Insight: Exploring Hidden Roles in Collaborative Play

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Abstract

This paper looks into interaction modes between players in co-located, collaborative games. In particular, hidden traitor games, in which one or more players is secretly working against the group mission, has the effect of increasing paranoia and distrust between players, so this paper looks into the opposite of a hidden traitor – a hidden benefactor. Rather than sabotaging the group mission, the hidden benefactor would help the group achieve the end goal while still having a reason to stay hidden. The paper explores what games with such a role can look like and how the role changes player interactions. Finally, the paper addresses the divide between video game and board game interaction modes; hidden roles are not common within video games, but they are of growing prevalence in board games. This fact, combined with the exploration of hidden benefactors, reveals that hidden roles is a mechanic that video games should develop into in order to match board games' complexity of player interaction modes.

Introduction

Research on collaborative games and co-located games, separately, is abundant. Many researchers (Jakobsson & Taylor 2003, Chen & Duh 2007 and Ducheneaut & Moore 2004) have studied the effects of multiplayer in games such as *Everquest* (Sony Online Entertainment, 1999) and *World of Warcraft* (Blizzard Entertainment, 2004). Similarly, there has been plenty of research into the social effects of co-located competitive games (Aleknevicus 2003 and Salen & Zimmerman 2003).

However, there has been less research about co-located collaborative games – games in which players are physically together not connected through network, and work together against the environment – and most of the studies that have been done focus on the physiological responses and social interactions the games evoke. Zagal et al. (2006) described the different studies that have been done with regards to comparing the social interaction in collaborative games. Williams, Caplan and Xiong (2007) were able to show that vocal communication in collaborative games has a positive impact on building community, and builds more trust between players than purely textual communication. Further, studies conducted by de Cremer and Stouten (2003) and many others showed a higher fulfilment and a greater self-other merging during collaborative gameplay. McGonigal (2011) even claimed that the positive physiological response to games could lead to solving global hostility.

Unlike previous studies, this study focused instead on the game design and types of mechanics in co-located collaborative games. The design and mechanics serve as precursors to the interaction between players in the game, which in turn can lead to the physiological and social responses studied above. The study served as an exploration of mechanics that would create interactions that have been underexplored in commercial games. In particular, the hidden role mechanic was explored as incomplete information within players can often lead to changing levels of trust and distrust throughout the game.

While most games presented in this paper are board games, the implications drawn can be applied to all types of games. As Zagal *et al*. (2006) states: "board-game design can inform computer-game design." Since the goal of the study is to find and develop interaction modes that are underexplored in commercial games, any area explored is a space for game development for any medium. This is especially true for hidden role games, since hidden role video games are not prevalent; the study reveals a growing area of development for new types of player interactions that the video game community should explore.

Exploration

This study began with exploring and categorizing games available on the market, including both digital and board games. The study focuses only on games in which players' relations to each other are clearly defined; as such, games with open-ended role play such as Dungeons and Dragons (Gygax & Arneson, 1974), in which relations and alignments can be freely chosen by the players and not by the game, were not included. Based on the different games researched, a new conceptual map was created in an attempt to identify gaps in the design space (Fig. 1). Once this map was created, the research shifted to explore the gaps and to analyse how what a game in the space would look like.
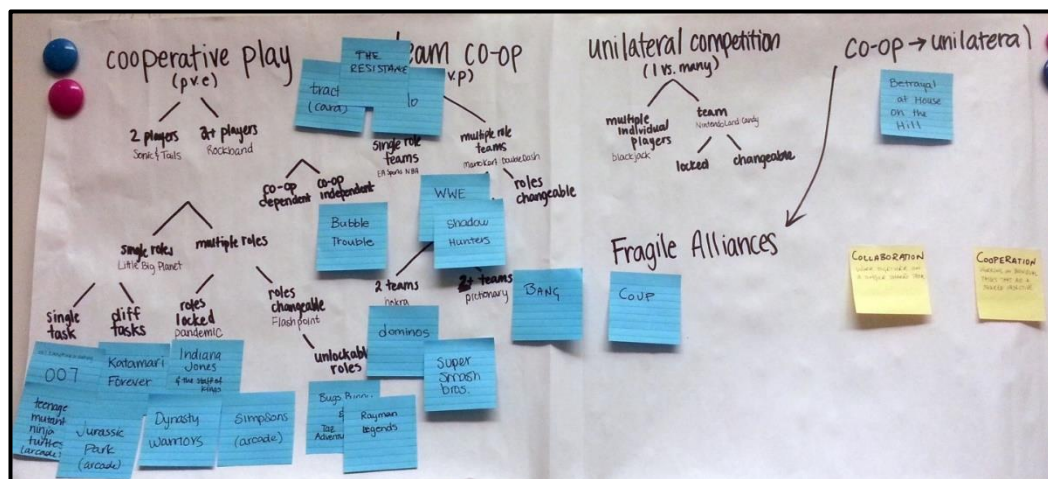

Figure 1. Tree map of collaborative gaming interaction modes

However, it was decided that game interaction modes are not well represented in a tree. The main problem was that game traits and player interactions do not depend on each other. Games can have many numbers of independent traits, and these traits can follow under many interaction modes. In addition, games might shift from one category to the next in the course of a game; *Betrayal at House on the Hill* (Daviau, et al., 2004), for example, starts out as purely cooperative as players explore the house, but the interaction mode changes to unilateral competition after the game assigns one player to be the traitor. Trees are unable to efficiently represent these relationships.

Instead, a more dynamic, interlocking visualization was proposed. Using a Python/JavaScript module by the Computational Linguistics and Psycholinguistics Research Center (CLiPS) called Pattern[1], an interactive web application was made that linked games to each of the categories (De Smedt, 2012) (Fig. 2). Each of the games, game traits, and interaction modes from the previously collected data were assigned a visual representation called a "node". Each of the game nodes were then connected to all of the traits and interaction modes that it encompassed.

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[1] http://www.clips.ua.ac.be/pages/pattern

The built-in weights and springs then allowed all of the nodes to interact with each other, pulling and pushing each other as the user explored the application.
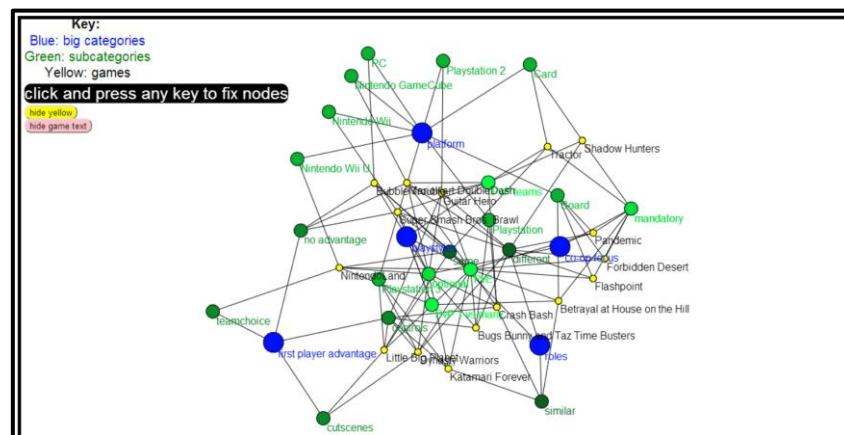

Figure 2. Web application depicting the relationships between games, traits, and interaction modes

The web application has not been fully developed; the list of traits and interaction modes must be updated, and the usability of the app should be improved. However, early development of the application did reveal some traits that had many nodes attached to them and some others that did not have many attachments at all. The idea that some areas are more filled than other is reminiscent of a design framework proposed by Lindley (2003). In his introduction of *Game Taxonomies*, Lindley proposed a method to brainstorm ideas: "If a new game is placed in a particular place in the classification system, designers can ask themselves about…integrating the different formal aspects of the game." In a similar manner, this study looked at traits that either had many or few nodes attached and tried to integrate them into a single game.

Exploring Game Traits

To narrow in on what parts of the games design space to explore, the study looked into traits prevalent in many successful collaborative games. Rocha et al. (2008) described many mechanics common in cooperative games; however, this study chose to only investigate further those applicable to very many games – to look for a common denominator in common games—or very few games – to look for areas to expand upon for future games. The three types of game mechanics explored were the hidden roles, path-building, and physical representations.

Hidden Roles

Hidden roles come in a variety of forms. In team-based games such as *Blood Bound* (Krenzer, 2013) and *Shadow Hunters* (Ikeda, 2005), this mechanic increases or decreases trust between players as they learn

about which team the other players are on. *The Resistance* (Eskridge, 2009), *Saboteur* (Moyersoen, 2004), *Shadows over Camelot* (Cathala & Laget, 2005), and similar games have a hidden traitor who tries to sabotage the group mission without being identified by the other players. Tension builds as players attempt to deduce the traitor. Once accused or revealed, the game becomes one versus many. Yet another usage of a hidden role can be seen in *Panic Station* (Ausloos, 2011). The hidden traitor might not exist at the beginning of the game; he receives his role by drawing a certain item card. He then sabotages the other players' mission by converting players to his side. Existing games have hidden roles in team versus team, one versus many, and changing teams but not in any purely collaborative games. All hidden roles in published games are on the opposite side of some players. A hidden benefactor – a person who helped all of the other players reach their end goal – was suggested as a possible gap in the design space.

Path-building

In games like *Panic Station* (Ausloos, 2011), *Escape: The Curse of the Temple* (Østby, 2012), and *Betrayal at House on the Hill* (Daviau et al., 2004), players create their own board by exploring. Through repetitive plays, they can come up with the best strategy for locating key tiles. Another example of the path-building mechanic is in *Saboteur* (Moyersoen, 2004); the game has a set board, but players use path cards to explore towards a goal. Yet other uses for the mechanic exist: players in *Carcassonne* (Wrede, 2000) and *Tsuro* (McMurchie, 2004) use path-building strategically to score points or oust others from the board, without an end destination in mind. Path-building increases the replay value of games by ensuring that the board is different each time. Additionally, it has the potential to combine with hidden roles: if a player's path cards are kept private, they can manipulate the board secretly while pretending they cannot help the group (e.g. having a four-way split but playing a left turn instead). The flexibility and applications to a variety of games makes path-building a valuable mechanic. However, its functionality has been widely recognized, so path-building in two dimensions is extremely common.

Physicality

Most games have figurines represent the players as they move around, but frequently, the items they collect and the actions they make involve simplified representations, such as adjusting sliders and rearranging tokens or cards. An example found in many games is making an attack: neither the player nor the figurine is affected by the attack; the part that is affected is the slider or health tokens that represent the player's character. On the other hand, *Castle Panic* (De Witt, 2009) has the players place actual wall game pieces on the board to protect their castle; *Big City* (Delonge, 1999) allows players to physically place 3D

figurine buildings on the board's city blocks; and the classic example, *Risk* (Lamorisse & Levin, 1959), also allows players to amass an army of plastic soldiers. Other games with the trait exist, but are rare. Physicality allows the player to immerse himself into the gameplay, as he can see the results of his moves as real objects, not just representative tokens.

The conclusion from exploring game traits found a few areas of the game space that have been filled with very few, if any, existing games. Both hidden role games with a helper instead of an antagonist and games with physical representations are uncommon or non-existent. Path-building as a general concept is common, but only in two-dimensions. The study then focused on looking for a way to use one, or all, of these traits in a new game. Implementing a hidden benefactor required more forethought about setting and player actions, whereas path-building and physical representations could be added to any context, so the main focus was the hidden role mechanic. The hidden role that helped the rest of the team was dubbed the "benefactor".

The end-goal was not the hidden benefactor game itself, but rather the lessons that could be learned from the development process. As Eladhari and Ollila (2012) describe, game design is a "wicked problem space… an area where attempts at producing solutions change the understanding of the problems." They also suggest that testing prototypes can help developers learn what interactions can arise from certain game mechanics. In this study, creating a hidden benefactor would raise questions about balancing powers and dispersing information, the answers to which would inform development for all games with the hidden role mechanic. In addition, creating a testable prototype would reveal what player interactions could occur with a hidden benefactor in place.

Determining Player Interactions

Before implementing a prototype, a decision about the intended player interactions had to be made. Team-based hidden role games already exist, and the goal was to add a single hidden benefactor. Doing so would unbalance teams, unless a hidden benefactor was added to both sides, but that would complicate the design process. Instead, interaction modes that were already unbalanced were preferred. The one versus many, with a hidden or known traitor trying to sabotage the mission was a possibility, since adding a hidden benefactor could balance out the negative effects of the traitor. Additionally, in games where all players work together against the environment, a hidden benefactor could function as an extra guide to overcome the game's challenges.

Within the team, whether it be the team of players against the traitor or against the environment, a decision about whether to foster cooperation – in which all players do separate tasks to achieve a shared mission, as in *Space Cadets* (Engelstein, Engelstein, & Engelstein, 2012) – or

collaboration – in which all players are working on the same task, as in *Flashpoint* (Lanzing, 2011) and *Pandemic* (Leacock, 2008). Cooperation had the benefit of avoiding one player dictating all decisions, since each player has to perform a separate task. However, the drawback of having separate tasks was that a single weak player could frustrate all the other players by causing a mission to fail. Collaboration, contrastingly, allowed for more even gameplay, since the team could compensate for a weak player. However, similar to the findings by Aarsand and Aronsson (2007), the collaborative environment came with the drawback that a more experienced or more talkative player could end up dominating the discussion and gameplay.

Ultimately, the decision was to maximize discussion. Because the appeal of a hidden role game comes from deducing each player's role, discussion should be encouraged, so players can strategize and speculate. The mode of interaction that allows for the most communication is collaboration; players are working on the same objective instead of their own mini-objectives, so more discussion is necessary. Therefore, the desired player interactions were collaborative in one versus many or all versus environment gameplay.

Development

The ultimate goal was to develop a game that incorporated a hidden benefactor role. Contrasting the traitor, the benefactor should help the group achieve the ultimate goal. However, he should have some motivation to not reveal his role. Three questions that permeated designs in each step were as follows.

Why does the hidden benefactor want to stay hidden?

In hidden traitor games, the traitor has an incentive to stay hidden. This incentive has many forms. In *Shadows over Camelot* (Cathala & Laget, 2005), a bonus is granted to the traitor if he remains hidden until the end of the game. *Saboteur* (Moyersoen, 2004) and *The Resistance* (Eskridge, 2009) have gameplay related consequences for staying hidden. In *Saboteur*, if the traitor is revealed, he is immediately blocked from making moves by other players. Likewise, the traitors in The Resistance are prevented from attending missions, which prevents them from having any impact on gameplay. The traitor, thus, has to stay hidden or else compromise his ability to sabotage the group goal and win the game.

In other hidden role games, factions give incentives to stay hidden. *Shadow Hunters* (Ikeda, 2005), for example, allows players to learn definitive facts about other players' allegiances. However, announcing a player's team could draw unintended retaliation by that player's teammates, who can now identify the affiliation of the announcer. *Blood Bound* shares this dynamic, where information about players' roles and

affiliations trickles out during the game. However, this information is all public, so it is up to the player to decide what to share to minimize harm to his team.

Even games without teams share the sentiment of trying to stay hidden. *Coup* (Tahta, 2012) and *Love Letter* (Kanai, 2012) both lack factions, but the incentive for each player to keep his role hidden is still essential to the game. Hidden roles give players bargaining power in *Coup* and protection from guards and elimination in *Love Letter*.

The challenge is then to find a reason why someone who is on the same team as other players would want to stay hidden. Ultimately, most of the reason came from creating an appropriate setting.

Why do other players want to find the hidden benefactor?

An instinctive answer to the first question would be to strip the powers of the benefactor if he is found. This approach mimics other hidden role games, in which the reveal of a character gives him more powers to compensate for the fact that his identity and affiliation are compromised. *Shadows over Camelot* (Cathala & Laget, 2005) has this mechanic, where the traitor gains immunity and the ability to play bad cards on the board on his turn. *Shadow Hunters* (Ikeda, 2005), too, gives characters a special ability that can only be used if the player reveals. Therefore, gaining extra powers balances out giving away the player's affiliation and drawing attacks from the opposing team.

In theory, having the benefactor only be able to use his or her power if hidden would give a reason to stay hidden, and the powers would provide a counterweight for the identity: revealing as a good player would instil more trust, which would be balanced out by the lack of powers.

However, if the players benefit from the hidden role, then they need to have a good reason to identify the benefactor. Otherwise, players would simply deduce the benefactor and adjust their strategy around that knowledge, without formally making any identification. This type of gameplay is not intended, since in all other hidden role games, there is a desire to formally identify the hidden characters.

Resolutions to this question can come in two forms: first, by introducing a traitor or villain who plays against the rest of the group. This character has an incentive to identify the benefactor, since eliminating this character would make eliminating the rest of the players easier. Second, by giving the benefactor subtle methods to use his power; the benefactor could pretend to not know anything while using his cards to guide players.

How do players react to the hidden benefactor's presence?

Hidden role games play on the element of trust. As the game progresses, players trust each other more or less, depending on the

circumstances. In the traitor game *Panic Station* (Ausloos, 2011), players get more paranoid as any person could have gotten infected secretly and switched sides. Team games, on the other hand, build more trust as players can identify their teammates and start to formulate strategies.

The goal of the new interaction mode was to build more trust. Players should be able to become more confident with how to approach the end goal as the game progresses as the hidden benefactor makes his moves. This is because the benefactor is theoretically the inverse of the traitor; instead of working against the team, the benefactor propels the team towards the goal. Thus, since the traitor decreases trust, the benefactor should increase trust. However, there still has to be some distrust so that the benefactor can stay unidentified.

Game Modifications

Keeping these three questions in mind, the first step to designing with a hidden benefactor was to modify existing games or check for variations of the games that included a benefactor role. In order to keep the game moderately balanced, games with traitors were chosen for modifications. The traitor(s) in the games were given extra power boosts to compensate for the benefactor, who was given an extra power.

Figure 3. Saboteur Variant: the saboteurs ended the game by leading dwarves away from the gold tile. The game modification did not allow the dwarves to keep mining after the goal card was reached.

Saboteur Variant

Saboteur (Moyersoen, 2004) is a path-building game in which the traitor can lead the other dwarves astray, making them run out of cards before the end destination is reached. He can give false information about the end goal and play block cards on the board and on other players. To

help the traitor, the possible goal cards were placed further away from the start point, and the rule that if the wrong goal card was reached, the traitor automatically won (Fig. 3). In the original rules, the group could simply switch directions to check the other goal cards. These changes balanced the game in favor of the traitor, so that the addition of the benefactor would not make the traitor's job impossible.

The new benefactor role could look under one card at the beginning of the match to check if it was the right destination. He would then have more information than the rest of the players, but he could not announce this publicly or he would be targeted by the traitor and potentially eliminated from the game.

The traitor wanted to identify the benefactor in order to stop him from building to the correct location, while the players had the risky option to identify the benefactor to grab his gold for themselves.

Panic Station Survival Kit Mini-Expansion (Ausloos, 2011).
An officially published expansion to *Panic Station* (Ausloos, 2011) includes an antidote, which allows players to cure other infected players. Because this antidote was an item that any player could pick up, not a power of a player i.e. a doctor, the mini-expansion does not fit the description of a hidden benefactor.

However, the mini-expansion did have the intended effect of reducing the paranoia. Since becoming infected was no longer permanent, the players could trust each other more. The impermanence of the teams also lead to an unintended side effect of frustration, though, as a player who was infected and then cured would have to switch teams twice in a single game, meaning he constantly had to readjust his strategy and objective.

The Resistance: Avalon (Eskridge, 2012)
An official stand-alone reimplementation and reskinning of *The Resistance* (Eskridge, 2009), Avalon adds Merlin, a hidden benefactor who knows the identities of the traitors. Similar to the *Saboteur* variant, Merlin can lie and vote wrongly to throw off suspicious traitors. His motivation to stay hidden was to avoid being found by the traitors, who could end the game by finding him.

The modified games had desirable elements, such as having a reason for the hidden benefactor to stay hidden, reasons for some players to identify the benefactor, and improving trust within the players.

First Concepts, Prototypes, and Play Tests
The challenge then became to make an original game that could also incorporate these desirable elements. The first concepts fell into three categories: hidden benefactor with a known traitor, hidden benefactor with a hidden traitor, and hidden benefactor without a traitor.

Known traitor: Pathway to Freedom

Set in the pre-Civil War era, *Pathway to Freedom* is a path-building game that encouraged collaboration. Players had to work together to escape to a square at the top of the board that only the benefactor knew, without being captured by the traitor (Fig. 4). Similar to *Saboteur* variant, the benefactor could subtly give hints about which direction to head by playing path pieces, but there was more flexibility from square rather than rectangular pieces. In addition, each player was allowed to look at two cards, play one, and return the other to the top of the deck. Therefore, the players could learn more about each other by seeing whether actions match the "expected" move.

However, since this only gave information about adjacent players, information about others was not available. In playtests with four players, the traitor did not identify the benefactor. He just focused on blocking off the paths that the other players attempted to pursue and did not take the risk of identifying wrongly. In addition, the pieces were abundant enough that even if the benefactor did not pull in the correct location at the beginning, the players would eventually find themselves near a goal anyways. This prototype showed the strengths of the path-building mechanic for allowing subtle manipulation, but it was lacking in amount of information available about players.
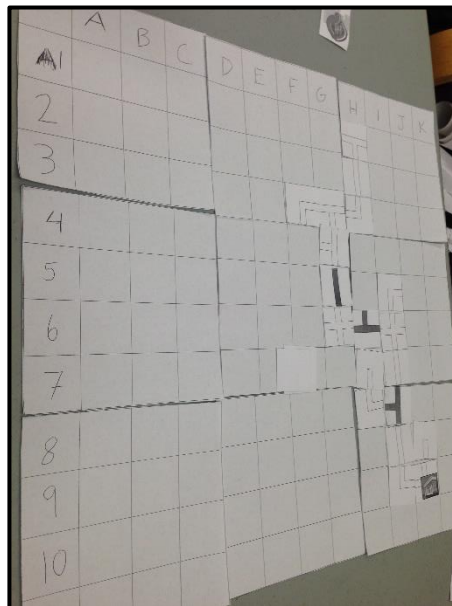

Figure 4. Pathway to Freedom: players reach the goal (F3), even though the traitor managed to block off a few paths. The benefactor was not identified.
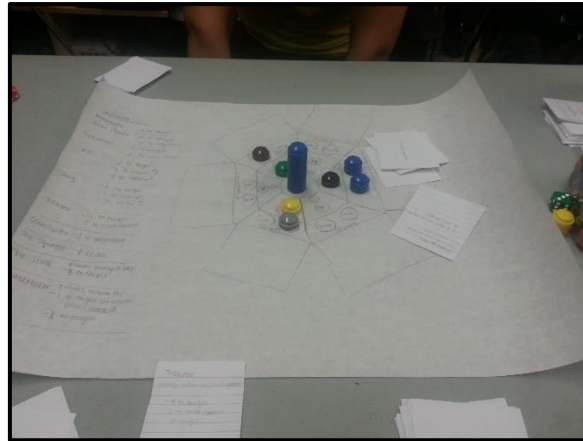
Figure 5. City Capes: The villain did not manage to identify the superhero, so he did not take down enough defenses. The other players won the game by successfully guarding the city.

Known traitor: City Capes

A previous project in CMS.301 Introduction to Game Design Methods at the Massachusetts Institute of Technology had the idea of a superhero game (Boning, et al., 2014). However, that game had multiple superheroes. *City Capes* pared down the powers to just one benefactor and many civilian defenders. One player controlled a league of supervillains who attacked the city while the superhero and civilians had to defend.

The benefactor was more susceptible to attacks on his family, and if the villain could find the benefactor's civilian identity and capture his family, the superhero's powers would go away, cutting away a large portion of the city's defence (Fig. 5). The benefactor, then, had a strong desire to protect his family, but defending them too much would draw attention and more attacks.

The concept was ultimately abandoned for being too similar to the already existing *Castle Panic* (De Witt, 2009); it functioned as a variant instead of an original game. Additionally, the villain did not bother trying to find the hero; he just captured families indiscriminately, again revealing the need to have better ways of learning about players. However, the prototype was referred to in future design sessions, as it encouraged dialogue and strategy.

Hidden traitor: Save the Princess

Save the Princess explored what a hidden role dungeon crawler would look like. Players were knights, exploring an unknown land, gathering items, and attempting to return a princess to the castle of her fiancé, the benefactor. The benefactor could attempt to reveal himself, but there was also a nefarious dragon who wanted to steal the princess away to his castle, who could pose as the benefactor.

Figure 6. Save the Princess: The traitor (yellow) was stopped after stealing the princess but before he made it back to his castle. The game was heavily unbalanced against the traitor.

The game had the most explicit information gathering, with players able to draw Trial Cards and pass them to other players for information in style of Hermit Cards in *Shadow Hunters* (Ikeda, 2005). However, this information was too easily obtainable and ended up being detrimental to gameplay, since once the traitor was found, it was too hard for him to overcome all of the other players and steal the princess away (Fig. 6). *Save the Princess* illuminated the balance between knowing too little and knowing too much: Before the Trial Cards were added, players had to make a guess about who was the real benefactor, but the Trial Cards made it too hard for the traitor.

No traitor: The Accomplice

The Accomplice stemmed from a CMS.301 project about criminal investigations. Players were investigators trying to solve a case, and one player was the accomplice, who was a guilty criminal conspirator. However, the accomplice did not want to get caught for fear of being arrested, so he had to guide the other investigators to the criminal hideout secretly (Anderson, *et al*., 2014).
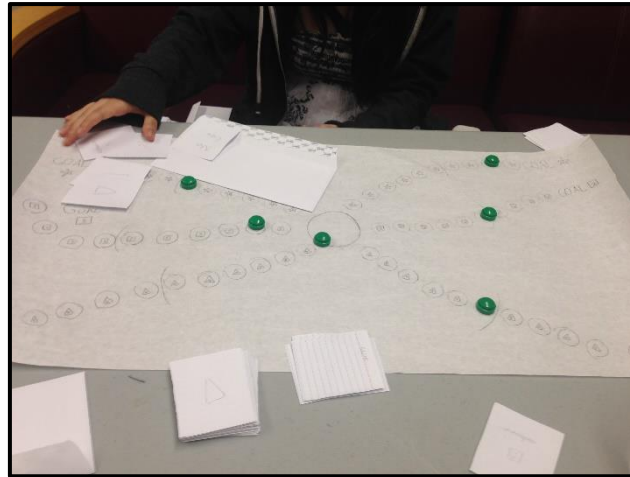
Figure 7. The Accomplice: Endgame conditions. The top-right path has reached conclusion. Some other leads have been explored, but players stopped advancing down those paths after reaching a clue (marked by a curve) that suggested that lead was incorrect.

The concept was mechanically the most simple out of the initial prototypes. Players had symbols that corresponded with six different pathways. They took turns laying down the cards and advancing the investigation token down one of the tracks. After a certain depth in each path, the team received a clue about which path was correct. The game ended when the end of a path, correct or not, was reached (Fig. 7).

A problem was that accomplice could just help get clues and thereby not reveal himself. In the end, people were guessing the accomplice randomly. Despite this flaw and the simplicity of the gameplay, *The Accomplice* proved that the benefactor could have a reason to stay hidden, have a reason to be found, and help the group grow confident about achieving the end goal without a traitor in the game. This finding was especially important in determining which traits to explore even further because it was unfound in commercial gameplay. Some published games had variants that included a benefactor to counter the traitors, such as *Resistance: Avalon* (Eskridge, 2012) and the *Panic Station Survival Kit* (Ausloos, 2011) mentioned earlier. However, the benefactor existing independently of another adversarial was not found, so it was chosen to be developed further.

Revisions and Final Prototype

The final step was to combine the successful elements of each game into one final prototype. Therefore, the path-building from *Pathway to Freedom* and lack of traitor from *The Accomplice* were combined. To make the game more original, a third dimension was added to the path-building to compensate for the abundance of two dimensional path-building games in existence; in the intermediate prototype *Skyscrapers*, investigators, with guidance from the accomplice, now had to locate the

correct city grid and build up to the correct height in order to find the criminal.

Figure 8. Nab a Banana (working titles Insight, Skyscrapers): (left) endgame when all players are cooperative; short towers show where false leads were abandoned. (right) Endgame when players act selfishly: players built more tall towers to score points. The end goal was not reached, as the players ran out of tiles. Additionally, the black piece in bottom-right corner is for voting; players placed the marker (white in picture) in front of the color of the player believed to be the benefactor.

The final prototype, *Nab a Banana*, had a monkey theme, in the style of Wolfgang Köhler's *The Mentality of Apes* (1957), in which chimpanzees attempted to reach bananas that were out of reach. In *Nab a Banana*, one player is the pirate monkey who feels remorseful after stealing so many bananas that his friends are hungry. Similar to the accomplice in *The Accomplice*, the pirate monkey must lead the other monkeys to the specific grid location and height where he stashed the bananas without revealing himself as the perpetrator (Fig. 8).

Players take turns placing Build Cards out of their hands to stack crates and moving the crosshair that represents where they can build. Additionally, each player receives a voting block that allows them to accuse another player in secret only once per game; the votes are then resolved at the end of the game: players get points for guessing the pirate correctly, and also for being accused of being the pirate monkey if they are not (this is to ensure that players other than the benefactor have a motivation to move the crosshair and lead the group in another direction). Points are also rewarded for building crate towers to a certain height and finding the correct location. If the benefactor manages to hide from all other players, he receives a large point bonus at the end of the game.

One major change from any previous prototype was the addition of the voting block. Instead of a single player announcing the benefactor's identity in the middle of the game; all players could vote individually. Because the decision was resolved at the end of the game, the voting

did not detract from the flow of gameplay, unlike verbal accusations, and it forced all players to make deductions.

The final version of the game satisfies the three original conditions: The benefactor stays hidden to gain points, other players want to find him to gain points, and through proper guidance, players feel comfortable that they will reach the final goal.

Analysis

In terms of gameplay, *Nab a Banana* is fast-paced and easily repeatable. Players have a collective pool of fifty crates, and each player's turn involves using one to four crates. On average, each player takes six to eight turns, each lasting a fraction of a minute, per game. The short duration serves two purposes:

First, multiple repetitions allows for point balancing. Since receiving bonus points as the benefactor is difficult unless others are willing to impersonate the role, having several rounds and switching roles between rounds balances out the disparity.

Second, players learn and develop strategies round to round. With the first group of play-testers, each player tried to score the most points instead of trying to find and complete the group goal. After the first round ended in failure, the second round had more collaboration, and the group goal was achieved without struggle. Subsequent rounds then skirted the balance between maximizing personal gain while still getting to the group goal. The second group of play-testers also behaved differently round to round. In the first round, each player cooperated and identified the benefactor. In the second round, players started impersonating the benefactor to draw extra points and made aggressive moves in random directions. The group goal was not met, and false accusations did happen. The structure of Insight gave players the ability to learn about the balance between individual and team goals.

While *Nab a Banana* developed into a playable, educational game, the hidden benefactor mechanic could still use improvement. The final version only has consequences for identifying the benefactor narratively and in terms of scoring points. However, the ultimate goal is to have a strategic reason to identify the hidden benefactor. Just how players have an incentive to find and stop the hidden traitor from sabotaging the mission any further, and how the *City Capes* prototype villain had a strategic advantage to eliminate the superhero first to reduce the city's defence capabilities, Insight still needs a gameplay consequence for finding the benefactor. Future research into hidden roles could explore various consequences.

Findings and Implications

Though the design space for hidden role games still has yet to be fully explored, *Nab a Banana* showed hidden roles can exist without direct antagonism between players; it showed that it is possible to craft narrative and gameplay around a beneficial hidden character. Future games can expand on this mechanic, exploring more in-depth how the benefactor affects game balance and interactions between players.

More generally, the fact that a hidden benefactor could exist opens up a new realm of possibilities for hidden role characters. Breaking free from the current traitor or hidden teams mechanics could reveal other engaging and fun games.

Video games, in particular, can also learn from the fact that hidden benefactors can exist. Even more generally, because hidden roles are virtually non-existent in video games, this whole design space can be explored. The proof of hidden benefactors just expands that design space even further.

The introduction of hidden roles into video games would be a continuation of bringing board game and video game mechanics closer together. Recent developments in both modes of play have toyed around with one vs. many: horror board games such as *Betrayal at House on the Hill* and *Mansions of Madness* (Konieczka, 2011) and video games such as some *Mario Party* mini-games (Soft, 1998) and *Nintendoland* (Nintendo, 2012) explore the dynamics when one player is pitted against all others. This asymmetrical gameplay is only one step away from a hidden traitor game. Making the "one" hidden while still allowing him to somehow manipulate gameplay would introduce the hidden role mechanic to video games.

Hidden roles in video games may be more immersible than hidden roles in board games because players take turns simultaneously. While most board games are turn-based, meaning players spend most of the game watching others make decisions, video game players all move at the same time. This could add more intensity to the hidden roles aspect, as players will have to work towards the goal and also constantly check other players' decisions. This would require more attentiveness by players, but also make the game more active and engaging.

However, adding hidden roles to video games has complications. The main problem is keeping information hidden. Board and card games can have traitors because each player can keep his hand hidden. Because players in co-locative video games all look at the same screen, assigning hidden roles is not possible without external devices. A solution might be in the form similar to Square Enix's one-time password that allows a player to receive a secret, personalized number to a keychain or smartphone app (Square Enix Co., Ltd., n.d.). If a similar technology

can be incorporated into a game, players can receive their teams on their personal devices and then play the game on a shared screen.

Another solution is to explore hidden roles in online games, in which each player has their own TV or computer screen. The individual roles could be displayed on the screen without players worrying about revealing themselves. Hidden role games of this mode might not have the same effect as existing hidden role games, since they will not necessarily be co-locative. Current hidden role games are co-locative, so players are encouraged to discuss and guess each other's affiliations. In addition, players' body language and tone of voice could give away key information. Future research can look into how these discussions are carried out over the internet, either through headsets or through online chat, and whether the distance and anonymity of the internet affects player interactions.

An important distinction to draw in investigating hidden roles in video games would be to distinguish between formal rules and free-form play. Because games such as Massively Multiplayer Online Role Playing Games (MMORPGs) are largely free-form in that they allow players to interact with each other as antagonistically or benevolently as they wish, examples of individuals helping others anonymously or purposefully trying to sabotage a group quest might exist. However, these individuals are not considered hidden benefactors or traitors as discussed in this paper: the interaction constraints are not placed by the game; rather, the individual is deciding by himself how he wants to interact. The difference between formal and informal role decisions is the expectation by all players. If the game defines that there will be a benefactor or traitor, then players know that they should be vigilant for suspicious behaviour; on the other hand, if the game allows any type of interaction, then players may not be paying close attention to an especially nice or an especially mean person. In order to investigate hidden roles in video games as they were investigated in this paper, formal rules should be defined for existing player interactions.

Conclusion

As hidden traitor games become more popular in board games, it would be interesting to see how the mechanic would fare in video games. The mechanic would create variety, both in terms of possible narratives and of emotions that the game could convey. Additionally, board games with hidden roles cause players to question and observe each other, since contextual clues and body language can lead to important deductions about team affiliation within the game; the question then arises: would video games with hidden roles also encourage players to question and observe other players, or would the challenge against the environment override that type of player interaction? Building off that question, further research could also compare the player interactions of hidden

role games between players in a co-locative setting and players who engage over a network and are not in physical proximity.

Another area for further research and development for both board and video games is the different types of hidden characters, including those that are not antagonistic. Through the development of *Nab a Banana*, this study showed that a hidden benefactor can exist, so hidden roles do not always have to foster distrust. While challenges do exist in keeping roles secret and balancing information distribution, hidden roles are useful mechanics to encourage discussion and involvement by players. Research could investigate how the role of the hidden player in relation to other players – if the hidden player is antagonistic, benevolent, or somewhere in between– affects the way players interacts with each other.

Overall, board games have shifted away from the strict dichotomy between collaboration and competition. Newer games have elements that question the true allegiances of players by hiding the affiliations of each individual. As technology develops and becomes more sophisticated, adding similar mechanics to video games is more feasible. Adding hidden roles to video games has the potential to open a new realm of narratives and interaction modes, which could bring the gaming experience to a whole new level.

Acknowledgments

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