

# The Aesthetics of Gameplay: A Lexical Approach

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## ABSTRACT

What does it mean to appreciate gameplay? When we judge a game's gameplay, what are the elements or characteristics of gameplay that we should focus our attention on? We report on a study that analyzed the use of the term gameplay in hundreds of thousands of user-submitted game reviews on a popular online website. Using Natural Language Processing (NLP) techniques we identified and extracted the adjectives that modified "gameplay", and then clustered those adjectives based on the words (nouns, verbs and adjectives) which appeared in the surrounding contexts. Our analysis of the resulting clusters shows a surprising richness in the variety of words used to describe gameplay, but more importantly we identify a popular aesthetic of gameplay. The primary elements of gameplay aesthetics are pacing, complexity, cognitive accessibility, scope, demand, and impact. This aesthetic provides two things: empirical support for the importance and centrality of the concepts we've outlined towards understanding gameplay, and evidence of the differences in language for describing gameplay between players and designers/scholars.

## Categories and Subject Descriptors

K.8.0 [Personal Computing]: General - Games

## Keywords

Videogames, reviews, aesthetics, gameplay, natural language processing, lexical analysis

## 1. INTRODUCTION

What does it mean to appreciate gameplay? Does it make sense to speak of beauty in gameplay and of how it gives us pleasure and satisfaction? We believe the answer is a resounding yes. However, much work is still necessary in order to better understanding what aspects of games are the ones that give us pleasure and satisfaction. How do we appreciate gameplay? What does it mean to have good taste in gameplay? When we judge a game's gameplay, what are the elements or characteristics of gameplay that we should focus our attention on? If music's aesthetic elements include harmony, rhythm, and mood, and film includes

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elements such as montage and lighting, what are the key elements for gameplay?

These questions have most often been explored by proposing things as central to gameplay and arguing why they are important. These proposals are often based on theories, observations, and experience with games and gameplay. This has been the primary mode of discussion of gameplay from academics as well as game designers and practitioners. The former often offer theories and frameworks for describing the medium of videogames and those elements that define it as distinct [e.g. 1, 13, 23] while the latter generally provide normative rules or guidelines that serve to separate gameplay that is aesthetically pleasing from that which may not be [e.g. 5, 8, 26]. Both these approaches have been valuable and productive. In this article we propose a different approach.

We seek to answer the questions of how we appreciate gameplay and what matters when talking about gameplay by broadly examining how people who play games describe gameplay. We will present the results of our analysis of close to 400,000 online game reviews written by more than 100,000 people for over 8,000 different game titles. Game reviews, written by game fans, aficionados, and non-professional writers, are a popular form of discourse that provides a window into the thoughts and feelings on gameplay as understood in the broad sense of popular culture. Game reviews provide us with insights on gameplay as it is commonly understood, used, and negotiated by players in practice. Our findings illustrate an alternate way of understanding gameplay while also providing empirical evidence to support many of the existing ideas surrounding gameplay.

## 1.1 Natural Language Processing and Lexical Analysis

Thanks to the rapid adoption of the world wide web, especially those services which facilitate information sharing and social networking among users, a huge amount of 'content' is generated every day on the internet. A large portion of such content is text. These texts are vast, ideal data resources that can be used to analyze player language and discourse on games and gameplay. By analyzing how players refer to gameplay, the words they use, and how they use them we can identify those elements of gameplay that are, in practice, an aesthetic of gameplay. However, analyzing these texts manually is intractable because of sheer volume. Printing 400,000 game reviews, each on a single sheet of paper, would result in a stack of paper almost 38 meters tall! How could we read all of these reviews, let alone find or discover information from them? Fortunately, there are tools and techniques for automated analysis.

Natural Language Processing (NLP) is a field of computer science and linguistics devoted to creating computer systems that use human (natural) language as input and/or output [12, 20]. Broadly speaking, NLP uses a collection of tools and methods for the automated analysis of text data. For instance, Landwehr et al [15] examined the text of all the mission quests in the game World of Warcraft in order to examine expressive power of quests in games and their effectiveness in dealing with sophisticated themes. However, NLP has most commonly been used in games for making sense of player-provided textual input. For instance, using a parser to translate player-typed text into actions that are carried out in a virtual environment [e.g. 16] or, when combined with novel AI techniques, to create novel gameplay experiences [22].

NLP can be useful for identifying patterns and commonalities in large volumes of texts that otherwise would prove intractable to human analysis. NLP allows for more than counting words or finding simple associations. Part-of-speech (POS) tagging is a task in NLP which identifies and annotates each word in a sentence with its part of speech (e.g. noun, verb). Parsing is another task in NLP which derives the syntactic structure of a sentence and the dependencies between the phrases in the sentence. NLP can also help, through semantic analysis, identify subtleties in language use such as variations in word meaning between domains or the feelings or sentiment of a text. Sentiment analysis is a task in NLP which classifies opinions or feelings written in documents into (pre-defined) sentiment classes, typically positive or negative [25]. Drake et al. [4] analyzed game reviews posted on Gamespot.com and used the games' rating scores to discover words which are positively or negatively correlated with certain sentiments.

NLP is not without its limitations. NLP's automated analysis of text data is based on linguistics and computer science, and makes no claim on the validity of the analyzed results beyond those fields. So, for tasks whose analysis concerns semantics (rather than syntax), validation and interpretation of the results may be necessary. Similarly, the role of the domain expert is crucial in the process of sifting data and guiding the analysis in order to obtain meaningful results. Understanding the nature of the corpus being analyzed is also crucial. For example, analyzing all the reviews posted on a single website would not be representative of the broader population of game players.

We note that the approach we follow in this work is *lexical*. Our analysis is strictly through words used in texts. It is based on linguistics (e.g. syntactic and semantic analyses of the words and sentences), and obtains empirical results using statistics (e.g. word frequency, distributions). This kind of analysis can complement other avenues of inquiry. In the case of exploring gameplay, it could support techniques from cognitive science [18].

## 1.2 Game Reviews

Game reviews are undoubtedly an influence on the ways that people view, understand and talk about games. They are one of the primary forms of videogame journalism and often overshadow other forms of journalistic discourse surrounding games such as news, investigative reporting, and commentary [29]. Videogame journalism is, in many ways, a referent regarding the popular use of words and terms for describing games. Gameplay is no exception to this. For instance, game sites IGN and Gamespot explain: "By gameplay, we mean everything from the responsiveness and design of a game's controls to how

challenging, intense, or exciting the game is. Basically, this represents how well a game plays and how enjoyable it is to play." [10] and "In a nutshell, how fun and satisfying the game is to play. Usually considered the most important part of any title, this category encompasses the controls, design, and overall feel of the experience" [11]. These definitions of gameplay capture an experiential component critical to understanding what makes games interesting and compelling to play. The game review is a model of discourse that is also adopted by videogame aficionados. Zagal and Bruckman [30] found that students taking videogame-related classes will often, when asked to describe, analyze and talk about specific games, write in a tone and style evocative of the game reviews they are familiar with. Game reviews, especially those written by fans and non-professionals are thus a relevant source of information that can help us understand how regular players, albeit those willing to write a game review, describe gameplay. What words do they use? How do they choose to express their feelings and emotions as they share their opinions regarding certain games? Also, would this be meaningful and relevant? In other words, would these results simply replicate "obvious" knowledge about games and gameplay?

It is "common wisdom" that popular discourse for describing gameplay is limited in vocabulary and nuance. Is this really the case? If our results simply mirrored what scholars and game designers have been describing all along, we would at least contribute empirical evidence to support those claims. We hypothesized, however, that we might also identify a discursive gap between the popular language used to describe gameplay and the language employed by academics and designers. We were curious to see whether aspects of gameplay that aren't commonly addressed elsewhere were described as central by players.

## 2. METHODS AND DATA COLLECTION

In linguistics, adjectives describe the attributive characteristics of the modified noun and can thus be used as the lexical representation of the characteristics of the noun. For example, the adjective "warm" in a phrase "warm milk" is a modifier of the noun "milk", and describes the 'temperature' attribute of "milk". Based on this linguistic principle, we can focus on the adjectives which modify the word "gameplay". Then, by clustering such adjectives, we should be able to, in principle, derive various categories of gameplay and game experiences.

We downloaded and analyzed all of the user-submitted reviews posted on Gamespot ([www.gamespot.com](http://www.gamespot.com)) as of April 20, 2009. There were 397,759 user reviews in total, and they covered a total of 8,279 game titles. Games with the same title, but on different platform were counted separately since we know that a game's narrative, controls, and resulting gameplay experience can vary significantly across platforms even when the game title is the same. For example, *Rayman Raving Rabbids* was released on Nintendo's Wii and Game Boy Advance platforms under the same title. The characters and visual design, technical constraints permitting, are largely the same. However, the Wii version is ostensibly a collection of short mini-games, while the GBA version is better described as a platforming adventure game with occasional mini-games [24]. In total, we examined all 397,759 user reviews, which were written by 111,943 unique users. This constitutes the corpus of our study in this paper.

**Table 1: Most common gameplay adjectives**

Adjective (frequency)			
great (3,975)	solid (1,048)	awesome (773)	simple (612)
good (3,352)	overall (993)	new (734)	repetitive (533)
actual (1,647)	online (879)	core (654)	fast (426)
same (1,321)	fun (849)	excellent (648)	unique (425)
addictive (1,111)	amazing (802)	basic (629)	classic (422)

Our analysis consisted of several steps. We began by extracting all sentences in which the word “gameplay” (and variations such as “gameplays”) appeared, and parsed the sentences using a NLP syntactic parser (we used the Stanford Statistical Parser<sup>1</sup>). Of the 397,759 reviews, 156,611 included the word *gameplay* (or a variant thereof). As expected, *gameplay* is often mentioned or discussed in user-submitted game reviews (39.4% of all user reviews). Then we extracted all the adjectives used as a pre-nominal modifier to “gameplay” (e.g. “smooth *gameplay*”) or as an adjectival complement of “gameplay” (e.g. “*gameplay* was smooth”). This first-pass provided us with 7,791 unique adjectives. However, this list required cleaning up to account for misspelled words, typographically irregular symbols (e.g. “----”), or words that had been misidentified as adjectives by the parser. Cleanup also included collapsing morphological variations (e.g. “great”, “greater”, “greatest” collapsed into “great”) and common typographical errors (e.g. “awesome” and “awsome” collapsed into “awesome”). We also eliminated words that only appeared once because they are statistically insignificant and oftentimes erroneous or idiosyncratic. Our final list had 723 adjectives. Table 1 shows the 20 most frequent *gameplay* adjectives in our corpus. The frequency distribution of these 723 adjectives followed Zipf’s law - a small number of words occurred frequently, then the frequency dropped rapidly, followed by a ‘long tail’ of a large number of words that occurred less frequently. In our case, the 20 most frequent adjectives (representing 2.8% of the 723 adjectives) shown in Table 1 accounted for 53% of the total frequency. We note that such a distribution is quite typical for the frequency of natural language words. For reference, a total of 68,202 (unique) adjectives were used in all the game reviews. In other words, approximately 11.4% (7,791) of these adjectives modified “gameplay”. This supports the idea that most adjectives aren’t used indiscriminately to describe *gameplay* and that a specialized vocabulary for describing *gameplay* exists.

The next step in our analysis consisted of extracting the *context* of each selected adjective as it appeared in all of the reviews. For example, if the phrase “smooth *gameplay*” appeared in one sentence in a review, and “smooth control” appeared in a sentence in another review, the list of *context words* for “smooth” would contain “gameplay” and “control”. Basically, context words is the set of all the words which appeared in the context (or in close proximity) of a given adjective. Context is defined as the words in an *n*-word window surrounding the adjective. For this study, we chose one word preceding and one word following the adjective (thus *n* = 3, including the adjective). Also, we only chose nouns, adjectives and verbs as relevant parts of speech because most

other types of words are ‘function words’ (e.g. determiners (“a”, “the”), pronouns, prepositions, and so on), which carry little meaning. We note that we used an NLP tool, the Stanford part-of-speech tagger<sup>2</sup>, to annotate every word in the corpus with its part of speech. Also, if the word immediately before/after the adjective is not one of the three parts of speech listed above, we took the next closest word that was. If there were no other words that met this criteria before the sentence boundary (the end or beginning of the sentence) was reached, no context word was used. The list of context words extracted in this way numbered over 175,000.

We then chose the 5,000 context words that appeared most frequently and represented every original adjective by the context words. Table 2 shows the 20 most common context words together with the number of occurrences in total they appeared with the 723 selected adjectives in the corpus. Then using those context words, we created a 723 x 5,000 matrix, where the rows were adjectives and the columns were context words. The value of each cell in the matrix corresponded to the number of times that a given adjective appeared together with the context word.

**Table 2 - Most common context words**

Context Word (occurrences)			
game (345,775)	look (79,000)	good (63,418)	way (51,059)
get (111,068)	play (78,486)	fun (61,397)	feel (50,736)
graphic (87,799)	make (74,610)	character (60,240)	control (49,784)
time (87,050)	thing (74,282)	story (56,379)	player (47,858)
gameplay (80,646)	sound (73,150)	level (54,320)	mode (46,195)

We then proceeded to create adjective clusters by using a clustering algorithm called Kmeans [19]. Our initial goal in creating and examining adjective clusters was to see if we could derive various categories of *gameplay*. Kmeans is a machine learning algorithm which partitions the data into *k* number of clusters (where *k* is specified a priori). The algorithm assigns each data instance to one of the clusters whose mean (called *centroid*; the center/average of the members assigned to a given cluster) is closest to the instance. Therefore, since the adjectives are represented by the context words in our matrix, the adjectives whose contexts are similar/close are grouped into the same cluster. Before applying Kmeans, we conducted preliminary experiments using *k* = 10, 20 and 30, and inspected the derived clusters. We did this preliminary step in order to get a holistic sense of the data. Clustering is an exploratory task and Kmeans generates different clusters for different *k*’s (by which we mean different partitions). After we inspected the derived clusters in each preliminary experiment, we determined that the 30-way clustering (i.e., *k* = 30) generated more meaningful clusters than those derived by the 10- or 20-way clustering.

As described, we clustered adjectives based on their contexts. This approach is based on a concept in NLP called *Distributional Similarity* [17] - two words are similar if their distributions, in

<sup>1</sup> <http://nlp.stanford.edu/software/lex-parser.shtml>

<sup>2</sup> <http://nlp.stanford.edu/software/tagger.shtml>

particular the words which co-occurred with them in a context, are similar. For example, “coffee” and “juice” are considered similar because they are often used in similar phrases such as “drink coffee in the morning” (and “drink juice in the morning”) or “spilled coffee on the table” (and “spilled juice on the table”). Other drinks such as “tea” and “cocoa” are used in similar contexts as well. Thus, by clustering words based on their contexts, we can derive various categories of words which have similar meanings. In this study, we first extracted adjectives which modified “gameplay”, then clustered those adjectives based on the words (nouns, verbs and adjectives) which appeared in the contexts. Therefore, not only do the resulting clusters represent various types/categories of gameplay, they also indicate the (similar) aspects of a game, such as “control”, “look” and “feel”, which brought out the particular type or characteristics of gameplay.

The final step of our analysis consisted of examining and assigning a label to each of the clusters generated. The goal was to identify a concept or theoretical category that embodied or represented what the adjectives in each cluster referred to. This was an iterative process and labels were refined and consolidated as necessary. These theoretical categories were thus generated in bottom-up fashion since rather than try to match adjectives or clusters to pre-determined categories, we labeled the clusters (categories) according to what they represented. The results of our analysis are described in further detail in the following section.

### 3. FINDINGS

So, what language do we use to describe gameplay, and what does this say about games as an expressive medium? For some, the diverse vocabulary (723 adjectives) used to describe games may seem notable. We could use this to argue that videogames are now a mature and sophisticated medium based on the language we use to describe them. More words mean a richer vocabulary which may suggest we talk about games with some degree of nuance, subtlety, and sophistication. However, the words we use to describe games reveal more than that. As we described earlier, our results reflect an aesthetic of gameplay. By this we don’t mean the assessment of the “looks” of a game (i.e. the graphics and representation). This would be just one aesthetic aspect of videogames, and not necessarily one closely related to gameplay. There are, of course, others. For instance, we could discuss the beautiful and peaceful landscapes in World of Warcraft [4], the ways that sound is used in Half-Life 2 evoke memories and bring about strong emotional experiences [3], or how some horror games borrow aesthetic elements from film and video (scratched film stock, blurred images, shaky cameras) to disturb and confound their players [14]. In our case, we are referring to gameplay itself, something that is intangible yet still appreciable. In other words, our results represent a popular understanding of what it means to appreciate gameplay, what it means to have good taste in gameplay, and what elements or characteristics of gameplay we should focus our attention on.

Our analysis revealed three different types of clusters of adjectives we describe in detail in the following sections. The first group of clusters is judgmental in that it includes adjectives that express broad value judgments regarding games. The second group of clusters is descriptive and constitutes the primary aesthetic elements of gameplay. The third group of clusters is relational and

consists of clusters of adjectives that relate gameplay and non-gameplay elements of games.

#### 3.1 Expressing Evaluations

When we describe gameplay, and especially in the context of a game review that is by definition a value judgment, we are dealing with matters of taste, art, beauty, appreciation, and such. In other words we are evaluating gameplay using adjectives that represent judgments of sentiment and taste. However, what kinds of adjectives? Not surprisingly, there was a cluster which contained general and common adjectives which would apply in any domain or topic:

*great, amazing, awesome, excellent, fine, stupid*

We found other clusters of adjectives that described gameplay more specifically as:

*horrific, disgusting, unpleasant, crummy, horrifying, horrid*

And also:

*pretty, super, lame, spectacular, stylish, flashy, pathetic, unimaginative, cute*

These clusters (and others like them) demonstrate that we have developed a holistic appreciation (or disdain) for certain types of gameplay. For instance, consider:

*old, realistic, beautiful, bright, cartoonish, bland, slick, sharp, choppy, dated, updated, crisp, outdated, clean, aged, stylized, ugly, gorgeous, primitive, untouched, chunky, lovely, sleek, blurry, dazzling, edgy, funky, gritty, retarded, shabby, childish*

The above clusters include adjectives that are also used to describe other kinds of media. There are however some that are more specific to games:

*broken, buggy, unbalanced, uneven, unpredictable, stable, steady, forgiving, unforgiving, methodical, restrictive, puzzling, unfair, punishing, harsh, unrealistic, imbalanced*

#### 3.2 Primary Elements of Gameplay Aesthetics

If music’s aesthetic elements include harmony, rhythm, and mood, and film includes elements such as montage and lighting, what are the key elements for games? We found several clusters that described specific concepts. These elements, taken together, constitute a popular aesthetic of gameplay.

**Pacing**, or the perception of how often game events occur, is one of those elements. Adjectives in this cluster include:

*fast, cranky, stressful, dull, tedious, frantic, chaotic, hilarious, obnoxious, frenzied, aggravating, energetic, silky, ridiculous, stunned, wrapped, brisk*

Videogames, as computational systems, are becoming increasingly complex, sophisticated, and opaque to the average player. To put it simply, there is more going on both under the hood as well as on the screen. Since gameplay is no exception to this, we weren’t surprised to find that **Complexity** is another key aesthetic element of gameplay. However, this aesthetic element goes hand in hand with **Cognitive Accessibility** or how accessible to understanding a system of gameplay is. Cognitive accessibility is the measure, or sense, of the opacity of a system and the

challenges it poses in understanding it. We note that these adjectives describe how transparent, accessible, or understandable a game's system is, rather than describe how it is constructed. The following are excerpts of adjective clusters for **Complexity** and **Cognitive Accessibility**:

*simple, enjoyable, short, complex, streamlined  
ingenious, flexible, uncomplicated, organized, reliable  
entertaining, straightforward*

*deep, designed, unusual, expansive, twisted,  
uninteresting, memorable, customizable, imaginative  
intricate, crafted, wacky, colorful*

The importance of these aesthetic elements is supported by the proliferation of online resources, both amateur as well as professional, designed to assist players by describing games' underlying systems. By token of example, popular website GameFaqs.com currently lists 16 general FAQs and 17 in-depth FAQs for the PC version of Fallout 3. The in-depth FAQs cover specific, or finer, aspects of Fallout's gameplay such as the character creation process, terminal hacking, unique items available in the game, and character stats and skills.

A fourth aesthetic element is **Scope**, which refers to the size of the possibility space afforded by a game. Adjectives in this cluster included:

*limited, complete, unlimited, large, significant,  
endless, sheer, massive, vast, tremendous, immense,  
minimal, ultimate, substantial, maximum, enormous,  
moderate, reasonable, unprecedented, infinite,  
extensive*

A fifth aesthetic element is **Demand** which refers to the requirements imposed upon the player by the gameplay. We note that this aesthetic element accounts for more than just the raw ability and knowledge required to play a game (i.e. reflexes and hand-eye coordination), also considering a player's attitude towards the game.

*casual, sandbox, hardcore, experienced, retro,  
demanding, intellectual, loving*

A sixth aesthetic element we identified relates to how games affect us, what we feel games "do to us" when we play them, and how they make us feel. In other words the **Impact** games have on us such as:

*addictive, exciting, refreshing, exhilarating*

Another cluster had:

*boring, annoying, stale, monotonous, irritating, tiring*

Yet another included:

*overwhelming and numbing*

And finally:

*satisfying, painful, rewarding, tense, visceral, scary,  
amusing, nostalgic, unsatisfying, dramatic,  
frightening, comical, gratifying, terrifying, unexciting*

### 3.3 Relational

Although our analysis focused exclusively on adjectives describing "gameplay", we found clusters that overlapped with, or referred to non-gameplay elements as well. We identified clusters

that referred to story and characters (representational elements), controls (interface), and items (entities or in-game objects).

The existence of a story/character related cluster supports the notion that story and characters can impact and affect our perceptions of gameplay. However, this effect may not be as strong as we might otherwise expect. Only two of the clusters we found have to do with narrative and representational aspects:

*fluid, rich, basic, linear, simplistic, general,  
balanced, underlying, derivative, uninspired,  
formulaic, emergent, sophisticated, hybrid, seamless,  
unmatched, focused, structured, versatile, trashy,  
airtight, layered, multifaceted, unconventional,  
uninventive, unrivaled, exquisite, faultless, rigid,  
unengaging, unentertaining, abysmal*

*interesting, engaging, lacking, wise, solid, immersive,  
compelling, lackluster, creative, inventive, thrilling,  
engrossing, intriguing, gripping, unoriginal,  
captivating, quirky, novel, suspenseful, enthralling,  
rounded, cohesive, forgettable, thoughtful, riveting,  
innovative, non-linear, flawless, dynamic, fluent,  
integrated*

We found it surprising that there were only two clusters related to narrative and representational aspects because one of the goals of good game design is to create gameplay experiences in which gameplay and narrative are tightly interconnected. Since gameplay expresses ideas through certain representations as well as operational units [2], the stronger the relation between them, the better. Our results indicate that, generally speaking, when describing gameplay, people have no difficulties separating the formal or mechanical aspects (game mechanics) from their narrative interpretations (representation). This suggests that common thematic and narrative elements aren't distinguishing factors from a gameplay perspective. Thus, we don't distinguish between, for example, science-fiction and gothic horror gameplay.

Gameplay was also described via the controls, or interface of the game. We note that, for the most part, these adjectives present a value judgment of the controls themselves, rather than describe how they function:

*easy, frustrating, clunky, dumb, normal, hard,  
intuitive, tight, responsive, sloppy, simplified,  
sluggish, complicated, awkward, confusing,  
intelligent, clumsy, faulty, problematic, inconsistent,  
direct, cumbersome, tricky, managed, precise, sketchy,  
twitchy, unresponsive, adaptive, dodgy, efficient,  
inept, loose, practical, unorthodox, jumpy, reduced,  
sensitive*

Finally, in-game objects or entities are also described in relation to gameplay:

*different, funny, common, rapid, unique, cool, diverse,  
generic, explosive, changing, random, varying,  
conventional, powerful, distinctive, specific, opposite,  
altered, bizarre, futuristic, destructive, goofy,  
unexpected, experimental, heroic, cheesy*

### 3.4 The Missing

Our findings refer to what people say when describing gameplay. They can also highlight those aspects that aren't mentioned or that didn't feature prominently. Our findings suggest that, when

describing gameplay, the most important game elements are: story and character, controls, and in-game objects. That these elements appeared isn't all that surprising. Rather, it's those elements that didn't appear that surprised us. For instance, artificial intelligence (AI) arguably plays a critical role in many videogames. In fact, it has been argued that AI is coming to the fore as a major focus in game design [7, 21]. If AI is such a central component of gameplay, why doesn't it feature prominently? One possible explanation is that we haven't yet developed a language (and corresponding vocabulary) for talking about behavior in games [21]. However, while we may not yet have a rich vocabulary for the formal description of behavior, we don't seem to have trouble describing real people's behavior in informal terms. Perhaps AI behavior isn't sophisticated enough at the moment for players to describe it in gameplay terms? Another explanation is that perhaps AI has only recently become an explicit marketing point, and thus a point of discussion in game reviews. It is possible AI is discussed only in recent reviews and these results are being overwhelmed (swamped out) by the larger corpus of older reviews. An analysis limited to recent reviews, is necessary.

Cultural aspects are also conspicuously absent from our results. We imagined that the perceived differences between, say, Japanese games and Western ones would also be expressed in terms of their gameplay with certain clusters denoting gameplay from games of certain origins. We know that these divisions do exist for other types of games. In board gaming circles, a split is generally recognized between two styles of gameplay: the American style, and the German (or Euro) style [27]. The American style favors the theme and representational elements often resulting in gameplay described as realistic, baroque, and complex. The German style, on the other hand, favors game mechanics over theme resulting in gameplay described as elegant, effective, coherent, and even cold [6]. Deeper analysis of our data, such as associating clusters by game genre or origin, might provide additional insights.

**Table 3 - Primary Elements of Gameplay Aesthetics**

<b>Pacing</b> - The perception of how often game events occur.	<b>Scope</b> - The size of the possibility space afforded by a game.
<b>Complexity</b> - The measure, or sense, of the number of parts in a system and how they are interrelated.	<b>Demands</b> - The requirements imposed upon the player by the gameplay
<b>Cognitive Accessibility</b> - The measure, or sense, of the opacity of a system and the challenges it poses in understanding it.	<b>Impact</b> - What we feel games "do to us" when we play them, and how they make us feel.

We expect that, over time, our aesthetic appreciation for different forms of gameplay will grow and diversify with the development of specialized gameplay tastes. To an extent, this has already started to happen as can be observed in the broader discussions (and controversy) surrounding the gameplay aesthetic of, say, casual games, indie games, and AAA titles. However, with the notable exception of one cluster featuring the adjectives *mature*

and *professional*, we found no reference to these distinctions. This may be explained because our corpus comes from a website that mostly features "mainstream" (AAA) titles. Another explanation is that the increased interest in casual, indie, experimental, and other types of games is too recent and the language used to describe this gameplay aesthetic hasn't yet come in to regular use.

### 3.5 Limitations

There are some limitations to our work. We chose to analyze a large corpus of data that covers a significant period of time. This means that our findings don't reflect changes and trends in language use over time (e.g., new language possibly used to describe indie games). Also, our analysis focused on game reviews submitted by regular users of one popular website: Gamespot.com. Although Gamespot is a popular site worldwide<sup>3</sup>, its audience comes from a specific demographic, male (95%) and mostly (69%) between the ages of 18 and 34 [9]. Those users who choose to write game reviews are also arguably more passionate and vocal about videogames than the "regular" visitors to the site, so we can't make any broad claims regarding the generalizability of our findings to all videogame players. A better understanding of the community of review-writing Gamespot users could provide additional insight. By expanding our corpus of data to include reviews from other websites and by dividing the data by genre, player characteristics (demographic, expertise, etc.) we could also investigate the possible differences in discourse employed by different player communities.

Another limitation of our work concerns the characteristics of the corpus of text we analyzed. The language of most user-submitted game reviews is informal and colloquial when compared to "professionally-written" texts. This was evident when we cleaned up our data from over 7,000 unique adjectives down to 723. After removing the words which occurred just once, the remaining adjectives (around 3,500 of them) still contained a large number of misspelled words and typographical idiosyncrasies (e.g. "n/a", "\\*!\\*!\\*!\\*"). Because of those ill-formed non-words, the accuracy of the POS tagger was decreased, resulting in many erroneous tags (where well-formed words of other parts of speech were incorrectly identified as adjectives). Furthermore, the POS tagger we used doesn't accept hyphenated words.<sup>4</sup> Although we noticed adjectives that described potentially relevant themes or concepts, we opted to leave them out of our analysis. For example, adjectives such as *easy-to-learn*, *easy-to-grasp*, and *difficult-to-learn* describe the notion of **Learnability**. However, since this concept didn't come up in other clusters, we presume that it isn't a central aspect<sup>5</sup>.

As noted earlier, natural language processing is but one set of tools amongst many. Other methods of analysis such as deep readings, ethnographic research and discourse analysis should be used to complement many of our findings as well as provide greater context on their meaning.

<sup>3</sup> Ranked 225 worldwide according to Alexa.com as of April 20, 2010.

<sup>4</sup> A hyphenated word was automatically split into multiple words by the Stanford POS tagger.

<sup>5</sup> Adjectives such as *fast-paced* and *slow-paced* were also excluded. However, **Pacing**, was still salient as an aesthetic element.

## 4. DISCUSSION

It has been argued that games are medium in its infancy, that we have just begun to explore their expressive potential, and that we are just starting to understand the wider range of emotional responses we can experience with games. Perhaps things aren't that bad after all. We began our research hoping to identify categories of gameplay experience. We also wanted to verify if popular discourse for describing gameplay is limited in vocabulary and nuance (i.e. is the "common wisdom" true?). It isn't. Our analysis shows a surprising richness in the variety of words used to describe gameplay, but more importantly we have identified a popular aesthetics of gameplay (see Table 3). This aesthetic was generated in a bottom-up fashion from a sizeable amount of discourse covering a wide variety of modern videogames. This approach complements analyses that are based on top-down reasoning (i.e. most academic approaches for discussing games) and highlights how some aspects of gameplay may not be as salient or central to the player experience as previously thought. For example, "emergent gameplay" has been described as a way to empower the player, provide them with greater freedom, and ultimately allow for a more satisfying and interesting gameplay experience [28]. Curiously, we found no evidence to support "Emergence" as a core aesthetic dimension of gameplay. This example also highlights the gap between how scholars and game designers talk about gameplay and how players do. Emergent gameplay is a lofty design goal that, when achieved, may be largely invisible to players blissfully unaware of the extent to which their gameplay experience isn't pre-scripted or determined. Whether or not a game's gameplay is emergent may also be less important when compared to other aesthetic elements. This would be like focusing on the weight of a sculpture rather than its form or materials. Alternately, "emergent gameplay" may be so rare, that it simply isn't talked about as much, and thus didn't register in our analysis. Regardless, the point is that the aesthetic elements of gameplay that are meaningful to game designers and scholars are probably different from those of players. We would have to perform a similar analysis of writings by game designers and scholars to confirm this.

This language gap, so to speak, may also help explain the challenges that, say, students learning about games have in articulating their thoughts on different aspects of gameplay and how they interact with each other to produce a certain experience [30]. We presume that it isn't so much that they can't articulate their ideas, rather that they focus on different aesthetic elements. This understanding could be useful for the design of pedagogical interventions designed to help students move from one aesthetic to another.

In this article we have presented a popular aesthetic of gameplay that reflects the meaning and understanding that players make of games based on their writings about them. This aesthetic provides two things: empirical support for the importance and centrality of the concepts we've outlined towards understanding gameplay, and evidence of the differences in language for describing gameplay between players and designers/scholars. We feel that this is a contribution to the broader dialogue surrounding games and we look forward to other approaches on this matter.

## 5. FUTURE WORK

We plan on extending our work by tracing the clusters we identified back to specific game titles. We could then identify patterns that connect gameplay experiences with game features and explore questions such as: What role does platform and game genre play when describing gameplay experiences? Are game genres distinguishable based on these descriptions? Furthermore, this analysis could support hypotheses regarding similarities across game franchises, and more. We also plan to extend our analysis to user-submitted game reviews available on other popular websites. Additionally, we want to complement our findings with an in-depth analysis of the amateur game review community in order to better understand their authors as well as their motivations. Why do they write reviews in the first place?

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