The influence of COVID-19 on Twitch audience : How lockdown measures affect live streaming usage ?

Anil Narassiguin, PhD
Data scientist at Upfluence, anil.narassiguin@upfluence.com

Vivien Garnès
Co-CEO at Upfluence, vivien.garnes@upfluence.com
www.upfluence.com

At the time of writing, the COVID-19 (also known as novel coronavirus) pandemic has profoundly changed humans' habits around Asia and Western countries. The global economy has slowed due to emergency responses from different governments around the world such as self-quarantine, travel bans, social distancing and non-essential business closures. As a result, influencers across various social platforms are promoting a home-loving lifestyle, most notably, the popularity of certain hashtags on Twitter such as #StayHome or #StayHomeSaveLives. Many musicians and artists who had large scale events planned have decided to record their concerts online using Youtube or Twitch. Most famous for its live streaming content, especially video games, Twitch particularly caught our attention. Indeed, besides an increase in audience engagement driven by recent health measures, we can plausibly expect to see a shift of the way Twitch is used. In this study, we qualitatively show that there is a correlation between countries that implemented a full lockdown (such as Italy, Spain, and France) and a significant increase of total views on the platform. We'll also stress the fact that new activities such as live streaming music strongly emerged while artists couldn't on their traditional concerts to promote their activities.

Key words: Twitch, Covid-19, exploratory data analysis, lockdown, quarantine, social behaviour

1. Introduction

The Coronavirus disease 2019 (COVID-19) is an infectious disease first identified in Wuhan, China. Reported at the very end of 2019, the disease spread promptly around the world, first in East Asia, particularly China and then in Central Asia (Iran) and Western countries. Now recognized as a major pandemic by the World Health Organization on the 6th March 2020 [Organization et al. (2020)], this large scale worldwide catastrophic event is one of the first to have a direct influence on the digital world. Indeed, even if at the time of the last worldwide pandemic in 2009 (the swine influenza), social networks such as Facebook and Twitter already existed, in the last decade their usage has increased exponentially and other popular social networks have emerged (Instagram, Twitch, Tiktok, Pinterest, etc...) [Cinelli et al. (2020)]. From 2010 to 2020, the number of social media users has multiplied by 3 (from 1 billion to 3 billion) [Statista

(2020)], their use is far more ubiquitous than it was 10 years ago thanks to new devices (smartphones, smartwatches, tablets, etc...) all of which tend to promote new kinds of content (stories, streaming, etc...). Many studies on how social media and health are interconnected [Reece and Danforth (2017), Gencoglu and Ermes (2018)] have been performed but the uniqueness of the present crisis is an interesting playground to better understand how social behaviours change during the quarantine.

As of 22nd March 2020, 9 countries implemented full lockdown restrictions to control the spread of the disease: China, Denmark, El Salvador, France, Ireland, Italy, New Zealand, Poland and Spain. Many other countries closed their schools, encouraged their population to respect strict hygiene rules, avoid public transport and closed their international airports.

Full lockdown proposes that most of the countries' populations have to remain at home, including third sector employees. Given such broad restrictions, we expect an increase in social media usage and content production in the coming weeks.

In this article, we quantify the impact of the pandemic on the audience on Twitch. Twitch [Wikipedia (2020)] is a video live streaming platform owned by Amazon and specialized in video game streaming. Other activities/channels such as Music and Art also offer insight into user activity on the platform, we'll show that the recent outbreak may have an impact on those secondary categories.

Twitch reports the usage of its streamers by language. The most spoken languages on the platform are respectively English, German, Spanish, French and Italian. Other languages are more popular than French and Italian, namely Korean and Russian, however, the crisis in South Korea arose before Europe and Russia have reported a significantly lower number of cases.

As reported in Figure 1, Italy initiated quarantine 1 week before France and Spain. At the time of writing, the UK, US and Germany still hadn't implemented strict lockdown measures. Using Twitch data, we will propose that official lockdown actions affected total viewers for Italian, French and Spanish speaking streamers.

2. Data sets and outcomes

This study has been based on Twitch data from Upfluence, a company specialized in Influencer Marketing [Narassiguin and Sargent (2019)], enriched by additional data from TwitchTracker [TwitchTracker (2020)] (total views on Twitch per day, language and game) and the John Hopkin's data sets for COVID-19 case records [Dong et al. (2020)]. The data was analyzed for a range of dates starting from February 15 to March 22.
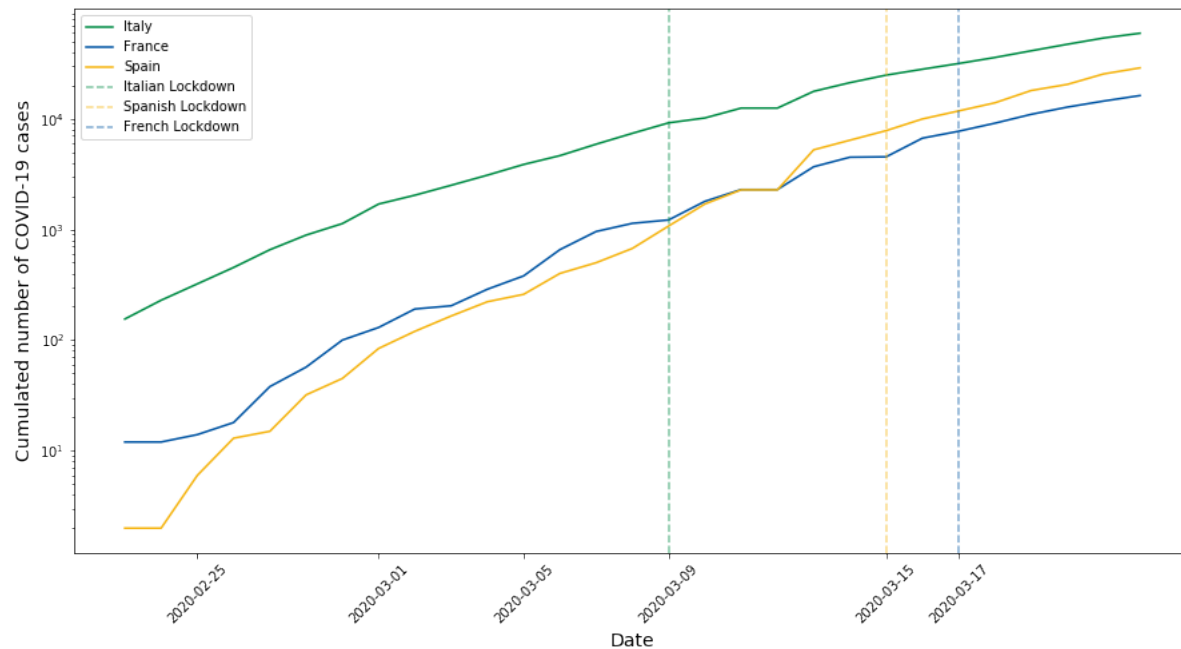
Figure 1 Evolution of the number of cases for Italy, Spain and France in log scale with lockdown dates [Dong et al. (2020)]

We have qualitatively tried to answer two major questions :

• By comparing streamers performances from Italian, French, Spanish, English and German speaking areas, is there a correlation between lockdown and an increase in total views on Twitch?

• Are new usages methods of the platform starting to emerge ?

3. Audience increases by language area : comparison between countries and non-lockdown countries

One main engagement metric to quantify activity on Twitch is the total number of viewers on a stream. It reveals how many viewers have been watching the stream since the streamer began. Figure 2 represents different time series of total viewers per day for different language areas. The number of total viewers was normalized by each language's max value to easily compare the time series.

To have a better idea of the raw range of value, quantiles are given in Table 1.

For all languages, the time series show features of seasonality between weekdays and weekends, with high spikes correlating potentially with major gaming events (Apex Legend and Lyon E-Sport). There is a steep increase for Italian, French and Spanish around mid-March.
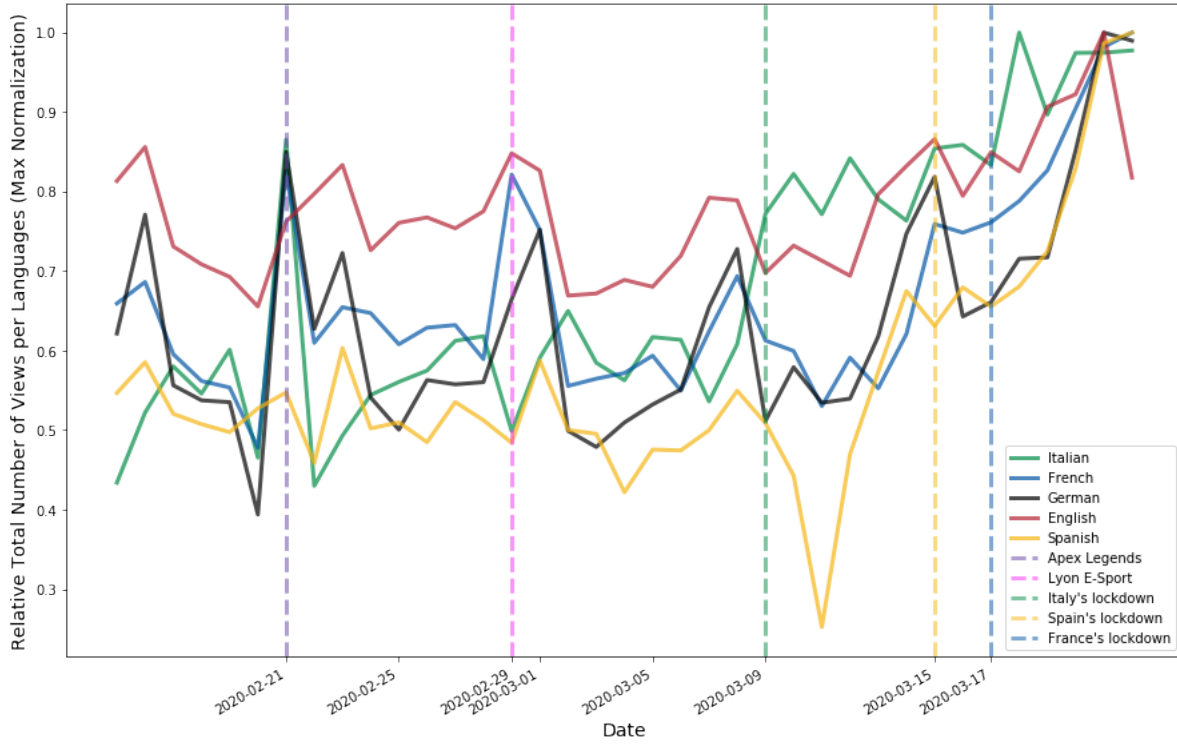
Figure 2 Evolution of the total of viewers on Twitch per day for 5 main languages

	English	French	German	Italian	Spanish
Mean	764,083	78,652	84,612	21,903	76,696
Min	645,962	57,022	52,965	13,830	34,925
$Q_{25\%}$	700,533	69,258	72,120	18,067	67,847
Median	756,441	74,077	77,882	19,739	70,939
$Q_{75\%}$	817,254	89,485	96,820	26,634	82,423
Max	985,564	117,130	134,489	32,174	136,596

Table 1 Quantiles of the daily total number of viewers per languages

The week-over-week analysis in Figure 3 allows us to highlight a consequent increase for Italian, French and Spanish (between 30% and 50%). Keeping in mind that some French and Spanish speaking streamers are not all located in France or Spain, this large increase is clearly linked to quarantine measures. Since Italian lockdown occurred 1 week before Spain and France, it could give us a baseline tendency on how the activity will evolve on Twitch. Indeed, the relative increase is brutal for the week of the quarantine proclamation, but it seems to stabilize one week later. For Spanish, it would reasonably depend on the situation of Latin America in the
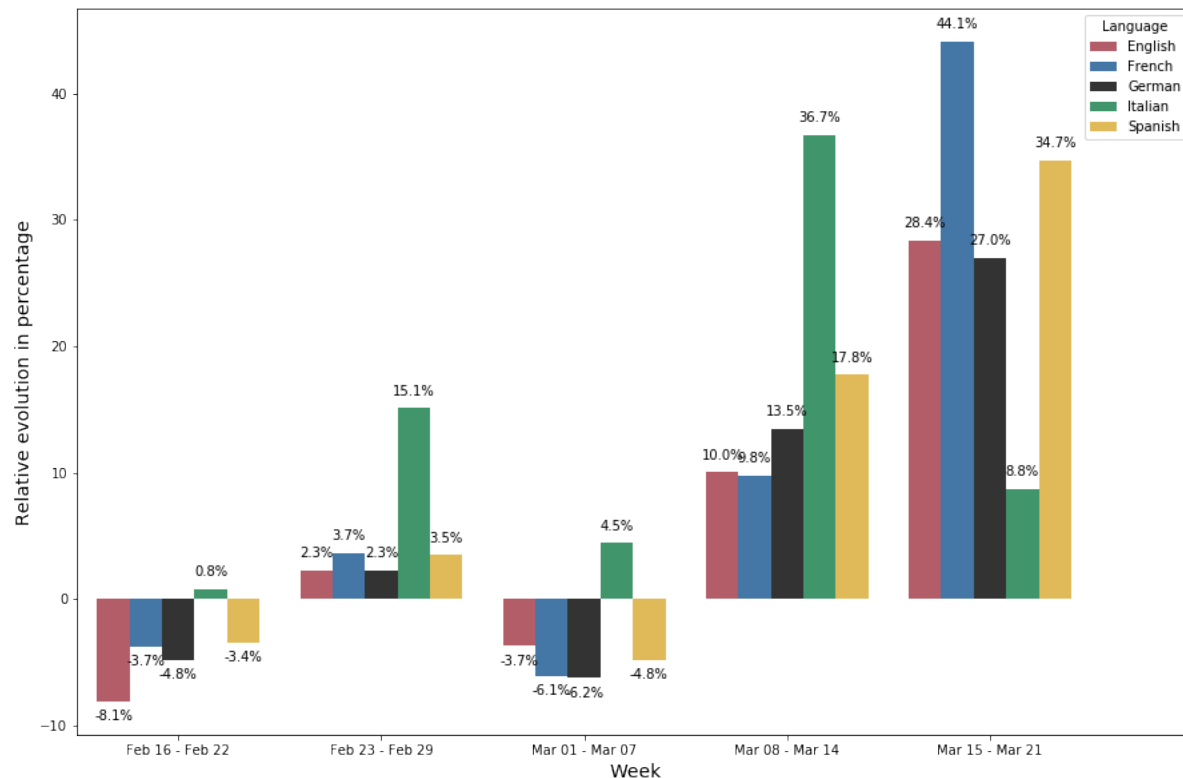
Figure 3   **Weekly relative evolution of total viewers on Twitch**

coming weeks. Overall, it has to be noted that non-lockdown language areas (mostly the US, UK and Germany) also had an interesting increase during the last two weeks, plausibly due to light health measures, but no sharp progression at the moment. Figure 7, showing the relative increase in the number of active channels per weekday supports the previous claims.

Predictions of the number of total viewers continuing to grow irrespective of new online gaming events during the quarantine period fall out of the scope of the study. However, if we consider that the number of COVID-19 cases is a pertinent feature to quantify "how bad" the situation is evolving in a country, we can compare the number of cases with the increase of Twitch total viewers per day (Figure 5). A direct correlation between the increase of cases and the number of viewers would be absurd, and therefore the results displayed on Figure 5 should be treated with extreme caution, but for now, as long as the crisis evolves, the number of viewers increases. This increase would most likely stagnate and potentially decrease after the crisis.
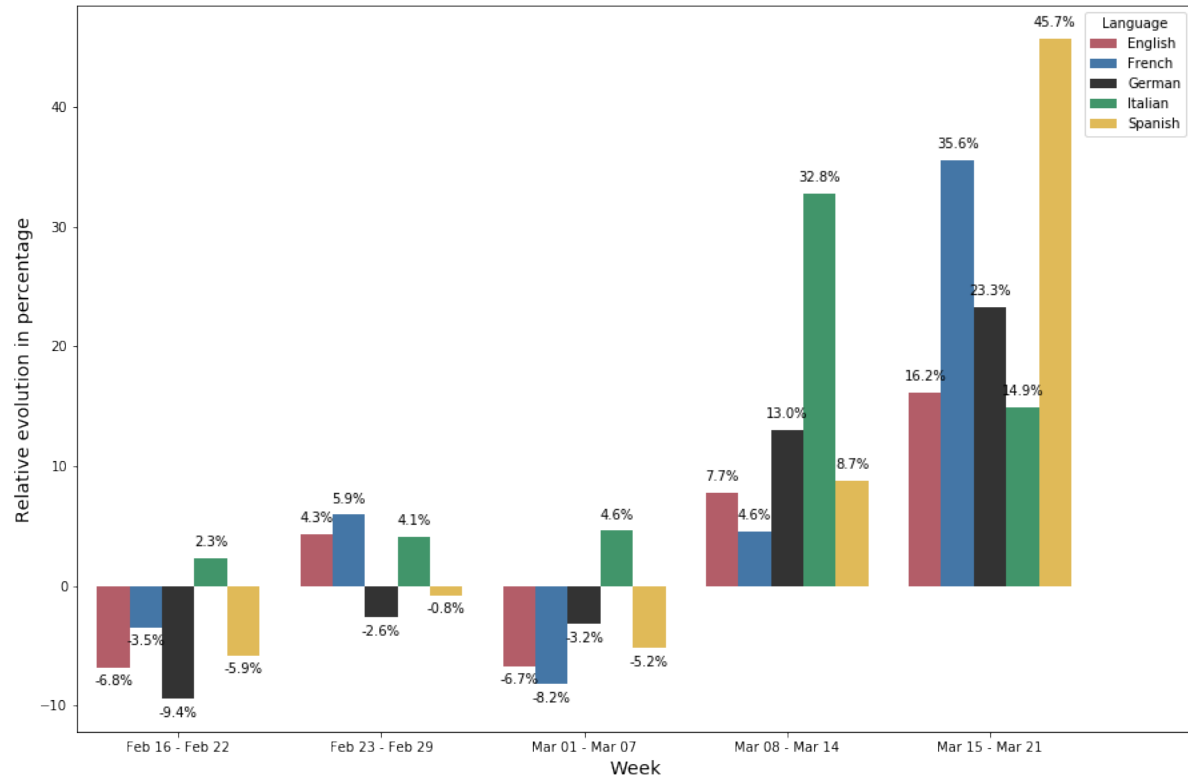
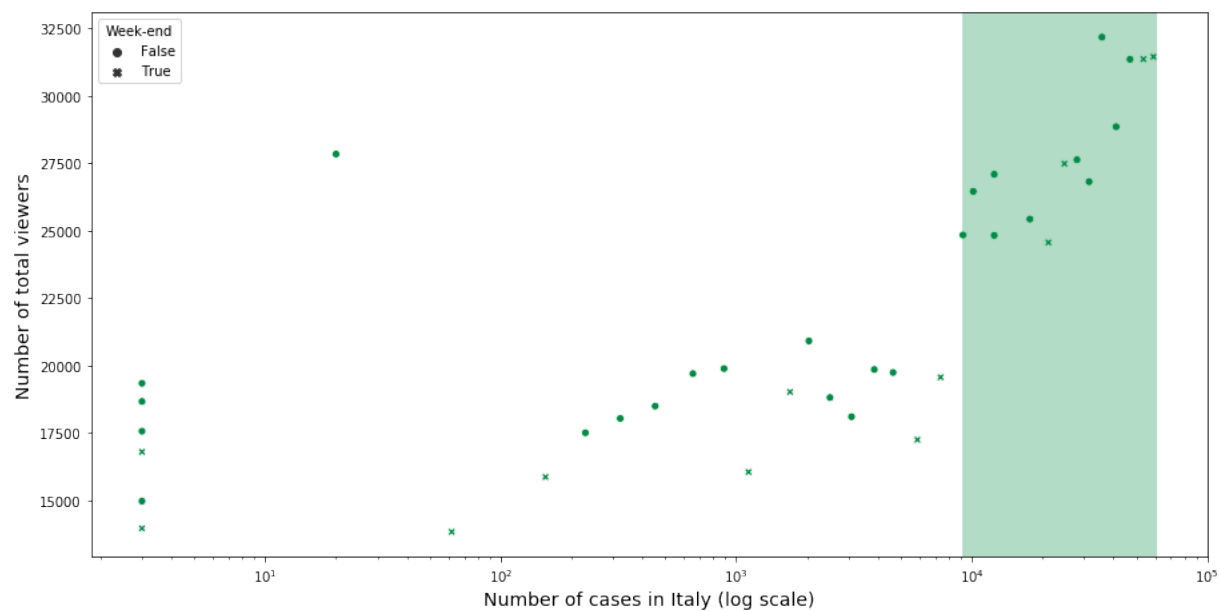**Figure 4**   **Weekly relative evolution of active channels on Twitch**

Figure 5   **Number of COVID-19 cases vs. total viewers on Twitch in Italy (green background is the "lockdown area").**

4.   Audience increases by games : new emerging trends on Twitch

As soon as the crisis emerged in Western countries, famous artists announced that while their tours were cancelled, they would ensure continuous online musical shows [Forbes (2020)]. This led to a large increase in the total number of viewers for music content (Figure 7).
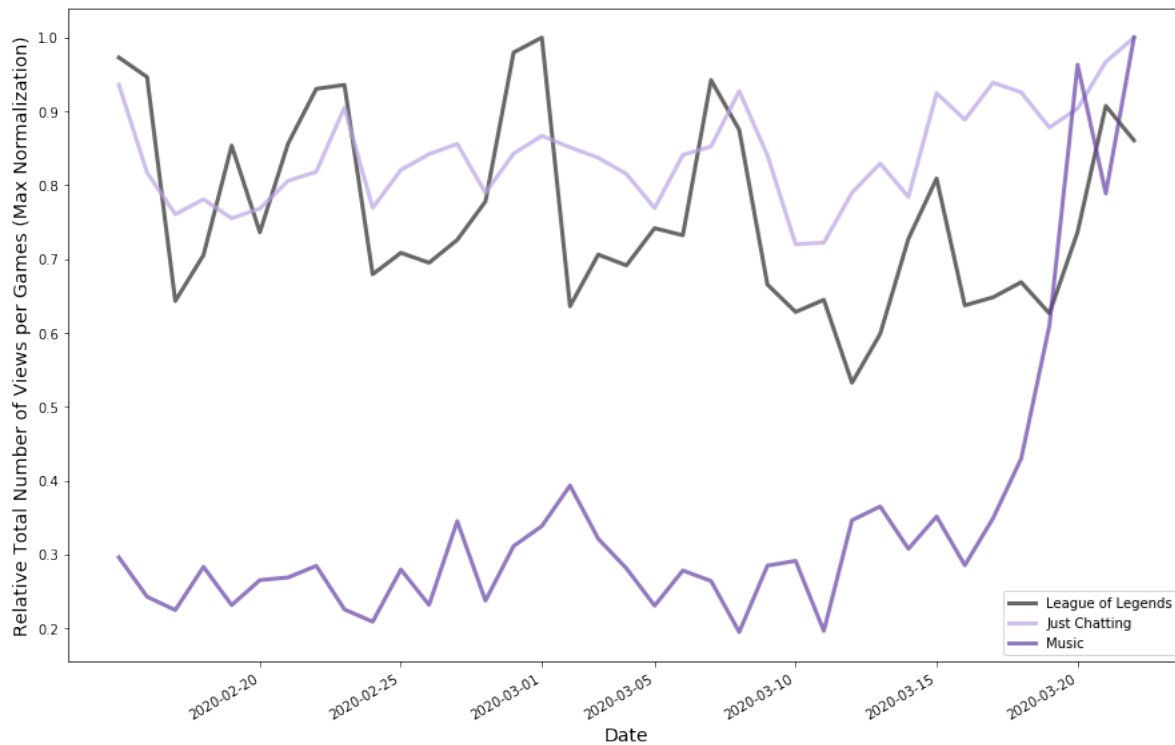
Figure 6   **Evolution of the total of viewers on Twitch per day for 3 main activities.**

As seen in Figure 7, there is an increase of almost 40% for music content in the last week, and with the tangible enthusiasm of artists with stream content, this trend will probably remain the same in the coming weeks. This number should be compared to other stream usages: for one of the most popular video games, *League of Legends*, the seasonality of the data is quite regular and the relative increase is still moderately superficial compared to music. This is likely due to the considerable community size of *League of Legends*' audience, while new trends are just starting to establish in new communities.... It is important to note that usual *Just Chatting* activities, where the streamers simply interact with their communities, show an interesting increase of 25%. By studying posts manually, we can see people tend to use *Just Chatting* to promote their quarantine lifestyle (food, homework, workouts, health advice). This claim has to be corroborated by analysis using natural language techniques on stream descriptions or live captions.

Will the COVID-19 crisis have a permanent effect on usage/viewing habits on Twitch or is it just a passing trend? Will other professionals (DIY makers, painters, speakers, etc...) follow the musicians' path? The answers to these questions need more quantitative evidence and should be discussed in further analysis.
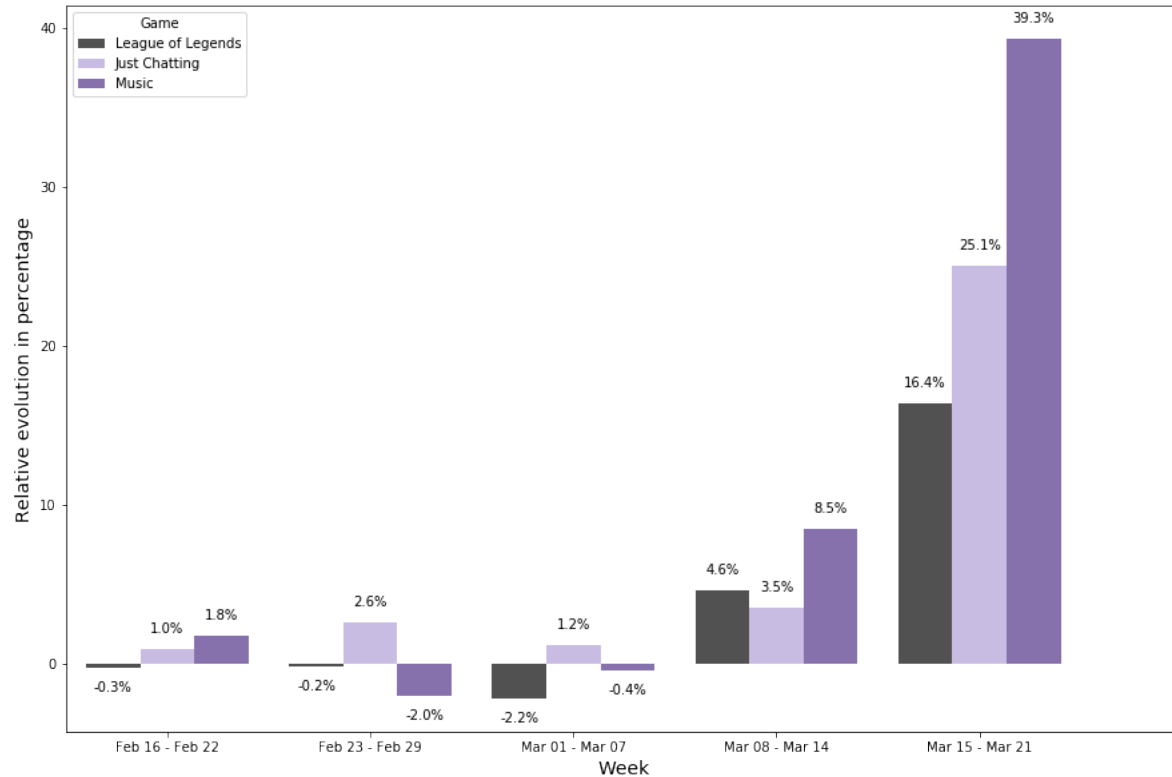
Figure 7   **Weekly relative evolution of total viewers on Twitch.**

5.   Conclusion and further work

The following qualitative research helped us to better understand the COVID-19 pandemic and its ongoing impact. Business closures, home-working, freedom of movement limitations and full lockdowns, had a large impact on the activity of the social streaming platform, Twitch. We first saw that lockdown countries such as Italy, France and Spain experienced a strong relative increase in Twitch activity from one week to another. At the time of writing, the United Kingdom is planning a full lockdown, reasoning based on the result of the other countries featured in this report, we expect a boost in British streamers commencing the week of March 24th.

We also brought to light, by looking at audiences for musical content on Twitch, that new usages of the platform would emerge in the coming weeks and would potentially make Twitch a general content streaming platform after the crisis. In this next steps, we would like to present more quantitative insights using rigorous statistical tests to prove the causality between lockdown and streaming activities, analyze textual and vocal content to better understand if Twitch usage respectively changed over time and how it changed, and finally, to engineer a prediction model to anticipate the boost in Twitch audiences.

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