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and its influence across time and  
expertise**

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# How much depends on a red wheel barrow

## A computational analysis of Imagism and its influence across time and expertise

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### Abstract

How do standards of poetic beauty vary as a function of time and expertise? We used computational methods to compare the stylistic features of poems written by 19th century professional poets, contemporary professional poets, and contemporary amateur poets. Building upon techniques designed to analyze style and sentiment in texts, we examined elements of poetic craft such as imagery, sound devices, emotive language, and diction. We found that contemporary professional poets used significantly more concrete words than 19th century poets, fewer emotional words, and more complex sound devices. These changes are consistent with the tenets of Imagism, an early 20th-century literary movement. Further analyses showed that contemporary amateur poets resembled 19th century professional poets more than contemporary professional poets on these dimensions, suggesting that elite standards of poetic beauty in the past “trickled down” to influence amateur works in the present. Our results highlight the influence of Imagism on the modern aesthetic and reveal the dynamics between “high” and “low” art. We suggest that computational linguistics may shed important light on the forces and trends that shape poetic style.

## 1 Introduction

From Homer's epics, to Li Po's elegant verses, to Billy Collins' charming and often startling portraits of everyday life, poetry has been widely celebrated across languages, cultures, and time. Countless readers have experienced the power of a beautiful poem; however, an astute reader may notice that this power takes a different form in Shakespeare's measured sonnets than it does in Pablo Neruda's lush poetry. In this paper, we are interested in the forces and elements that shape the aesthetic standards of poetry. In particular, how do literary movements transform ideals of poetic beauty? How do changes in aesthetic standards impact poets with high versus low levels of expertise? Can we characterize this transformation using precise quantitative methods and analyze its influence on a large scale?

Many literary critics, historians, and social scientists have studied artistic change and proposed theories about its inception and development. These scholars have approached artistic change from the perspective of direct influence among artists (Clayton & Rothstein, 1991), legitimization of new or previously ignored art forms due to social change (Baumann, 2007), and the dynamics between high and low social classes (Simmel, 1957). This diversity of approaches suggests that a holistic view of artistic change should incorporate the influence of individual artists as well as more general forces such as class dynamics or the nature of artistic appreciation itself. While the ideas proposed in these works are enlightening and influential, their methods have been mostly qualitative, making it difficult to draw objective and data-driven conclusions about large bodies of texts.

Martindale (1990) was one of the first to use quantitative methods to comprehensively analyze a sizable collection of artwork across several time periods. His analysis showed that visual, verbal, and musical art all tend to exhibit higher complexity over time, suggesting that a major force for artistic change may be the pressure to be less predictable and thus more complex. While this research presents compelling quantitative evidence to support a theory of artistic change, it (largely intentionally) ignores the historical context in which change takes place. Furthermore, Martindale regards certain types of art such as poetry as a product of the elite, largely overlooking poetry generated and consumed by the masses. While this approach sheds light on broad patterns of artistic change, it fails to consider the different ways in which the force of change acts upon artists in different historical and social contexts.

In this paper, we apply the same degree of quantitative rigor to ex-

amine changes surrounding a specific literary movement: Imagism. By focusing on a particular movement, we are able to examine whether and how powerful literary leaders can dramatically shift the standards of poetic beauty within a short amount of time. Furthermore, by comparing the movement's effect on elite poets and amateur poets, we aim to explore the differences between high and low art and their responsiveness to change.

We chose to focus on the Imagist movement for two reasons. First, Imagism is regarded by many literary critics as "the beginning of modern literature in English" (Pratt, 1992). Leaders of the Imagism movement articulated and championed some of the principles of craft still taught in creative writing workshops today, such as the advice to show and not tell (Addonizio & Laux, 1997, Burroway, 2007). If the Imagism movement has such a strong influence on modern aesthetic standards, then we should find significant differences between the styles of poems written prior to and following the movement. Second, while the work of amateur poets before the 21st century are mostly undocumented, the Internet now enables easy dissemination and documentation of poems produced by the masses. It is now possible to collect poems not only from modern anthologized poets, but also from modern amateur poets who published their work on the Internet. By choosing a movement closer to our times, we are able to compare the influence of Imagism on poems written by poets with vastly different levels of skills and formal training.

### **The Imagist movement**

Given its significance, the Imagism movement was surprisingly small and short-lived. The movement officially launched in 1912 and ended in 1917, involving only a handful of English and American poets, including Ezra Pound, Amy Lowell, William Carlos Williams, and James Joyce. Ezra Pound is regarded as the intellectual leader of the movement (although Amy Lowell took over soon afterwards, not without some drama). Although there are speculations about Pound's personal motives for launching the movement (?), Imagism is often construed as a reaction against Georgian and Victorian styles, which are characterized by abstract and sentimental language (Frank, 1991). The Imagists articulated their aesthetic ideals in an anthology published in 1916, titled "Some Imagist Poets." Here we list the six tenets they proposed, modified for brevity:

1. To use the language of common speech, but to employ always the exact word, not the nearly-exact, nor the merely decorative word.

2. To create new rhythms—as the expression of new moods—and not to copy old rhythms, which merely echo old moods.
3. To allow absolute freedom in the choice of subject.
4. To present an image. We believe that poetry should render particulars exactly and not deal in vague generalities.
5. To produce poetry that is hard and clear, never blurred nor indefinite.
6. Finally, concentration is of the very essence of poetry.

Pound's poem titled *In a Station of the Metro*, published in *Poetry* magazine in 1913, embodies the central tenets of the Imagism movement:

*The apparition of these faces in the crowd;  
Petals on a wet, black bough.*

In fourteen words, the poem constructs a clear and compelling image that conveys an abstract emotional experience without explicitly describing it. The poem does not follow a strict meter or rhyme scheme; instead, the relationship between the two lines is one of imagery rather than one of sound. The image of faces in the crowd is equated with an image of petals on a bough, remnants of flowers that had just been separated from the tree after rain. A sense of ephemerality is evoked by the precise and concrete image of these delicate petals, which lingers in the reader's mind for much longer than an abstract statement about life's transience.

According to Imagists, the work of a great poet is to select the right image that causes the reader to experience a particular emotion or infer a particular reality (Hamilton, 2004). As Pound said, "The gulf between evocation and description is the unbridgeable difference between genius and talent." Regardless of whether the aesthetic ideals of Imagism provide an objective measure of "genius," the question of whether Imagists were successful at shifting standards of poetic beauty and influencing modern poets to adopt these ideals is the one we wish to investigate.

## 2 Features of Imagism

The tenets articulated in the Imagist manifesto form the basis of our analysis. In order to determine the degree to which a particular poem conforms to Imagist ideals, we first define specific features that correlate with each of these tenets. We then measure the number of times a poem uses these features. By comparing these features across different sets of poems, we can identify the amount of Imagism's influence on poets

from different time periods and with varying levels of expertise. Here we motivate and describe the set of features selected for this purpose.

## 2.1 Concrete imagery

Imagists put great emphasis on depicting concrete, specific objects and avoiding abstractions and generalizations (Aldington et al., 1916). We quantified the degree of concreteness in poems using predefined lexicons and psycholinguistic measures. The Harvard General Inquirer (Stone et al., 1966) consists of 182 word categories, including a category for words referring to concrete objects (Object: 661 words) and one for words referring to abstract concepts (ABS: 276 words). We computed an *Object* score for each poem by counting the number of words that appear in the object category and normalizing it by the total number of words in the poem. We computed an *Abstract* score by counting and normalizing the number of words that appear in the ABS category. For more fine-grained psycholinguistic measures of imageability, we used the MRC Psycholinguistic Database (Wilson, 1988), which contains imageability ratings for 4,954 words (Coltheart, 1981). We first normalized the imageability ratings by z-scoring them to have zero mean and unit variance across the 4,954 words. We then derived an *Imageability* score for each poem by computing the average z-scored imageability rating for all of the words in the poem that appeared in the database. Finally, we used concreteness ratings collected by Brysbaert et al. (2013) to compute a *Concreteness* score for each poem. We again normalized the concreteness ratings by z-scoring them to have zero mean and unit variance across the 39,955 words. We then calculated the average concreteness rating for all words in the poem that appeared in the database.

## 2.2 Emotional language

As seen in Pound’s *In a Station of the Metro*, Imagist poets often use carefully chosen objects and imagery to evoke emotional reactions instead of depicting emotions explicitly (Hamilton, 2004). To quantify the degree of emotion explicitly described in each poem, we used the EMOT category (311 words) in the Harvard General Inquirer (Stone et al., 1966). We computed an *Emotion* score for each poem by counting and normalizing the number of words that appear in the EMOT category. We then used the z-scored valence and arousal norms of 13,915 words collected by Warriner et al. (2013) to account for more fine-grained differences between negative-valence and positive-valence words (e.g. “torture” v.s. “love”) and low-arousal and high-arousal words (e.g. “sad” v.s. “panicky”). A *Valence* score was obtained for each poem by com-

puting the average valence rating for all words in the poem, and an *Arousal* score from average arousal ratings.

### 2.3 Sound devices

To examine the types of sound devices used in different poems, we computed sound device features using Kaplan (2006)'s PoetryAnalyzer, which utilizes the Carnegie Mellon Pronouncing Dictionary to identify phonetic patterns indicative of poetic sound devices. We examined six different sound devices, which are listed as major elements of poetic craft in influential handbooks on creative writing (Burroway, 2007, Adonizio & Laux, 1997): identity rhyme, perfect rhyme, slant rhyme, alliteration, consonance, and assonance. The PoetryAnalyzer identifies rhymes by examining phoneme sequences at the end of lines. If two words in a window of four line endings have identical phoneme sequences, then an instance of an identity rhyme is recorded. The final count of identity end rhymes is normalized by the total number of words in the poem to produce an *IdentityEndRhyme* score. If two words in the window have different initial consonants but identical phoneme sequences from the stressed vowel phoneme onward, then the count for perfect end rhymes is incremented and normalized to produce a *PerfectEndRhyme* score. If two words in the window of four line endings have the same stressed vowel but different phonemes following the stressed vowel, then the count for slant end rhymes is incremented and normalized to produce a *SlantEndRhyme* score. If the initial phoneme of two consecutive words are identical consonants, an alliteration count is incremented and normalized to obtain an *Alliteration* score. If there are at least two identical consonant phonemes in a window of nine syllables, the consonance count is incremented and normalized to obtain a *Consonance* score. If there are at least two identical vowel phonemes in a window of nine syllables, the assonance count is incremented and normalized to obtain an *Assonance* score.

### 2.4 Diction

The first tenet of Imagism is “to use the language of common speech, but always the exact word, not the nearly-exact, not the merely decorative word” (Aldington et al., 1916). This suggests that diction, or word choice, may reveal interesting characteristics of Imagism. We can measure the “commonness” of language used in a poem by computing average word length (*WordLength*) and average word frequency (*WordFreq*), which are often used as a proxies for word difficulty (Breland, 1996). We measured average word length by computing the average length of words in each poem in units of letters. We measured average



Feature	Examples
Object	<i>boat; leaf</i>
Abstract	<i>day; love</i>
Imageability	<i>an → beach</i>
Concreteness	<i>although → comb</i>
Emotion	<i>confidence; anxious</i>
Valence	<i>torture → love</i>
Arousal	<i>sad → panicky</i>
Identity end rhyme	<i>restore / store</i>
Perfect end rhyme	<i>floor / store</i>
Slant end rhyme	<i>bred / end</i>
Alliteration	<i>frozen field</i>
Consonance	<i>brown skin hung</i>
Assonance	<i>shallower and yellowed</i>
Word length	–
Word frequency	–
Type-token ratio	–

TABLE 1 Summary of features

word frequencies using a list of the top 500,000 most frequent words from the Corpus of Contemporary American English (COCA) (Davies, 2011). To measure “exactness” of language, we assumed that more precise words are appropriate for fewer contexts. By this logic, “exactness” can be approximated by the ratio of total word types to total number of words in each poem (*TypeTokenRatio*), where poems with higher type-token ratios avoid repeating the same words and are assumed to employ more diverse and precise vocabulary (Ben-Simon & Bennett, 2007, Pitler & Nenkova, 2008).

Table 1 provides a summary of all 16 features and their corresponding examples.

### 3 Study 1: Contemporary vs 19th century professional poets

Using these features, we compared poems written by contemporary poets to those written by 19th century poets to examine the influence of Imagism on the modern literary aesthetic.

#### 3.1 Materials and methods

100 poems were collected from 19th century American poets listed on a website called “Famous Poets and Poems.” To ensure that we selected poets who were prolific and whose works are well known, only fifty

poets with more than ten poems listed on the website were selected. We randomly selected one to five poems from each poet, resulting in a final selection of 100 poems ranging from 12 to 1775 words in length, with an average length of 210.25 words (see Appendix for full list of poets and poems). Of the 19th century poets we selected, six were involved in the Imagist movement: Hilda Doolittle, T.S. Eliot, Amy Lowell, Marianne Moore, Ezra Pound, and William Carlos Williams. This resulted in 12 poems written by 19th century Imagist poets and 88 poems written by 19th century non-imagist poets.

100 poems were selected from sixty-seven professional poets whose work was published in a collection of Contemporary American Poetry (Poulin & Waters, 2006). These poets produced most of their work towards the middle and end of the 20th century and are considered some of the best contemporary poets in America. All of the poets are listed in the website of the Academy of American Poets, and many have won prestigious awards (e.g., Louise Gluck, Mary Oliver, Mark Strand). We randomly selected one to three poems from each poet, roughly proportional to the number of poems each poet had in the collection. The final selection ranged from 32 to 378 words in length with an average length of 174.15 words (see Appendix for full list of poets and poems).

### 3.2 Results

We implemented the 16 features described in Section 2 for all 200 poems. The features were standardized to have zero mean and unit variance across poems.

We began with a simple analysis comparing the feature scores of poems written by 19th century professional poets (including Imagists) and contemporary professional poets (Figure 3.2). With respect to the use of concrete imagery, we found that poems written by contemporary poets contained significantly more *Object* words and significantly fewer *Abstract* words. We also found that contemporary poems scored significantly higher on *Concreteness* as well as *Imageability*, suggesting that modern aesthetic standards are characterized by the presence of concrete imagery to a higher degree than 19th century poems.

In our analysis of emotional language, we found that poems written in the 19th century contain significantly more *Emotion* words than contemporary poems. This provides quantitative evidence that contemporary poets are less likely to make explicit references to emotions. In addition, 19th century poems scored significantly higher on both *Valence* and *Arousal*, suggesting that 19th century poets tend to use words that are more positive and excited, and that contemporary poets are

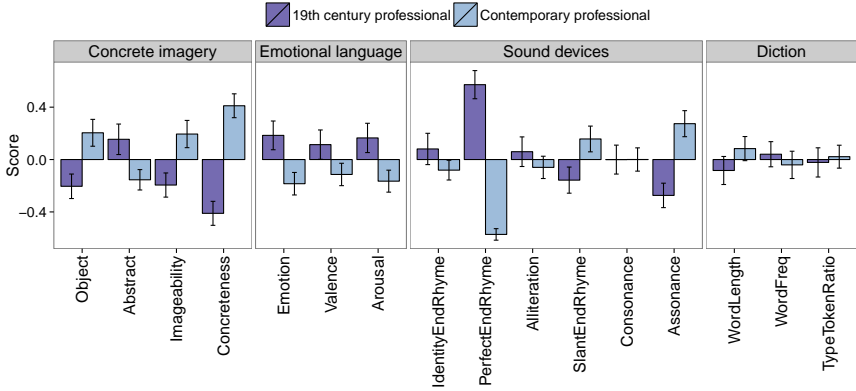


FIGURE 1 Average z-scored feature scores for poems written by 19th century and contemporary professional poets. Error bars are standard error.

generally more subdued in their use of emotional language.

The sound devices used by 19th century and contemporary poets also differ in interesting ways. 19th century poets used significantly more identity and perfect end rhymes, which follows naturally from adherence to stricter poetic forms and rhyme schemes. On the other hand, contemporary poets developed “new rhythms” and new sound patterns by employing significantly more subtle devices such as slant end rhymes and assonance.

Finally, our analysis of diction suggests that contrary to the tenet promoting the use of “the language of common speech,” contemporary professional poets tend to use longer and less frequent words than 19th century poets. This departure from our prediction highlights an interesting tension within the first tenet of the Imagist manifesto. While the language of common speech is desired, the pressure to employ “the exact word” pushes contemporary poets to choose words with precise meanings, which tend to be words that are less frequently used because their meanings are only appropriate in highly specific contexts. The fact that contemporary professional poets use longer and less frequent words suggests that they chose to sacrifice commonness of language for higher precision of meaning.

Figure 3.2 shows the magnitude of the differences between contemporary and 19th century poems for these 16 features. The two sets of poems differ the most on *PerfectEndRhyme* and *Concreteness*, suggesting that the defining characteristic of professional poetry shifted

from an emphasis on sound patterns to an emphasis on concrete imagery. These comparisons show that contemporary aesthetic standards are more consistent with Imagism sensibilities. However, it is unclear whether the Imagist movement was responsible for establishing this aesthetic, or whether the preference for more concrete imagery is the natural result of artistic tastes evolving over time.

Martindale (1990) proposed that art naturally evolves to become more complex, because the pressure to be novel requires artists to create work with higher complexity. This complexity can manifest in higher concreteness, which may be partially responsible for the differences we observe in our analysis. If time is the best predictor for concreteness, then we would expect the degree of concreteness in a poem to be consistently higher the later it is written, regardless of the Imagism movement. If, on the other hand, Imagism is responsible for promoting concreteness as a critical characteristic of good poetry, then we would expect that poems written prior to the Imagism movement would be uniformly low on concreteness, while poems written after the movement would be uniformly high on concreteness. In other words, we would expect to see a shift in concreteness before and after the Imagism movement, without much systematic variation otherwise.

To test these two hypotheses, we obtained the birth years of each of the poets from Wikipedia and further classified the poets into more fine-grained time periods <sup>1</sup>. Figure 2 shows the relationship between the poet's birth year and the poem's concreteness. We first tested whether the concreteness of a poem is correlated with the poet's birth year and found a significant correlation of  $r = 0.386$  ( $p < 0.0001$ ), suggesting that overall, more modern poets use more concrete words. We then tested whether this correlation is an artifact of the difference between 19th century and contemporary professional poets, or if it is consistent across time. We found that while contemporary poems had significantly higher concreteness scores than 19th century poems ( $t(197.99) = -6.36$ ),  $p < 0.00001$ , there was no significant correlation between the poets' birth years and concreteness within these time periods ( $r_{19th} = 0.05$ ,  $p_{19th} = 0.65$ ;  $r_{contempt} = 0.16$ ,  $p_{contempt} = 0.11$ ). To validate this result, we constructed a linear regression model with two predictors: the poet's birth year and a binary factor indicating whether the poem was written by a non-Imagist 19th century poet or an Imagist/contemporary poet. This model showed that the binary factor is a significant predictor of concreteness ( $t = -2.85$ ,  $p = 0.0048$ ), while

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<sup>1</sup> Although the year in which each poem was written is a more accurate measure, this value is more difficult to obtain and can be adequately approximated by the poets' birth years for our purposes.

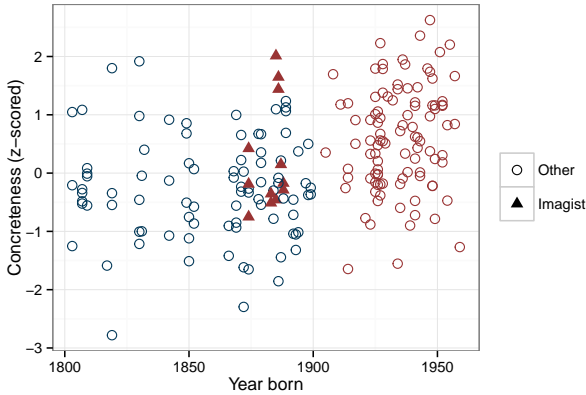


FIGURE 2 Scatter plot of the birth years and concreteness of 200 poems. Each point represents a poem written by either a 19th century non-Imagist poet, 19th century Imagist poet, or a contemporary poet. Triangles represent poems written by poets involved in the Imagist movement. Red points represent poems written by poets who were either involved in the Imagist movement or may be influenced by the Imagist movement. From the visualization, we observe that there is an overall correlation between birth year and concreteness. However, we also observe that Imagist poets writing in the 19th century more closely resemble 20th century poets in terms of concreteness. Furthermore, within the red and blue points, there is no apparent positive correlation between birth year and concreteness.

birth year does not capture a significant amount of the residual variance ( $t = 1.15, p = 0.25$ ). Our analysis suggests that the data more strongly supports the interpretation that Imagist poets writing in the 19th century used more concrete imagery than their peers, and that their style was in turn adopted by contemporary poets. In other words, concreteness is not simply a natural product of time, but rather the consequence of a highly concentrated and deliberate literary movement.

## 4 Study 2: Contemporary professional vs amateur poets

Our results from Study 1 suggest that the Imagism movement had a significant influence on the styles of contemporary professional poets. However, is this influence also present in the works of contemporary amateur poets? Are literary movements only relevant to elite poets, or do they affect aesthetic standards across different levels of expertise? In this section, we explore the dynamics between professional and amateur poetry by examining the presence of Imagist ideals in poetry written by contemporary amateur poets.

### 4.1 Materials and methods

100 poems were selected from amateur poets who submitted their work anonymously to a free and uncensored website, aptly called “Amateur Writing” ([www.amateur-writing.com](http://www.amateur-writing.com)). At the time of selection, the website had over 2500 amateur poem submissions by registered users. The website contains a diverse set of poems submitted by amateur writers with a wide range of experience and skill levels. We randomly selected poems from the website and corrected for misspellings and obvious grammatical errors in the poems to control for the effect of basic language skills. The final selection of amateur poems ranged from 21 to 353 words in length with an average length of 137.52 words.

### 4.2 Results

We implemented the 16 features described in Section 2 for the 100 amateur poems. To compare across the three sets of poems (19th century professional, contemporary professional, and contemporary amateur), each feature was standardized to have zero mean and unit variance across all 300 poems in our dataset. For each of the groups of poems, we computed the mean scores for each of the features. We then computed the difference between contemporary amateur poets’ scores and the scores of 19th century and contemporary professional poets. Figure 4.2 shows the mean differences for each of the 16 features. We see that professional poets from both eras tend to use more *Object* words

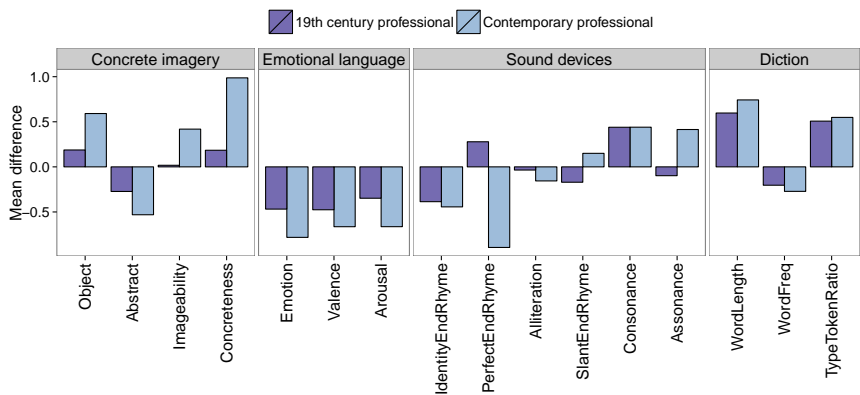


FIGURE 3 Difference in the feature score means between contemporary amateur poets and 19th century and contemporary professional poets. 0 represents the mean feature scores for contemporary amateur poets. A positive dark blue bar indicates that 19th century professional poets scored higher on that feature than contemporary amateur poets. A negative pale blue bar indicates that contemporary professional poets scored lower on that feature than contemporary amateur poets. Overall, the dark blue bars tend to be shorter than the pale blue bars, indicating that contemporary amateur poems are more similar to 19th century professional poems than they are to contemporary professional poems.

and fewer *Abstract* words than amateur poets, as well as words with higher *Imageability* and *Concreteness*. Professional poets from both eras also tend to use fewer *Emotion* words and words with lower *Valence* and *Arousal*. Amateur poets tend to use fewer *PerfectEndRhymes* than 19th century professional poets, but still significantly more than contemporary professional poets. Professional poets from both eras also tend to use longer, less frequent words, and a more diverse vocabulary, than contemporary amateur poets.

Across all of these features, it appears that poems written by contemporary amateur poets exhibit significantly *fewer* instances of Imagist ideals than poems written by either group of professional poets. Furthermore, poems written by amateur poets more closely resemble poems written by 19th century professional poets than their professional contemporaries. This can be seen from the fact that, regardless of directionality, the dark blue bars are shorter than the light blue bars ( $t(27.36) = -3.35, p = 0.0023$ ), indicating that amateur poets are "closer" in style to 19th century professional poets. Overall, these analyses suggest that the Imagist movement affected contemporary professional poets to a much greater degree than it did amateur poets—if it affected amateur poets at all.

## 5 Discussion

In this paper, we quantified the aesthetic ideals of Imagism using computational linguistics techniques and evaluated the degree of conformity to these ideals in three sets of poems: poems written by 19th century professional poets, contemporary professional poets, and contemporary amateur poets. Our analyses reveal several interesting points about Imagism and its affect on the modern literary aesthetic. First, poems written by contemporary professional poets exhibit significantly more features of Imagism than poems written by 19th century professional poets. This suggests that even though the Imagist movement itself was short-lived, the modern literary aesthetic has adopted Imagist ideals and moved away from the more abstract, emotional, and rhyme-schemed style of the 19th century. Second, while some theories of artistic change claim that the increase in use of concrete imagery may be the natural consequence of time and the pressure to be novel, a more detailed analysis of concreteness suggests that the Imagist movement maybe have been responsible for promoting the use of concrete imagery, more so than a uniform pressure of time. Finally, although contemporary professional poets have adopted Imagist ideals, contemporary amateur poets use much fewer Imagist features. In fact, contemporary



amateur poets use even fewer Imagist features than 19th century professional poets.

Several explanations may account for the finding that contemporary amateur poets write in a style more similar to that of 19th century professional poets and conform less to Imagist ideals than professional poets in either era. First, it is possible that literary movements have a stronger influence on elite poets and do not tend to reach amateur poets (more about this). A second explanation is related to the delayed emulation of elite styles by amateur poets. Since contemporary amateur poets are more likely to be exposed to 19th century poetry than modern poetry in high school English classes, their impression of good poetry is shaped by the styles of that era. When they later produce poetry of their own, amateur poets tend to emulate these more "outdated" styles. This explanation is closely related to Simmel (1957)'s theory about fashion, where new fashion styles are created by the elite in order to distinguish themselves from the lower class, which forever lags a step behind when emulating elite styles from the previous season. This theory predicts that amateur poets in the next century will write more like professional poets in this century, and that professional poets in the next century will develop a new style altogether.

A third explanation is that the Imagist aesthetic may be more sophisticated and difficult to master, in which case amateur poets are less likely to adhere to it regardless of the time period in which they are writing. A consequence of this explanation is that prior to the Imagism movement, professional and amateur poets wrote in a more similar style; as contemporary professional poets adopted the Imagism aesthetic, the gap between professional and amateur poets grew. A second explanation is that while the Imagist aesthetic is not necessarily more difficult or sophisticated, While we lack sufficient longitudinal data to distinguish the three explanations proposed, these theories offer different predictions that can be examined in the future with more data.

"Fundamental beliefs change art, but do not, necessarily, either improve or injure it. Great poetry has been written at every stage of the world's history, but Homer did not write like Dante, nor Dante like Shakespeare, nor Shakespeare like Edgar Allan Poe." (Lowell, 1920)

One of the most important and oft-repeated piece of advice for writers is the following: "Show, don't tell." Burroway (2007) interprets this as meaning: "Use concrete, significant details that address the senses." Effective imagery allows readers to bring in their own associations to understand and truly experience a new emotion, and skilled poets and writers are able to pick out specific sensory details that evoke deeper abstractions and generalizations.

The appeal of concrete imagery may have roots in processes that facilitate learning and memory. Previous research has shown that concrete noun pairs are easier to memorize than abstract noun pairs, which suggests that imagery can enhance the learning of word pairings (Paivio et al., 1966). Other studies have shown that mental imagery facilitates relational association between concepts (Bower, 1970). Furthermore, Jessen et al. (2000) found neural correlates that suggest that concrete nouns are processed differently in the brain than abstract nouns. One of the reasons why we find poetic imagery striking may be due to the psychological power of imagery to evoke rich associations formed by culture and personal experience.

Another reason why imagery is an essential element of poetic craft is that it allows writers to avoid falling into cliché, which is the bane of the creative writer's existence. Burroway (2007) writes, "flat writing is...full of abstractions, generalizations, and judgments. When these are replaced with nouns that call up a sense image and with verbs that represent actions we can visualize, the writing comes alive." Many abstract and common concepts can be embodied or evoked by surprising imagery. In our analysis, we predict that skilled poets are more likely to describe concrete objects and less likely to reference abstract concepts. We measure the degree to which a poem contains concrete details rather than abstractions and generalizations using categories from the Harvard General Inquirer (see Table 1).

"Great poetry, Hulme argued, always endeavours to arrest you, and to make you continuously see a physical thing, to prevent you from gliding through an abstract process. It chooses fresh epithets and fresh metaphors, not so much because they are new, and we are tired of the old, but because the old cease to convey a physical thing and become abstract counters, A poet says a ship "coursed the seas" to get a physical image, instead of the counter word " sailed."

As predicted, poems written by professional poets contain significantly more words that reference objects and significantly fewer words about abstract concepts and generalizations. This result suggests that professional poets follow the sacred rule of "show, don't tell" and let images instead of words convey emotions, concepts, and experiences that stick to readers' minds. Professional poets not only use more object words than amateur poets (698 counts versus 205), but they also use a larger and more diverse set of object words (250 types versus 85), as shown in Table 4. Professional poets reference natural objects very often, such as *tree*, *grass*, and *flower*. On the other hand, the most frequent concrete object word in amateur poems is the extremely vague word *thing*. This suggests that even when amateur poets ref-

erence concrete objects, they do not use words that provide specific sensory details.

In terms of affect, our results suggest that poems by professional poets are not more negatively emotional—at least not explicitly. On the contrary, amateur poets are significantly more likely to reference negative emotions than professional poets. Our results reveal an interesting distinction between words with positive and negative outlooks and connotations versus words that reference positive and negative emotions. While the two pairs of categories are strongly correlated, they capture different aspects of a text's emotional content. The positive and negative outlook categories contain many words that are not emotions but may evoke certain emotional attitudes, such as *clean* and *death*. The fact that professional poets are significantly less likely to use explicitly negative emotion words than amateur poets, but not significantly less likely to use negatively connotative words, suggests that professional poets may evoke more negative sentiment through connotation rather than explicit descriptions.

The results on sound devices provide interesting insight into the current stylistic trends of contemporary professional poetry. While sound devices have a long history in poetry and are considered a feature of poetic beauty, contemporary professional poets now use these devices much less often than amateur poets. Sound devices that were traditionally important in poetry for mnemonic purposes, such as rhyme and alliteration, are more prevalent in amateur poems. These results suggest that repetition of sound is becoming a less aesthetically significant poetic device among contemporary masters of poetry.

Our analysis supports the idea that Imagism has strongly influenced the ways in which modern poets and literary critics think about literary writing. Literary critic I.A. Richards argued that image clusters and patterns of imagery are keys to deeper meaning in literary works, and that critics should pay close attention to these patterns in order to understand “the language of art” beneath the surface ordinary language (Richards, 1893). Not only are concrete images able to render the world in spectacular detail, they also provide windows into particular experiences on which readers can project their own perceptions and interpretations.

Consistent with our predictions and with the aesthetic ideals of Imagism, professional poets also make significantly fewer direct references to abstract and intangible concepts (Table 5). If the deeper meaning of a poem is conveyed through imagery, abstract words are no longer needed to reference concepts and experiences explicitly. Moreover, amateur poets use significantly more words concerned with gen-

eralizations, as shown in Table 6. While amateur poets embrace the human impulse to generalize, the skilled poet must learn to extract and report unique details that single out each experience from the rest.

Overall, our results suggest that professional poets are more likely to show, while amateur poets have a tendency to tell. This difference marks the most significant distinction between contemporary professional and amateur poetry in our analysis and may be an essential aspect of craft and poetic beauty.

### 5.1 Implications for the influence of Imagism

### 5.2 What is happening to sound in poetry?

Research in psychology has confirmed poets' intuitions about the powerful effects of rhyme on perception and learning. For example, an aphorism that contains a rhyme is more likely to be perceived as true than a non-rhyming aphorism with the same meaning (McGlone & Tofigbakhsh, 2000). Exposure to rhymes also enhances phonological awareness in young children and can lead to better reading performances (Bryant et al., 1990).

### 5.3 Implications for professional and amateur poetry

## 6 Limitations and future directions

While our approach reveals interesting patterns that shed light on elements of poetic sophistication, conclusions from the analysis need to be tested using controlled experiments. For example, does modifying a professional poem to include less concrete words make people perceive it as less beautiful? Investigating these questions using psychology experiments could help identify causal relationships between linguistic elements and sensations of poetic beauty.

In summary, our framework provides a novel way to discover potential features of poetic beauty that can then be experimentally tested and confirmed. By applying both stylistic and content analyses to the quantitative assessment of contemporary poetry, we were able to examine poetic craft on a representative set of poems and reveal potential elements of skill and sophistication in modern poetry.

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