

An Exploration of Feedback Loops in Friendship Games

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Abstract—Having deep friendships is a necessary part of a happy life, and the importance of friendships is shown in various research. The term, "Friendship Games" is a relatively new genre of games that aims to create cooperative video-games that utilizes systems to intentionally design for building deeper friendships among players. To explore this genre further, this study will investigate game design patterns for friendship formation and how to apply it to cooperative video-games. By applying other studies of friendship formation and positive/negative feedback loops, an iterative framework for one dimension of friendship formation was developed to illustrate how reinforcing and balancing relationships can intentionally create consensual reciprocity between players in cooperative online video-games. The extent to which the proposed framework can be used is discussed, however tests of the system with a real video-game scenario is needed for any real validation of the system.

Index Terms—Friendship formation, reciprocity, cooperative video-games, Feedback Loops, video-game design.

I. INTRODUCTION

Having a close set of friends is an essential aspect of life, as without it, it can lead to loneliness. Several studies indicate a link between mortality rate and loneliness from social relationships and show that the lack of loneliness increases the likelihood of survival of 50% [1] and loneliness increasing the risk of early mortality by 26% [2].

Online video-games have been a platform for many players worldwide to connect and bond with people we already know and find new friendships through the medium itself. However, some argue that for the most part, online video-games do not directly encourage players to interact in a more profound, meaningful way, and when friendships are made, it is often a byproduct of the game itself [3]. While Video-games are arguably an excellent medium for making friendships, it is believed that video games can do better, for creating deep, meaningful friendships [4]. More and more people both from the game industry and academia are interested in developing/researching these so-called "friendship games," such as the Danish Video-game company BetaDwarf [5], acquiring a 6.6 million US dollar investment for creating an online cooperative video-game, that will aim in designing for deeper friendships among players [6]. Cook and others have conducted research into what makes friendships while playing and has compiled the main factors of friendship

formation (Proximity, Similarity, Reciprocity, Disclosure) and explains how these factors can be incorporated in online video-games [4] [7]. Furthermore, O'Donnell [3] briefly states what designers should examine to create Friendship Games, for example designing reciprocation loops to provide players opportunities to build meaningful friendships over time [3], but does not convey a specific proposed example of how it could be executed.

All these mentioned examples are very recent and show that there is an interest in these types of games and that meaningful solutions are still being developed. Therefore, this paper will present sociological and psychological perspectives on the importance of reciprocity in friendships and theoretical concepts of friendship formation and feedback loops in a video-game context. Applying this new knowledge, a proposed framework which illustrates how game designers can use Positive and Negative Feedback Loops to intentionally encourage consensual reciprocity between players in Cooperative Online Video-games.

II. RELATED RESEARCH

The following section will detail theoretical sociological and psychological perspectives on the importance of reciprocity in friendships; this will lead to presenting friendship formation in a video game context, and finally, examining the game design concept of positive/negative feedback loops.

A. *The Importance of Reciprocity in friendship*

In contrast to family relationships, friendships are uniquely voluntary [8]. When investigating psychological and sociological perspectives for forming friendships, the majority of friendship research will mention the importance of reciprocity in creating mutually beneficial results through social exchange [9] [10] [11]. Basically, reciprocity is a give and take relationship between people, and both positive and negative reciprocity exists. Positive reciprocity is when one person's positive actions towards another person are received and returned with approximately the same level of positive action [12]. While negative reciprocity is the opposite, being one person's negative actions will be returned with similar negative

actions [12]. Anthony Giddens coins the term '*pure relationships*', which is when a relationship is built on the existence of meeting their partners need and will likely only continue as long as it succeeds [13]. In short, Giddens argue that the traditional relationship has shifted to a pure relationship, meaning rather than staying together for the sake of the their children and other traditional values, couples stay together because of the mutual love for each other, from e.g. sexual attraction and mutual trust.

Although Giddens revolves this around intimate relationships, we argue that real-world friendships and especially gaming-related friendships are based more on a pure relationship. A gaming relationship exists when players need each other and are likely to continue as long as they succeed in their shared goal. We see this typically in match-based games, whereas if a team succeeds, they will likely play another match, but as soon as the team no longer succeeds, players will most likely not play together again.

With that said, the following will further explore friendship formation, but specifically in a video-game context.

B. Game Design Patterns for Building Friendships

Cook et al. [7] presents four properties from sociological and psychological studies that are needed in order to form friendships and how it can be applied in a video-game context and, as a result, not make player-to-player interaction feel interchangeable, disposable, or abusable.

Proximity is the social distance between players [7]. In other words, the likelihood of players seeing each other and hence having the opportunity to interact with one another in the virtual world [7]. A typical example of this can be seen in the cooperative video-game, Deep Rock Galactic [14]. Here, before playing through the core game loop, the player runs around in a spaceship with fellow players, encouraged to socially interact, by, e.g., dancing, drinking, and playing mini-games. This intricate part is a great way for players to form acquaintance and share their personality prior to playing the game's core loop. On top of that, this "social hub" is repeated after each gameplay loop, which then precisely encourages multiple interactions to happen.

Similarity is the perception of shared norms. We tend to trust people who are similar in all terms of the matter, from culture, personality, and aesthetics, and are therefore inclined to choose similar people as friends [7]. Similarity can also be used within having similar goals/objectives, which can strengthen the bond between players. In Deep Rock Galactic, every character has their own personality traits, but all players are playing as a 'Dwarf' and sharing some of the stereotypical personalities that entail with Dwarves in a fantasy genre. These personalities are familiar, everyone is similar, and it is not directly referencing to the real world thereby lowering the risk of personal disruptive behavior.

Reciprocity is the iterative exchange of producing a friendship through trust [7]. If all players feel that they are benefiting from this gaming relationship, the likelihood of a shared success producing trust, and therefore friendship much higher.

Deep Rock Galactic [14] encourages reciprocation loops in many different ways. For example, complementary roles by having each character a player can choose from having a unique set of tools that can benefit the team in a certain way. If the players play with their toolkit correctly, they will form reciprocation, hence trust.

Disclosure is the final important aspect of friendships. To evolve a friendship into a deep relationship, disclosing personal information to another is the only way to grow [7]. However, disclosure of personal information is very intimate and should, therefore, be an opt-in system [7]. As in any cooperative multiplayer game, voice chat is the dominant and most efficient way of communicating, though many video games, including Deep Rock Galactic [14], have implemented tools that enable the player to voice important information through the player character himself. A system like that makes it possible for players that do not want to share their voice immediately can still act on a lower level of a social relationship.

All in all, in the context of friendship formation, we would argue that proximity, similarity, and disclosure can all inherently be linked to reciprocity. Cook et al. [4] [7] propose a solid foundation for friendship formation in a video-game context and provides common design structures to address the creation of games that foster meaningful friendships. Therefore, this paper will propose a design model exploring one dimension of video game design and hence show how it can be connected to friendship formation in cooperative video games. First, the forthcoming will explore feedback loops in video game design and from there propose a design model that utilizes such loops for friendship formation in cooperative video-game experiences.

C. Feedback Loops

Before getting into the framework for using feedback loops for friendship gaming, we will first establish what feedback loops are in video game design. Feedback loops are systems where the output is fed back into the system as an input [15]. In video-game design, feedback loops are based on the player's successes or failures. Each success or failure will then impact the probability of the player's future success and failures. Feedback loops come in two types. A positive and a negative feedback loop.

A positive feedback loop is when a game will reward the player when the player succeeds. This can be seen as a snowball effect; something good happens, which in turn rewards something good. An example is the franchise Call of Duty [16] where a *kill-streak* is a standard reward for successfully killing enemy players. Here when a player kills a set number of enemy players, the player will be rewarded with an item that will increase the player's likelihood of getting more kills, e.g., an airstrike. This also goes for the reverse outcome; if a player does not get kills, the player does not get *kill-streaks*, which means the player is weaker

than the opponent. Both of these examples are a positive feedback loop. As the player does poorly, the game will give fewer rewards, or as the player plays well, the game will give more rewards. Both being "positive" in the sense of the effect in both cases are increasing throughout each iteration of gameplay [17].

Some also refer to this as reinforcing relationships, as a change in one element will change in the same direction to another element. [15], therefore reinforcing/positive feedback loop tends to destabilize the game, as the player will either get further ahead or further behind depending on the success or failures [17].

A Negative feedback loop is the opposite of positive feedback loops. When a player succeeds, the player is "rewarded" with failure and vice-versa; if you fail, you are rewarded with success. Negative feedback loops are therefore made to balance the success and failures within the game. Concerning success and failures, it means that the game gets more challenging when a player is successful, and the game will become less challenging when a player fails. Just like reinforcing/positive feedback loops, negative feedback loops are also referred to as balancing relationships [15].

The game franchise Mario Kart [18] is an excellent example of this. Mario Kart consists of 'Reward Boxes' you collect throughout the racecourse. When a player is leading, the rewards that the player will get from the boxes will typically be the least impactful rewards and hence give a disadvantage to the leading player. In contrast, players that are behind will be rewarded with impactful rewards that tend to give that player an advantage.

Therefore, balancing/negative feedback loops tend to stabilize the game, as the players who are ahead will be drawn back to the center, and players that fall behind will be pushed forward to the center [17].

All in all, feedback loops are used to reward, punish, and balance the power of players. The following section will propose a framework on how to utilize feedback loops in conjunction to friendship formation through reciprocation loops.

III. FFL - FEEDBACK FRIENDSHIP LOOP

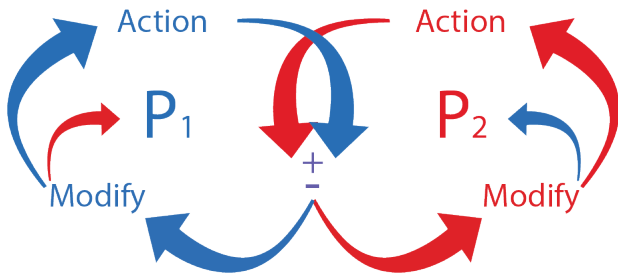


Fig. 1: Feedback Friendship Loop

The Feedback Friendship Loop (FFL) focuses on building reciprocation loops in friendship formation and applying it to positive/negative feedback loops (reinforcing/balancing). Hence, this system aims to use feedback loops that intentionally is used to create reciprocation loops between players in order for the players' trust in each other to increase over time. That hopefully encourages an increase in the player-to-player relationship over time. Figure 1 illustrates the proposed system on how implementing positive and negative feedback loops between two cooperative players (P1 and P2) can encourage reciprocation between them. Note that the naming convention of each step of the framework is inspired by Andrzej Marczewski's interpretation of a basic feedback loop [19]

Both players will perform an *Action*, which the game will respond with either reinforcing(+) or balancing (-) the relationship. This will result in the relationship being modified (the player experience will change), resulting in an increase in trust from the other player and in a new action. This loop will go on, whereas the reinforcing(+) or balancing(-) is interchangeable, dependent on both players' actions.

A. FFL - Examples

1) *When P1 is successful and P2 is NOT successful:* The problem that can occur in a lot of cooperative video-games is the skill gap between players. If one player is better than the other player, the lower-skilled player can quickly become a disposable teammate for the higher skilled player. This is where Negative Feedback loops (-) can help close the gap between the players.

Figure 2 shows an example of the problem explained above. P1 gets *more kills* and P2 gets *fewer kills*. The game will notice this and will, therefore, balance the relationship (-). This will result in the more skilled player (P1) getting *fewer power-ups* and the less skilled player (P2) gaining an advantage through *more power-ups*. Since P2 now has gained an advantage, he will now also contribute to the more skilled player (P1), which will increase the likelihood of both players finding each other beneficial for the shared goal, hence increasing the trust between both players.

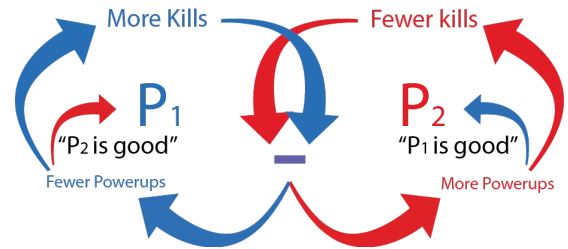


Fig. 2: P1 = Success and P2 = Failure

2) *When both P1 and P2 are successful or NOT successful:* When both players either succeed or fail, the feedback loop is dependent on the Flow [20] of the game, as this is where we want to ensure the game is matching the level of challenges with the players' skills and is not too hard or too difficult in order for all players to get a feeling of shared success.

We would therefore argue that the following two examples could also be reversed to ensure that the Flow [20] of the game is met and the level of challenges match with the players' skills.

Figure 3a shows an example of both players playing well. P1 and P2 get *more kills* which results in reinforcing the relationship (+). This will result in both players getting rewarded for their success, which will increase the likelihood of both players finding each other beneficial for the shared goal, hence increasing the trust between both players.

Figure 3b shows an example of both players not playing well. P1 and P2 get *fewer kills* which results in balancing the relationship (-). This will result in both players gaining an advantage, which will increase the likelihood of both players contributing to future shared success. Again, increasing the likelihood of both players finding each other beneficial for the shared goal and, in turn, increasing the trust between both players.

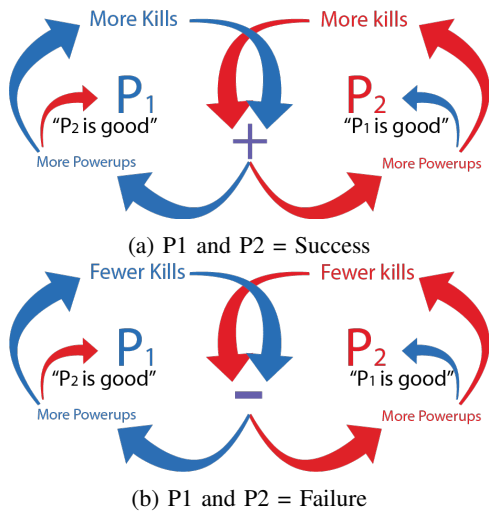


Fig. 3: When both P1 and P2 are successful or **NOT** successful

This covers the basics of the proposed framework, "The Feedback Friendship Loop" (FFL). Therefore, the following will critically evaluate the framework and explain its relevance to video game development and its connection to sociological and psychological perspectives of friendship formation.

IV. DISCUSSION

The purpose of this study was to investigate game design patterns for friendship formation and to use reciprocity as a foundation for a developed framework that illustrates the extent to which feedback loops can be used for intentional consensual reciprocity between players.

A crucial limitation to keep in mind going forward is that the framework remains to be tested in a video-game scenario. The framework itself is proposed quite narrowly in that it only remains relevant for cooperative video-games. We argue that a system like this would only potentially work in cooperative player versus environment-based games, as the

system for interchanging between reinforcing and balancing the relationship can not take an opposing team of players into account, as they would also be needed to be reinforced and balanced accordingly. Therefore being able to satisfy both teams in a player versus player video-game is likely to be much more complex than in cooperative players versus environment.

The framework we propose is only meant as a minor example of how well-known design tools can be incorporated into building deeper friendships in video-games. We believe that the proposed framework proves as an inspiration for other researchers and designers to take well-known game design tools and implement them to systems that correspond to psychological and sociological perspectives of friendship formation.

Psychological/sociological research of friendship is heavily grounded in studies such as [9] [10] [11] [8], and the idea of building systems that intentionally are designed to cater to acquiring new friendships within a video-game has shown to be possible [4] [7]. We argue that the proposed framework is successfully grounded in psychological/sociological research, as for example, Cole and Teboul's model of relational functioning among friends for relational development [10], claims that in building close relationships, humans will first explore the relationship through the initial encounters, which will engage in games of exchange and coordination [10]. Furthermore, Anthony Giddens *pure relationships* [13] and the argument that; "(...) *equal distribution of power in peer relationships forces children to embrace equality and reciprocity in social interactions*" [21]. All can relate to the Feedback Friendship Loop in that the interchangeable system of reinforcing and balancing will *exchange* positive reciprocity by *distributing* more or less equal power and by that intentionally creating a *pure relationship* where both players are contributing to a shared success. With that said, the Feedback Friendship Loop is only theoretical, and testing of the system within the framework is therefore needed for any further validation.

V. CONCLUSION

This study has investigated game design patterns for friendship formation in cooperative video-games whereby four factors of friendship formation are needed (Proximity, Similarity, Reciprocity, Disclosure), and applying grounded theory of friendships from sociological and psychological perspectives. The findings resulted in a proposed framework that utilizes positive and negative feedback loops to intentionally create reciprocation loops between players to increase trust and thus encouraging deeper friendships among cooperative players. The framework proposed in this study, the Feedback Friendship Loop, is intended as both a tool for game developers within the field of creating friendship games, and hopefully also an inspiration for other researchers or game designers to develop and share systems that combines video game design with the intent of building deeper friendships along the way. However, future work calls for testing of the system to investigate the potential.

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