Remix and Play: Lessons from Rule Variants in Texas Hold'em and Halo 2

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ABSTRACT

Players can change the rules of a multi-person game to experience a different gameplay mechanic, add thematic color, or fine-tune its balance. To better understand game variants, we use a grounded approach to analyze 62 variants for Texas Hold'em, a popular card game, and a follow-up case-study of 91 variants of Halo 2, a popular video game. We study their development and examine whether lessons from Texas Hold'em apply to a constrained system such as Halo 2. We discover video gamers' reliance on 'honor rules', rules dependent on the cooperative spirit of its players. We develop a theory of 'necessity' in rule adoption, showing players' sensitivity to the impact of one change on the whole game. In solving game-design problems, adjustments drawn from a set of 'canned' rule changes address common problems with familiar solutions. We find a complex interplay between who can play and what rules are chosen. Our findings have implications for game designers and for non-game variants.

Author Keywords

customization, poker, halo, game design, variants, honor rules

ACM Classification Keywords

H.5.3 Group and Organization Interfaces: Computer-supported cooperative work

General Terms

Human Factors, Design

PREFACE

One researcher recalls: During my childhood, I played the board game *Monopoly* with the following understanding: whoever landed on the "Free Parking" space would get the bonus money at the center of the board. During one game, I was surprised to find out that a new player did not know this rule. Smugly, I picked up the instructions to point it out; after reading and re-reading the rules for 20 minutes, I realized it was not there. To my surprise, Parker Brothers (the publisher) notes that this is a common 'house rule', a game variant but not part of the standard rules.

LET'S PLAY SOMETHING A LITTLE DIFFERENT

Changing the rules in a game produces a variant, allowing players to create a unique gaming experience that fits their playing style. Game variants and other customizations can extend a game's entertainment value when the players tire of the standard rules. Variants range from minor tweaks lasting a single game, to rules for specific contexts (i.e. '*House* rules'), to a complete overhaul of the gameplay mechanic. The rule change may be simple or complex, and its effects diverse: it may either be adopted as a popular variant or forgotten when the day ends; its impact on the game experience can be small or wide-ranging. For example, the rule of whether or not a dealer is required to hit on 17 in Blackjack can potentially double the casino's edge.

Variation may be developed through similar processes across different games and other collaborative customization contexts (such as software). The characteristics of variation inform designers and system builders about how to cater to their users. Additionally, a closer inspection of variants inform our understanding of appropriation and further the design of customizable systems. This study investigates:

- decision-making processes when players create a variant
- characteristics of rule changes
- relationships between system features and appropriation

Our study is exploratory and its scope is limited to two games: a card game and a video game. We selected the poker game Texas Hold'em and its variants to study (extending initial work [2]), and we picked the video game Halo 2 and its variants to study. Both are among the most popular games in their genre; these two cases provide a starting point for deriving insight into games in general. We conducted the first study on public descriptions of Texas Hold'em variants found online and analyzed the data using Grounded Theory [18]. Using the theory we derived, we conducted a case study on Halo 2 to explore the transferability of the theory and to focus on the challenges of variation in a software context.

In our analyses of both games, we describe how variant authors adopt a systematic perspective to evaluate how rule changes upset the balance of the original game. Rule changes disrupt and restore the games' equilibrium as part of a 'chain of necessity'. We discuss how this can be applied to understanding customization and supporting it.

What is a variant?

Merriam-Webster defines a variant as "a form differing slightly from a standard". Monopoly house rules are variants of standard Monopoly. Texas Hold'em has many twists to its basic formula, as do Halo and other video games. But what is a "slight" difference? Which of these variants on Halo, for instance, stands as a game in its own right? Pinning down the meaning of variation means engaging the thorny problem of ontology and essence. Others have pondered this problem under the name of 'genre'; for example, Jesper Juul wrests with categorizing the family of 3-match puzzle games [10]. Projects such as gameontology.com seek to broadly categorize games. In this study, we depend on the gaming culture to define variants by collecting game descriptions that are described as "variants of X". This approach exposes the perceived boundaries of a game and, by extension, the perceived essence of a game. Close scrutiny of "variants" promises to inform the creation of ontologies, design for appropriation, and the rhetoric of customization; the overlap between variation and these areas remain underexplored.

RELATED WORK

Variants are often mentioned in collections of games and game types to develop insights about games themselves or to make claims about larger sociological patterns. Parlett's collection of card games [14] is a thorough collection, but as a book written for players, it does not make many claims about variation except to say that card games are folk games, not established by any governing authority. Sutton-Smith's catalog of games [19] also reviews many games, but does so to create a theory of play rather than a theory of variation.

Studies of variation in individual games such as Iida et al. [9] examine the historical evolution of chess in seven variations. Using metrics to approximate conceptual features, they conclude that chess's variations have been refined to seek a balance between search-space complexity and entertainment impact. FlexibleRules [5] is a software framework that allows players to customize the rules in digital board games. They authors found that players enjoyed inventing and discussing new rules, and that they reported enjoying playing the custom game more than the standard game. Customization is often used to achieve different gameplay, but it can also be a solution to a social problem. In Xu et al. [23], players customized Halo 3 to make the game fair for inequally skilled players. Xu et al. explain that the players desired "a good social experience associated with the game".

Cheating [3], "bad play" [12], mischief [13], or griefplay [4] may seem like forms of variation. Mischievious players and griefers (disrupting the play of others) still play according to the rules of the game, but perhaps not in the spirit of the game. The variation can be of a social nature, breaking the rules of convention. Cheating, as Huizinga [7] points out, is meant to be hidden; the opposing players are led to believe that the rule-breaker is actually following the rules. Such malignant rule bending does not produce variation in play—it reinforces the importance of the original rules since the cheater purports to comply with the standard. When undisguised, rule-breaking represents a kind of playfulness with the rules that may lead the game's transformation [12]. Work such as Huizinga's lends us insight into actions that may produce game variations. However, not all variants arise from instances of cheating, malice, or even playful innovation.

In *digital* games, variation has been somewhat recognized by the examination of game "customizability" [15] and in the culture of co-optation by clever modification of the original code [16]. Players see customizability as a way of adding a proper level of difficulty and replayability, enhancing the entertainment value of replaying the game. Pinelle et al. uncover the primacy of customizability during the process of collecting heuristics from game reviews [15]. Modifications of existing games are of great interest to both industry and researchers in that 'mods' promise to extend the value of a commercial game [16] and foster creativity and learning [17]. However, variation need not be limited to complex reprogramming of the software. A layer of 'reconfiguration' is accessible to everyday variant authors who find effective ways to play new games without relying on programming skills. For example, Wright et al. [22] observe how *Counter-Strike* players cheat death by using a voting mechanism to communicate with their living teammates from the grave. Wright sees this as a creative response by players to overcome technical limitations established in the game.

We propose to explore variation in games as a core phenomenon rather than as a side-effect. To expose the rationales or processes behind rule changing, we start the investigation with the variants of a card game: Texas Hold'em.

TEXAS HOLD'EM

According to Parlett's ontology of card games [14], Texas Hold'em (or Hold'em, for short) is a popular *vying* game in which players vie with one another over who is holding the best cards. It is played in both living rooms and casinos, for fun and for profit. The breadth of the game's adoption in casual contexts implies that we are likely to find a large number of casual variations. The institutional presence of casinos establishes standards, providing an authoritative version against which we can compare casual variants.

In Texas Hold'em, players use money in the form of chips to back their claims to better cards throughout multiple rounds of betting. They make a round of bets each time cards are dealt or revealed, for a total of four rounds. In each round, every player must match or raise the bet amount if they wish to remain in contention for the chips. The players select from the mix of private and public cards to compose a 'hand'. Players are first dealt two private cards ('hole' cards), then three public cards are revealed, then an additional public card and a final public card enter play. Players who remain reveal their hands in a 'showdown' to determine the winner of the gambled chips. Sets of cards are generally ranked according to rarity; for example, five cards of the same suit (a 'flush') rank higher than two pairs (e.g. 4-4-J-J-8).

Methodology

The examination of Hold'em variants was conducted from a Naturalistic standpoint [11] using Grounded Theory [18]

Figure 1. Intermediary diagrammed memo during the axial coding phase focusing on the implications of bodies of associated rule changes.

Figure 2. Cluster diagram of rule types for Texas Hold'em variants.

as a guide. Data sources were descriptions of Hold'em variants found on the Internet, taken from public websites, blog posts, forum posts, and comments (See Table 1 for a breakdown). We recorded the URL, an excerpt of the text, and descriptive notes from 83 reports of variations. There were 63 descriptions of variants, 15 comments on 'house rules', and 5 comments providing general advice about customizing games. The collections sites were general interest websites on poker, poker discussion forums, personal blogs, and general purpose informational sites (e.g. ehow.com). Theoretical sampling was used to collect data, prioritizing *variety* in sampling ([18], p.73). Here, the sampling strategy changes as 'theoretical saturation' is encountered. Saturation describes the condition where the theoretical insights that can be derived from gathering more data are so few that it is more profitable to turn collection efforts beyond the area in question, to either stop collecting (moving further into analysis) or to look for something different to collect. Analysis followed Strauss and Corbin's method of coding data, a progression from discovering instances and categories (open coding), relating those categories (axial coding, Figure 1), to review and refinement (selective coding) of the categories. The process alternated between diagramming and line-by-line micro-analysis ([18], Chp.5).

To collect data, we started with Web search queries for "Texas Hold'em Variants". When we encountered names of variants such as DOUBLE FLOP, OMAHA, and others, we also used those terms as queries until the diversity of variants reached saturation. As our model developed, following Theoretical Sampling, we returned to collection with theoretically informed queries, such as "is a horrible rule" in our search for spoiling rules. The conceptual completeness of our model (from the selective coding phase) indicated a sufficient level of saturation for us to stop data collection.

We recruited an outside auditor to validate our interpretations. From a fraction of the data (16 randomly selected excerpts) and our ontology of rule types, the auditor applied our categorization to the sample and kept a critical eye on the interpretive step between data and initial categories. From this feedback, we maintain that our theory does not make claims about why new rules are formed, only that it recognizes patterns in the rules and in the language used to describe rule variants. In our discussions, we recognized the
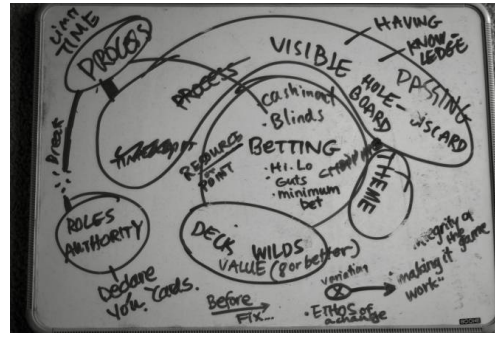
difficulty of discerning the motivations for inventing rules from the kind of data we had collected, since the descriptions were typically written after the rules had been invented.

Variants

Clustering (by types of rule-changes, Figure 2) produced groups of paired changes; one type of rule was commonly associated with another type. We defined three clusters of associated sets of rule changes: variations on hole and community cards were typically accompanied with limits on what to play; unusual sets of community cards were accompanied by rules on dealing and revealing them; and, custom decks were accompanied by new rules on ranking hands.

Hole/Community ⇒ Play-limit Rules that increase the hole or community cards are accompanied by 'play-limit' rules on how many cards could be played. PINEAPPLE possesses new rules in which players receive three hole cards instead of two. As a consequence, PINEAPPLE limits the possible plays by requiring players to discard one of the three cards, sometimes before any public cards are revealed, sometimes after (in CRAZY PINEAPPLE). IRON CROSS grants players 5 hole cards and 5 board cards. Players are restricted to playing two hole cards, and the remaining 3 are taken from the board.

Community cards ⇒ dealing/reveal Unusual sets of community cards (such as IRON CROSS above) are accompanied by specific instruction on the manner of dealing (one at a time, all at once) and revealing (flipped over to be assessed and used).

Deck ⇒ Evaluation Custom decks lead to instructions about how to compare and evaluate hands. "MANILA is played with a strip deck of only 7-A (32 total cards). Because it is played with a strip deck, a flush beats a full house." (pokertips.com) The same rule is used in Spanish poker, which uses a stripped deck of 8-A.

Source Type	Variants
Poker websites (texasholdem-poker.com, etc.)	37
Online forums (pokerforums.org, cardschat.com, etc.)	25
General websites (ehow.com, googobits.com, etc.)	17
Blog (blogspot.com)	2

Table 1. The sources of data for variants in Texas Hold'em.

We reviewed these three associations and found a language of necessity (uses of the words, "because", "should", "must", etc...) and appeals to balance, fairness, fun, and other requirements. One rule flowed into the next, leading us to annotate them with directional arrows above. Our main interpretation of the clustered data is that, instead of clusters, these are *series* of rule changes. We call these series "chains of necessity" which we now introduce.

THE CHAIN OF NECESSITY

New Rule → Disrupted Nature → Necessity → Satisfying Rule

Texas Hold'em seems to exist in a state of proper equilibrium. Its basic rules facilitate a playing style that meets players' requirements for a fair, balanced, and engaging game of poker. The introduction of a new rule may upset the delicate balance of the game, ruining its fairness or making it predictable and uninteresting; thus one may adopt another new rule change to restore balance. This is an example of such causal reasoning in which a forum poster engages in a creative session of inventing a Hold'em variant:

> all right, lets play hold'em wait lets play super hold'em, i'll deal everybody two extra cards well, lets see.... somehow this isn't fair. let's make it you have to use two out of your hand. i like that, lets call it super holdem (SUPER HOLD'EM, pokerforums.org forums)

This variant author starts with an initial rule change: ("i'll deal everybody two extra cards"). However, this new rule disrupts the game, and the author is concerned that the game is now imbalanced ("lets see....somehow this isn't fair"). To resolve this, the author imposes an additional restriction ("let's make it you have to use two out of your hand"). He evaluates the new implications of this second rule and validates it ("i like that"). This pattern of justification exists throughout the variants: a new rule is introduced and the implications of the new rule create an incomplete game that requires a solution. The problem is resolved by introducing an additional rule which may cause a new disruption or produce a satisfying stasis to the game's condition.

The vocabulary within the data specifically exposes an implied necessity for new rules. Note the causal implication of this quote regarding PINATUBO POKER, a variant of MANILA: "*Because* Manila poker has five poker betting rounds, it does not play well at no limit or pot limit. This can be easily modified by eliminating the poker betting round between the second and third community cards." In this example, a new rule (playing no limit or pot limit) creates a poor game for MANILA ("does not play well"). This situation is remedied in PINATUBO POKER by adjusting the betting sequence. Thus we see a pattern where the variant creators perceive and employ a sense of cause and effect to explain further revisions to the original game.

The notion of necessity is accompanied by two concepts: optional rules and 'spoiling' rules. During our analysis, we found counterexamples of the claim that all rule changes could be linked to one driving need. In a game of *crazi-ness*, we could not claim that all new rules must have a causal link back to *craziness*; instead optional rules supplemented the required ones. For example, a common option is to play a game *hi-lo*. To play hi-lo is to split the winnings between whoever has the highest ranking hand and whoever has the lowest ranking hand. The option of playing hi-lo is often tacked on at the end of the description. In the SUPER HOLD'EM example above, the variant author decided, as an after-thought, "....oh wait, lets throw in a hi-lo variation," implying that the variant is compatible with playing normally ('straight') or playing hi-lo. One can say that optional rule changes are considered as such when the implications of the rule change are believed to be inconsequential.

If satisfying rules and optional rules exist, the next step in selective coding is to project a third possibility. Are there rules that are the opposite of satisfying rules? These would be proposed rule changes that are rejected as incompatible with the desired nature of the game. After being sensitized to the possibility, we returned to the data seeking prohibitive language. One discovery is presented in Table 2.

This player at a casino found that if a player mistakenly bet too early, before another player had a chance to bet, the casino would still allow the game to continue. This person saw that players could abuse this rule to their own benefit: if a player intentionally bets out of turn, he can use this 'accident' as a way of influencing the choices of other players. From this person's perspective, this rule ruins the integrity of the game and should be removed. His rationale differs from that of the chain of necessity. Now, when a new rule disrupts the state of the game, the commenter's prescription is that this 'spoiling' rule should be removed rather than amended by another rule. That the casino ignores his request does not negate the rationale that he uses; the casino's refusal is a reminder of the subjective quality of this rule type. Rather than an objective assertion that certain rules are satisfying, optional, or spoiling, this ontology helps us understand and explain rule changes. The theory of necessity does not examine the correctness or persuasiveness of the argument.

In summary, satisfying, optional, and spoiling rules can be traced back to their relation to necessity in a game variant. Outside expectations such as fairness, craziness, and fun impose a need for new rules or the prohibition of others, and a new rule can provoke this need by creating a distinct change in the nature of the game. Sometimes rules can co-exist without any relation to necessity. Such optional rules imply that a game can have two variations: for example, a 'deck to evaluation' set can be played with the 'hi-lo' variation or without it. Lastly, the necessary imposition of new rules is accompanied by the necessary forbidding of other rules.

Canned Solutions

Continuing our analysis, we sought to explain why three clusters of common rule changes appeared in the dataset. This repeated phenomenon was notable for its pairing of two kinds of rule changes with causal language. The first rule in the pair disrupts the balance of the game (e.g. players receive more cards than normal, changing the expected odds);

Rule type	Texas Hold'em	Halo 2
Satisfying	"After all bets are placed, players turn their hole cards FACE UP on the table in front of them. The flop is then dealt face DOWN [...] My buddies and I made this up after a couple games of Pineapple, [...]. **We actually prefer it over Hold'em, much more suspense.**" (UPSIDE-DOWN PINEAPPLE)	"This gametype was **inspired by the raw scene in lord of the rings**, [...] wot u end up with is a seige, and the orcs hadcap means that to win they have to use thier greater numbers to good effect" (HELM'S DEEP, *a seige narrative*)
Optional	"This game is best straight without a high/low option with structured limits or no limit. **Optionally it can be a split pot game** where the winner of each of the two boards gets half the pot" (DOUBLE FLOP HOLD'EM)	"...being a big fan of the movies thought up some other aspects that would **make it more like the movie**. The people in the base should have either BRs or Snipers(arrows) and the secondary should swords(for inside the base)." (HELM'S DEEP)
Spoiling	"The most annoying one was they let raises out of turn stick [...] The raising out of turn was terrible and when I tried explaining it to the staff how people were taking advantage and how **it affects the integrity of the game**, they had no idea what I was talking about. (cardschat.com forums)	"Make sure you turn off Force Even Teams. As we learned the other night, **it ruins the respawning** if the teams are not even. I would consistently sit out for 45 seconds or more. Its not fun." (REINFORCEMENT CTF)

Table 2. Examples of different rule types in Texas Hold'em and Halo 2. Key phrases emphasizing the underlying motivation of the rule are bolded.

the second resolves the imbalance as a satisfying rule. These clusters were prominent, but did not encompass all the rule changes found. There were many rule changes that did not fit dual-paired clusters.

Also missing is an objective causal relationship between the two rule types. Consider the pattern that associates hole card variations with play limit rules (see above). Just because a player receives one or two additional cards does not mean that limits *must* be imposed on how many cards can be played; an equally balancing solution could be to change the ranking of hands. A careful analysis of how odds are changed by having one or two extra cards can allow players to rebalance the game without relying on a typical solution. Similarly, a game played with a stripped deck does not necessitate a re-ranking of hands as the discovered cluster suggests; other solutions exist.

Our interpretation of the nature of these clusters is that a *problem* and its *fix* reflect a 'canned solution': an easy to understand, off-the-shelf solution born of community norms. We anticipate that as communities play games and develop variations of those games, familiar patterns of rule changing will arise. Within such a community of practice, those who know many variations will recognize familiar solutions for common problems in (re)designing their game.

Summary and Next Steps
To solve needs, variant authors prescribe satisfying and optional rules and ward against spoiling rules. They employ 'canned solutions', a pattern of use that shows reliance on familiar solutions to solve common problems. These rules are evidence of a player's systematic perspective. The theory of necessity shows end-users' keen awareness of the ability of one small change to disrupt the balance of the game-system.

Beyond this card game, future inquiry can be directed toward other domains. We next examine this theory in a digital context, taking these insights from a traditional medium into a digital one. Digital games appear more difficult to customize than non-digital games; for example, video games currently feature automatic processes and discrete representa-

tations. These features deeply restrict the choices for variation as compared to a simple deck of cards, raising questions on the transferability of the theory of necessity and the quirks of game variants in digital media. To address these questions, we study variants for Bungie's Halo 2 next.

HALO 2
Halo 2 is a first-person shooting game on the Microsoft Xbox where players battle with plasma rifles, shotguns, and grenades. With over 8 million copies sold, Halo 2 is the best-selling Xbox game and can be played as a single-player campaign or a multi-player game (online, networked, or split-screen on the same device). In a typical multi-player match, players accumulate points for killing one another. When they die, players are revived ('respawn') in random places on the battlefield. The game ends when one player has scored a target number of kills (e.g. 25 kills in the *Slayer* game type).

We focus on customization in the multi-player aspect, in which one player (the host) can choose the type of game. Halo explicitly allows the host to create, play, and save different variants. Players can choose from seven built-in game types: Slayer, King of the Hill, Oddball, Juggernaut, Capture the Flag, Assault, and Territories. These game types feature programmed support for win conditions, respawn locations, count-down timers, game items, and territories. For example, *Capture the Flag* is a timed team game in which players try to steal an enemy flag and return it to their home base for points. Game logic is reconfigured to spawn team members on opposite sides of a map, to introduce a flag item for each team (spawned inside home territory), and to track the location of the flag to determine scoring. Players choose among different game types, each offering four to seven sub-variants for a total of thirty-eight built-in variants.

In addition to the predetermined types, players can fine-tune each variant as a "Custom Game Type" by adjusting the available weapons and armor, and the scoring and win condition (Figure 3). While the customization exhibits flexibility (technically, there are thousands of possible permutations), we have found that players still encounter limitations in how the software permits them to play.

Figure 3. Customization categories for a Halo 2 custom game (top). Weapon and equipment options in a Halo 2 custom game (bottom).

Methodology

Our goal was to categorize rules in Halo 2 variants and to see when they were used to overcome challenges with the software. Unlike the Texas Hold'em analysis, we did not seek to produce new theory; instead, we started with the existing theory and a corpus of 91 variants of Halo 2. The data source is an online wiki page[1] where player-enthusiasts posted instructions for Halo 2 variants they have tried and enjoyed. Each variant consisted of the required game settings, rules (including 'honor rules' which we will describe later), and advice, along with occasional commentary by other players pertaining to each variant. 75 people publically contributed to the wiki at the time of retrieval. This number implies that a small community of players were engaged in the collection and curation of variants, rather than a collection of variants compiled by one enthusiast.

We analyzed these Halo variants via thematic analysis [1] by applying our existing categories and exploring sub-themes or overarching themes. The Hold'em analysis supplied two major constructs: (1) our theory of necessity and the three types of rule changes and (2) the finding that canned solutions exist within a community of players. To examine the design implications of working in a digital space, we subcategorized the canned solutions by the relationship between rules and technology, examining whether the new rules were socially- or digitally-mediated.

Variants

The writers of the Halo 2 variants from the data exhibited similar rhetorical strategies to those from Texas Hold'em. Some chose a theme and made rules to fit that theme: D-DAY, a reenactment of the World War II invasion at Normandy, specifyies a map with a beach and hills and weapons for each team. A canned solution is provided for the common problem of players spawning on the wrong side: *"There should be one designated non-fighter who gives rides back to the beach with a Warthog [a 3 person vehicle] for those who respawn behind it." (*D-DAY*)*

To illustrate a typical variant, we annotate excerpts from ZOMBIES, a variant so prevalent that Bungie Studios inte-

[1] http://h2.halowiki.net/p/Custom_Game_Types

grated it as a formal *Infection* game type in the next release of Halo. In *Zombies*, a smaller, weaker team with infinite lives assimilates members of the opposing team by killing them. Three people independently described this variant. An except from one such set of rules is:

> *"The object of the game is for the zombies to kill the non-zombies. When you are killed by a zombie, you have to change teams by pressing start and going to change teams, and change to the zombie team, [...] The catch is that the zombies can only use swords, they cannot use battle rifles!!"* —Searayman

Searayman describes two situations that depend on the players imposing the rules on themselves: players equipping the appropriate weapon depending on their team, and changing teams when a player dies as a human.

One player notices a problem on some maps where some weapons are too weak for the human team. While the weapons themselves are not weak in the standard Halo game, they do not fit the theme of ZOMBIES, which is that zombies should be easy to kill.

"Instead of pistols on map put Shotguns on map and Magnum/Sword start. This will help on levels like Midship were most of the pistols would end up being Plasma Pistols, Plasma vs Sword = Sword 99.9 percent win." —Tru3 SoLdi3r

One person identified spoiling rules and proposed a solution.

"No starting grenades or grenades on map (I originally had grenades, but zombies abused them...) No team damage (Again, I originally had team damage to force humans to be careful, but people over Xbox Live necessitated a change.)" —Bionic Pants

Several people suggest optional rules for weapons and maps:

Another version of this is 'Zombie Survival', basically its all normal zombie rules BUT there are no weapons on the map so you have to be careful with that ammo, I like playing this type of zombies on Zanzibar. —SF2006

"When I've played the game we usually spawn with swords and magnums, and allow shotguns on the map. In addition we turn off shields and the motion sensor." —Ven Rondua

Satisfying, Optional, and Spoiling Rules

Thematic analysis of the 91 variants exposed rules that could be categorized as satisfying. Similar to the cases in Texas Hold'em, rules were justified by their support of the theme of the game (e.g. ZOMBIES, BASKETBALL, BRAVEHEART), experiential qualities (e.g. chaos, fun, intensity), and balance. Because the source for these variants was a wiki, we were able to identify the contributors of the variants. The variant author would typically come up with satisfying rules for the variant, along with anecdotes of their experience playing the variant as encouragement for other players to try it. These satisfying rules captured the essence of the game and could be used to explain the variant to new players. Other people would comment in several ways: 1) noting

that they had been playing the same variant and describing their own rules, 2) suggesting optional rules, or 3) identifying spoiling rules and providing canned solutions.

Variant authors did not always enumerate every setting for a customizable game. Many settings were excluded because they were considered 'optional'. Wiki entries often highlighted only the essential rule changes for their variant, the satisfying rules. Some variant authors emphasized that omitted settings were up to the host to choose. For example, GOLF prefaces its abbreviated rule list with, "the vital [*settings*] only, the rest is optional." Other players would often discuss different weapon settings or maps that enhanced the objective of the variant, as seen in the example in Table 2.

Spoiling rules were rare, but did appear in the data. REINFORCEMENT CTF is configured with a periodic respawn, meaning only one dead player can re-enter the arena per cycle. The experience is spoilt for players if a second respawn option is enabled ("Force Even Teams"). A dead player on a winning team will be unable to play until the losing team respawns enough players into the field. This complaint can be read in Table 2. Another spoiling situation appears in RUN LIKE HELL. This variant increases the power of weapons, raising the intensity of the game. However, the friendly fire option now becomes a more prominent problem, spoiling the game. The variant author suggests, "It is fricken insane with a lot of people, also you might want to shutoff team killing because between shotguns and grenades you accidently kill your own teamates a lot."

The three types of rules support the idea that players were concerned with a *systematic* understanding of the impact of rules on the overall game. Also, custom game entries in the wiki were often accompanied by descriptions of what to expect from the recommended game settings and tips on how to play well. Both types of entries show the game designers' careful consideration of the impact of individual settings on the game and the best practices for new players to follow in order to take full advantage of the new game settings.

Canned Solutions
The analysis revealed a number of 'canned solutions', commonly used rules that solved familiar problems. For example, a number of variants forbade combat (or as in the game FIGHT CLUB) permitted players to engage only in hand-to-hand combat. Players would ideally start the game without guns in hand. However, as it is impossible to configure the initial weapons loadout as empty, players arranged workarounds to this limitation. Three workarounds, or canned solutions, surfaced: decreeing that players must publically empty their ammo at the beginning of the game, exploiting a known game bug to have players drop their only weapon[2], or giving players weak initial weapons and not having any available to pick up in the game. These solutions appeared often in many variants or relied on expected common knowledge such as the game bug to drop weapons.

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[2]An esoteric series of player actions will drop all weapons: charging a particular gun, picking up a grenade, and moving backwards.

Another common problem was the enforcement of the variant's rules when a player broke them, which could not be programmed as part of the customization. Canned solutions included: having everyone kill the rule-breaker, voting to eject the player from the game, assigning a player as an external referee to identify the rule-breaker for sanctioning, and watching post-game metrics such as awards or medals (if the game required no use of weapon, then any award for weapon skills would show that a player broke the rule).

Finally, spawn locations cannot be customized and three solutions surfaced: giving players immunity when they are walking to their designated locations, having one player take a 'cab driver' role to ferry players to the correct side of the map, or setting the game type to 'assault' or 'capture the flag' and ignoring the default objectives in those game types. Of these three, the immunity and the game type solutions appeared more than once, implying that players were familiar with them as known solutions. The 'cab driver' solution only appeared once in the data set. This uniqueness shows that viability and solution-popularity are different properties.

In addition to the themes surrounding the theory of necessity, we fixated on technology's role. Video games digitally encode the rules of the game and we sought to explore the challenges that players face when the medium of the game is limited. Halo 2 exhibits such limitations in its inability to start games without weapons or give the game host more control over respawn locations. We now highlight two sub-themes regarding the limits of technology and strategies of variant authors: the right players and honor rules.

THE PROBLEM: PEOPLE OR SOFTWARE?
"No seriously, most people play this to practice splattering, and it ruins the whole game for everyone. If they don't get it, just tell them. If they still won't get off the rock, just end the game. If they can't play the right way, they shouldn't be playing at all." (TREMORS, a vehicle-based variant)

Unlike the Texas Hold'em variants, reports of custom games in Halo 2 regularly discuss how to manage uncooperative strangers. The Halo 2 data presents the opportunity to examine how players manipulate custom rules to produce the attitude necessary to successfully play a particular variant.

In the wiki text, the variant authors warned against several motivations for non-conformance: gaining an unfair advantage, boredom or lack of interest, ignorance of the rules, and playing a different game (see the above quote about splattering). The actions that non-conforming players used included rule-breaking and play that did not technically break prohibitive rules, but counteracted the expected goal of the game (e.g. delaying the game and ignoring expectations to cooperate with an arranged team).

The variant authors proposed diverse strategies. First, hosts could include the right people ("to make sure you have some trustworthy players. NO CHEATERS"). Second, players could threaten exclusion by limiting the lives of the players or booting them from an active game. Cheaters risked

reprimands if discovered. To facilitate this, hosts employed methods of accountability by appointing referees or evaluating evidence. Third, hosts sometimes expected some players to break the rules and chose configuration options accordingly. For example, the variant author for BOOM BALL assumed that players might shoot their guns (breaking the 'no shooting' rule), so the starting weapons were weak pistols:

"The idea is that no one is to shoot weapons, only use grenades, however since not all people obey rules I choose the plasma pistol to limit the damage to kills etc." (BOOM BALL)

In summary, not only do the authors of the game variants tell players to choose their players wisely, they modify the rules of game itself to lessen the impact of spoilsports on the variant. These rules provide sanctions (killing and booting), accountability (observers and metrics), and compromise. This tension between adjusting the players or the rules is also reflected in Xu et al.'s study of sociability in Halo 3 [23], further supporting the recognition of complex ties between gameplay, configuration, and *who* comprises the roster.

Honor Rules
About one third of all the variants depended on the integrity of their players rather than the digital enforcement of behavior. Wiki authors described this system as honor rules. Here were a couple of examples:

- Players must all open a personal menu and choose a Severe Handicap setting, making players more vulnerable to damage (THE THING)

- No shooting vehicles or boarding them if you are playing as the "Mouse" (CAT AND MOUSE)

Honor rules in Halo 2 are rules not enforced by the software, but instead require that the players obey them or the variant would fail. Essentially, they are a type of satisfying rule that work around game customizations that one cannot implement in the software. They were unique to our analysis of Halo 2 variants and did not appear in Texas Hold'em variants. They depended on trusting the players to act appropriately in the spirit of the variant.

For example, the game variant DODGEBALL simulates the children's team sport using the 'Brute Shot' weapon to lob grenades at opposing teams from different sides of the map. Players treat the creek in the middle of the map as a line that they cannot cross. In the game, the players can technically cross this line since Halo does not know about the variant, but crossing it defeats the purpose of the game. Thus, the honor rule is that players should not cross the creek except to move back to the correct side after respawning.

While in DODGEBALL other players will notice when an honor rule is broken, in other variants breaking honor rules is easy to conceal; thus, following the rules truly depends on trust. Two variants had honor rules that were difficult to verify, and both emphasized the importance of playing with trusted people. In KING OF CRYSTAL, players have to be trusted to keep score for themselves, since only kills with a particular weapon were counted. In HIDE AND SEEK, the

seeker must wait for a period before being able to move, so that the hiders had enough time to find a hiding spot. Our overall reading of the Halo 2 variants indicates that unverifiable honor rules are uncommon and that while the honor rules depend on trust, they are typically enforced by public disapproval of visible rule-breaking.

Honor rules may be successful because they are tied to social norms. First, 'Honor rule' implies that players are being called to adhere to a higher standard of behavior. Second, there are occasional references on the wiki page to a clan of players who promote a code of fair and courteous play[3]. These signals point to a dependence on cultural values (perhaps specific to Halo) to establish behaviors that would otherwise be an even greater challenge to enforce.

Honor rules are agreed-upon rules that enable hosts to create variants not fully represented by the software. While one may have thought that uninformed players or the anonymity of online multiplayer play may ruin a game, our findings suggest that there are ways to overcome those hurdles. Honor rules are one such framework.

DISCUSSION
The systematic perspective permeates the whole negotiated development of a variant. The Hold'em data reflects a common rhetoric seen in individual thought exercises (SUPER HOLD'EM), group ideas (UPSIDE-DOWN PINEAPPLE), polished variants, and critiques by players. We witnessed on the Halo 2 wiki that although the variant author dictates the satisfying rules, other people contribute to optional rules or identify spoiling rules and canned solutions. In the discussion of the ZOMBIES variant, the players would propose other rule changes, but also point out situations for spoilers and propose canned solutions to resolve them. When creating variants, the three types of rules play different roles, the most central being the first type: satisfying rules. We can now define a variant by claiming that satisfying rules solve problems and primarily shape the core game mechanic of the variant. Optional rules and advice about spoiling rules play supporting roles once the ethos is established.

Variants and Social Collaboration
In an offline game, players implicitly expect others to follow the rules; 'honor rules' are mostly an online phenomenon, since they are simply 'rules' in an offline context. However, we find one example of an 'honor rule' in a game of Foursquare among elementary school children, typically 3rd or 4th grade girls [6]. In this game, four players, each situated on a quadrant, hit a ball between their squares until one player is eliminated when they miss the ball. The player who has remained the longest is the 'King' who decides the rule variations for the next round. One popular variant is 'Rooie's rules', which comprises 'nice' rules such as "no slams", "no spins", and "no holds" but these are not enforced to accommodate younger players who may break them unintentionally. Therefore, Rooie's rules is essentially an honor rule to play nice, intended to prevent players from

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[3]http://h2.halowiki.net/p/Code_of_Bob

intentionally eliminating others. When a group of 'rough' boys join the game, they slam or hold the ball, but the girls find it difficult to enforce violations, because 'niceness' depends on intent. When honor rules are broken in this offline game, the Foursquare rules do not instruct players to sanction the misbehaving player; the girls instead resort to social workarounds to keep the boys in line.

The foremost principle in an online game possessing honor rules is that they must be verifiable; otherwise, one can only play with those one trusts. Along with verifiabe rules, the game host should be able to reduce the potential damage caused by misbehaving players, by minimizing the effect of breaking the honor rule, removing the rule-breaker, or developing a workaround condition when it occurs (making it part of the variant). For example, in Cops n Robbers, if the cops become bored while guarding the jail cell, they are permitted to kill the prisoners. Or, in a hand-to-hand combat game like Troy, kills by ranged weapons are not allowed and players must immediately discharge their weapons upon initial spawning. However, if they happen to hit an opponent, then, "lucky you; if not, too bad!"

Appropriation, Customization, and Packaged Solutions

While the topic of appropriation and customization is not new to the CSCW community, we propose that the idea of variants provides a useful and new perspective on appropriation. Our findings on variants have been permeated with an emphasis on what might be called "packaging". First, variants themselves are packages, as they are designed to exist within a systematic equilibrium. As we have found, variant authors pay great attention to the completeness of a variant. The result is meant to be a playable, balanced, and complete package. Furthermore, we discovered canned solutions—packages of smaller scope. Game variants and canned solutions can be studied to reveal the values and design tendencies of a community of gamers.

Likewise, similar 'packaging' behavior can be explored in non-gaming communities of appropriation, such as behavior relating to open source patch files [21]. Customization of enterprise software does not appear to require the same systematic attention. Trigg and Bødker [20] find that software tailors lack systematic theories of the computer application. However, the existence of variants, forks, patches, and canned solutions suggests that end-users manage complex adjustments by bracketing problems and solutions into defined sub-systems of a different sort. These examples further illuminate how individualistic appropriation translates into a community resource.

Design Implications: Tackling 'Immutability'

So far, we have framed digital systems as 'rigid', supported by evidence of numerous strategies in the Halo 2 dataset where the software impedes the desired rule change. The cost of this 'rigidity' comes in the inefficiency of some of the solutions (e.g. relying on arcane sequences to drop weapons). Texas Hold'em's variants do not exhibit similar inefficiencies. What can be learned from this?

First, we find that 'rigidity' and 'flexibility' are best applied when measured against a set of rule changes. A vague assessment of 'rigidity' can be made concrete by scoping variant authors' expectations. Second, inefficient solutions are markers of 'rigidity', exposing desirable rule-changes. Finally, 'rigidity' favors neither digital nor analog configurations. Our interpretation of card games like Hold'em is that flexibility exists due to a well-developed match between the card medium and the players' desired set of rule-changes.

Canned solutions allow us to speculate on general solutions to common 'immutable' challenges in system design. A canned solution is familiar and well understood by the community of tailors. Researchers who look for canned solutions will discover the channels in which workarounds are transmitted, but they will also expose vetting processes and the community's design mindset. Thus, by investigating or supporting these social processes, perhaps by providing a catalogue and discussion area for canned solutions, unanticipated rigidities may be resolved more quickly by the community of users. And, treating solutions as packages will expedite their transmission.

The systematic perspective directs variant authors. To support this mindset, we suggest a quantitative approach. If the video games have an online connection, as most modern games now support, the setup, iteration, and outcome of each game variant can be recorded. This data can be exposed to the designers or analyzed automatically. To help create fun and balanced games, a game system may be able to anticipate imbalances and leverage historical data to offer canned solutions. The game system can propose adjustments for returning the game back to equilibrium by examining patterns of previous variant authors' rule changes. This use-case expands the application of game metrics beyond research [9] and industry [8] into the end-user's hands. In non-game systems, relevant real-time metrics can also inform customization activities. With access to aggregate metrics and proper information tools, users can pioneer new 'canned solutions' that fit their unique understanding of the system.

We observed two types of functionality that helped enforce honor rules: features for accountability and for sanctioning. Expanding these features would allow players to better enforce the rules they adopt. For example, a rich live feed of game events (*Player 1 has picked up a shotgun!*) enables players to keep each other accountable. Next, developers can make sanctioning options more versatile. Imposed timeouts and handicaps (*Player 2 may not pick up new weapons for 1 minute!*), allow players to continue the game despite rule-breaking. A variety of ways for players to monitor and sanction will make honor rules easier to enforce and perhaps provide software hooks for making some of those rules automatic. In similar collaborative contexts beyond gaming, we recommend a similar provision of accountability and sanctioning tools to accompany honor among strangers.

Limitations

We decided to study a large number of variants for two very different games rather than a few variants for a large num-

ber of games. This gives us deep insight into variants for these two particular games, but leaves us unable to generalize to games in general. Future work entails using alternate methodologies and studying more game types to allow us to validate our theories across different genres of games. Online sources provide a diverse and concrete product of variant authors' deliberations, along with discussion from other players for the particular variant. However, we can only infer why particular decisions are made in creating the variant since the variant author is unavailable to question.

CONCLUSIONS

The rules of the game have been changed. Not by the inventor of the game, but by its players. We have taken a grounded approach to analyze written reports of Texas Hold'em variants. Our analysis produced a theory we call 'the chain of necessity', in which the newly introduced rule requires additional changes until equilibrium is restored. Sometimes 'canned solutions' are adopted to address common problems in variations, such as too many cards in Hold'em. Our study of the Halo 2 video game exposed a similar process of variation development as well as the use of 'honor rules' to circumvent software limitations. In a customization system, both people and software factors determine which variants are possible. Variant authors are a kind of system designer. They are pragmatic, they bundle solutions in packages, and are flexible—ready to adjust the rules (or the roster).

Video game designers already provide customization options for players to expand the possibilities of the game; however, they cannot predict every variant that players may want to try. By taking a systematic view of game variants, designers may be able to create games that better support the creation of satisfactory variations. Perhaps records of past game variants can inform future variant authors of imbalances and useful canned solutions. Variant making is a community process involving game designers, players, and variant authors to enable more expansive gameplay in a single game.

Returning to the researcher's tale of Monopoly, he later found that *Free Parking* delays bankruptcy, resulting in tediously long games. This is a 'spoiling rule' for timeliness, but it was a fun rule and next time we play maybe we'll keep it.

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