What Drives Meme Virality?

A Quantitative Study of Meme Shareability Over Social Media

By Jonas Cohen, BA

A Major Research Project presented to Ryerson University in partial fulfillment of the Master of Digital Media

Toronto, Ontario, Canada, 2019

STUDENT NUMBER: 500921003

DEPARTMENT: Master of Digital Media

FACULTY: Yeates School of Graduate Studies

SUPERVISOR: Dr Sean Wise

SECOND READER: Dr Michael Carter

DATE OF SUBMISSION: August 31st 2019

REB File: 2019-285

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Abstract

The internet meme is a recent phenomenon in the mass media industry, but its etymological route can be traced back over 4 decades, when evolutionary biologist Richard Dawkins decided to coin a “monosyllable that sounds a bit like ‘gene’”. Memes carry the prolific characteristics of a parasite, and can be as common as a catchphrase. This aspect of memes has revolutionized the way content is consumed on digital platforms, and therefore the advertising of content on such platforms. This research examined how recognizability, humour and shareability each impact meme virality. This research found positive correlations between recognizability and virality, humour and virality; and shareability and virality.

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I. INTRODUCTION

1.1 Defining the meme

For Dawkins, a meme could be anything from a word-play to a religious belief. Today, a meme is generally identified as an image accompanied by a humorous caption meant to raise hilarity from the members of the online community it is exposed to. In an article written for *the Washington Post*, Joe Randazzo, an authority on the matter as editor of *The Onion*, denunciates this new form of media as banal and self-indulging: 'Once an "enjoyable thing" becomes a "meme," we stop enjoying the thing for its own sake, but consume and regurgitate our enjoyment of it as a symbol of hipness, as if to say: "I am aware of this thing's popularity — therefore I, too, exist!"'

Randazzo brings up two key points that perfectly highlight the staying power of memes in a constantly-evolving digital environment. First, the consumption and proliferation of internet memes are unparalleled by any other type of medium, if only because of their minimalist nature and conceptual design to appeal to the widest possible audience. A picture is easy to share, and a meme's success heavily relies on the relatability of its caption, especially if it is short and sweet enough to capture a web browser's attention as they scroll through their feed. UC Berkeley's Haas School of Business has released a new study (Counts) correlating dopamine production in the brain with the reception of new information: "We were able to demonstrate for the first time the existence of a common neural code for information and money, which opens

the door to a number of exciting questions about how people consume, and sometimes over-consume, information," said Associate Professor Ming Su (Counts.)

The second point Randazzo unintentionally draws our attention to is the democratic nature of meme generation. With the invention of the "like" button and the "retweet" feature, content creators throughout the social media spectrum now have the opportunity to pave their way to fame one picture at a time. So long as it is posted at the right time, to the right audience and with the correct hashtag, a meme stands the chance to go viral simply because it was viewed by a social media user who chose to voice their appreciation with a click of the scroller, a tap of a screen. The tools needed to make any meme are readily available to both mobile and desktop users: memegenerator.net or any free picture editing software allows users to add text to a picture found on the net. All one needs is an astute sense of observation to write a humorous caption, attach it to a relevant picture, and let the social media community they share their product to judge its value.

1.2 A widening target demographic

With Smart Insights reporting in 2019 that the number of social media users worldwide is 3.484 billion, up 9% year-on-year, and the number of mobile phone users up 2% year-on-year, the audience for memes is only increasing. Furthermore, a 2002 study out of Stanford University by Coget & al indicates that social media users with many online friends are significantly more lonely, as opposed to social media users who

value real-world interactions over virtual connections. These users actually choose to relate to others through online content. Another study conducted by Ying Wang & Shaojing Sun in 2009 points out that lonely users (who do not interact with real people on a regular basis) are more prone to procrastinating online. Social media platforms are designed to have users scroll through so as to be exposed to advertisements, which has in turn contributed to the popularization of memes. It is indeed simpler to pause while mindlessly browsing a newsfeed on pictures with minimal text, rather than a news article or a video clip that requires more attention to fully absorb.

1.3 A rapidly-evolving format

What started as an obscure form of visual comedy only found in forums such as 4chan and reddit quickly gained popularity with the explosion of social media as an everyday means of communication. Chuck Norris jokes and popular tropes such as the “Confused Velociraptor,” “Bad Luck Brian” or “Successful Baby” have lost their place in today’s cyberspace (Kostidakis,) succeeded by jokes heavily reliant on an audience well versed in digital interactions. Figure 2 below shows two memes separated by over a decade. It is clear that, as social media users become more familiar with online platforms through intergenerational usage, the language in vehicles used to convey humour adapt accordingly, as seen in the uses of Facebook and Google. Both images discuss the use of online outlets, yet the first contains a format that has all but disappeared today while the second presents a fresh new frame used in recent memes.

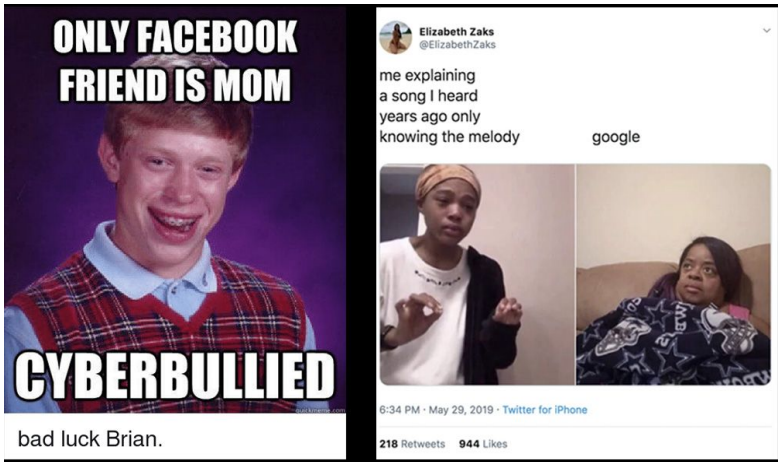

Figure 1: 2 memes separated by a decade (me.me Online Meme Repertory)

The images that were conceived simply for the purpose of being memes have been replaced by screenshots of both amateur and studio productions, accompanied by captions that In fact, the normalization of the medium has in some cases been identified as a key factor in world-changing events, such as the election of Donald Trump (Taveira & Balfour). Memes form communities and languages, they allow social media users whose main form of communication is commenting on pictures and sending their online acquaintances content they believe will incite mutual interest. Moderators of meme groups on Instagram have so many followers they can charge companies to advertise their products. Others simply manage Facebook groups with tens of thousands of members who simply enjoy interacting with fans of the same source material. Memes are now more than a joke, they are becoming a culture. And like any culture, the vocabulary used by its demographic represents the trends this audience follows and is willing to consume more of.

II. LITERATURE REVIEW

Researchers from the University of Memphis agree that “social media provides a petri dish environment for rapid meme generation and mutation” (Shubeck & Huette 2018, 5.) By studying the popularity of 268 established memes categorized by 12 features grounded on cognitive theories of memory, emotion, and working memory limitations, all pointing towards meme content driving popularity, Shubeck and Huetter validated the theory that memes are quintessential in the evaluation of cultural progress. However, they clearly recognized that limiting future studies to a specific social network allows research into the specific content of memes, as should taking into account working memory limitations. As the authors put it: “whether or not the node transmits the information further”(Shubeck & Huetter, 7.) By incorporating cognitive processes into models that also include information about the network at large, greater levels of prediction could be achieved in future instantiations of meme transmission models . They go on to state that a sensitivity analysis that would detail which features contribute most to the outcome is in order. Furthermore, the text asserts that the ability to determine meme context from Google search is expensive, but given some tools, one might identify memes that can be used in multiple contexts. All in all, the paper stressed the future importance of gauging the memorable aspect of the meme in a cognitive sense. This is where NodeXl has proven a valuable asset. By assisting in the scraping of visual data, it has allowed me to input images related to my study to Google default AI search engine, thereby enhancing the visualization of memorable memes.

This perfectly ties into a New York patent by the International Business Machines (IBM) Corporation pertaining to meme tracking dating to early 2017. According to this paper “visual memes propagated over time are tracked to extract information associated with identified visual memes” (Hill et al. 12) The data extracted pertained to topics addressed, time passed and generation, propagation and use. While this patent produced comprehensive results, it failed to take into account the number of views, rating score and other such parameters with absolute certainty because of the lack of evidence of a meme’s true source. This is addressed in my research as I focus on memes derived from specific audiovisual works. I have also created a scoring mechanic for viewers of the most popular memes through the Google survey participants have been asked to complete. This consists of giving each meme three grades out of 10: one measuring their comic effect, or Humour, one gauging the Recognizability of the characters in the image, and one evaluating their Virality, or the survey participants’ likeliness to share these memes. The patent also expressed uncertainty due to the reposted nature of memes, so the authors looked at accumulated interaction, which is something I have taken note of in conducting research.

III. **METHODOLOGY**

I will describe the evolution of the meme format in the last decade. This analysis will illustrate how memes have gone from a very general form of humour to a specific

visual tool used to target and retain potential followers. This will allow me to delve into the mechanics that make some memes more viral than others.

The key overarching quantitative deductive hypothesis that will be tested is the correlation between recognizability, humour and shareability as the independent variables and virality as the dependent variable. This study will test that the more recognizable the meme and the characters it is comprised of, the more humorous and the more people want to share it, the more likely it is to be disseminated throughout social media. This process is twofold. First, I measured the actually real world virality of of each meme by counting how that meme has been shared to date(e.g. retweets, mentions.) Second, I conducted a group survey consisting of viral memes (from the first phase) to gauge the factors that influence virality. The first step is accessible through NodeXL, described below, the second via survey.

The first hypothesis that will be tested is as follows: Virality is positively correlated to recognizability. In their 2015 analysis of online virality, Varis, Piia and Blommaert defined recognizability as a key component of “the essentially arbitrary nature of memic success.” (40.) In this study, Recognizability was measured through the survey by having each participant score the memes based on how quickly they recognized the characters in the image from 1 to 10. The same was done for participants’ likeliness to share the images. A correlation chart between the recognizability and virality scores was established to identify any potential trends that would validate this hypothesis. This thesis statement is based on this assumption,

mainly due to the overwhelming presence of memes including famous figures throughout social media platforms.

The second hypothesis states that virality is positively correlated to comedic content, which I define as Humour. Researchers have relied on the definition of humour as “the presence of amusing effects, such as laughter or well-being sensations” (Reyes 2.1.) Humour was measured through the survey by having each participant score the memes on how funny they were from 1 to 10. A correlation chart between humour and virality scores was established to identify any potential trends that would validate this hypothesis.

The third and final hypothesis rests on virality being positively correlated with subjective shareability. Sharebility is defined as an individual’s subjective personal comfort being associated with forwarding of the material. Material might be recognizable and humorous but considered inappropriate or offensive, and as a result have a low shareability. Shareable content is defined “as built to ‘show and grow’” (Hirvijärvi 25). A correlation chart between shareability and virality scores was established to identify any potential trends that would validate this hypothesis.

3.1 Measuring The Dependent Variable: Virality

To measure virality I turned to the works of Dossis, Dimitrios and Ifigeneia, who used the NodeXL software, an open source tool that allows users to visualize interactions between content and users on Twitter, to mine data and undertake case

studies pertaining to trending hashtags. Schivinski and Nagucka also observed online marketing trends with the software, reinforcing the credibility if NodeXL as a complementary tool to similar academic studies

Using NodeXL, I initially identified the most popular memes of the summer pertaining to three separate datasets: Spongebob, Game of Thrones and Avengers. These three datasets represent distinct facets of the studio production-based meme industry: the first is a wildly popular TV series that has maintained mass appeal despite no recent releases; the latter two are recent adaptations of literary source material. Using the hashtags #Spongebob, #GOT and #Avengers, I found how many content creators have attempted to create viral memes on the week of June 5th, 2019. The dataset will be limited to a maximum of 18,000 tweets. Each tweet has a number of edges, which represent every path the tweet has taken, in the form of a retweet, a favourite or a mention.

Each hashtag was input into the NodeXL software queue. A workbook for each of them was created after a day of running the software. In the “edges” section of the workbook, each visual item was collected from the “Media URL.” In that timespan, 16,545 Twitter users tweeted using the hashtag #Spongebob, 18,615 users tweeted using the hashtag #GOT and 16,208 users tweeted using the hashtag #Avengers. If the “Media URL” column was empty, that entire row was discarded for the purpose of the study, since the tweet in question has no image or video, and meme tweets are visual.

Using Microsoft Excel VBA, I wrote a data scraping script to go through the thousands of rows in the NodeXL workbooks, and extracted all the images from the

Media URL column of each hashtag. By establishing a protocol reliant on Google Image recognition in Python (figure 4,) I streamlined the assimilation of memes and grouped together memes of similar formats to determine which of said formats were the most popular. Once identified, the most shared memes in these formats were chosen. Of those memes, the most appropriate for the purposes of an academic survey were carefully selected and inserted into a Google Survey described below.

In order to compare these findings with those of the independent variables below, the sum of all meme formats across the three datasets was input into the same location. The proportion of each of the chosen formats in this dataset was evaluated, converted to a decimal and is now depicted in Figure 5 in the Virality column.

3.2 Measuring the Independent Variables: Recognizability, Humour, Shareability.

The top 10 most proliferated types of memes with the hashtags #GOT, #Avengers and #Spongebob were selected as a subject of study for further study. A survey in which 40 university graduates participated (the Reviewers). The survey was created on Google Forms. The Survey contained each of the 10 top meme. Each Reviewer scored three characteristics of these images on a scale from 1 to 10 based on: Recognizability, Comedic Value and Shareability. The Recognizability factor pertains to how easily they recognize the characters or actors in the meme (this is to evaluate if using celebrity is efficient in creating a memorable meme.) The Comedic

Value factor regards how amusing participants find the meme. The final factor, Shareability, asks how likely is the Reviewer to share this meme in question, it is a subjective measure of intent and potential. Contrast that with virality, which is an objective quantitative historical measure of how viral that meme actually was, this is a measure of what actually happened.

Based on the above, the following hypothesis where developed.

H1: The more Recognizable a meme is, the more Viral the meme will be.

H2: The more Humorous a meme is, the more Viral the meme will be.

H3: The more Shareable a meme is, the more Viral the meme will be.

Once a minimum of 30 complete responses had been received, the material had become statistically significant and allowed me to see trends in what factors made memes viral. The resulting data was compiled onto an Excel spreadsheet, each ranked by the average score of each characteristic, with the ones scoring the highest considered the most “successful.” Then I established correlation charts between Recognizability of characters in the images, their Shareability and their Humour with the virality of the memes.

IV. FINDINGS

4.1 Quantitative Data

The NodeXL analysis of select hashtags provided the following results 16,545 Twitter users tweeted using the hashtag #Spongebob (Figure 2.1,) 18,615 users tweeted using the hashtag #GOT (figure 2.2) and 16,208 users tweeted using the hashtag #Avengers (figure 2.3) between June 5th and June 13th 2019.

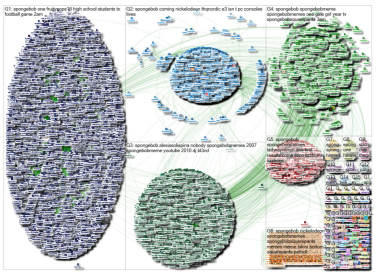

Figure 2.1

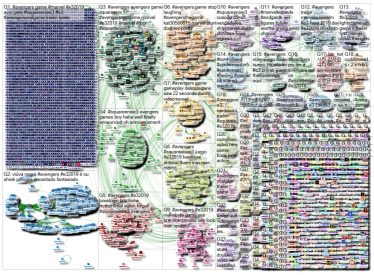

Figure 2.2

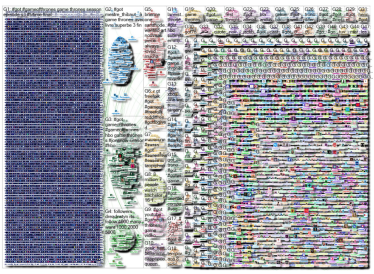

Figure 2.3

By scraping the Media URL column of each workbook using VBA (figure 4,) I was able to gather all 19,863 images from the tweets.These were all input into Google's default AI Image recognition software with the help of Python (figure 5), through which I was able to identify the most popular picture, that is to say the one that was tweeted the most amount of times.

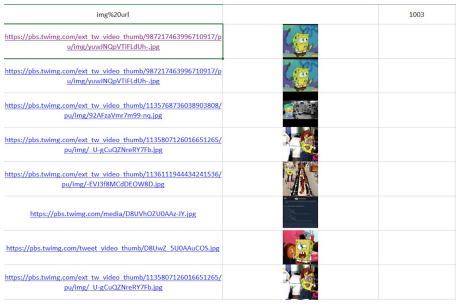

Figure 3:

Screenshot of VBA-supported scraping

```
For Each cell In Rng                                    / For loop to execute every row URL.
filenam = cell                                          / Set the variable to cell
ActiveSheet.Pictures.Insert(filenam).Select / Set range where images can be stored.
Set Pshp = Selection.ShapeRange.Item(1)  / Setting up the image insertion position
```

Figure 4:

Screenshot of Python-run AI recognition

In short, I did not use the actual tweeted image, but rather the format of the most popular images from the NodeXL dataset to gauge its presence on the web.

The following table (Figure 5) is a ranking each of these memes from most to least successful, following their scoring by 40 participants versed in social media environments and consumer culture:

Meme (in survey order)	***Recognizability***	***Comedic Value***	***Shareability***	***Virality***
	8.5/10	3.8/10	3/10	3.3
	8.2/10	2.8/10	3.1/10	7.1
Me asking my dad, after mum already said no 	6.5/10	5.1/10	3.7/10	5.2
When you haven't been in theaters for 10 years but still booming in the meme economy 	8.9/10	5.7/10	3.9/10	7

	6.9/10	4.2/10	3.1/10	7.6
	6.9/10	4.2/10	3/10	5.7
	6.1/10	5.1/10	4.2/10	5.6
	8.4/10	5.7/10	5.1/10	8.7
	9.1/10	5.2/10	4.6/10	7.9
	9.1/10	5.7/10	4.7/10	7.3

Figure 5: Meme Scores for all 4 variables

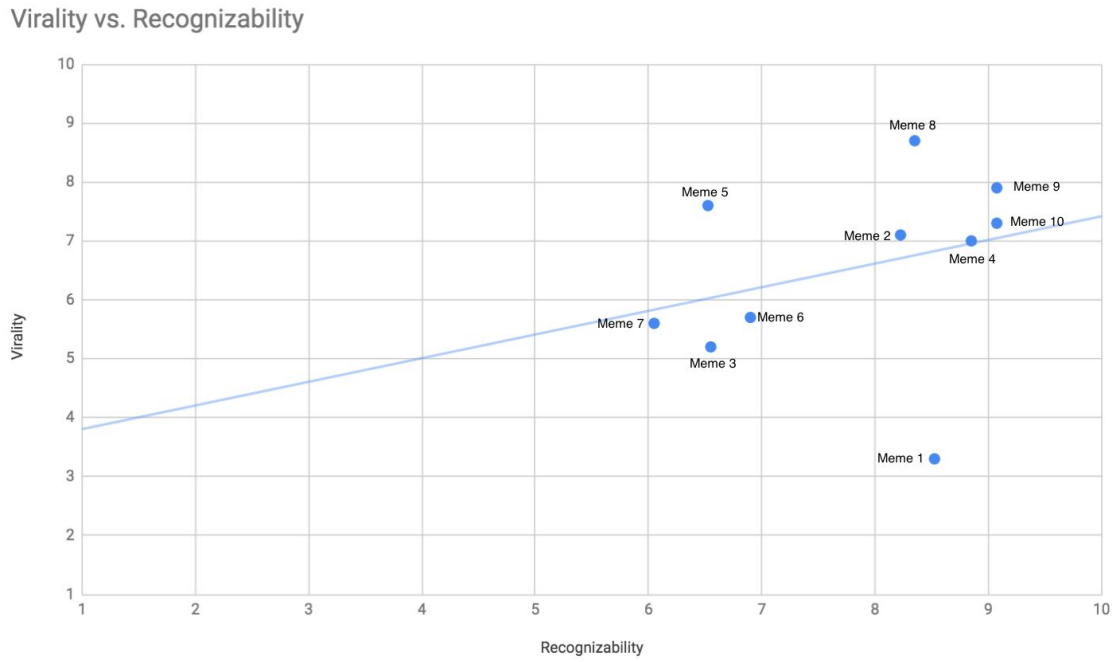

Figure 6.1: Virality vs Recognizability Correlation Chart (Excel-composed Trendline)

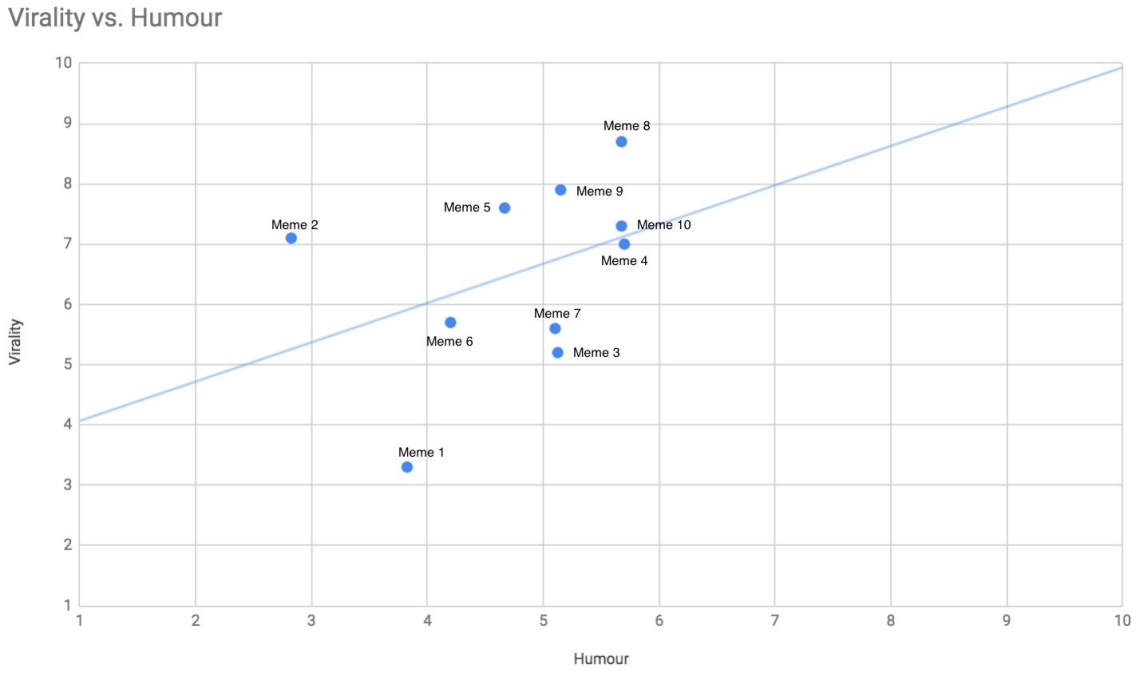

Figure 6.2: Virality vs Humour Correlation Chart (Excel-composed Trendline)

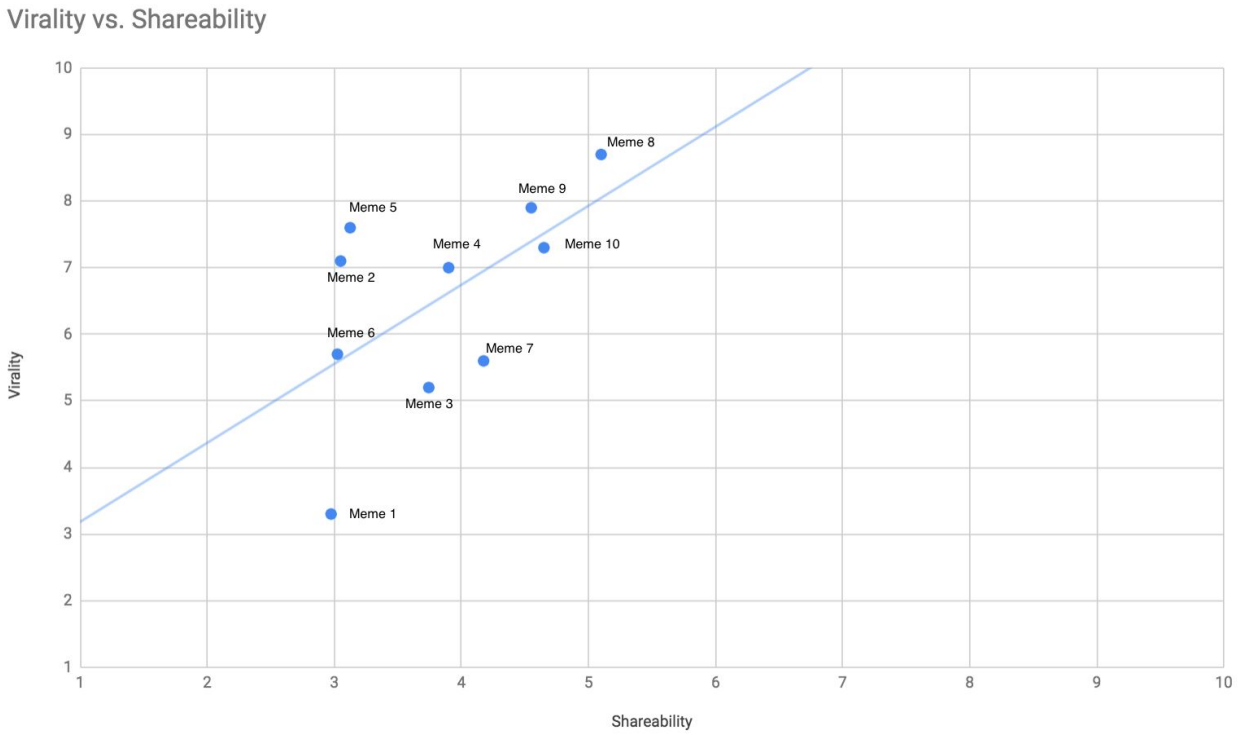

Figure 6.3: Virality vs Shareability Correlation Chart (Excel-composed Trendline)

4.2 Analysis

Ten memes chosen from the most popular formats on Twitter on the week of June 25th 2019 were evaluated based on three dependent variables: their Recognizability, their Humour and their Shareability.

Before delving into the data analysis, it is worth noting that these are not the most retweeted memes of the examined period. They simply borrow the same format (i.e. screenshot) of the most retweeted, mentioned and “favourited” memes of that period on Twitter. The reason for not choosing the memes with those formats with the most edges found on NodeXL is in the interest of avoiding ethical liabilities by subjecting

participants offensive content. The survey results serve the purpose of identifying potent meme formats rather than unique memes, and the images in the survey fulfill that purpose entirely, as the source material is still present in the rated memes.

Figure 6.1 allows us to validate the first hypothesis. Virality steadily rises as social media users recognize memes. There are exceptions such as Memes 5 and 9, which are slightly more recognized than the rest of the images, despite having a lower virality score than the top 3. The most notable divergence, however, is that of Meme 1, which despite a very high Recognizability score of 8.5/10, has the lowest virality at 3.3. This may be because of the meme's length, which most probably negatively affects the amount of attention it can garner, thereby making it less likely to be shared. The rest of the memes increase in virality at an almost identical pace as that of their recognizability. This allows us to confidently state that recognizability and virality are very much directly correlated on social media forums.

Figure 6.2 allows us to validate the second hypothesis. Despite quite similar Humour scores, Meme 1 (3.8/10) and Meme 2 (2.8/10) have vastly divergent virality scores. Once again, we are shown the potential downfalls of frame-heavy memes, as this suggests that Meme 1 is not only less likely to be shared, but that it also does not amuse audiences as much as shorter memes. Meme 8, a two-framed meme, scored the highest in Virality, and is the second-funniest meme according to the survey, which suggests that the funniest memes do not necessarily have to be the shortest. However, a cluster of high-scoring memes in the Humour section in the highest section of the

Virality line do suggest that the funnier audiences find memes, the more likely they are to be shared online profusely.

Figure 6.3 allows us to validate the third hypothesis. It is quite clear that the survey participants did not share the opinion of the massive amount of Twitter users that shared and approved of these meme formats, given the low Shareability scores in the chart. Meme 1, as in the previous case, has the lowest Shareability score, and even though this score matches that of Memes 2, 6 and is barely below that of Meme 3, it is still by far the least viral of all these images. This third instance in which Meme 1 stands out negatively in scoring, which allows us to posit that length is definitely counterproductive to meme virality. However, these scores increase at a similar rate to that of the Humour scores, therefore highlighting the positive correlation between Shareability and Virality, and allowing for the following statement: people are more likely to share what they find funny, which in turn is most likely to go viral online.

Further analyses of the trendlines and clusters allow us to pose that the funnier participants found memes, the more likely they were to share them. Humour and Recognizability do not seem to be absolutely correlated, as noticed by the low Humour and high Recognizability scores of Memes 1 and 2, but, for the most part, participants found what they knew to be funniest. The Virality of memes has a clear correlation with content creators' success in meeting these criteria, but the low scores derived from the survey heavily suggest the participants did not belong to the population that enabled this Virality. It would therefore be interesting to identify key demographics that drive Virality to understand which other criteria matter in these circumstances.

V. CONCLUSION, THOUGHTS AND LIMITATIONS

The hypotheses that recognizability, humour and shareability all have a positive correlation with virality have been confirmed, as shown in the correlation charts depicted in Figure 6. The NodeXL findings compared with the survey findings highlight a correlation between the highest-scoring memes and their virality on Twitter on the week of June 5th 2019, however no direct positive correlation was established for every meme in the survey. Both humour and virality scores were somewhat low in contrast with the high volume of edges found for these meme formats.

It is therefore reasonable to state that the findings conclusively highlight the positive effect of recognizability of meme content on the shareability of said meme; they show that funnier memes are more likely to be shared; but they do not necessarily unequivocally have the same effect on all viewers. The survey participants' answers may not be indicative of a larger meme viewer demographic, as noted by the divergence in popularity of the memes between the NodeXL and survey findings. It is therefore possible that the main population that enjoys and shares these memes is different from the university graduates that were recruited for the purposes of the survey. Given the content of the majority of the memes presented in the survey, it is probable that the intended audience for these images was of a younger nature, to which the jokes may have been more relatable. This suggests that further research pertaining to various meme audiences merits consideration in the future.

Recognizability plays a key role in ensuring a meme's staying power. What Shubeck and Huette (2018) may have been searching for in a cognitive process that makes memes memorable is the prior acquaintance of audiences with the image's source material. As online communities grow, so does their knowledge of meme culture, which allows for the creation of meta-memes. It is important for content creators to acquaint themselves with this knowledge so as to extend the reach of their online posts. By exploiting meme formats with proven virality, these creators can ensure that their posts will at least catch the eye of avid media consumers, the first step in giving their newborn content the chance to proliferate. By creating memes that some may find funny enough to post, they contribute to the productive cycle of the fast-food consumerism many social media users engage in on a daily basis.

All manner of media production is being adapted to smaller screens, with characters consequently taking up most of the shot to enhance cognitive effect. Screenshot-based memes are therefore destined to proliferate and evolve into more specific targeting advertising tools for wide audiences. It is in fact not uncommon to see viral memes derived from lesser-known recent media, such as Facebook Watch' s *The Real Bros of Simi Valley* or Amazon's *The Boys*. This is simply because sharing these screenshots is at a few buttons' grasp thanks to the availability of these platforms on all manner of electronic devices, from televisions to smartphones.

The degree to which the virality of these memes was evaluated is impacted by the lack of existence of a controlled group of survey participants. For instance, submitting the survey on a social media platform by no means guarantees the validity of

the answers due to the possibility of fake accounts. Furthermore, it would be extremely difficult to verify the identity or respondents, given that most forums do not obligate users to enter their correct age, name or occupation.

As for the studied material, NodeXL exploits the accessibility Twitter offers that information magnates such as Facebook and Google do not. It would be impossible to conduct this study on massive platforms such as Instagram, Facebook or even Snapchat for a variety of reasons, the main one being that these corporations do not allow access to track the “edges” of posted content. If, however, one of these platforms were made more accessible to social media researchers, it would open a major path to compare results such as the one in this paper to provide a more extensive perspective on the effect of memes on a product popularity.

In the future, one should examine how the independent variables interact and impact on each other. I suspect that shareability might moderate the variables of humour of recognizability, but further study is required to explore such. Devising a formula to identify the dynamics of the three independent variable’s relationship would provide invaluable information as to how the best design meme formats to garner online attention. Further research pending on more specific meme content, such as I touched on with the question of meme length, would also prove invaluable in instances in which meme creators have the opportunity to use multiple screenshots.

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Special thanks to Dr Marc Smith, NodeXL founder and exceptionally generous source of support and guidance throughout the research portion of this project.