Influencer Analysis
Who Should Businesses Target to Advertise and Sell Their Products?

This Capstone Project is submitted in partial fulfillment of the requirements for the course
Data-Driven Decision-Making (MDA 620) during the Fall Semester of 2022.

While writing this Capstone Project, I have not personally violated any conditions of the LIU
Honor Code.

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Background

In the world we live in today, social media has become a part of our everyday lives. It has revolutionized the way we live in terms of what we see, do and how we spend our money. Typically celebrities have been the ones to influence us, but nowadays more people are jumping onto social media platforms to become "influencers" and creating massive followings for themselves. These "influencers" create content and work with brands to promote products and services to their followers on social media. They use platforms such as Tik Tok, Instagram, Youtube and Facebook to reach a wide audience and make deals with brands to help them advertise their products and services. Influencer's followings can vary anywhere from hundreds of thousands to millions of people and there are tiers of influencers depending on the amount of followers they have. The tiers consist of mega, and mini or nano influencers. Often time influencers have flexibility within these tiers and can enter bigger tiers as they grow their following and become more popular.

Problem Scenario/Business Issue

Although it may seem simple for businesses to use influencers as a way to bring their products to consumers. There are a lot of factors that can complicate the process. It is important to choose the right influencer to help market a brand's goods or services. For example, "A sports drink brand working with a candy influencer is obviously not the right fit. A makeup brand that does not offer items free of animal products will not benefit from a vegan influencer. A fast fashion brand will not get great results working with an environmentally conscious influencer"

(Fields). Finding the right fit is crucial in order for the product to reach the correct demographic. People look for authenticity from the people they follow and therefore will not buy the products or services used by an influencer if it seems disingenuous.

In addition to choosing the right influencer to help promote products and services, it is important to recognize the value they can bring to help advertise for a business. Advertising through influencers on social media is seen to be more effective. Since commercials and advertisements via magazines and television are seen as dated, social media advertisements are a brand's main focus to get their products into the hands of consumers. People do not want to feel as though they are consuming advertisements so having them incorporated into their favorite influencers content is something that can be useful to brands. Brands recognize the value in this and realize that they must pay the influencers accordingly which can be tricky. "Today, mega influencers will usually not get out of bed for less than $30,000 – $200,000. A fashion blogger with around 100,000 followers will potentially demand approximately $60,000 for a blog post and another $10,000 for a dedicated Instagram post. In response, brands are turning to mini and nano influencers since they do not necessarily have a huge following but do have a dedicated audience who respects their recommendations" (Fields). These are just a few of the things brands must be conscious of in order to maximize their experience of using an influencer to market and advertise their products.

Objective/Goals of the Project

The objective of this project is to analyze influencers and their followings to see who would be the best fit for brands and whether or not they are considered to be mega or mini influencers on Instagram and Youtube. I believe through this analysis that I will be able to provide recommendations to specific brands and can suggest influencers for them to work with based on

their needs in the industry they operate in. Obviously higher end brands with bigger budgets will be able to afford mega influencers but I feel it will be interesting to see the mini influencers as they are of interest to most brands since they can be considered to be more affordable. I am also interested in seeing the most popular industry and running models to see who the best influencer choices are for that industry among the more relevant social media platforms.

Data Exploration

When looking at social media influence not only is it important to look at the follower count but it is also important to look at the engagement. "Engagement is a measure of how people are interacting with your social media accounts and content. Most times engagement includes:

- Likes and Favorites
- Comments, DMs, Replies
- Shares
- Saves
- Clicks
- Mentions

Engagement is a great way to measure whether the content you're creating is actually resonating with your audience" (Eckstein). Having the greatest amount of followers does not always correlate to having the most engagement. One can track engagement through a metric called the engagement rate. It can be calculated by dividing engagement average by the total number of followers and multiplying that amount by 100. While exploring the data I was able to calculate the engagement rate for the top influencer accounts on instagram to see how they correlated to their amount of followers.

Table 1. Instagram's Engagement Rate

Name (Instagram Handles)	Followers	Engagement Rate
instagram	549.3 M	0.066
cristiano	483.1 M	1.159
kyliejenner	370 M	1.189
leomessi	357.8 M	1.146
selenagomez	347.6 M	0.662
therock	338.1 M	0.137
arianagrande	331.6 M	1.206
kimkardashian	330.3 M	0.224
beyonce	275.7 M	0.798
khloekardashian	272 M	0.180
justinbieber	258.2 M	0.736
kendalljenner	258.2 M	0.581
natgeo	239.5 M	0.072
nike	238.5 M	0.060
taylorswift	224.9 M	1.245

Table 1 displays that followers and engagement rates are not necessarily correlated. The table shows Instagram's top 15 accounts and their amount of followers and corresponding engagement rates. As shown in the table the Instagram's instagram account has the most followers but is not seen to have the highest engagement rate. The highest engagement rate on Instagram is held by Taylor Swift at 1.245 but as you can see she has the least amount of followers out of all the celebrities in the table. This is valuable for brands because it shows which influencer or in this case celebrity gets the most response and interactions from their followers on Instagram. A good engagement rate means your content is making an impact on the audience (they really like you).

Taylor's good engagement rate tells us her content is more likely to be boosted in the newsfeed and will attract more eyes which can benefit brands she is working with. It also helps to show that out of these 15 influencers Taylor Swift holds the most power over her followers and can be an asset to market higher end products and services related to music and her lifestyle.

When looking at the amount of followers and the amount of engagement I was also able to see the "category" or industry the influencer works within for both Instagram and Youtube shown in Appendix A, as well as the country that holds the majority of the influencer's audience.

Data Visualization

In order to help visualize the top 15 most followed celebrities on instagram, I created a bar chart, Figure 1, essentially putting the celebrities in Table 1 in order from most followers to least followers.

Figure 1. Top 15 Most Followed Celebrities on Instagram
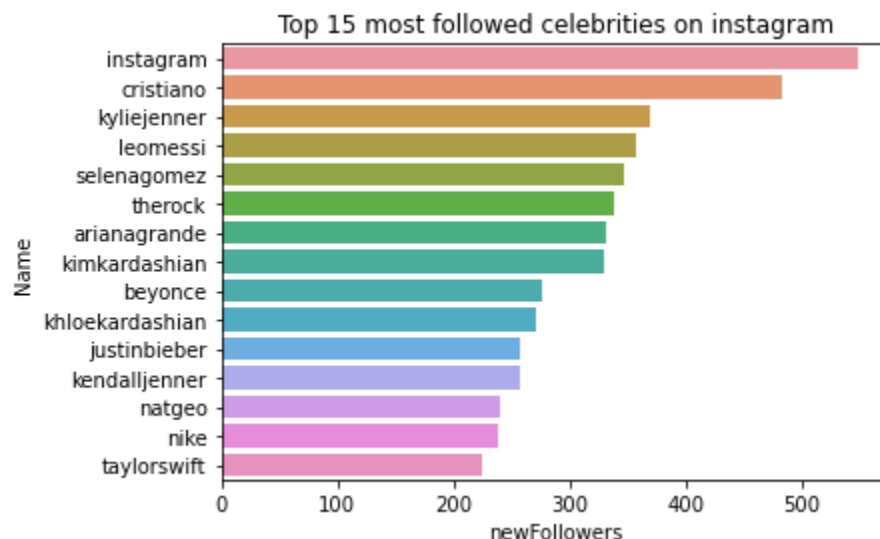
Here we again see the top followed account is owned by the app Instagram which contains over 500 million followers. I was also able to create graphs that depict the most popular "category" or industry that influencers work within. This information is very useful especially to brands so they can see whether or not it will be worth it to obtain influencers to market their businesses.

Figure 2. Most Popular Influencer Industries (Instagram)
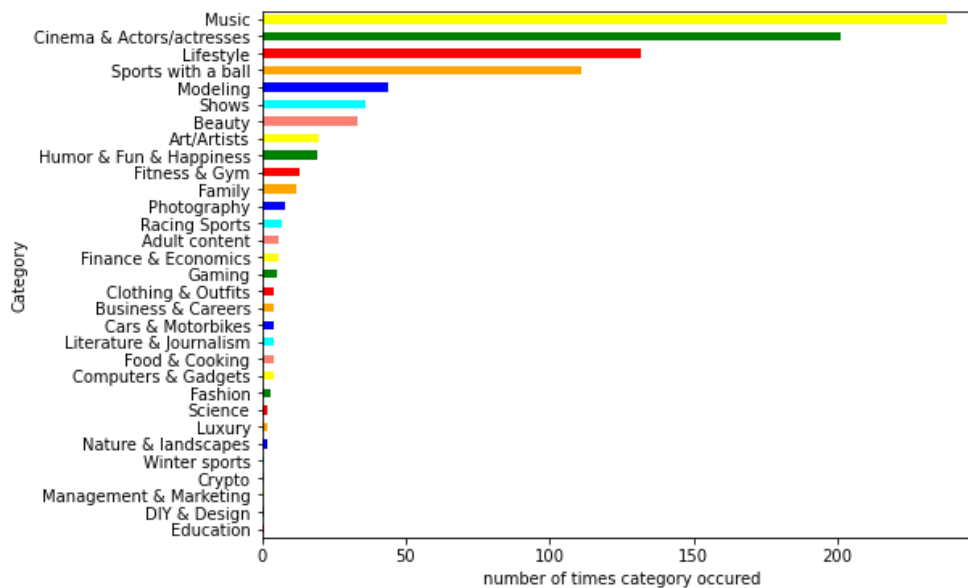
Figure 3. Most Popular Influencer Industries (Youtube)
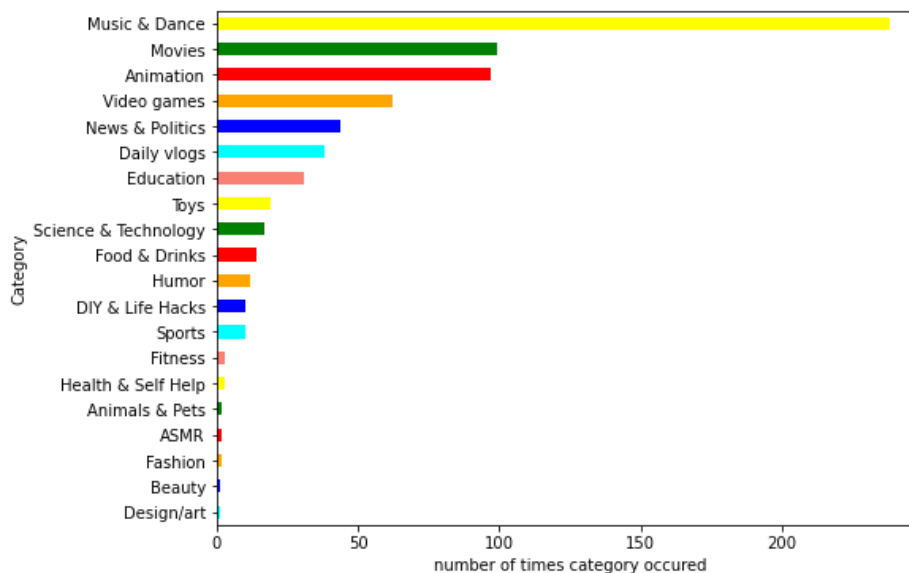
In Figures 2 & 3 we are able to see that the music industry or category contains the highest number of influencers on both social media platforms. We are also able to see that there are more categories for influencers on Instagram than Youtube.

Influencer activity among sports is much higher on Instagram than Youtube which indicates that sports based brands should focus their attention on influencers with growing popularity on Instagram such as Cristiano Ronaldo and Leo Messi who are within the top 15 most followed celebrities and have the highest amount of followers within the sports industry.

I feel it is also important to recognize the category with the fewest number of influencers, which is design. Brands within the design industry like DIY or art companies may not want to rely on influencers to sell their products since there are not many of them out there and there may not be an current audience for the industry on both social media platforms.

Data Manipulation

When handling the data my first objective was to sort through the copious amount of data from the data set I had collected online. I deleted variables that were missing values or not relevant to this study as well as only analyzed Instagram and Youtube data. Although influencer data from Tik Tok was available it did not contain the "categories" or the industries the influencers worked in or which country the majority of the audience of the influencer resides. For that reason, I did not find the Tik Tok dataset to be useful for the purposes of the study without that information because it would be hard to make recommendations of influencers to businesses without knowing if the influencer would be a good match for the industry and country it operates in.

Once I had obtained the relevant data, I had to convert the numbers of the data set into the same format. Since numerical values such as the Followers, Subscribers, Engagement Averages, Views, Like, Comments, etc. were expressed as abbreviations rather than the full number, for example, 300k instead of 300,000 and 3M instead of 3,000,000, I had to change the format to ensure they are recognized in the same manner, as numbers.

Table 2. Number Conversion

Name (Instagram Handle)	Category	Followers	Audience Country	Engagement Average	New Followers	New Engagement Average
cristiano	Sports with a ball	483.1M	India	5.6M	483,100,000	5,600,000
kyliejenner	Fashion	370M	United States	4.4M	370,000,000	4,400,000
leomessi	Sports with a ball	357.8M	Indonesia	4.1M	357,800,000	4,100,000
arianagrande	Music	331.6M	United States	4M	331,600,000	4,000,000

zendaya	Cinema & Actors/actresses	152.2M	United States	6.5M	152,200,000	6,500,000
…	…	…	…	…	…	…
thenewclassic	Music	16.7M	United States	132.8K	16,700,000	132,800
min.nicha	Lifestyle	4.2M	Thailand	526.6K	4,200,000	526,600
francety	Adult content	11.4M	India	196.6K	11,400,000	196,600
silambarasantr official	Shows	10.2M	India	216.6K	10,200,000	216,600
lalala_lfamily	Music	2.5M	Thailand	900.4K	2,500,000	900,400

Table 2 shows the process of converting the number of followers and the engagement average amounts to "new" amounts so that I can use those values to help me calculate numerical value for the engagement rates.

Methodology/Model Building/Analysis

To begin the model building process I wanted to run some statistical measures to obtain more information such as the mean, standard deviation and different quartiles of the data. I began by doing this for the instagram information and found it useful to see the average and the upper and lower quartiles of the followers. I wanted to use this information to find the top mega influencers within the data set. I created a 94% quantile to obtain a threshold for the amount of followers an influencer would have in order to be considered a mega influencer. The number I obtained was 60 million followers and I further split and broke the data down to help analyze who would be in this top tier. Since the Music category on Instagram is the most followed industry according to Figure 2, I wanted to see who exactly would be considered a mega influencer within it. Table 3 shows these influencers as well as the amount of followers they have and the averagement engagement and engagement rate. As you can see, most of these names are well known celebrities with over 60 million followers.

Table 3. Mega Influencers In Music Industry On Instagram

Name	Followers	Engagement Average	Engagement Rate
selenagomez	347,6000,000	2,300,000	4.704
arianagrande	331,600,000	4,000,000	1.609
beyonce	275,700,000	2,200,000	1.349
jlo	221,600,000	1,000,000	1.206
nickiminaj	200,900,000	398,000	1.156
iamcardib	140,800,000	1,900,000	.798
ddlovato	139,500,000	411,900	.662
champagnepapi	121,100,000	1,400,000	.451
chrisbrownofficial	118,100,000	137,900	.295

| billieeilish | 106,300,000 | 5,000,000 | .199 |
| dualipa | 87,000,000 | 1,400,000 | .116 |

Linear Regression Model:

From these influencers I created a linear regression to see the correlation of the engagement average on the amount of followers per influencer and to see who is on trend with the linear regression that I created. Based on this information, I found a correlation rate of 26.2% between the engagement average and the number of followers. This shows that although the amount of followers and engagement is related there may not be a causal relationship. As you can see in Figure 4, celebrities like Cardi B, Jennifer Lopez, Beyonce and Billie Eilish are all on trend in terms of the average engagement to amount of followers. An outlier with a high engagement average but a relatively low number of followers is Nicki Minaj. I feel that her spikes in engagement average can be due to the release of new music and potential tours that have occurred within the past few months.

Figure 4. Average Engagement to Follower Relationship Mega Influencers in <mark>Music</mark> (Instagram)
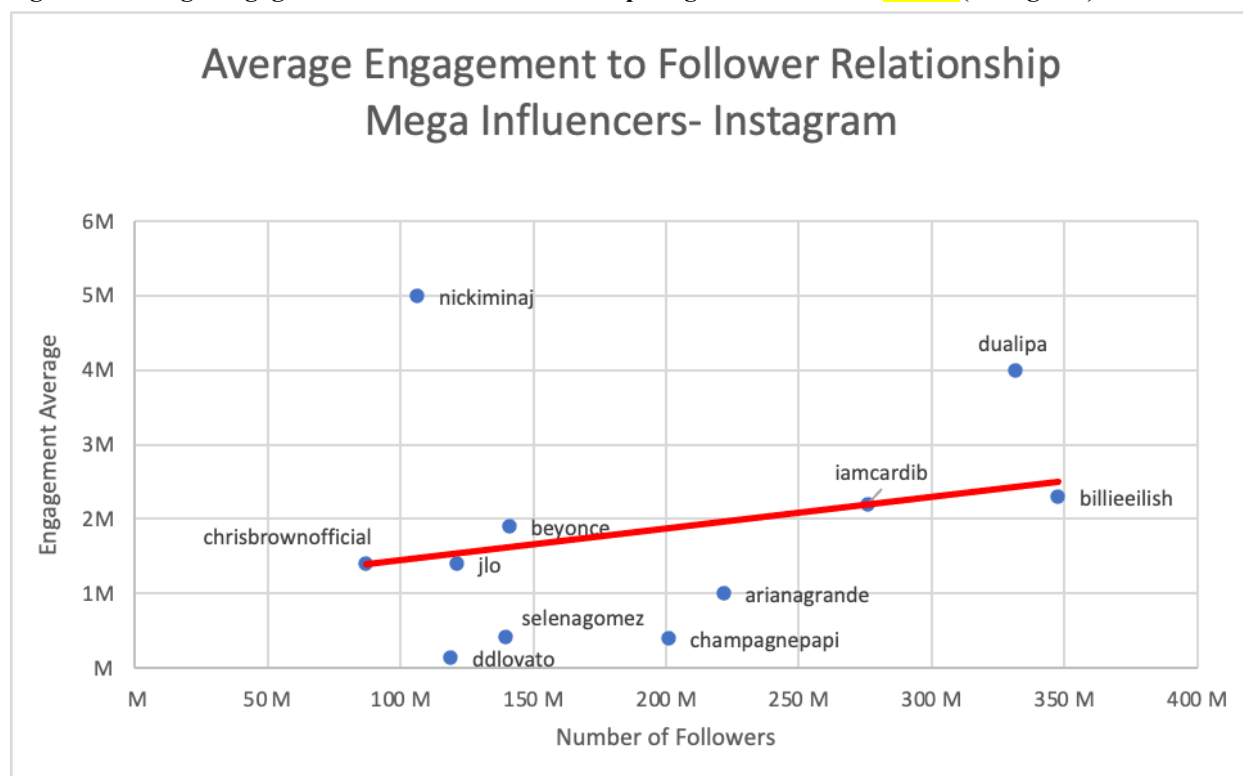
This is helpful for brands in the music space such as Spotify, and Apple to see in order to help determine who is currently relevant which can help to decide who they should negotiate with to market their products. This chart visualizes the mega influencers that can be useful for bigger, higher end brands in the music industry. After seeing these results I also wanted to run a linear regression for mini influencers within the same industry on Instagram.

Figure 5. Average Engagement to Follower Relationship Mini Influencers in Music (Instagram)
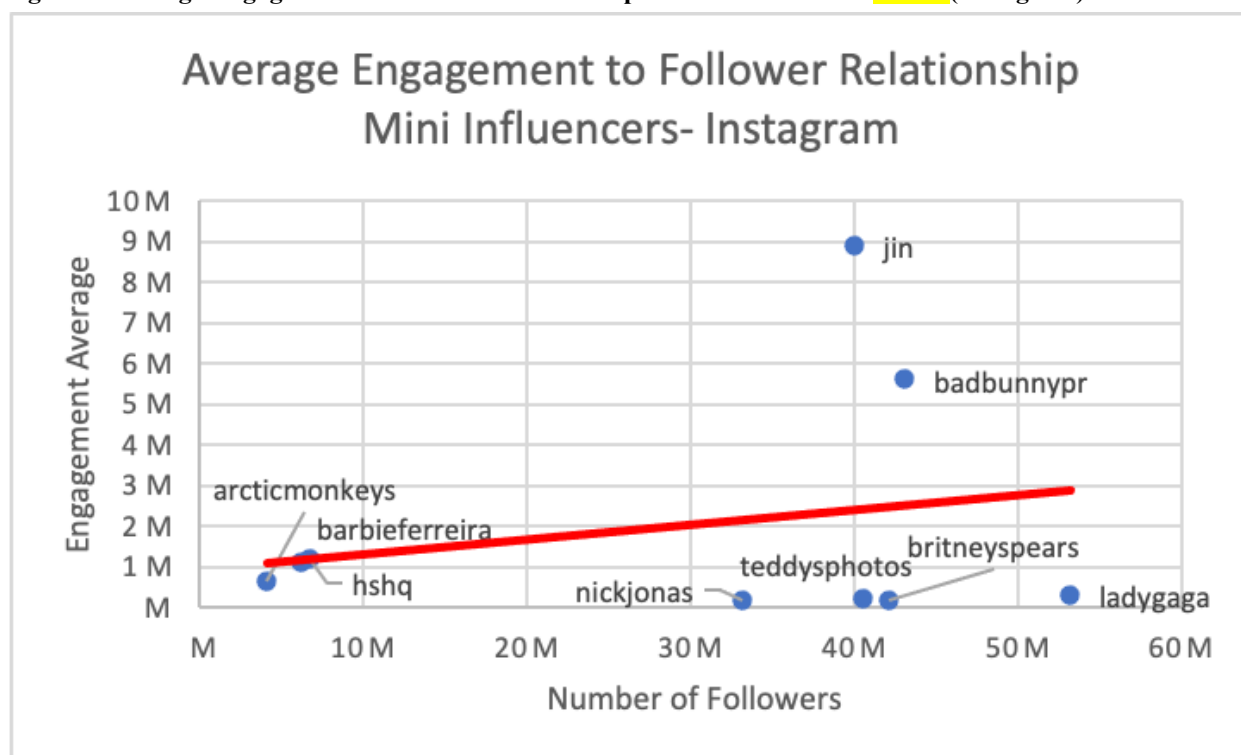

Figure 5 shows less of a correlation between engagement and followers with a rate of 22.5%. Here we can see that a majority of the mini influencers with the most following are under the trend line and contain a lower amount of average engagement. The mini influencers that are on trend with the least amount of followers are Barbie Ferreira, Harry Styles (hshq) and The band Arctic Monkeys. I feel that this can be a result of the major projects these influencers have recently been a part of. Recently, actress Barbie Ferreira starred in the hit HBO max show Euphoria and artists like Harry Styles and Arctic Monkeys have recently released music and been touring. The mini influencers above the trend are also relevant as they have released new music as well and can also be targeted by smaller brands in the Music industry who may not be able to afford the costs of a mega influencer to market their products.

Table 4 Formulas and Correlations for Music Industry Influencers Linear Regression (Instagram)

Influencer Tier	Formula	Correlation
Mega	Y = 0.0043x + 1,000,000	R = .262
		R-Squared = 0.067
Mini	Y = 0.0368x + 934156	R = .225
		R-Squared = 0.051

Let x = Number of followers
Let Y = Engagement Average

Based on these formulas it is clear to see that the Mega influencers engagement average will increase by .00043 for every one follower they gain. Although this is small it is relative in regards to a single follower considering these influencers have millions of followers. For mini influencers it can be said that for every follower they gain their engagement average will increase by .0368 which is more than that of the mega influencers. This can be because their followers are far less in comparison to the mega influencers so one follower will impact them more than a mega influencer with millions of more followers.

As I dove into this further, I was curious to see this relationship on a different social media platform like Youtube. In the linear regression for the engagement rate to subscriber relationship for mini influencers in the Music Industry on Youtube one can see there is more of a correlation between the two factors with a correlation rate of 31.3%. Here I needed to find the threshold for what is considered to be a mini influencer and found that influencers with less than 30 million subscribers were considered to be mini influencers.

Figure 6. Average Engagement to Subscriber Relationship Mini Influencers in Music (Youtube)
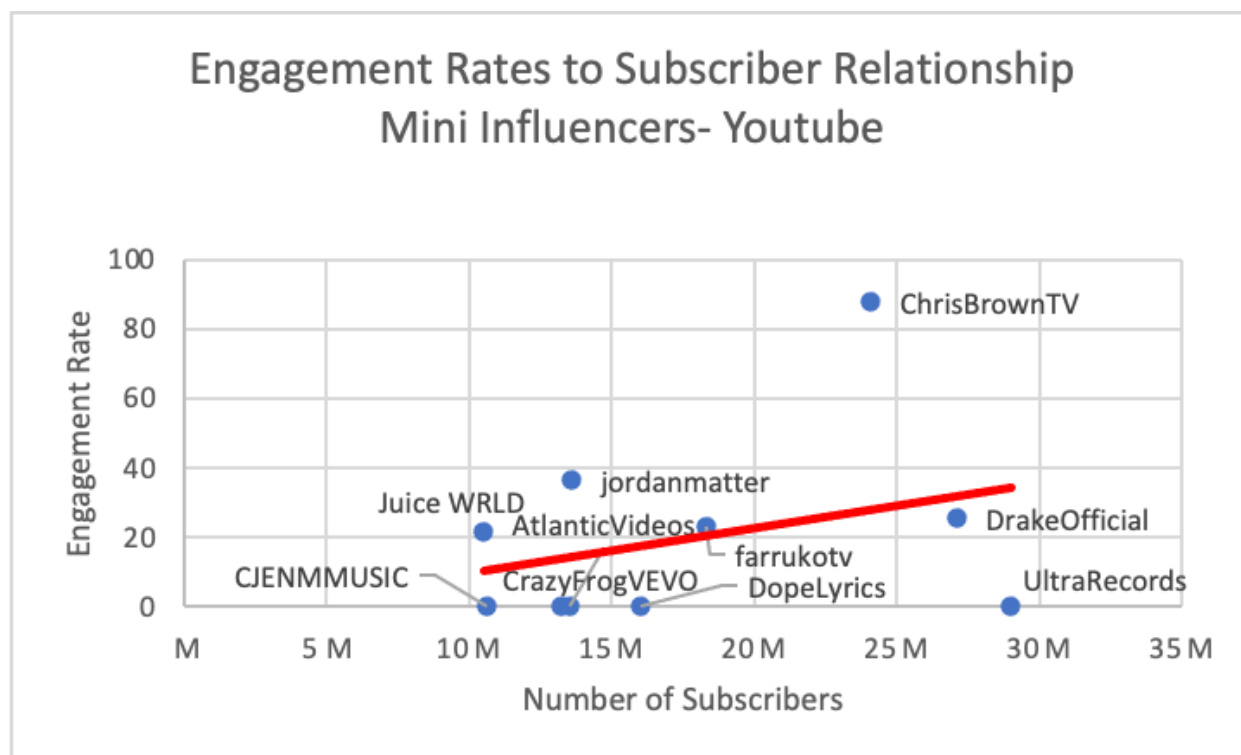

Figure 6 demonstrates the correlation between the engagement rate and the number of subscribers. Although there are some outlier influencers, Farruko and Drake are all relatively close to the trend line and would be considered good choices for smaller brands in the music space to work with on Youtube. Channels like CrazyFrogVEVO, DopeLyrics and UltraRecords may have high subscriber bases but as you can see their engagement rates are low which means they may not be the best mini influencer choice for brands to consider.

Table 5 Formulas and Correlations for Music Industry Influencers Linear Regression (Youtube)

Influencer Tier	Formula	Correlation
Mini	Y = .0000001x - 2.9852	R = .313
		R-Squared = 0.098

Let x = Number of subscribers
Let Y = Engagement Rate

Table 5 shows that the engagement rate for mini influencers will increase by .0000001 for every subscriber they gain. Similarly to Instagram, although this may seem miniscule, it is still

relative in regards to a single follower considering these influencers have millions of followers. This also shows that it can be harder to increase engagement on Youtube than Instagram.

Multiple Linear Regression:

For the second model I decided to run a multiple linear regression model factoring in the engagement rate as well as the engagement average to see the impact on mini influencer's number of followers. I wanted to run the model for mini influencers because I feel it will be of more use to firms since they will potentially have the ability to pay these mini influencers less to talk about their products and services. Table 6 shows the formula and variables for the multiple linear regression.

Table 6 Formulas and Correlations for Music Industry Mini Influencers Multiple Linear Regression (Instagram)

Influencer Tier	Formula	Correlation
Mini	$Y = 5.93x_1 - 2,459,803.34x_2$	R-Squared = 0.929

Let x_1 = Engagement Average
Let x_2 = Engagement Rate
Let Y = Number of follower

This model shows that for every follower gained by a mini influencer there will be an increase of 5.93 in engagement average. As mentioned, the engagement rate is the engagement average divided by the total number of followers and multiplying that amount by 100. Although the engagement rate is dependent on the engagement average we can see here that the multiple linear regression resulted in a decrease of almost 2,500,000 worth of engagement in the form of likes, comments, views and shares for every follower earned. This decrease can be attributed to engagement activity that occurs without the influencer being physically followed and shows that

following may not be the best way to gauge relevancy of an influencer. This model definitely shows the importance of engagement.

Conclusions/Recommendations

Overall these regression models allowed me to further understand that although the number of followers and subscribers are important they are secondary to the level of engagement an influencer has. I feel that although the multiple linear regression model demonstrates this, the linear regression models I have made for the mega and mini influencers on Instagram and Youtube are the best fit to help show brands who would benefit them the most to work with in the most popular industry in the data set, music.

Using the linear regression model helped me to be able to see the correlation between engagement and following and also allowed me to break it down further into mega and mini influencer status to give more concentrated recommendations to brands based on their budgets and business needs. Based on the information I would say the influencers on Instagram in the music space receive more engagement and are more relevant than those of the mini influencers on Youtube. I would suggest brands who have a larger influencer budget to work with influencers on Instagram like Cardi B and Billie Eillish who will help music brands like Spotify, Apple and other big companies to effectively sell their products and services. In terms of mini influencers Harry Styles and Barbie Ferreira would be good fits for smaller brands in the music industry who are still willing to pay for influencer marketing but maybe can't afford to spend money on mega influencers.

Limitations

I feel some of the limitations of this model is that it is specific for each individual industry and each industry will have different mega and mini influencers that will be suited for the industry and the different demographics that it caters to. Some other limitations is that although the models include information from one of the most popular social media platforms, Instagram, it does not take into account all platforms and the influencers that could be more relevant on those outlets.

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Appendix

Appendix A. List of Industries for Instagram and Youtube

Industries	
Instagram	**Youtube**
Accessories and Jewellery	Animals & Pets
Adult Content	Animation
Art/Artists	ASMR
Beauty	Beauty
Business/Careers	Daily vlogs
Cars & Motorbikes	Design/art
Cinema & Actors/actresses	DIY/Life Hacks
Clothing & Outfits	Education
Computers & Gadgets	Fashion
Crypto	Fitness
DIY & Design	Food & Drinks
Education	Health & Slef Help
Family	Humor
Fashion	Movies
Finance & Economics	Music & Dance
Fitness & Gym	News & Politics
Food & Cooking	Science & Technology

Gaming	Sports
Humor & Fun & Happiness	Toys
Lifestyle	Video games
Literature & Journalism	
Luxury	
Management & Marketing	
Modeling	
Music	
Nature & Landscapes	
Photography	
Racing Sports	
Science	
Shows	
Sports with a ball	
Winter Sports	