism and egoism relate to quality and quantity of help or user contributions in gamified systems. There have been indications that egoistic motivational factors such as the prospect of gaining reputation in systems

only increases quantity of contributions but not the quality, whereas altruistic motivational factors, such as enjoyment in helping others may increase both quantity and quality of contributions (Lou et al. 2013). In light of these suggestions, we offer that future gamification research should investigate if game features that address altruistic motivation are better suited than individualistic or competitive features when it comes to enriching systems that aim at enhancing both quantity and quality of help or user contributions.

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Appendices

Appendix A

We-Intention (7-point 'strongly disagree' – 'strongly agree' scale)	(Shen et al. 2009; Tsai and Bagozzi 2014)
WEI1	I intend that our group (i.e. myself and the group that I identified before) play Ingress together sometime during the next 4 weeks.
WEI2	We (i.e. I and the group that I identified before) intend to play Ingress together sometime during the next 4 weeks.
WEI3	We (i.e. I and the group that I identified before) plan to play Ingress together sometime during the next 4 weeks.
I-Intention (7-point 'strongly disagree' – 'strongly agree' scale)	(Shen et al. 2009; Shen, Lee, and Cheung 2014)
INT1	Even if the group members (I identified before) do not play Ingress, I still intend to play Ingress.
INT2	Even if the group members (I identified before) do not play Ingress, I still predict I will play Ingress.
INT3	Even if the group members (I identified before) do not play Ingress, I still make an effort to play Ingress.
INT4	Assuming the group members (I identified before) do not play Ingress, I will stop playing Ingress.
Enjoyment in Helping Others (7-point 'strongly disagree' – 'strongly agree' scale)	(Lin 2007; Wasko and Faraj 2005)
EHO1	It feels good to help other members of the group I mentioned before in Ingress.
EHO2	I enjoy helping other members of the group I mentioned before in Ingress.
EHO3	Assisting members of the group I identified before in Ingress is pleasurable.
Recognition (7-point 'strongly disagree' – 'strongly agree' scale)	(Hamari and Koivisto 2015b)
REC1	I feel good when my achievements in Ingress are noticed by members of the group I identified before.
REC2	I like it when members of the group I identified before comment my achievements.
REC3	It feels good when members of the group I identified before admire my level.
Cooperative goals (7-point 'strongly disagree' – 'strongly agree' scale)	(Wong, Tjosvold, and Yu 2005)
CG1	The group (I identified before) and I 'swim or sink' together.
CG2	The members of the group (I identified before) and I want each other to succeed.
CG3	The members of the group (I identified before) and I seek compatible goals.

Independent goals (7-point 'strongly disagree' – 'strongly agree' scale)	(Wong, Tjosvold, and Yu 2005)
IG1	The members of the group (I identified before) and I 'do our own thing'.
IG2	The members of the group (I identified before) and I pursue our own independent goals.
IG3	The members of the group (I identified before) are most concerned about what they accomplish when playing by themselves.
Cooperative Game Features (Newly developed formative measure) (7-point 'not at all important' – 'very important'/'never' – 'every time' scales)	
Cooperative Achievements (second-order construct)	
CA1	How often do you look at the faction's progress during a cycle?
CA2	How important is to you to see the faction's progress during a cycle?
Cooperative Interaction (second-order construct)	
CI1	How often do you upgrade portals of other players (Upgrade = deploy mods, deploy additional resonators, upgrade resonators to higher level)
CI2	How often do you recharge resonators of other players?
CI3	How often do you communicate with other players via chat?
CI4	How often do you create control fields, in order to obtain Mind Units (MU)?
CI5	How often do you use capsules to share items with other players?
CI6	How often do you participate in XM Anomalies? (for the sake of playing Ingress together with other people)
CI7	How often do you participate in Mission Days? (for the sake of playing Ingress together with other people)
CI8	How often do you participate in First Saturday (FS) events?
CI9	How important is it to you to upgrade portals of other players? (Upgrade = deploy mods, deploy additional resonators, upgrade resonators to higher level)
CI10	How important is it to you to recharge resonators of other players?
CI11	How important is it to you to communicate with other players via chat?
CI12	How important is it to you to create control fields, in order to obtain Mind Units (MU)?
CI13	How important is it to you to use capsules to share items with other players?
CI14	How important are XM Anomalies to you? (with regard to playing Ingress with other people)
CI15	How important are Mission Days to you? (with regard to playing Ingress with other people)
CI16	How important are First Saturday (FS) events to you?
Individualistic Game Features (Newly developed formative measure) (7-point 'not at all important' – 'very important'/'never' – 'every time' scales)	
Individual Achievements (second-order construct)	
IA1	How often do you look at your personal achievements (e.g. Mission Badges, Medals, Action Points (APs))?
IA2	How often do you look at your personal level?
IA3	How often do you look at the visualisation of your avatar?
IA4	How often do you look at your personal stats? (Stats about number of portals, MUs, links, control fields, etc., under your control)
IA5	How important are your personal achievements to you? (e.g. Mission Badges, Medals, Action Points (APs))?
IA6	How important is your personal level to you?
IA7	How important is the visualisation of your avatar to you?
IA8	How important are your personal stats to you? (Stats about number of portals, MUs, links, control fields, etc., under your control)?
Individual Interaction (second-order construct)	
II1	How often do you play missions?
II2	How often do you use power cubes?
II3	How important is being able to play missions to you?
II4	How important are power cubes to you?

Appendix B

Ingress game features	Individualistic	Cooperative	Competitive
Action points	X		
Agent level	X		
Agent stats	X		
Medals	X		
Mission badges	X		
Personal avatar	X		
Power cubes	X		
Playing missions	X		
Mission days	(x)	X	
Factions		X	
Mind units		X*	
Deploy resonators		X*	
Recharge resonators		X*	
Share capsules		X*	
COMM (in-game chat)		X	
First Saturday events		X*	
XM Anomalies		X*	
Mods		X*	
Takeover portals		X*	
Upgrade portals		X*	
Checkpoints and cycles		X*	
Attacking portals			X
Weapons			X
Hacking portals	C	C	C

X = primary perceived category of the game feature.

(x) = secondary perceived category of the game feature. A minority of experts perceived this feature as part of the category.

* = features that were perceived as having both competitive traits (on an intergroup level) as well as cooperative traits (on an intragroup level). For such cooperative-competitive features, we carefully identified the cooperative aspects before developing the corresponding survey items.

C = features that were perceived as core game mechanics of the game. Thus, no clear assignment to one of the feature categories could be made.