Indie is a Privilege: How wealth and well-being coincide with an "alternative" culture

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Abstract

"Indie" is a multi-industry term primarily employed to describe independent music, films, or games that operate without the funding of major publishing firms. Although the Internet has been a turning point in reducing costs and promoting independent art forms, it is still unclear if such increase in accessibility translates to a more diverse audience. In this work, we conduct an observational study exploring a worldwide gaming social network, where we analyze the characteristics of over 300k players, 19k games, and 2M game reviews from March 2021. Although our data suggests that the Internet has indeed democratized access to gaming in general, we find that players from wealthy nations are still the ones primarily involved in the indie culture, who in turn express less negative emotions (such as anger, disgust, and fear) in comparison to non-indie gamers. Ultimately, we analyze these results in light of Pierre Bourdieu's concept of "cultural capital", highlighting an inevitable correlation between wealth, well-being, and independent media consumption.

1 Introduction

For decades, high-quality artistic creations in the form of music, films, and games have been primarily funded by large corporations, mostly due to the elevated costs of producing, distributing and advertising these forms of art. However, with the introduction of new technology pioneered by high data-transfer speeds and the advent of online social networks, independent artists, filmmakers, and developers saw new opportunities to succeed. Today, independent art forms benefit from a "platform economy" (Vey et al., 2017), which harness the infrastructure of the Internet to provide accessible creative tools for the entire production cycle: funding (e.g., Kickstarter, Patreon); creation (e.g., BandLab, Unity); distribution (e.g., SoundCloud, Steam); and advertisement (e.g., Instagram, Twitter).

Over the previous decade, several academic works have explored how digital technologies have impacted independent art production. In the film industry, distribution began to shift from supply-led to a demand-led market (Kehoe and Mateer, 2015), while crowdfunding became a form to gauge interest and complement traditional investments (Baranova and Lugmayr, 2013). In the gaming industry, independent team sizes ranged from medium-sized companies to solo developers/hobbyists (Pereira and Bernardes, 2018), often having to rely on an early-access model to foster community building and to crowdsource significant development decisions (Lin et al., 2018; Arafat et al., 2019).

However, despite a massive increase in accessibility for producing and consuming independent art, it is still unclear if such innovations could translate into a more diverse audience. In the music industry, previous sociological work employing Pierre Bourdieu's concept of "cultural capital" draws a parallel between *indie rock* and *high art*, expressing how both of these art forms "depend upon a lack of popularity for their value, and require specialized knowledge to be fully appreciated" (Hibbett, 2005). Indeed, if such analysis could be generalized to most forms of independent art, then accessibility alone would not be enough to diversify target audiences, leading to the curious observation that consumption remains systematically biased.

In the present work, we start to bridge the gap between theory an practice by conducting an ob-

servational study in the digital gaming environment. For this purpose, we collect data from Steam[1], a popular online storefront for digital games, which peaked at 120M monthly active users in 2020 (Valve, 2020). Particularly, we propose an analysis comparing the audience of independently developed software (to which we refer as "indie games" hereinafter) to consumers of non-indie titles, exploring two major components that help to define such audiences: wealth and well-being. Ultimately, by outlining social differences between these two populations, our work seeks to validate Pierre Bourdieu's concept of "cultural capital" in the online gaming environment, paving the way for further empirical analyses in other digital industries.

The following is how this paper is organized. Section 2 explores the notion of what being indie means, laying the foundation of the analyses employed throughout this paper. In turn, Sections 3 and 4 analyze wealth and well-being respectively, discussing our methodological approaches to each of these concepts as well as their corresponding results. Finally, in Section 5, we revisit the notion of "cultural capital" in light of our findings, expressing our concluding remarks and outlining future research directions.

2 What is indie?

Operationalizing the concept of indie is a non-trivial task. The definition we provided in the abstract – "a multi-industry term primarily employed to describe independent music, films, or games that operate without the funding of major publishing firms" – is, in truth, a simplistic characterization that defines the indie movement in relation to the corporate industry, and not to its intrinsic value (Hibbett, 2005). Instead, one may consider a definition based on aesthetics or its opposition to mainstream, but all of these notions are problematically subjective. In fact, the quality of being indie seems to be dependent on one's own perception, ultimately suggesting a series of hidden patterns that are likely to be associated with the genre.

On digital distribution platforms, it is common for titles to be categorized by multiple attributes that attempt to describe their content. Particularly, on Steam, a series of user-defined tags can be applied to games by anyone on the platform, leading to a massive-scale crowdsourcing system where games are defined by their players' acquired perceptions. Popular tags are then displayed on a game's store page ranked by the number of users who applied them, with an average of 12.66 tags displayed per game ($n = 17,706\,; s = 6.46$). Conveniently, "Indie" is one of these tags, being present in 65.57% of all games containing tags on Steam ($n = 17,706$) and providing a powerful crowdsourced method for identifying indie games.

Naturally, issues with this classification system still exist: for instance, there may be games for which consensus is not achieved, but just enough players vote for the "Indie" tag for it to appear on the list of popular tags. Still, recent studies have demonstrated how, under multiple circumstances, crowdsourced data is comparable to that produced by experts, with the added benefit of being reproducible and agile (Benoit et al., 2016). Therefore, throughout this paper, we determine if a game is indie or not by simply verifying if it contains the "Indie" tag on its store page.

Moreover, by exploiting the tag system, we are able to determine other qualities that most differentiate indie games from their less independent

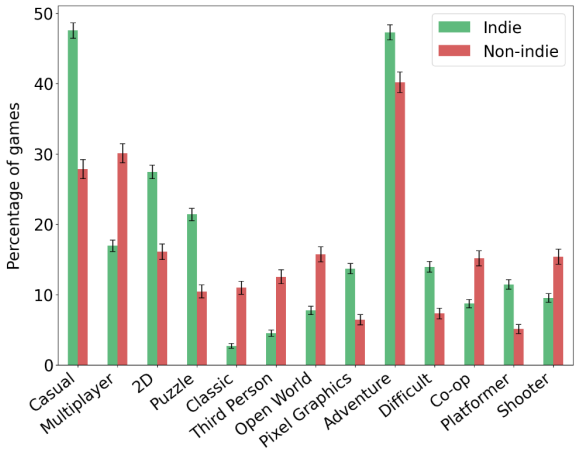

Figure 1: Percentage of indie games ($n = 11,609$) and non-indie games ($n = 6,097$) for which each tag was assigned (we plot the top 12 tags ordered by the largest difference between indie and non-indie games, 98% CI).

[1]Through Steam's own API, we retrieved country code and recent game-specific playtime (i.e., time spent on each game in the last 2 weeks) for $300,071$ users between February 19th, 2021 and March 17th, 2021. Note that the 2-week window for which we collected recent playtime data may not necessarily overlap among all users. Due to technical API restrictions for collecting data simultaneously for the entire population, we simply assume that whatever population drift that may have occurred during this 4-week period was insignificant, and treat our data as time-invariant. Still, for each of the $19,252$ games played by these users, we collected data on price, associated tags, and minimum system requirements. Finally, for each of these games, we collected at most $1,000$ reviews (if available), totaling $2,132,591$ game reviews.

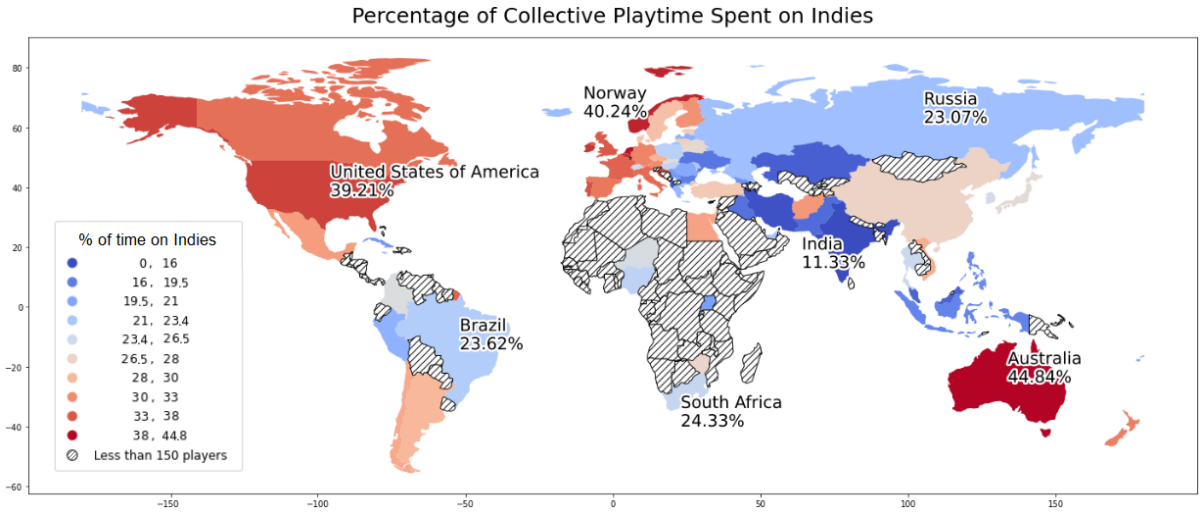

Figure 2: Percentage of total playtime spent on indie games for each country. Due to some profiles not containing country information, we report a reduced sample of users ($n = 162,786$). We also omit all countries with less than 150 observed players. With an average of 2179 users per remaining country, we guarantee, on average, 95% confidence and 2% error.

counterparts. Particularly, by measuring the number of games containing each of the 420 observed tags, we are able to calculate the difference between the percentage of indie and non-indie games containing each tag. Figure 1 displays the top 12 tags for which the largest difference in percentage between the two categories was observed, ordered from left to right.

Our data suggests that indie games are often perceived as casual, being more commonly played in single-player mode in comparison to other titles. Moreover, such games seem to concentrate more difficulty, often presenting a linear 2D adventure featuring more puzzle and platform elements than non-indie titles. Although such distinctions only scratch the surface of what an indie game is, they provide evidence that the indie movement is far from being a lower-budget version of their mainstream counterparts, suggesting a common set of characteristics that appeal to a more specific audience. In fact, in the following two sections, we shift our view from the games themselves to the audience that consumes them, observing how wealth and well-being can be systematically associated with indie players.

3 Wealth

It is no surprise that internet penetration is statistically correlated with GDP per capita (Banerjee et al., 2019). However, even after controlling for confounds related to internet accessibility, it is unclear if we can still observe a significant difference in online consumption patterns between affluent countries and developing nations. In this section, we explore this relation in the context of indie games, showing how independent software consumption is largely correlated with GDP per capita, despite the barrier to entry for playing indie games being quantitatively lower than that of their non-indie counterparts.

We start by understanding how the distribution of world population is reflected in our data. Particularly, we found that the estimated population by country is moderately correlated with number of users by country ($r = 0.470, p = 0.0$), as well as total playtime by country ($r = 0.512, p = 0.0$). We theorize that this correlation is not stronger due to social inequality: when calculating the fraction *# of users / estimated population* for each country, we find a significant correlation with GDP per capita ($r = 0.515, p = 0.0$), suggesting that more affluent nations are home to relatively larger gaming communities.

Moreover, we investigate how users from different countries divide their time between indie and non-indie games. To achieve this, we sum the total playtime for all users in a country and calculate what percentage of that time was spent on games containing the "Indie" tag. Figure 2 illustrates the value of this percentage for each country, with stronger tones of red representing countries in which users spent relatively more time playing indie games. In order to reduce error, we omit all nations for which we did not observe more than 150 users, leaving 70 countries with an average of $2,179$ users each ($s = 4,211$). Therefore, we

Correlation with **GDP Per Capita**	Pearson	p-value
Average playtime per user	0.312	∼0.008
# of users / estimated population	0.372	∼0.002
% of playtime spent on Indies	0.592	∼0.0

Table 1: Correlations with GDP per capita calculated for the 70 countries for which at least 150 users were observed.

guarantee 95% confidence and $<1\%$ margin of error for highly-engaged countries such as Russia, China, US, Brazil and Turkey, while underrepresented countries (that still fulfill our 150 users requirement) are susceptible to margins of error as high as 8%, as is the case of Iraq, Nigeria, Egypt, Fiji, and Cuba. Table 1 summarizes our findings for the 70 countries in question.

The results outlined above show a strong correlation between wealth and percentage of time spent on indie games, and perhaps this phenomenon can be explained by analyzing potential barriers of entry. After all, if indie content is systematically more expensive or requires high-end machines to execute, players from wealthier nations would have an unfair advantage. However, we find that this is not true, as show by the minimum system requirements for all games in Figure 3. On average, we find that indie games are cheaper, require less RAM memory, and occupy less storage space on disk. Interestingly, these values change significantly when we calculate a geometric average weighted by each game's total playtime: particularly, we find that users tend to spend their time on indie games that are higher priced, require more RAM, and occupy more disk space than the average indie game on Steam. Still, we conclude that these values do not vary greatly from the ones observed for non-indie titles.

Unfortunately, because minimum system requirements are manually entered by each developer with no apparent standardization, we were unable to compute reliable statistics for CPU and graphics card requirements. In fact, our method for retrieving memory and disk requirements was based on regular expressions, where we matched an integer as well as the unit of measure (either MB or GB) for specific fields in each game's store page. We were also forced to remove unrealistic values entered as a lighthearted prank by a couple of very small indie developers (e.g., 9000 GB memory), filtering all data above $1,000$ BRL, 64GB memory, and 1TB disk storage.

Figure 3: Average price and minimum system requirements for indie and non-indie games (95% CI). We report two values: "Unweighted" is a simple arithmetic average, while "Weighted" is a geometric average weighted by the total playtime of each game across all players. We removed all misreported data over 1k BRL, 64GB RAM, and 1TB disk.

4 Well-being

In Section 2, we observed that, despite indie games featuring joyful tags (such as "Casual") more often than their non-indie counterparts, they also concentrate more occurrences of potentially stress-inducing tags (such as "Difficult"). Moreover, the correlations outlined in Section 3 suggest that indie games appeal to a wealthier audience in general, which in itself has been shown to positively correlate with numerous measures of well-being (D'Acci, 2010). In this section, we solidify these vague intuitions by analyzing how users expressed their emotions in over $2M$ game reviews across indie and non-indie titles, ultimately finding that users consistently express more positive feelings when reviewing indie games.

Naturally, operationalizing the notion of well-being is a challenge on its own, and a series of attempts have been made over the years to collectively quantify feelings and emotions. State-of-the-art work on online social networks (Vosoughi et al., 2018) demonstrated the power of lexicon-based approaches, where each individual word in a corpus is matched to a database containing emotions commonly associated with that word, and results are reported as an average for the whole corpus. In this context, for analyzing game reviews, we resort to EmoLex, a well-established crowdsourced lexicon that associates a total of $14,182$ words with 8 emotions and 2 sentiments (Mohammad and Turney, 2013, 2010).

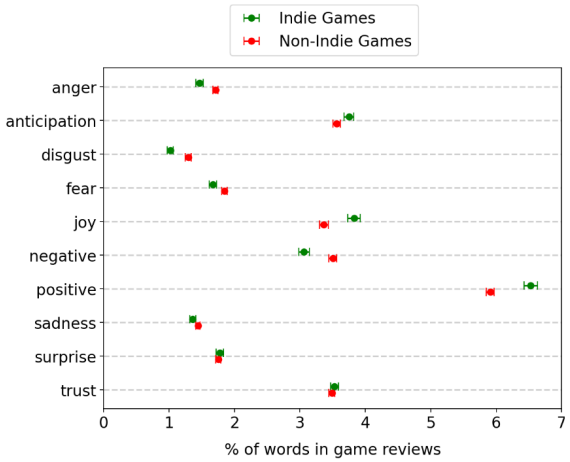

Figure 4: Weighted average percentage of emotion-inducing words in a sample of game reviews ($n = 2,132,591$; 99.9% CI). We first calculate the percentage of emotion-inducing words in reviews for each game, and then compute the geometric average weighted by each game's total playtime.

However, simply reporting the average percentage of emotion-inducing words for each game would not describe the overall population. If players spend twice as much time on game A in comparison to game B, we want game A's associated emotions to better represent all users. Therefore, we plot in Figure 4 the geometric average for the percentage of all 8 emotions and 2 sentiments weighted by total playtime of each game. Although we notice no major differences between indies and non-indies, a consistent and statistically significant pattern can be observed. On average, user-generated reviews for indie games are associated with more positive emotions (joy, anticipation) and less negative ones (anger, disgust, fear). We report all distributions in Appendix A.

5 Conclusion

Gaming in itself requires some form of capital: even in the US, where GDP per capita is the highest in the world, 22.7% of households did not have internet access as of 2015 (NCES, 2015). However, once an individual is online and decides to spend time on games, it is not clear why users from affluent countries tend to dedicate more hours to indie titles in comparison to users from developing nations. In an attempt to explain this phenomenon, we found that potential barriers of entry, such as retail price and hardware requirements, do not seem to provide a definitive answer. Other barriers, such as available languages, could point to the right direction: previous research observed that localization positively impacted the number of game installs by users (Toftedahl et al., 2018). Still, the top 5 most played indie games on Steam (Rust, Valheim, Rocket League, ARK, and Euro Truck Simulator 2) all have support for at least 12 languages (including Portuguese, Russian, and Spanish), with Rust, ARK, and Euro Truck Simulator 2 supporting over 21 languages.

Still, even if language is the answer, we start to observe a barrier for accessibility that is no longer physical. Linguistic capital is a form of cultural capital, which predetermines a person's ability to produce and consume contents of different kinds (Bourdieu, 1977). More generally, cultural capital is the collection of a person's cultural assets, being subdivided into three categories: *embodied*, pertaining to passively inherited knowledge (e.g., linguistics); *objectified*, encompassing cultural properties that can be bought or sold (e.g., works of art); and *institutionalized*, referring to the recognition of institutions (e.g., academic credentials) (Bourdieu, 1986). Games themselves can be classified as objectified cultural capital, being a form of art that can be bought, sold, or consumed once one possesses ownership of the (digital) object.

However, barriers of entry are often associated with embodied capital, which, despite being commonly connected to wealth, is not reducible to it. For instance, "high art" in the context of Cultural Studies – such as classical music, plastic arts, etc. – often implies limited accessibility and exclusivity, as a direct contrast to "mass" culture (Hibbett, 2005). Note that no impediments exist for users with an internet connection to go online and consume "high art" – yet, all top 10 most watched YouTube music videos of all time are considered pop music (YouTube, 2021). We believe that such phenomenon is very similar to the one we observe with indie games: while no obvious impediments exist for their consumption, underlying inherited cultural values determine if a population is more likely to consume this kind of content or not.

In the future, we hope to expand these findings to other forms of media, particularly music and films. By observing common patterns among all art forms that feature some distinction between independent and mainstream production, we will be able to build a stronger foundation for our argument on cultural capital. Regardless, indie is a privilege – be it due to the internet requirement, to possible language barriers, or to some underlying cultural prerequisite – and it is still not clear how to increase its audience.

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Appendix

A Percentage of emotion-inducing words weighted by playtime

	mean		variance		ks-test
	indies	non-indies	indies	non-indies	
anger	1.466	1.709	0.516	0.241	$D = 0.077$, $p \sim 0.0$
anticipation	3.749	3.564	0.989	0.448	$D = 0.094$, $p \sim 0.0$
disgust	1.020	1.293	0.360	0.290	$D = 0.075$, $p \sim 0.0$
fear	1.670	1.846	0.597	0.263	$D = 0.091$, $p \sim 0.0$
joy	3.826	3.367	1.467	0.609	$D = 0.117$, $p \sim 0.0$
negative	3.063	3.502	1.113	0.538	$D = 0.090$, $p \sim 0.0$
positive	6.528	5.909	1.877	0.477	$D = 0.158$, $p \sim 0.0$
sadness	1.361	1.442	0.343	0.125	$D = 0.034$, $p \sim 0.282$
surprise	1.775	1.752	0.522	0.209	$D = 0.056$, $p \sim 0.010$
trust	3.527	3.488	0.616	0.337	$D = 0.041$, $p \sim 0.115$