THESIS

SURVIVAL OF THE FITTEST: AN EXAMINATION OF THE HIGH PARK FIRE NEWS

MEME LIFECYCLE ON NEWS ORGANIZATIONS' FACEBOOK AND WEB PAGES

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ABSTRACT

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This study employs a mixed methods content analysis of 14 news organization's Facebook and website posts of the High Park fire news meme to identify the reasons behind how and why news memes propagate within social media and news website environments. This study gauges the feasibility of forecasting the spread of online news content based on specific features including photos, videos, article length, and span of time. News memes are defined as cultural units of information presented as written text, images, or videos whose existence is determined by the frequent behaviors of imitation and transmission, produced by media personnel from news organizations. The field of memetics, social media, and normative theories of the media serve as foundational areas for this study which extends the knowledge of the emerging domain of web memetics, which seeks to identify and track the evolution, spread, and implications of news memes by media personnel. Results show that specific characteristics (i.e. text, links, and photos) contributed to news meme propagation via reader comment contributions and likes. Additionally, results indicate that website environments are more frequent platforms for news memes to exist and thus perhaps more nurturing environments for High Park fire news memes to propagate within.

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Introduction

In today's information-saturated world, there is intense competition for news content to capture public attention and propagate quickly. This has caused web-based news memes to become common, fleeting, and trending visual and discursive modes of communication for web users and news consumers. More and more news organizations are turning to social media, mobile, and other web-based platforms to disseminate information to mass audiences at low costs and with greater speed. The Internet meme is one such mode of communication–an Internet-based unit of cultural information expressed via the constant replication and the independent use or juxtaposition of text, video, or imagery. Their representations range from absurdist humor to political and cultural commentary. As Sci and Dare recognize, "memes are meant for trending; they momentarily capture attention long enough to be recognized, appreciated and added to as they are passed along a seemingly limitless number of media platforms," (2012, p. 1).

This fleeting, competitive, trending mentality is pervasive and directly aligned with today's generation of communicators. In a contemporary communicative culture, people have come to value direct, explicit, instantaneous, and immediate flashes of information to construct knowledge about the world around them. As Chen notes, Internet memes not only have the power to influence a community's thoughts, but they even have the power to influence a community's values, discursive practices, and actions, which indicates there are many types of Internet memes that can elicit such commands (2012). In addition, the environment in which these memes exist and their content heavily influence whether or not a news meme is propagated within the web.

Memes are units of cultural information whose existence is determined by the frequent behaviors of imitation, replication, and transmission from person to person (Dawkins, 2006). Examples of memes include fashion, melodies, catch phrases, religions, languages, and other cultural ideas, symbols, or practices that are expressed through material and ethereal forms of communication (Dawkins, 2006). With origins in the field of genetics and biological evolutionary theory, the latest phenomenon of news memes have spread rapidly across the web, becoming the gold mine of Internet popularity. Their peer to peer proliferation has captured the attention of public relations, marketing, and advertising agencies around the globe that are trying to understand the concept of viral behavior to execute marketing strategies for their clients and stakeholders. News meme replication also heavily influences how online communities interact with one another and the kinds of ideas, thoughts, and cultural expressions that are formed online and subsequently offline. Finally, they help researchers understand Internet use and information proliferation.

News stories are one example of a meme that help us make sense of the world we live in. News stories may not necessarily be humorous or satirical in nature but their purpose is the same, to be trending, instant sources of information to be consumed and digested. News organizations facilitate the consumption process by utilizing traditional *and* social media platforms to disseminate the latest story developments in order to be the first and the fastest at information gathering and dissemination. News organizations also value direct, instantaneous, and immediate creations of information to quench audiences' thirst for knowledge and understanding. As Bauckhage (2011) states "Internet memes typically evolve through commentary, imitations, or parodies, or even through related news in other media," (p. 42) but the evolution of Internet memes from related news media has not been extensively researched in

academia. The meme phenomenon (types, purposes, and consequences) may yield interesting, intricate relationships between media spheres (i.e. social media, websites), memes, and the spread of news content that deserves further examination.

This study begins to uncover the reasons behind how and why news memes thrive and die within social media and news website environments in order to understand the possibility of forecasting "the spread of a [news meme] based on content features" (Bandari, Asur, and Huberman, 2012, p. 1). What benefits do these memes hold for users and how is it changing the landscape of news media practices and digital participatory culture? This study will examine this under-researched question.

Statement of the Problem

Despite the emerging popularity of Internet memes, the first problem with this topic lies in the fact that academic research has failed to adequately keep up with the latest web phenomenon. Minimal research has attempted to shed light on these attention-grabbing, trending entities that flood the web. Any attention that has been paid to Internet memes has focused on analyzing the popular and often humorous visual and discursive memes flooding social media news feeds and meme-based websites (e.g. LOLCats, 4Chan, Cheezburger) and their role in building virtual communities (Danung & Attaway, 2008).

Additionally, minimal research has attempted to extend the definition of an Internet meme to include more journalistic, news-based information from print, broadcast, and online news organizations, which find value in using traditional and social media platforms to disseminate information about society and culture quickly to audiences. The degree to which memes have been researched as news products is fairly minimal (e.g. Bandari, Asur, & Huberman, 2012), but what has been researched has taken a heavy quantitative focus (e.g.

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Leskovec, Backstrom & Kleinberg, 2009; Romero, Meeder, & Kleinberg, 2011; Szabo & Huberman, 2010). However, news articles, videos, and images are indeed a type of web-based meme because news stories are cultural units of information that are constantly imitated, evolving and replicating on–and offline (and across other traditional media platforms).

Meme discourse has suggested several definitions of memes that are propagated digitally and electronically. Such meme discourse has primarily been referred to as Internet memes, where various cultural units of information are disseminated through the Internet (i.e. email, World Wide Web). Information can be humorous, political, or news-based. Studies that have examined these kinds of memes look at blogs, social media content, online advertisements, online videos, and online news articles as memes (Bandari, Asur, & Huberman, 2012; Leskovec, Backstrom, & Kleinberg, 2009; Szabo & Huberman, 2010). Researchers (e.g. Bandari, Asur, & Huberman, 2012; Dawkins, 2006; Leskovec, Backstrom, & Kleinberg, 2009; Szabo & Huberman, 2010) have defined several characteristics of the meme that include a meme's ability to capture attention, propagate quickly among users, and transcend digital and physical spheres; that is, exist online and offline like PSY's Gangnam Style video for example.

Based on prior researcher's definitions of the meme, the news meme will be defined as a cultural unit of information presented as written text, images, or videos whose livelihood is determined by the frequent behaviors of imitation and transmission, whereby media personnel (e.g. reporters, producers) from news organizations are involved in the production and dissemination of memes. This definition highlights the essential manifestations of a meme (i.e. images, videos) while specifying its creator(s), that include news media personnel or organizations. It allows researchers to identify the origins of the meme itself, which offers more

accurate meme-tracking methodologies to be employed (Leskovec, Backstrom, & Kleinberg, 2009).

Even though there has been minimal research combining the ideas of news and memes together (e.g. Sun, Rosenn, Marlow, & Lento, 2009), the reality of contemporary news culture, the instant availability and competition among news organizations for story acquisition and content dissemination across media platforms, indicates that something interesting may be happening among news content, media platforms, and the spread of information that warrants discussion. The rise in social media use for news consumption is increasing steadily and becoming an additional source for users to seek information online (Bandari, Asur, & Huberman, 2009; Mitchell, Rosenstiel, & Christian, 2012). The increasing number of users seeking news information perpetuates a "survival of the fittest" environment for news memes to live within, and thus potentially serve as sources of information that influence community values and ignite online public discourse.

According to the 2012 State of the News Media report by the Pew Center, "more than twice as many digital news consumers follow news recommendations from Facebook than from Twitter," presuming those who do utilize Facebook as a news source are perhaps producing and exchanging more news memes on Facebook versus Twitter (Mitchell, Rosenstiel, & Christian, 2012). The number of users on Facebook, for example, is more than 1 billion, at least 70% of whom get news links from family and friends, 13% get news links from news organizations or journalists, and 10% from non-news organizations (Facebook, 2012; Mitchell, Rosenstiel, & Christian, 2012). The statement also sheds light on the diversity and dynamic nature of Facebook as a space for connection and networking in addition to being a preferred news source for users. Facebook's enhanced news applications like Social Reader show that Facebook is trying to adapt

to the proliferation of news content on their site, by allowing users to "follow, read, and share news without ever leaving the network" (Mitchell, Rosenstiel, & Christian, 2012).

Based on what is known about a meme's replicating behavior, it is reasonable to think that the more people who seek and disseminate news information online, the more likely the news meme will survive and influence those it interacts with because any meme's lifecycle dependant on human interaction. Knobel (2006) agrees, stating that Internet-based networks greatly facilitate the spread of memes. However, not enough academic research regarding news memes has focused on the potential purpose and function of such entities to serve as purposeful cultural and political commentaries that add value to knowledge creation. By studying news memes, researchers can better understand why certain ideas have greater fecundity and value, and how certain media spheres can help spread memes (Bandari, Asur & Huberman, 2012; Knobel, 2006). Meme analysis provides insight into the alternative perspectives on social issues that affect how citizens respond to certain issues (e.g. donating to a natural disaster, starting an after-school program for at-risk youth, supporting the work of local firefighters through a community fundraiser, etc). Therefore, more research needs to examine the characteristics, purpose, and function of the news meme within media spheres and uncover how (if at all) they can contribute to advancements in academic research.

This study attempts to identify and understand the behaviors, functions, and characteristics of news memes within news organization websites and social media environments as phenomenon that serve a practical and useful purpose in society. Even though media institutions have a long history of "voluntary engagement with society," the current understanding and popularity of Internet memes as humorous and satirical sources of cultural commentary overshadow the democratic role news memes can potentially hold for society

(Christians, Glasser, McQuail, Nordenstreng & White, 2009, p. 135). Normative theories of media often describe media institutions in an idealistic yet purposeful fashion, portraying media as defenders of democracy, observers and informers, "independent actors by way of critical comment, advice, advocacy, and expression of opinion," while providing platforms for all community voices to be heard (Christians et al., 2009, p. 116). With this perspective, the news meme's behavior across media spheres and potential impact on a community's thoughts and actions makes it an important construct to examine with a critical, academic focus. The characteristics that make a meme successful enhance its lifecycle when the meme itself is associated with current cultural and social trends, groups, and/or spaces. Since the news media are a central hub for covering trending socio-cultural ideas, news organizations are essential in meme creation and sustainment (Knobel, 2006, p. 422).

Purpose and Rationale

This study examines how the High Park Fire news memes propagate within two online media spheres, Facebook and news organization websites, in order to understand how these entities serve as potential sources of information to cultivate a new wave of digital participatory, communicative culture and add long-term value, utility, and authority to how citizens make sense of the world around them.

The High Park fire was a wildfire in the mountains west of Fort Collins, in Larimer County, Colorado. The fire was caused by a lightning strike and was first detected on the morning on June 9, 2012 (CBS Denver, 2012). The fire continued to grow quickly over the next few weeks, burning over 87,248 acres, becoming the second-largest fire in recorded Colorado history by area burned, behind the Hayman Fire of 2002 (CBS Denver, 2012). The fire destroyed 259 homes and took one resident's life (CBS Denver, 2012). More than 2,000 firefighters aided

in its containment, along with 19 helicopters and 5 tanker planes (InciWeb, 2012). The fire cost over $39.2 million just to fight the fire but was declared contained on June 30, 2012 (InciWeb, 2012). The High Park fire is one example of a news meme that drove newspaper readers and television viewers to the news organization's websites like the Denverpost.com, which hit a record number of page views when the fire started (Browning-Blas, 2012). In addition, hundreds of Facebook posts from news organization's pages allowed people to receive updates, share information, and message people directly during the fire when more than 140 Twitter characters were needed to convey a message to community members. In short, the High Park fire was not only a traumatic natural disaster that affected thousands of Colorado residents, but it was a social media and web sensation whose content spread as quickly as the fire did. The question thus became, what made this particular news story propagate so quickly? What components, visuals, content, or other factors contributed to the news meme's success on the web?

News memes can serve as sources of information that add value to the consumption of news. By this logic, news content would not serve as just a trending piece of information or way to increase television ratings. In this regard, it is important to study news memes to see how such cultural expressions can facilitate public discussion of social issues of concern that media have made public. The field of memetics, social media, and normative theories of the media serve as foundational paradigms and areas of study for this thesis. It extends and complicates the emerging domain of web memetics, which seeks to identify and track the evolution, spread, and implications of memes by users by offering new ways of categorizing memes based on content-specific characteristics (Shifman & Thelwall, 2009).

Memes allow us to understand how knowledge is formed and sustained; it is a vital component to the construction of knowledge and participatory culture. However, minimal

research has attempted to fully understand the relationship between news memes and online media environments. Similarly, little is known about the specific characteristics by which news memes replicate, are selected, vary, and are transmitted between human agents in social media and news organization website spaces (Bandari, Asur, & Huberman, 2012). The researcher proposed that by identifying the special characteristics of news memes that cause them to propagate in different online media spheres, we can begin to understand how such cultural and social stories/expressions contribute to contemporary communicative culture and constructions of knowledge.

Such connections can help researchers understand the implications of meme behavior on the human agents that preserve their existence. Layers of meaning begin to form from the reproduction, cutting, copying, and dissemination of news memes, which ultimately facilitates the construction of knowledge about issues, ideas, and things. In other words, new ideas are formed in the remixing, re-developing, collaborating, and sharing of news memes and are therefore, significant contributions to the knowledge base (Burgess, 2008). In short, news memes help us understand the world we live in. The structures of discourse that exist and play out in media environments from these news memes can also contribute to the development of new forms of social and political participation.

By studying news memes in this manner, researchers can better identify new forms of digital social participation and examine new areas of cultural production (Knobel & Lankshear, 2006). News memes can serve as a resource for "critically assessing problems and politics," revitalizing normative theories of the news media and redefining what it means to be a social media user and news consumer in today's technoculture (Christians et al., 2009, p. 242). As Chen notes, the Internet meme "actually helps to illuminate how [people] express values and share

interests, which then leads to the fostering of critical judgment in the membership and even creation of political action" (2012, p. 7). This thesis extends the theoretical context of meme discourse by examining the relationship between media spheres and the proliferation of news content.

<p style="text-align: center;">**Literature Review**</p>

Meme Theory

Although scholars have failed to adequately define meme theory, instead referring to the definition of a meme, Aunger defines meme theory as an evolutionary process that explains the "dissemination of cultural knowledge" through non-genetic means (2002, p. 17). The theory states that social mechanisms, in addition to biological processes, describe or explain behavior (Rose, 1998). Memetics is a theory based on Darwinian evolution that postulates how cultural units of information transfer in a variety of ways and through different media (Dawkins, 2006). It is based on the notion of cultural evolution where the origin and history of ideas are tracked and monitored, like the human species, in an attempt to explain human thought and behavior. It describes the relationship between the spread of ideas and the key players/environments in which the ideas spread in order to understand how and why certain forms of culture survive over others. Meme theory serves as a cultural counterpart to the biological study of genes and genetics where humans engage with forms of contagious communication similar to how genes behave in a gene pool. The theory is comprised of areas including the definition of a meme, its characteristics, the replication and transmission process and effects on meaning, and the selection of memes (Rose, 1998). Meme theory and discourse around the spread of ideas has been applied to mathematical, biological, architectural, cognitive, and psychological domains of research but has inadequately scratched the surface of communication and media studies domains (Knobel, 2006; Knobel & Lankshear, 2009). From memetic effects on behavior, to the spread of diseases, to information-processes, meme research and theory has been concentrated on discovering these kinds of cultural transfers of information (Aunger, 2002; Knobel, 2006).

With so many types of information available (i.e. biological, cognitive, political), meme theory may appear to be a far-fetched topic to link with communication and journalism studies;

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however, it is an appropriate fit, even if it is uncharted territory. Even though meme theory is rooted in scientific processes, cultural units of information are all around us: online, on television, in publications, and in everyday conversation and actions. Therefore, it is vital that memes be studied from a communication perspective where researchers can accurately identify new forms and behaviors of cultural information and how information is spread within digital spheres in order to better understand processes of public communication, information sharing, and popularity of content. Because we live in a social world, surrounded by people and channels that facilitate daily communication and how we come to understand the world, it is reasonable to examine how memes manifest within digital environments specifically, because of the trending utilization and application of the World Wide Web to harvest and disseminate cultural information (e.g. social media). Scientific, business, economic, and social processes all depend on information being communicated in some way—and lately, the dissemination and transfer of information and ideas have occurred prominently and steadily on the web via websites and social media. Therefore, this study will use meme theory to understand what specific environments and meme characteristics define a meme's behavior that influences news content popularity and propagation of ideas.

A meme must have three characteristics: longevity, fecundity, and fidelity (Dawkins, 2006, p. 194). Longevity refers to the span of time a meme survives (Dawkins, 2006; Knobel, 2006). The longer a meme exists in its environment, the greater the likelihood of it capturing attention, being imitated, and being propagated. Longevity also increases the possibility of the meme being memorable or easily recalled in people's minds, which sustains the lifecycle of the meme. Longevity has been measured by setting time frames around the meme's lifecycle timeline. For example, researchers will examine a meme from its birth and document its spread

through its native environment and other environments such as social media (Knobel & Lankshear, 2006). However, isolating the origin of memes can be difficult because some memes may exist in an environment for a long time before being "discovered," in which case researchers utilize methods of triangulation and/or web search engines to find a source or sources that identify a date (Knobel & Lankshear, 2006).

Fecundity refers to the rate at which an idea or pattern is copied and spread (Dawkins, 2006; Knobel & Lankshear, 2006). The quicker a meme spreads in its environment, the more likely it will capture attention, be replicated, and be distributed (Knobel & Lankshear, 2006). Susceptibility, the "timing or location of a meme with respect to people's openness to the meme and their propensity to be infected by it," is another factor in determining fecundity levels in meme theory (Knobel & Lankshear, 2006, p.202). Not only is the content of the meme important (i.e. appeal of the idea to the public) but the context within which the meme lives and spreads is extremely important to fecundity levels. Factors that influence high fecundity levels include intertextuality, humor/irony (i.e. playfully serious), and image juxtapositions in the meme (Knobel & Lankshear, 2006). Intertextuality may be manifested in a meme through a series of "cross-references to [various] everyday and popular culture events, icons or phenomena" (Knobel & Lankshear, 2006, p. 209). Memes with a high fecundity rate may also be humorous or ironic in nature by containing jokes, funny photos or videos, quirky or offbeat phrases, or parodies (Knobel & Lankshear, 2006). Finally, image juxtapositions can make a meme successful in propagating where two or more images are placed side by side or superimposed with one another to produce strange, uncharacteristic, or out of the ordinary visual composition and thus, meaning (Knobel & Lankshear, 2006).

Fidelity refers to the qualities or characteristics that make a meme readily copied (Dawkins, 2006; Knobel & Lankshear, 2006; Knobel, 2006). With this characteristic, memes may not be passed on in their entirety; rather, certain aspects of the meme may be more prone to spread than other aspects of the meme. As Knobel & Lankshear note, the "meme idea itself [may] remain relatively intact, [but] the 'look' of the meme [isn't] always held constant" (2006, p. 208). Activities like remixing, reordering, bricolaging (the construction or creation of a work from a diverse range of things that happen to be available), splicing, and superimposing are common practices that influence a meme's fidelity levels and thus, the meaning of the unit of information itself (Knobel & Lankshear, 2006). However, other qualities, like the interaction between the meme and the person viewing it and content of the meme itself need further examination because the interaction between the person and the meme influences the meme's likelihood of propagating. Likewise, the content of the meme itself needs further examination because prior research has inadequately addressed specific content characteristics that make a meme propagate.

The greater the strength of all three characteristics, the more likely the meme will survive in its environment. As Salingaros notes, memes "have something attractive that makes them stick in one's mind" which makes them a vital and intriguing phenomenon to understand (2002, p. 6). These three characteristics relate to meme theory because they outline what specific processes make a meme salient enough to capture attention, prompt imitation, and urge mass dissemination. They determine how successful or fruitful a meme will be in its environment. Fidelity, fecundity, and longevity are similar to a gene's compositional elements that allow it to replicate and reproduce to survive.

Because people make copies of memes, variations of an original meme will produce new meanings and expressions. For example, researchers aid in the creation of memes by citing other academic research in their own work. By selecting bits and pieces of original research and ideas to incorporate into their own research, new meanings and ideas are formed via the decontextualization and rearrangement/manipulation of information. Think of a meme like a tumbleweed; the meme replicates itself repeatedly in order to grow and develop, picking up bits and pieces of other cultural units along the way. These other cultural units and expressions come from humans who contribute to the tumbling meme passing by. As the meme continues to replicate, the meme copies will grow, change, and evolve, but the original essence of the object will be preserved during its production (Dawkins, 2006). Some bits and pieces of original research and ideas will fit better than others in a "meme tumbleweed" depending on the constraints and confines of the environment in which the meme exists (Fuller, 2005). Some memes are fleeting while others last a lifetime, such as one-hit-wonder songs versus the idea of ghosts (Buchel, 2012). Aunger echoes this sentiment, stating that their expression (and thus, meaning) depends on the developmental context in which it is placed (2002). The more the environment nurtures the levels of fecundity, fidelity, and longevity, the greater the likelihood of the meme's success.

Definition of a Meme

In 1976, evolutionary theorist Richard Dawkins coined the term meme (pronounced "meem") and defined it as a "unit of cultural transmission or unit of imitation" which replicates itself by leaping from brain to brain through imitation (Dawkins, 2006). There are many different definitions of memes within meme theory. Other researchers describe memes as ideas, thoughts, or concepts that are "passed between minds" (Buchel, 2012, p. 18). Researchers also place an

emphasis on the evolutionary aspects that occur within a specific media, defined as topics or ideas that evolve over time and spread across the web (Leskovac, Backstrom & Kleinberg, 2009). Other definitions define a meme by example describing memes as songs, tales, jokes, thoughts and/or ideas that replicate and spread between people and cultures (Danung & Attaway, 2008). Memes have also been defined by the consequences of their behaviors, described as "contagious patterns of cultural information that are passed from mind to mind and which directly shape and transmit key actions and mindsets of a social group" (Knobel, 2006, p. 411). Similarly, Buchel defines a meme as "an idea, a thought, or a concept which can be passed between minds" (2012, p. 18).

Examples of memes include language, diets, ceremonies, customs, art, architecture, tunes, ideas, catch-phrases, clothes and fashion, and architectural constructions (Dawkins, 2006, p. 192). According to Buchel, Dawkins used memes to explain "cultural transmission, human behavior, cultural evolution, and the development of human society" (2012, p. 17). Similar to a gene, which naturally replicates itself to survive and evolve, memes are a new form of a replicator in human culture, similar to the original gene replicator in biological culture. This imitating behavior is what makes a meme unique and different from a gene. A meme has a different way of replicating than a gene. A meme imitates cultural ideas or expressions whereas a gene replicates to make *exact* copies of itself for its own survival (Blackmore, 1999). Blackmore describes a gene as the *biological* replicator and memes are the *cultural* replicator (1999).

A replicator like a gene or meme is formed during the transmission process between individuals, that is, pieces of information are passed from one gene to another or one human brain to another (Aunger, 2002; Dawkins, 2006). The transmission process can only occur if a replicator is copied in some fashion. Some piece of information must be copied or imitated in

order to be passed along. However, the terms replication and imitation have been used interchangeably in prior research (Burgess, 2008; Danung, 2008; Knobel, 2006; Knobel & Lankshear, 2006) even though their processes of producing information are different.

Prior descriptions of the replication process state that a meme must be copied *exactly* to reflect a product that is *identical* to the original meme (Blackmore, 2001; Thorndike, 1998). Researchers often describe replication in biological or genetic terms or with examples like Dawkins', who referenced "a molecule that has the ability to create copies of itself" as an example of the replication process (2006, p. 15). Aunger describes the conditions of replication that include causation, similarity, information transfer, and duplication (Aunger, 2002, p. 73-74).

Similarly, prior descriptions of the imitation process state that *aspects or parts* of a meme are transferred from one person to another (Blackmore, 2001; Thorndike, 1998). Blackmore and Thorndike describe it as an act of learning to do an act from seeing it done where a person attempts to match bodily actions to learn about the form of behavior through observation, not learning about the environment through observing others (Blackmore,1998; Blackmore, 1999, p. 49, 52; Thorndike, 2011). Thorndike also emphasizes the difference of imitation from replication by describing what imitation is not. For example, imitation is not an exact copy of the original meme and transmitted to one or more individuals (Thorndike, 1998). Similarly, the imitation process is described as "information that is copied via selection but the copied information is not an exact replicate of the original piece of information (Blackmore, 2005). Blackmore also describes imitation referencing the processes of information transfer, that is, passing information along by "using language, reading, and instruction, other complex skills and behaviors as primary methods of transmission" (Blackmore, 1999, p. 43). Blackmore continues to describe

imitation by comparing it to a gene's information transfer process, stating that imitation occurs when an element of culture is passed along by non-genetic means (Blackmore, 1999).

Even though there is some debate around the definitions of replication and imitation, in most cases, memes are described as being imitated pieces of cultural information because it is difficult for any human to produce an exact copy of an original meme. Biologically, genes replicate and produce exact copies of the original gene, whereas, a meme imitates, producing similar versions of the original meme. Activities to imitate a meme may include producing a remix, making edits, inserting splices, juxtapositions of content, and so forth. Nevertheless, replication and imitation relate to meme theory because they are both processes that describe and explain the spread or evolution of ideas.

The Internet is often heralded as the ideal space for memes to grow and thrive online because such an environment "enhances all social aspects of the meme mechanism" (Dunung, 2008, p. 6). The intense pace at which information on the Internet operates is seen as both beneficial and simultaneously detrimental to meme success (Marshall, 1998). An Internet meme has been described as a fad or popular entity that becomes widely imitated and can be presented as text, images, and videos (Burgess, 2008; Knobel & Lankshear, 2006). Knobel and Lankshear (2006) define an Internet meme as "a popular term for describing the rapid uptake and spread of a particular idea presented as a written text, image, language 'move,' or some other unit of cultural 'stuff'" (Knobel & Lankshear, 2006, p. 202). Bauckhage describes internet memes as "phenomena that rapidly gain popularity or notoriety on the Internet...Often, modifications or spoofs add to the profile of the original idea thus turning it into a phenomenon that transgresses social and cultural boundaries" (2011, p. 42). Buchel (2012) identifies an Internet meme as "media objects such as videos, pictures, texts, audio records, etc. that rapidly spread via

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electronic communication such as email, forums, social networking sites, and chats" (p. 30).

Chen describes them by example as "funny quotes, silly captioned pictures, riffs on popular

culture, and viral videos that are created, found, and shared by Internet users who usually belong

to online communities" (2012, p. 7). Examples of popular Internet memes include All Your Base

Are Belong to Us, The Star Wars Kid, That Tourist Guy, Chocolate Rain, and Lost Fog, to name

a few (Knobel, 2006). More recent examples of memes include PSY's Gangnam style music

video, 6 year-old beauty queen Honey Boo Boo, the Harlem Shake dancing videos, and the

Officer Pike pepper spray incident from the Occupy Wall Street protests.

Seminal Internet meme research often examines the popular video-sharing social media

site YouTube and image-board forum 4chan in order to understand the Internet meme's behavior

and implications on information seeking and dissemination (Chen, 2012; Shifman, 2012). Chen's

examination of 4chan illustrates that meme creation and sharing fostered user independence and

creativity, often manifesting into the formation of a "collective political conscience" among a

close network of politically and socially driven users (Chen, 2012, p. 8-9). This sense of

collectivity is facilitated by the fact that 4chan does not require users to adopt or create a

username to construct an online identity, which allows users to post anonymously amongst a

"free, almost anarchic community," destroying any sense of social hierarchy (Chen, 2012, p. 10).

Even though the 4chan users' posts were not always related to political ends, since Internet

memes are known for being notoriously simple and easily comprehendible, it did indicate that

online environments can be beneficial for meme success and for communities to freely express

and address their cultural needs as a group (Chen, 2012). The posting and re-creation of Internet

memes on 4chan fostered cultural production for the sake of it and the interests of its users.

Regardless of whether the memes were serious or humorous, purposeful or playful, Burgess

argues they are still contributions *of knowledge* and contributions *to knowledge* that are created within spaces that value and encourage participation (2008, p. 6).

Meme Environments

Human interaction with various media platforms allows humans to copy and reproduce aspects of memes which ultimately creates dynamic environments for memes to exist within. As cultural expressions manifest themselves in the digital realm, memes need specific environments that nurture fidelity, longevity, and fecundity in order to survive. Media platforms like televisions, radios, and of course social media are ideal spaces for memes to exist. Researchers often compare memes to viruses, describing them as "replicating agents that need a host (carrier)" in order to survive (Buchel, 2012, p. 18). This "survival of the fittest" discourse around memes is often referred to as the "selfish meme" proposed by Blackwell (1999), which purports that their only goal is to replicate themselves regardless of the effect it can have on the host (Salingaros, 2002). However, other researchers disagree. Aunger (2002) and Dyens (2001) advocate that meme creation and lifecycle success is a two-way process where humans perpetuate their expressions which, in turn, change human society. In this vein, the act of imitation is a human response to a meme.

Within memetic research, Internet memes (expressed via a collage of videos, text, and/or imagery) are seen as the primary components of social connection (Burgess, 2008). Social network sites like 4chan, Facebook and Twitter, utilize text, hyperlinks, videos, and imagery as social connectors to prompt or solicit online discourse and express cultural ideas and topics. The value in discourse is generated through the "spreadability" of a meme (Burgess, 2008). For example, Burgess studied the YouTube video meme "Chocolate Rain" to understand how the popularity of a meme facilitated digital participation (2008). Popularity was measured by the

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number of times it was shared and parodied, and identified by textual hooks or key signifiers (2008). Participation and discourse resulted from the re-working and jamming methods of replication and variation on the social network site. Burgess found that parodies, mashups, and remixes of the video facilitated its popularity and thus, the likelihood of it initiating digital participation among users. Aspects of the video were selected for repetition in other video creations, making the video a successful meme and instigator of digital participation.

Social media structures, news media practices and sharing of the content allow for the constant circulation of memes through a cyclical functionality where meme producers and users can chose to select, adjust, and repost any aspect of a news meme over and over again. Just as we create these environments for memes, we also have the ability to control their existence through the selective creation and sharing of certain memes over others. In this context, the notion of the "selfish meme" proposed by Dawkins, is not applicable. Memes are not using humans for the sole purpose of surviving. Rather, an intimate interaction occurs between the meme and the human (Aunger, 2002, p. 228). This co-existence has made us who we are and memes what they are (Aunger, 2002). Humans both create and depend on memes to understand aspects of their world, which contradicts the once popular notion of the passive Internet consumer and emphasizes the user as a creative producer, freely expressing his/her political, social, or cultural sentiments via imagery, text, and/or video in a civically active and liberating manner (Chen, 2012, p. 15).

The News Meme

Based on prior researchers' definitions of the meme and Internet memes, *the news meme* will be defined as a cultural unit of information presented as written text, images, or videos whose livelihood is determined by the frequent behaviors of imitation and transmission,

produced by media personnel from news organizations. The news meme can be manifested in the form of an article, image, video, comment, or combination of the four and present on traditional or new media (online) platforms. It is a unit that details some aspect of social, political, and/or cultural life.

The fact that news stories are constantly changing and evolving across a number of platforms (TV, print, web) indicates that news stories are indeed one type of meme. News organizations may approach the same news story differently, framing perspectives and altering tones and imagery to capture the essence of the story in their own way. Different journalist narratives, styles, corporate policies, and frames influence story construction and meaning. Journalists also provide audiences with a variety of spins on the same story. As a story naturally develops, it changes as well. Once posted on social media sites and other news platforms, user commentary, remixing, and comments from viewers (e.g. online comments or over the phone comments) facilitate a news meme's rapid imitation and change. The recent High Park Fire is a perfect example. The news coverage and imagery associated with the natural disaster fire in Fort Collins, Colorado, spread quickly on social media sites like Facebook and across news organizations' websites. The story grew and developed as the fire events unfolded, producing a number of memes including ideas around heroism and fire fighters, citizen survival, community strength and support; journalists wrote about it and users commented and shared information.

News memes allow for a diversity of information to propagate on and offline so users have the opportunity to understand a variety of stories and perspectives to make informed decisions. The result of the news meme evolution and lifecycle is a diversity of spreadable ideas and cultural sentiments. News memes produce cultural expressions, therefore, researchers need

to consider where these types of memes exist and how their environments impact the expression of cultural and political ideas and action (Knobel, 2006).

News memes, such as news stories, are forms of culture which are comprised of more intellectually challenging components (discussion of social/political issues) rather than the typical Internet meme produced from anonymous users or entities like LOLcats or The Dork Side that often focus on the humorous or satirical aspects of culture. News stories, like humorous memes, are disseminated on social media sites like Facebook and Twitter but also on news organizations websites as well. News content is recycled (i.e. used repeatedly), re-worked, and re-distributed through various journalistic organizations across multiple platforms, which shows the meme principle at work. This replication allows the news meme to take on new meanings, attract new audiences and markets, and generate community values (Burgess, 2008). By this logic, any news meme is like a tumbleweed; no two are exactly the same and every expression is different. Similarly, news values and media practices function to suggest and encourage that certain types of stories and treatments are newsworthy while others are not. Agreed-upon news values in this regard may also be considered contributing to the use of memes by media. Such practices produce cultural value to the extent that it acts as a hub for further creative activity from a wide range of contributors or users (Burgess, 2002). Therefore, a news story can be considered one type of meme.

To note, a news meme is not a meme simply by virtue of its quantity of shares, likes, comments, or re-posts, or by the sole fact it was created by journalists. It is a news meme if the cultural unit of information was imitated in some capacity (i.e. copied, re-worked) and then shared with the public to inspire or prompt further creations from its existence. Just like any piece of information, behavior, or idea, some news stories are passed along, while others fail to

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get covered at all. In many respects, the news meme is dependent on human agents and other variables such as media, and information-sharing processes for survival. Without audience attention and response to meme expressions, the news meme fails to function as a source of information and inspiration for public discourse.

News Memes and Media Platforms

Journalism depends on the public to share stories, and the people depend on news organizations and journalists to highlight important areas of public life. The nature of a news meme requires acts of socialization, collaboration, and contribution by media personnel and citizens alike in order to survive. Because news stories are constantly being shared over the wire and with sister news stations, with other journalists and organizations, and across various media platforms, many human agents interact with news content on a daily basis; that ultimately changes the meaning of the news story. The interaction, interpretation, and processing of political and socio-cultural ideas from the news sustains the news meme. Every news story has a hook, a captivating lead or piece of information that draws the reader/viewer in and makes the story both newsworthy and spreadable.

It is the act of working together discursively and creatively within a space, whether that is in a newsroom or online, that makes such a cultural unit of imitation, a news meme, a source of information that can help citizens make informed decisions about the world. Media institutions in this sense can be seen as hubs for meme creation. They centralize meme production and aggregate public concerns to facilitate discursive, problem-solving, critical-thinking processes that seek to address and resolve common community concerns.

News memes have the potential to influence *how* ideas are talked about. As Buchel states, "in order for memes to spread, there needs to be some kind of common ground for meanings [to

emerge] which ensure that what is meant and what is understood is similar" (2012, p. 53). In this respect, the "common ground" for meanings and expressions to emerge rests within the hands of media personnel.

Increasingly, news memes on social networks like Facebook and Twitter are becoming valuable objects within these spaces for consumers to view information and interact with one another in communicative exchanges that foster discourse–the news meme (and its expression) being the central focus of such discourse. Social networks' ability to aggregate user interests, allow users to access and share an unprecedented amount of information, and circulate information via news feeds and links, shares and likes, ideally providing a centralized location for news memes to be reproduced and disseminated, yielding what is presumed to be a more participatory political culture (Loader, 2011). In this vein, social networks are "mediating mechanisms" where cultural practices originate, are adopted, and sometimes retained (Burgess, 2008). In this regard, the Internet and social media sites have been thought of as communicative equalizers where a "plurality of unfiltered voices and endless opportunities for interactive exchange" exist, supporting the popular notion that the Internet is an inherent, democratizing, technological force that does not discriminate access to information and encourages sociality and connectivity (van Dijck, 2012).

Herein lies the beauty and potential of the news meme: its constant imitation and evolution on and offline brings together people who value each other's contributions to their creations and development (Knobel & Lankshear, 2006, p. 220; Marshall, 1998). With the replicating nature of news memes, social media and news organization websites can serve as spaces for socialization and information sharing. As Marshall states, "what matters is a common interest...the network facilitates this with communication and the spread of memes" (1998, p. 4).

Social media sites like Facebook foster a sense of inclusivity that, many researchers argue, helps break down power structures (Chen, 2012). The sites require users to develop a username which creates some form of identity between one's Internet persona and their real world persona; however, these sites do not segregate users by charging fees to use their services. Chen (2012) argues that by not charging fees or implementing other forms of user segregation, ultimately facilitates the quality of intellectual thought and thus the "creation of culture [memes] for its own sake"–a thought that runs contrary to Blackwell's "selfish meme" notion discussed earlier (p. 9-10). In this integrated environment, citizens are free to associate and develop a wide range of relationships and channels through which they can communicate their ideas in public life by "cutting across societal cleavages" (Himelboim, 2011, p. 5). In this sense, the Internet and social networks such as Facebook, have fostered public discussion, problem articulation, and the development of virtual communities that "create social ties that otherwise could not have been formulated" because of what many researchers see as a level playing field of access to information and opinions on social networking sites (Himelboim, 2011, p. 6).

News memes that are disseminated on social media and news websites create common grounds for users to come together to discuss their opinions in relation to societal concerns. Just like a physical public space that we enter into influences our communicative experiences as humans, a virtual public space like Facebook, the content displayed within it, and the discourse that falls from it influence communicative experiences and how citizens construct knowledge and engage in public life. Without a full understanding of news meme characteristics that fuel their success, we fail to consider how these cultural messages are presented as *products of* those behavioral characteristics, environments, and discourses. Media spheres and discursive elements influence how the news meme is presented to and interpreted by users, which affects what they

know and understand about its expression. Not only do we need to examine the components that make up a successful news meme, but we need to consider the terrain in which these "meme tumbleweeds" travel within and how human responses contribute to contemporary communication climates that can potentially serve to further engage citizens.

Facebook

Facebook is one platform where we can examine the environment within which news memes exist and survive in order to understand how such environments contribute to the success of news memes. With more than 1 billion active users on Facebook, audiences are using the social network for a variety of purposes that extend beyond its original intent as a space to maintain close contacts with friends, establish new relationships, and update others on one's daily activities (Facebook, 2012).

News outlets have utilized the space as another platform from which to disseminate news memes (text-based articles consisting of links, images, and/or video). The growing popularity of Facebook allows it to serve as a space for learning and understanding, a space where users can log on and view news content from their news feed, click on a specific news organization's page, or search a particular topic of interest to augment their news consumption and knowledge-gathering processes. *The Atlantic* claims that Facebook is indeed becoming a major driver of news content, ranking as the fourth largest media source behind Google, Yahoo and MSN (Thompson, 2011). In addition, with respect to its demographic and geographic reach, Facebook ranks number three, just below Microsoft and Google on Nielsen's Top 10 Global Web Parent Companies with an active reach of 67.7% (Nielsen, 2011). These statistics signify the important role Facebook plays in disseminating news content to audiences and speaks to the larger role social networks play in news meme production and distribution.

Despite the power of a news meme to serve as a cultural expression about the world, the effectiveness of it as a entity that sparks public discussion, collaboration, and creativity decreases when presented on a Facebook timeline where the meme depends heavily on the actions of the users and exposure to others. For example, the cyclical and temporal nature of Facebook's timeline either circulates the news meme over and over again or not at all, based on user-generated actions of liking, sharing, re-posting, and/or commenting (performing some indication of response and participation). It is possible to have new content on a user's news feed within minutes of refreshing the Home page, preventing the user from seeing the news meme again, if at all. If the user attempts to find a specific piece of information on Facebook using the search tools or by seeking out news organizations' past posts, the amount of effort expended to isolate such content makes it increasingly difficult for the user to find information quickly, read it, develop their own ways of making sense of its content and talking about it online. Depending on a number of factors, including the frequency of media coverage, time of day spent on the site, and the frequency of re-posts, likes, commentary, and shares can determine whether or not the news meme, as a unit of cultural information, is disseminated widely and discussed online in a meaningful way that contributes to the production of knowledge about the world we live in.

In summary, social media has the potential to effect the purpose and function of the news meme, a traveling, dynamic, and adaptable tumbleweed of cultural expressions formulated by users, which in turn effects how users talk about these expressions. If news memes are not able to grow and thrive within online social media environments that value collaboration and creativity, the environment itself is not conducive to serve as a cultural expresser of ideas. In this sense, we are dishonoring, demeaning, and destroying the potential of the news meme to serve as a new source of dialogue, cultural formation and renewal, and a mode of inspiration that fosters

political advocacy and civic engagement. As Buchel reminds us, memes "serve as a way to reach out to the community and talk about problems and situations of the everyday life and get some feedback on your story...in other words, to feel connected...They provide avenues for the effective communication of thoughts, views, and ideas as well as participation in the life of the community" (2012, p. 60, 64).

Concept Map
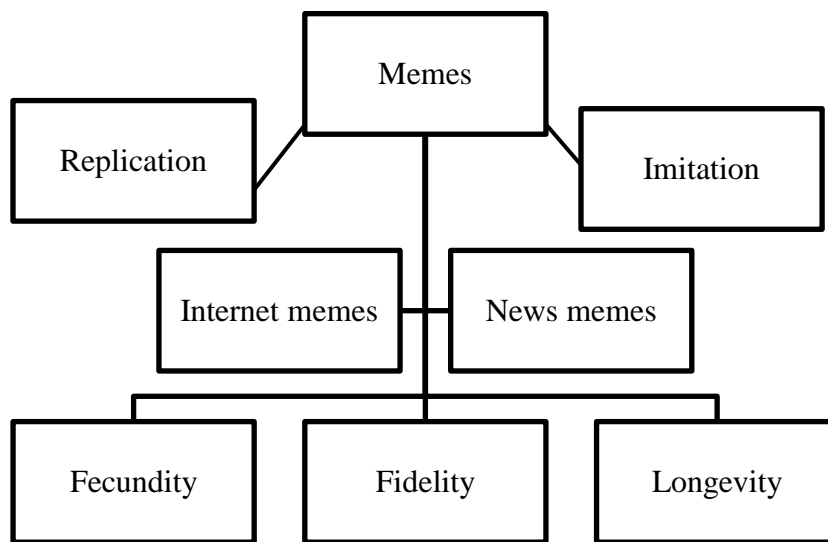
Figure 1: Concept Map of Memes

Figure 1 demonstrates the conceptual hierarchy under investigation. Memes are placed at the top of the figure because it is the central concept that possess all the descending characteristics and concepts. Replication and imitation branch off of memes because they are two concepts/processes that drive the existence of memes and their propagation. Without the processes of replication and imitation, memes would not be able to propagate successfully. The graphic layout suggests that replication and imitation are a part of meme functionality. In addition, memes branch off into two main types, Internet memes and news memes, located in the center of the concept map. There are many types of memes one may examine however, this study

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is focused on news content and the Internet as types of memes and are thus listed as two central meme concepts. Finally, there is are three characteristics that describe the general behaviors of Internet memes, news memes, and memes in general: fecundity, fidelity, and longevity. These are placed at the bottom of the figure because the behaviors of a meme are influenced by the type of meme and the processes of replication and imitation.

Research Questions

Based on the conceptualization of the above constructs (memes, Internet memes, news memes, fecundity, fidelity, longevity, replication, and imitation) and based on a review of the literature, the following research questions were established:

RQ1: What characteristics and/or qualities contribute to news meme survival and success?

Minimal research has clearly identified specific characteristics and qualities that comprise an Internet meme, let alone a news meme. Therefore, it is important to understand what components or manifestations of cultural units of information propagated by news organizations exist to define a news meme. This research question will outline the characteristics and qualities that make a news meme successful within its environment(s).

RQ2: How can news meme characteristics and/or qualities be identified and measured?

This question attempts to provide clarity to RQ1 by identifying how one will be able to physically observe/identify the phenomenon under investigation. The researcher will accurately and confidently identify and measure the characteristics and qualities that RQ1 seeks to identify like who posted the meme, through what media, with what kinds of content, and identify levels of frequency for each item identified.

RQ3: Do news organizations' Facebook pages influence how frequently a meme propagates?

This question seeks to understand the potential impact or influence a meme's web environment can have on their likelihood of propagating. Perhaps specific contexts and environments like Facebook pages are more conducive to making a meme spread and propagate within that space. This question will allow the researcher to understand if a news meme's environment influences the meme's levels of fidelity, fecundity, and longevity on the site.

RQ4: Do news organizations' website pages influence how frequently a meme propagates?

Similar to RQ3, this question seeks to understand the potential impact or influence a meme's web environment can have on their likelihood of propagating. Perhaps specific contexts and environments like news organization's website pages are more conducive to making a meme spread and propagate within that space. This question will allow the researcher to understand if a news meme's environment influences the meme's levels of fidelity, fecundity, and longevity on the site.

Methods

The researcher conducted a mixed methods content analysis of one specific news meme, the High Park fire, across multiple news organizations' Facebook pages and websites in order to effectively answer the research questions. The researcher examined the recent Fort Collins High Park Fire disaster as it was portrayed and broadcast on Facebook and news website platforms because of the topic's prominent presence on these two platforms. The researcher focused on Fort Collins and Denver news organizations only and analyzed their Facebook and website posts on the fire and its meme development. Likewise, the researcher looked at these posts and identify specific characteristics that influence the potential popularity, visibility, and trending nature of the news meme itself using Dawkin's three characteristics of meme success: fidelity, fecundity, and longevity as quantitative measurements. The universe of content was the High Park Fire Facebook and news website story posts identified from the 14 news organizations selected by the researcher.

The researcher measured the number of posts and frequency of likes of the High Park Fire news meme and number of comments per meme post to see the quantitative impact of the news meme's lifecycle, and then examined qualitatively the comment language (latent content) associated with each news meme post. This additional inclusion of qualitative content analysis will extend the limits of quantitative data by tracing the "relevant characteristics which [are not always present in] frequency counts" (Kracauer, 1952, p. 638). Again, Dawkins' (2006) three characteristics of fecundity, longevity, and fidelity were used to measure how news memes thrive and disappear within social media environments.

Fecundity, the speed of the spread of the news meme was measured by counting the number of copies (i.e. versions of the story) posted each day and over the course of the specified

time period. The number of likes and comments were also indicative of fecundity because liking or commenting on a post in Facebook propagates that post and users' friends have the opportunity to see it in their news feed (Heylighen & Chielens, 2009). With the integration of social media buttons on news organization's websites, it is also easy to see how many likes or comments the news post has garnered, which made it feasible to harvest data of news meme fecundity on both Facebook and news organizations' pages and posts. Fidelity, the qualities that make a meme readily copied, was measured by observing and tallying the presence or absence of images, videos, comments, text, links, and article length or a combination of any of those elements per Facebook news post and web story post. Any of these qualities may make a news meme more prone to be copied, shared, or propagated in some fashion. Finally, longevity, the span of time in which a meme exists, was measured by establishing a specific time frame in which to assess the qualities of the news memes that influence propagation levels. For this study, June 9, 2012-June 15, 2012 and June 21, 2012-June 23, 2012 served as the span of time in which the High Park Fire news meme characteristics and behaviors were analyzed due to an increase in media coverage from the fire's development during that time frame.

Past studies have measured meme "fitness" or propagation levels by using quantitative, complex, mathematic algorithms like non-linear differential equations (Heylighen & Chielens, 2009). Fecundity rates for meme growth have been measured by the number of meme copies at a specific time (Heylighen & Chielens, 2009). Although these equations produce substantial evidence for measuring and predicting the propagation levels of memes, other methodologies including qualitative approaches need to be considered in order to measure the content-specific qualities that make a meme thrive in a certain online environment.

The researcher purposively selected 14 local Denver and Fort Collins news organizations

that covered the High Park Fire and have a social media and web presence. These organizations

included: Fort Collins Coloradoan, Northern Colorado 5, the Rocky Mountain Collegian, KUSA-

TV, KCNC-TV, KWGN-TV, KMGH-TV, KDVR-TV, KBDI-TV, KUNC, The Denver Post,

Viva Colorado, Westword, and Colorado Community Media. Relevant data collection covered

between June 9, 2012 when the fire started receiving news coverage to June 15, 2012 when news

coverage began to wane and on June 21, 2012-June 23, 2012 when coverage peaked again. These

days were chosen to hone in on a specific, high media coverage time period of the fire and for

practicality purposes. Local news organizations covered the fire extensively over one month and

during that time numerous news posts were generated on a daily basis. Therefore, it is reasonable

to assume that hundreds if not thousands of news posts were generated within a week's time,

which makes for ideal and substantial data to be collected within the period of a week. The units

of analysis were the individual news meme posts published by the news organizations' Facebook

and website pages (this may include any likes and/or comments the post received).

Content Analysis Overview

Content analysis is defined as "the study of recorded human communications" suitable

for examining material artifacts like web pages, books, paintings, magazines, newspaper articles

and other material documents and collections (Babbie, 2010, p. 333). Wimmer and Dominick

describe a content analysis as a "method of studying and analyzing communication in a

systematic, objective, and quantitative manner for the purpose of measuring variables" but make

special note that other methods of content analysis can be utilized to assess the potential impacts

of content (2006, p. 150-151). This method has been employed to understand historical, political,

and social communication processes that answer the classic question "who says what, to whom,

why, how, and with what effect?" (Babbie, 2010, p. 333). Public relations practitioners, marketers, private sector businesses, and other organizations use it to measure the effects and influences of content on consumers, constituents, communities, and stakeholders. The data can be used quantitatively or qualitatively. For this study, it was used both ways to describe variable characteristics using frequency counts and also identify potential patterns and relationships among variables of news meme characteristics and propagation rates (Babbie, 2010, p. 341). Content analysis methods are unobtrusive, allow for corrections of errors, allows data to be analyzed over a period of time, and is reasonable in terms of time and monetary costs (Babbie, 2010, p. 344).

The researcher engaged in critical observation of each news meme post to identify the visible, textual, and temporal characteristics of each artifact while observing the discourse of users via analysis of the comments and observation of the number of likes and shares of the meme itself (Lindlof & Taylor, 2011, p. 227). It should be clarified that a "like" on a Facebook page is reminiscent to agreeing with the original post itself (Gerolimos, 2011). This mixed methods content analysis reveals that news meme manifest content characteristics like imagery, comments, text links, videos, and frequency of posts are factors of news meme survival and success. Looking at one news meme and seeing how different news organizations covered and posted/discussed the story can help identify factors that influence news meme production and reproduction within these online spaces.

Why Mixed Methods?

The study is a close examination of a specific news meme, which further advances web memetic theory and provides "an idiographic understanding of the particular case under examination" (Babbie, 2010, p. 309). Examining this kind of material culture and objects

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"exhibits a complex duality of being" where such artifacts are worked upon and manipulated for human purposes but simultaneously exist because of human agency and thrive off of such interactions to "make their influence felt" (Lindlof & Taylor, 2011, p. 218). Objects like news memes "have the power, mostly by virtue of their material constancy, to reconnect people...to serve as sense-making devices...even spur the formation of a community" (Lindlof & Taylor, 2011, p. 219). Even though some qualitative communication researchers believe that material culture cannot "formulate a complex idea in the same way as spoken language" material objects and culture can prompt such discourses to occur, which is why in today's culture, such artifacts like news memes need to be examined to understand how they contribute to social understandings and formations of digital participatory culture (Lindlof & Taylor, 2011, p. 220). News memes are very much "enduring articulations" of human experiences and resources, referents, and signs of communication that help us make sense of our world and the issues in it (Lindlof & Taylor, 2011, p. 220). Additionally, analysis of textual materials like website content and Facebook comments produce information richness, availability, nonreactivity, and truth value (Lindlof & Taylor, 2011, p. 237).

A mixed method content analysis has not been previously carried out extensively in news meme research; doing so provides foundations for further research on the interplay between news memes and their media environments. This approach is an appropriate way to research this topic because it provides an in-depth understanding of topics that cannot always be gleaned from quantitative research methods alone (Babbie, 2010). Quantitatively measuring the circulation of news memes on social networks and news organizations' websites will provide a baseline from which to assess the popularity and visibility of the news memes. However, the numerical values

produced from the quantification of comments and post summations does not illuminate enough about the relationship between news memes and effects on digital participatory culture.

By combining qualitative research methods to uncover the relationship among these concepts, researchers can better understand how news memes behave within social networks and news organizations' website environments, and the specific characteristics that make a news meme popular. Additionally, it will allow researchers to better understand how news organizations utilize these networks to disseminate information and how specific types of information facilitate the public deliberation process. Pragmatically, examining this relationship among concepts in this fashion can help researchers and marketers understand the phenomenon of news memes and the types of successful and unsuccessful forms of communication that occur on behalf of such entities within public spaces. News organizations will gain insight into which Internet platforms are appropriate to use when disseminating news content for public consumption. Photographers, writers, and marketers will understand which content is best suited for meme status, dissemination and viral behavior, which will garner more public attention and commentary.

Artifact Selection

Fourteen news organizations were selected from an Internet Google search for local Fort Collins and Denver mainstream print and television broadcast news organizations. They were selected because each of these news organizations have a social media and website presence and posted frequent coverage of the High Park Fire. Additionally, the sites were selected for their high circulation (reach) of news content across the Denver and greater Northern Colorado area. Sites were also selected based upon the researcher's knowledge of media organizations in the Northern Colorado and Denver area. Even though the High Park fire made national news, for the

purpose of this study, national news organizations and news posts were not selected for study nor included in the artifacts to be studied because substantial data could be collected from the 14 news organizations located locally. In addition, such national examinations would most likely produce less High Park Fire news memes because of geographic distance to the event itself and probability that other national news coverage will be more predominate on national news sites. Finally, with current newsgathering processes, many of the national news organizations may have received the content from local organizations which are covering the event locally. The centrality of the event lends itself to be much more highly covered by local media and close communities affected by the High Park Fire than distant communities.

Sampling Rationale

A purposive sample is a non-probability sampling technique "in which the units to be observed are selected on the basis of the researcher's judgment about which ones will be the most useful or representative," is preferred because specific information regarding the lifecycle and influence of news memes in social media environments is needed (Babbie, 2010, p. 193). This specific information cannot be as successfully obtained from other forms of sampling and was therefore the sampling method employed for this study (Babbie, 2010). Purposive sampling allowed the researcher to understand how different local news organizations presented information about the High Park Fire and identify specific features within the news meme itself that possibly promoted user commentary and meme success within social media and news media website spheres.

Artifact Retrieval and Archiving

The Facebook and news organizations' website comments were archived using the software SnagIt. SnagIt, a screen-capture software, takes content on a computer screen and saves

it as an image, video, or text. SnagIt screen-capture software was used to collect 456 news organization's Facebook and website page posts of the High Park fire that were published from June 09, 2012 through June 15, 2012. Additional posts were collected between June 21, 2012 through June 23, 2012 when the fire jumped the Horsetooth Reservoir, a significant development in the fire's spread. Posts were digitally screen captured and organized in computer file folders between December 14, 2012 through January 15, 2013. Each screen capture was housed in a designated folder labeled according to the news organization it came from. For instance, a screen capture from KUSA-TV's website was stored in a folder labeled "KUSA-TV-web" and so forth. The same labeling process was done for Facebook posts (e.g. "KUSA-TV-FB"). Both web and Facebook subfolders were placed in a general news organization folder (e.g. "KUSA-TV"). All posts were stored on the researcher's laptop and were stored on two additional devices including an external hard drive and personal desktop computer.

This study used SnagIt to capture the data as an image, an image that contains text, video, links, and/or photos. Such collections are important to retrieve and archive in order to ensure that no content is removed or deleted from the sites when data is starting to be analyzed. Each day (June 9, 2012-June 15, 2012 and June 21, 2012-June 23, 2012) was saved as a jpeg image.

Variables

News memes were coded as either High Park Fire (HPF) memes or non-HPF memes based on the content (i.e. imagery, words, phrases) and containment of the words/phrases "High Park Fire" in the meme post headed or body of the article. Any meme that did not contain a word, phrase, image or indication of the High Park Fire was considered a non-HPF meme. The HPF meme was the independent variable under examination and user responses (i.e. comments, likes) were the dependent variables representing the propagation levels that influence meme

success (i.e. fidelity, fecundity, longevity). For future analysis, the researcher was only concerned with the frequency of HPF meme posts, comments per post, longevity of posts and comment threads, characteristics of the HPF meme posts (i.e. videos, imagery, text), and the comment language from users. This will allow for associations to be made between news memes and the specific online environments in which they propagate. Relationships were expected to emerge among HPF meme prevalence and the frequency and sustentative comments and other qualities observed (e.g. photos, links) on each post.

Codebook

To measure these theoretical concepts, variables were operationalized in quantitative and qualitative terms via a codebook. HPF memes were measured according to the criteria discussed above (presence of imagery and/or terminology of High Park Fire) and according to the criteria listed in the Appendices. The running totals of the news organizations' Facebook and website comment categories are in Appendix A to provide a comprehensive view of the types of comment categories available and levels of frequencies of each. HPF memes characteristics were measured by the number of images, videos, links, article length and text associated with each post on the news organizations' Facebook and website page (see Appendix B) and categorization of comments (see Appendix C) found on each post. News organizations' Facebook pages were assessed by ensuring that pages were created by the news organization itself and not third party users (those unassociated with the organization) and validated by noting the URL http://www.facebook.com in the prefix of the web address. User comments on Facebook and websites were measured according to the number of likes, comments (see Appendices D) and posts of the HPF meme (see Appendix E).

Codes for the fidelity and fecundity data sets were assigned alphabetically following a numerical value (i.e. A.1, A.2). Each news organization post code had its own letter and number associated with it and each comment had a number associated with it. Comments were categorized after all comments were collected and analyzed.

Coding Pretest, Intercoder Reliability, and Validity

The researcher conducted a simple random sample to execute the pretest in order to ensure categorical reliability and that all variables to measure fidelity, fecundity, and longevity were exclusive. Posts were numbered 1 to 456 numerically and stored in a "pretest" folder to separate the entire post population from the already organized website and Facebook posts. The researcher followed Babbie's (2010) simple random sample instruction guide to use a random numbers table. A random collection of 15 posts were collected and analyzed from Facebook and websites combined from randomly selected news organizations in the aforementioned sample of 14 organizations' Facebook and website page posts under investigation. The researcher randomly selected a location on the random numbers table to begin building a 15 post pretest sample for analysis. The fifth row and six column was randomly selected. The first batch of posts did not yield enough comments to effectively carry out the pretest with its intended purpose in mind, that is, to modify protocols for data collection (e.g. categories and variables). Therefore, a second batch of posts were collected and yielded a more diverse and variable selection of comments and visual elements within the posts. The random post numbers (in numeric order for organizational purposes) included: 45, 130, 151, 185, 186, 214, 219, 279, 331, 340, 363, 388, 394, 457, and 458.

A pretest instruction guide was created by the researcher to provide the two graduate student coders with the theoretical concepts and operational variables needed to understand the

purpose and necessity of the pretest. The pretest instruction guide included an overview of how the 15 randomly selected posts were collected, theoretical definitions of fidelity, fecundity, and longevity, and operationalized definitions of the variables. Information was provided about the expectations of the coders, and the types and examples of comments and how to categorize them in the data collection tables provided by the researcher. The researcher's advisor was sought to initially approve the pretest instruction guide, pretest sample, and data collection charts. Once approved, these items were sent to the two coders via email on January 24, 2013 and asked to complete the pretest coding by the end of January or early February. The researcher gave each coder a $10 Starbucks gift card upon completion of the pretest.

The researcher also did the pretest to compare coder's categorical selections with hers. Once the pretests were completed by both coders, each data collection chart from the coder was printed out and manually compared to the researcher's pretest answers. Discrepancies and agreements were identified among the three data collection charts. If the researcher and either of the coders did not reach at least at 80 percent agreement on coding, a phone or in-person meeting was conducted to discuss discrepancies and questions in the coding process and resolutions and agreements were made to ensure the coders and the research achieved at least an 80 percent agreement of comment categories (fidelity), number of likes and comments per post (fecundity), and date and time of posts and comments (longevity) (Wimmer & Dominick, 2010, p. 174-175). Discrepancies meant that the researcher and either of the two coders disagreed on the categorization of a comment or post characteristic.

Pretest Results

53 artifacts were coded including comments and news posts. The percentage of judgments on which the coders agreed on the comment categories (fidelity), fecundity, and

longevity variables with the researcher was in the 90 percentile range. Coder 1 agreed with the

researcher's comment categories 92 percent of the time while coder 2 agreed 90 percent of the

time. There were a total of 53 artifacts available for coding and a percentage of the agreed versus

disagreed comment categorizations was calculated.

To calculate observed agreement between the two coders, the number of items on which

the coders agreed was divided by the number of items. In this case $52 \div 53 = .9811$ or 98 percent.

One hundred percent reliability score was reached using a Scott's Pi equation. A total of 107

items were coded between the two graduate student coders, which was determined by creating a

contingency table of comment categories with the appropriate sample data set values. A

coefficient of reliability was calculated using the equation $CR = 2M/N1+N2$ where M equals the

number of times the two coders agreed and N equals the total number of artifacts coded. After

inserting the appropriate values from the pretest data set produced the equation,

$CR = 2(107)/53+53$ where $CR = 2.018$. Any value above 1 represents 100 percent agreement. The

two coders agreed on 107 out of the possible 132 coding options so the coders agreed 100

percent of the time with a 20 percent expected agreement value.

Table 1: Contingency table for pretest Scott's Pi reliability statistic calculations

	Coder1	Coder2	Total	Joint Proportion	JP Squared
General comments	37	43	80	0.3	0.0918
Funny comments	11	14	25	0.09	0.0089
Suggestion comments	3	5	8	0.03	0.0009
Advertisement or Spam comments	2	2	4	0.01	0.0002
Complaint comments	4	5	9	0.03	0.001
Thankful comments	7	7	14	0.05	0.002
General Information	0	0	0	0	0

comments					
Question comments	25	21	46	0.17	0.03
Religious/Political comments	38	31	69	0.26	0.068
News comments	5	4	9	0.03	0.001
Offensive language comments	0	0	0	0	0
Total					**0.2038**

The observed percent agreement (i.e. pr(a)) equaled .81. The percent expected agreement was subtracted from the percent agreement observed to produce the value .6062. This number was then inserted into the Scott's Pi equation (.6062/1-.6062=1.5).

Per the coder's suggestions, the researcher modified the data collection charts to simplify the data coding process for her by combining fidelity, fecundity, and longevity spreadsheets into one spreadsheet. Additional comment categories were suggested by the coders and were included as new comment category labels in the fidelity chart. Some suggested comment categories included hopeful/positive thoughts (not religious), weather-related comments, empathetic/sympathetic, opinion, and taking action or requesting action be taken. Comments that were not utilized in the 15 post sample included offensive language and general information about the High Park fire. Therefore, these two categories were eliminated from the researcher's data collection charts and the following categories were added: Positive thoughts/hopeful (not religious), weather-related comments, empathetic/sympathetic, opinions comments, and taking action or requesting action to be taken.

Reliability and Validity

Reliability is important in content analysis because researchers need to confidently know whether the measurements will yield the same data if applied several times independently

(Babbie, 2010, p. 417). Reliability will be determined by asking another researcher to identify

categories and codes for the data set. The results were compared to identify similarities and any

differences that may arise from category and code development. Intercoder reliability is defined

as the "levels of agreement between independent coders who code the same content using the

same coding instruments" (Wimmer & Dominick, 2006, p. 166). Reliability for this pretest was

be measured by calculating the percentage of agreement, that is: $Reliability = \frac{2M}{N_1 + N_2}$. For

example, in the pretest, reliability was measured by using the formula $Reliability = \frac{2M}{15+15}$. A

Scott's Pi statistic was used in order to correct for the number of categories and frequency of use:

$Scott's\ pi = \frac{\%\ observed\ agreement\ \ \%\ expected\ agreement}{1-\%\ expected\ agreement}$ (Wimmer & Dominick, 2006, p. 167).

Validity for this study was enhanced via triangulation, the use of multiple methods where

the "researchers look for convergent data" in material documents (Lindlof & Taylor, 2011, p.

274). Validity seeks to ensure the researcher that she is measuring what she thinks she is

measuring (Babbie, 2010, p. 416). Validity is essential in content analysis studies like this one

because if the categories overlap or the study design is inadequate, the validity of the study is

low. Since a majority of the content analysis is descriptive in nature, such as describing the kinds

of qualities and characteristics of news memes, face validity techniques can adequately measure

what it sets out to measure (Wimmer & Dominick, 2006). Additionally, since this study also

measured the relationship between expected and observed frequencies of news meme

propagation, predictive validity was utilized that allowed the researcher to predict something

about the behavior or quality of the item(s) under investigation (Wimmer & Dominick, 2006).

Quantitative measures were collected to established "objective truth of factual events" while

qualitative techniques were employed to understand "multiple subjective views" of the

possibilities of news meme propagation within specific online environments (Roth & Mehta,

2002, p. 137).

Results

There were 456 total website and Facebook posts analyzed, which contained 2806 reader comments and had 60,642 likes on the posts. The presence of either comments or likes was a strong indication that the post was shared in some fashion, most likely on the user's Facebook news feed. A total of 89 percent of the posts were from news organization's websites while 11 percent were from news organization's Facebook pages. A total of 2453 reader comments were from the website posts and the remaining 353 reader comments were made on the news organization's Facebook pages. This equates to 87 percent of the comments were made on website posts while 13 percent of the comments were made on Facebook posts. Additionally, 25 percent of the Facebook posts had comments and 73 percent of the website posts had comments. These percentages indicate that website posts of the High Park fire are more likely to solicit reader comments than Facebook page posts.

Given the large amount of comments within approximately a week's worth of time, there is obviously an indication that comments played an important role in the news meme's success. Each comment was another contribution to the overall news meme, making the post that much more visible to the user's social media audiences, especially if the news meme contained a social media plugin for users to comment. Any comment that was made or any post or comment that was liked on the news meme increased the news meme's likelihood that it was then disseminated on social media platforms. In this case, there are six times as many comments as news meme posts indicating that comments played a significant role in whether the High Park fire news meme was evolving and shared with other online readers.

There were a total of 406 posts captured from news organizations' websites and 50 posts were captured from the news organizations' Facebook pages. Given all the above data between

Facebook and website pages indicates that perhaps websites are more conducive environments for posting news memes than Facebook. This could be due to Facebook's website structure and layout (i.e. information architecture), the capacity of the news staff to manage their Facebook page during high volume coverage of natural disasters like the High Park fire, and/or because Facebook pages lack the ability to produce detailed content about the fire for users to consume. Thus, websites may be a central hub for news meme dissemination of the High Park fire event because content can be easily shared on user's social media pages with the utilization of social media buttons or plug-in features on the news organization's web content management system. The researcher makes these inferences because scenarios like website structure issues and staffing issues indeed arose during the data collection process where certain news organizations' Facebook pages hardly contained any Facebook posts of the High Park fire, including CBS4 Denver, The Collegian, and Viva Colorado. These organizations' did not have many (if any) Facebook posts of the fire as searched in their time line because they did not have the adequate staffing available over the summer season to fuel posts on this platform. The researcher verified this by directly contacting the news organization's social media management team(s) to determine why there was a lack of Facebook posts during the first week of the High Park fire eruption.

Additionally, some news organization's website posts like Viva Colorado or NoCo5, lacked social media buttons, plug-in features, or simply, a comment section in order to offer users the opportunity to contribute their thoughts to the fire's development by commenting on a post. The lack of a community forum feature like a comment section on the web posts prohibited users from contributing to the news meme and thus made it less likely that a specific news post was visible to the public and thus shared with others. Essentially, the lack of interconnecting

social platform options decreased the chances of the news meme post being seen. Without

visibility and some sort of public awareness of the news meme content, the meme lacks

fecundity (the rate at which a meme is readily copied and shared), fidelity (the characteristics

that make a meme readily copied), and longevity (the span of time in which a meme lives).

Data Analysis

After all data was collected, a statistics consultation was executed to provide the

researcher with direction for statistical analysis and ensure an appropriate quantitative analytical

approach. Numerous contingency tables were created (see Table 2 as an example) in Microsoft

Excel where the data set was recorded to compare news meme characteristics of fidelity,

fecundity, and longevity. A contingency table was produced to see the relationship (if any)

between comments and likes of a news meme post. The same was done for other relationships

including web versus Facebook posts, fecundity characteristics versus likes, and comment types

versus likes among other comparisons.

Table 2: Example of contingency table of comments and likes

Count of like_yn	like_yn			
comment_yn	n	y	(blank)	Grand Total
n	2039	580		2619
y	180	181		361
(blank)				
Grand Total	2219	761		2980

A Chi Square test was calculated to determine if any of the data were statistically

significant, that is, "the likelihood that relationships observed in the [population] could be

attributed to sampling error alone" (Babbie, 2010, p. 478). Significance level is typically

expressed in a p-value, where p≤.05, meaning that "a relationship as strong as the observed one can be attributed to sampling error alone is not more than 5 in 100" (Babbie, 2010, p. 482). In the original data set, 10 out of 15 of the comment types were statistically significant (67 percent). Funny, suggestive, complaints, thankful, religious/political, news, empathetic, positive thoughts, opinionated, and concerned/worried comments were statistically significant when compared with the number of likes per comment type. Similarly, in the outlier data set, 12 out of 15 of the comment types were statistically significant (80 percent). All the aforementioned comment types listed above in the original data set were also statistically significant in the outlier data set. However, general comments and question comments were also statistically significant in the outlier data set. The similarities between the two data sets indicate that a pattern exists between comment types and number of likes it receives on a news meme post. The following results were generated from the tests of statistical significance using the Chi Square equation:

Table 3: Chi Square results of statistical significance between comment types and likes (original data set)

Comment type	Percentage liked	Percentage of non-comment type liked	p-value	Statistically significant? (p≤.05)
General comments	22%	20%	.2587	No
Funny comments	52%	25%	4.149e-05	Yes
Suggestive Comments	40%	25%	0.001436	Yes
Advertisement/Spam comments	7%	25%	0.09303	No
Complaint comments	50%	24%	1.659e-13	Yes
Thankful comments	36%	25%	0.0002173	Yes
Question comments	30%	25%	0.1199	No

Religious/Political comments	47%	24%	7.935e-11	Yes
News comments	7.5%	34%	2.2e-16	Yes
Empathetic comments	36%	25%	0.002986	Yes
Positive comments	41%	24%	3.794e-06	Yes
Weather-related comments	26%	22%	0.1515	No
Opinion comments	51%	24%	1.121e-08	Yes
Take Action or Recommend action be taken comments	38%	25%	0.4368	No
Concerned/Worried comments	42%	25%	0.02519	Yes

The difference between the outlier data set and the original data set still showed statistical significance. 12 out of the 15 comment types were statistically significant in the outlier data set whereas 10 comment types were statistically significant in the original data set. The percentage of comment types that were liked only shifted one to five percentage points and such a small numerical difference could indicate that a pattern was indeed present and the researcher's observations did not occur simply by chance.

Table 4: Chi Square results of statistical significance between comment types and likes (outliers eliminated)

Comment type	Percentage liked	Percentage of non-comment type liked	p-value	Statistically significant? (p≤.05)
General comments	9%	13%	0.01635	Yes
Funny comments	48%	25%	0.00057	Yes
Suggestive Comments	36%	25%	0.0261	Yes
Advertisement/Spam comments	27%	25%	0.9036	No
Complaint comments	51%	24%	2.871e-15	Yes

Thankful comments	38%	24%	8.53e-06	Yes
Question comments	35%	24%	0.0003245	Yes
Religious/Political comments	43%	24%	3.711e-08	Yes
News comments	9%	40%	2.2e-16	Yes
Empathetic comments	35%	25%	0.008248	Yes
Positive comments	40%	25%	3.622e-05	Yes
Weather-related comments	27%	25%	0.6782	No
Opinion comments	44%	24%	2.668e-12	Yes
Take Action or Recommend action be taken comments	50%	25%	0.1078	No
Concerned/Worried comments	46%	25%	0.007443	Yes

In order to analyze the data, the researcher examined the frequencies of posts and likes to

the corresponding posts to see if there was a correlation between the number of posts per page

and number of likes and comments per post. Then, the researcher compared the frequencies of

the posts per Facebook and website page with the categorizations of comments to see if there

was a correlation between the frequency of posts, likes, and/or comments and types of comments

users left on each post. The researcher compared similarities and contrast differences between

comment categories and frequencies in comment categories to identify potential relationships

between meme characteristics (e.g. photo, video, text), and the number and types of comments

per post in order to identify a possible relationship between meme characteristics and meme

lifecycle length (i.e. increase likelihood of a user liking or commenting on the news meme post).

The creation of these contingency tables covers the quantitative component of the mixed

methods content analysis employed. The qualitative content analysis piece of the methodology

was meant to further develop the conceptual components of news memes as fecundity-, fidelity-, and longevity-driven units of cultural information. Since minimal research has attempted to truly define the characteristics and processes/behaviors of a news meme, analyzing the comments of the news meme posts allowed the researcher to identify whether discursive or interactive elements of the post influence its propagation levels (e.g. user comments increase the likelihood of the news meme being seen by other users and liked, shared, or commented on, thus increasing propagation levels).

Measurement of Meme Characteristics

Fidelity was measured using the criteria listed in Appendices B and C which documented and organized the presence of text, videos, links, images, article length, combinations of characteristics, and categorized the comments per post (adapted from Gerolimos, 2011) for each news organizations' Facebook and website page for the High Park Fire memes. Appendices B and C are sample screen shots of the news meme fidelity charts used during the data collection process. Appendix C documents the comment categories that each comment was classified into during the data collection process. Categories include:

- General information (comments about fire updates, damage, spread), general comments (comments not assigned to any other category that may express issues not related to the fire itself)

- Funny/humorous (comments that depict comical, jokey, or laughter)

- Suggestion (comments that propose an alternative idea, offer, plan, and/or solution to solving the issue of the fire and its effects)

- Advertisements (comments that advertise or promote services for victim relief, rebuilding, counseling, etc)

- Complaints (comments that project a critique, protest, or objection to an issue related to the fire)

- Thankful (comments that include expressions of gratitude and/or appreciation)

- Questions (comments seeking an answer to a problem, inquiring about an issue related to the fire)

- Religious/Political (comments that refer to a religious entity like God or practice like praying; comments that are bias, show support for one side over another)

- News (comments that offer new information or developments about the fire and/or news media content).

Further categories like Taking Action or Recommending to take action, Concern/Worry, and Weather-related commented emerged during the data collection process, and Appendix C was modified as needed to account for new, emerging categories from the pretest coder suggestions.

Fidelity was measured in this manner because it is defined as the qualities that make a meme readily-copied (Knobel & Lankshear, 2006); items like text, links, videos, images, and comments can be considered qualities that make a news meme propagate and spread successfully. Appendix C allows the researcher to see the date and time the post was published online as well as whether the post had any comments and the date and time of the comments. It also shows how many likes and comments were made on each post, even documenting comments made on comments.

Similarly, fecundity, the rate at which an idea is copied and spread, was measured using the criteria in Appendices D and E, where Appendix D outlines the total number of likes and comments per post and Appendix E records the number of different versions of each news meme post per day per news organization. Appendix D allows the researcher to see how many times all

the posts per news organization were shared via the number of likes and number of comments. Each like and each comment made are demonstrations of the news meme evolving and being shared on social media, a vital component of the meme livelihood. In Appendix D the most notable result is that almost 60 percent of the total number of likes came from news organization H, Fox31 news. Therefore, the researcher examined this news organization to identify any outliers or unusual characteristics of the post that could have clarified the high percentage.

In addition, the table notes that a large portion of the comments per post came from one news organization, news organization D, 9News of KUSA-TV. Again, the researcher was able to review the data set for this news organization to identify the outliers present to explain the high percentage (almost 64 percent). Upon taking an average of the likes and comments per post, the researcher was able to standardize the results (with the consideration of outliers in the data) to see how fecundity played a role in the news meme livelihood. The researcher found that there were approximately 132.98 likes per post and 6.1535 comments per post. However, given the large outliers in the data set and other factors that may have contributed to the number of comments and likes (e.g. web architecture, lack of social media buttons on articles), such averages will undoubtedly be skewed so these factors must be taken into consideration upon viewing and interpreting these numbers. A careful look at the data set reveals that indeed not every post had approximately 132.98 likes and not every post had 6.1535 comments on it. Overall, Appendix D was a critical component of the news meme lifecycle for the High Park fire because the researcher could effectively identify the disparities and extreme values in the data set per news organization and take the step needed to understand why the number were the way they were.

Appendix F supplements Appendix D, outlining the total number of posts per news organization and the number and percentages of posts with no comments. Appendix F shows that approximately 26 percent of the posts did not have a comment associated with it. With such a huge percentage of the data set lacking comments, the researcher began to note during the data collection process, reasons for a lack of comments, including web architecture layouts that did not have a comment section on the article, the date and time the post was published could have affected the user's compellation to comment, and/or characteristics of the post could have played a factor in low or no comments. Additionally, the table tells the researcher a lot about where a majority of the lack of comments came from per news organization. For example, 51 posts did not have a comment on it in news organization D, KUSA-TV. This could be due to the fact that approximately 1117 comments were made on one post, many of which were from the same user. Because of this special circumstance not seen in other news organization's posts, it is clear why other user's did not comment on half of the posts, because many were made on that one post.

It should be noted that the criteria in Appendix E allowed the researcher to see trends in the number of different versions of the news meme throughout the time span in which the data was collected (10 days' worth). The fact that there are a total of 456 different versions of the High Park fire post among 14 different local news organizations is a great indicator that fecundity plays a major role in the news meme's lifecycle to propagation. If there were a small number of posts collected, the researcher would see fecundity as a low criterion in the news meme propagation process. In addition, the data indirectly shows the impact longevity has on news meme success and propagation. With such high numbers of different versions of posts within a 10 day span of time, longevity is obviously present and active in the news meme because if such propagation can occur in such a short period of time, there is a clear indication

that something interesting is happening here. Furthermore, not only can one see that there are 456 different versions of the High Park fire news meme, but one must also consider that with every comment made and every "like" button pressed on each of these news posts, contributions are being made and the post is evolving and changing with a simply click of the mouse.

Fecundity is measured in this manner because speed at which a meme spreads can be determined by the number of likes, posts and comments it receives. Likes, posts, and comments per post enhance the visibility of the meme in both the Facebook news feed and website page hits, which impacts how users seek out and find information related to the High Park Fire. In turn, this influences the likelihood of the news meme being seen, copied, and disseminated to others quicker and with greater reach. For a comprehensive view of all the tables and charts used in the study, please see Appendices A through H.

Relationship Between Fidelity and Fecundity Characteristics

There were several relationships that emerged during the creation of pivot tables in the data set. The following statistical comparisons were made in order to identify relationships between fidelity and fecundity characteristics:

- The relationship between likes and comments

- The relationship between news meme posts and article length

- The relationship between news meme posts and presence of photos

- The relationship between news meme posts and presence of videos

- The relationship between news meme posts and presence of links

- The relationship between news meme posts and presence of text

- The relationship between news meme photo posts and comments

- The relationship between news meme video posts and comments

- The relationship between news meme linked posts and comments

- The relationship between news meme text posts and comments

- The relationship between variations of article length posts and comments

- The relationship between text, photo, video, linked, and article length posts and whether each were liked or commented on

- The relationship between comment types (e.g. general, thankful, weather-related comments) and number of likes.

These comparisons allowed the researcher to see if certain fecundity characteristics of commenting and liking a post increased or enhanced the post's fidelity characteristics (characteristics that make a meme readily copied). Such comparisons also highlighted the relationship between fidelity and fecundity meme characteristics in order to understand how each component of a news meme contributed to the meme's overall propagation level on social media and news organization's website pages.

The following results were generated from the pivot table comparisons with outliers in the data set:

Facebook vs. website pages: 89 percent of the posts were from websites; 11 percent from Facebook pages

Relationship between likes and comments: 50 percent of users who commented on a post, liked it or 50 percent of users who liked a post, commented on it. 22 percent of users who commented on a post, didn't like it or 22 of users who liked a post, didn't comment.

Table 5: Relationship between posts and article length

Article length	Percentage of posts that were article length	Percentage of posts that were not article length
One paragraph or less	31	69

58

More than one paragraph but less than one page	40	60
One page	21	79
More than one page	7	93

*99 percent of the posts are considered because one percent of the posts did not have text

Table 6: Relationship between posts and fidelity characteristics

Fidelity characteristic	Percent of posts that possessed characteristic	Percent of posts that did not possess characteristic
Photos	55	45
Videos	31	69
Text	99	1
Links	69	31

Table 7: Relationship between fidelity characteristics and fecundity characteristics

Fidelity characteristic	Number of posts with fidelity characteristic with comments	Percent of posts with comments
Photos	255	72
Videos	143	19
Text	450	90
Links	317	79
Article length: one paragraph or less	143	17
Article length: more than one paragraph, less than one page	184	10
Article length: one page	98	58
Article length: more than one page	31	9

Table 8: Relationship between fidelity characteristic posts, comments, and likes

Post type	Percent commented	Percent liked
Photo	72	38
Video	19	52
Text	90	81
Link	79	75
Article length: one paragraph or less	17	31
Article length: more than one paragraph, less than one page	10	50
Article length: one page	58	6
Article length: more than one page	9	3

Table 9: Relationship between comment types and likes

Comment type	Total number of comment type	Percent liked	Percent not liked
General comments	604	22	73
Funny comments	44	52	47
Suggestive comments	84	40	60
Advertisement/Spam comments	15	7	93
Complaint comments	167	50	50
Thankful comments	203	36	64
Question comments	257	30	70
Religious/Political comments	172	47	53
News comments	967	7.5	93
Empathetic comments	141	36	64
Positive/Hopeful (not religious) comments	155	41	59

Weather-related comments	219	22	79
Opinion comments	92	51	49
Take action or request action be taken comments	8	38	62
Concern/Worried comments	33	42	58

Outlier Data Results

Additionally, these aforementioned relationships were also observed with a data set where outliers were taken out to see if there was a difference in percentages of fidelity and fecundity characteristics. Outliers in the data set were identified by isolating extreme values in the data set. For example 604 general comment types, 967 news comment types were categorized, 8 action comment types, and 15 advertisement/spam comments types were categorized out of a total of 2806 comments and were identified as outliers in the data set through the creation of scatter plot graphical illustrations.

These results were not surprising to the researcher because there was an overall lack of comments that advised taking a course of action to fight the fire and there was a lack of advertisement/spam comments made within the posts. However, the high number of news and general comments also was not a surprising result. There were many comments that did not fit within any of the 14 comment categorizations listed, so many were coded in a general category. Topics that were bundled into a general category included comments where people were offering to help victims, volunteering, donations, wolves and animal sanctuary comments, issues around logging and foresting procedures, funding and military responses to the fire, debates about fire science processes, lack of resources, living in the mountains, and comments discussing mandatory firebreaks on public and private lands.

Topics that were bundled into news comment types included comments where users provided direct links to news content, comments that discussed fire fighter's recent activity, spread, containment updates, regional evacuations, recent locations of the fire, press releases, weather updates, power outages, recent animal evacuations, road closures, and comments that came directly from police and firefighter scanners. News was a clear outlier because one 9News (KUSA-TV) posts from day three of the fire had 1070 comments on it, many of which were made by one reader who repeatedly posted comments/updates about the fire because she had access to a scanner. Thus, she posted a lot of comments on this particular post as the scanner provided information on a minute by minute, second by second basis.

The following results were generated from the pivot table comparisons without outliers in the data set:

Relationship between likes and comments: 77 percent of users who commented on a post, liked it or users who liked a post, commented. 23 percent of users who commented on a post, did not like it or users who liked a post, did not comment.

Table 10: Relationship between fidelity characteristics and fecundity characteristics (outliers eliminated)

Fidelity characteristic	Number of posts with fidelity characteristic with comments	Percent of posts with comments
Photo	252	56
Videos	139	2
Text	44	83
Links	314	59
Article length: one page	97	35

Relationship between article length posts and comments

    a) **One Paragraph or less:** no outliers seen in data so results are the same as

        original data set

    b) **More Than One Paragraph, Less than One Page:** no outliers seen in data so

        results are the same as original data set

    c) **More Than One Page:** no outliers seen in data so results are the same as original

        data set

Table 11: Relationship between fidelity characteristics, comments, likes (outliers eliminated)

Post type	Percent commented	Percent liked
Photo	56	42
Video	2	21
Text	83	48
Link	59	37
Article length: one paragraph or less	No outliers seen in data so results are the same as original data set	12
Article length: more than one paragraph, less than one page	No outliers seen in data so results are the same as original data set	15
Article length: one page	35	13
Article length: more than one page	No outliers seen in data so results are the same as original data set	6

Table 12: Relationship between comment types and likes

Comment type	Total number of comment type	Percent liked	Percent not liked
General comments	604	9	90
Funny comments	44	48	52
Suggestive comments	84	36	64

Advertisement/Spam comments	15	27	73
Complaint comments	167	51	49
Thankful comments	203	38	62
Question comments	257	35	65
Religious/Political comments	172	43	57
News comments	967	9	91
Empathetic comments	141	35	65
Positive/Hopeful (not religious) comments	155	40	60
Weather-related comments	219	27	73
Opinion comments	92	44	56
Take action or request action be taken comments	8	50	50
Concern/Worried comments	33	46	55

Overall, there is about a one to nine percent difference in the original data versus the outlier data set in comment types that were liked. General and advertisement comment types produced a higher difference in percentages as well as certain fidelity characteristics like videos.

Before outliers were taken out, 19 percent of the video posts were commented on however, after the outliers were taken out of the data set, only two percent of the video posts were commented on. This was a surprising result to the researcher because it was assumed that engaging media like videos would produce more commentary on the post however, this was not the case with the outlier statistic. The drastic decrease in percentages could mean that a video post alone is not enough to effectively prompt a user to comment. Other characteristics like photos, text, and links and article length may be necessary components in order for a user to

comment on a post with a video even if the content in the video is compelling or captures user's attention. Additionally, perhaps the videos in the post were too long and users did not want to watch the entire video because they were only concerned with specific details of the fire's development and spread. A final explanation as to why the percentages decrease between outlier versus non outlier data sets is because perhaps the content in the video was not intriguing enough for a user to comment on the post. All these factors—video content, other characteristics, and video length—could be possible factors in this difference.

Similar arguments can be made for drastic differences in percentages between photo posts (72 percent vs. 56 percent), text posts (90 percent vs. 83 percent), linked posts (79 percent and 59 percent). Photo, link, or text content, lack of other characteristics, and frequency of photos, links, or length of text could all be factors in these differences.

<center>**Discussion**</center>

So what do all these numbers and percentages mean? It shows there is a relationship between whether or not a user makes a comment on a posts and whether it is liked and shared. The comparison between the comments and likes is an indication that Dawkin's (2006) fecundity and fidelity characteristics of meme theory are dependent on one another in order to ensure a news meme's propagation. Without the appropriate fecundity characteristics like comments or like buttons that are vital in the rate at which a news meme is copied and spread, the news meme does not have the ability to be visible on specific platforms like websites and social media platforms, thus decreasing the likelihood it will be contributed upon and shared.

Prominent Features of News Memes

Text and links were the most prominent features on the High Park fire posts, composing 99 percent posts with text and 69 percent posts with links. Photos were the third most prominent feature composing 55 percent of the posts; videos were the least prominent features composing 31 percent of the total posts. Since text, links, and photos were the most prominent features, they thus solicited greater percentages of comments. 90 percent of the text posts had comments, 79 percent of the linked posts had comments, and 72 percent of the photo posts had comments (with outliers included). This could mean that these features are more conducive to prompting user contributions to the news meme because users are looking for sufficient information to quench their thirst for knowledge about the fire (text), users want to have multiple avenues for finding additional information quickly and easily (links), and users are compelled to view stories of the High Park fire from visual information (photos).

As far as article length is concerned, the greatest majority of posts were between one paragraph and one page long (40 percent of the total posts). One page on the web was defined as

<center>66</center>

an article that did not require the researcher to click on additional page numbers at the bottom of the article to view the remaining content. This could mean that users are looking for sufficient information in the news meme that gives enough detail about the fire for them to understand its latest developments and answer user's questions while striking a balance between too little and too much information. A final consideration could be simply journalistic standards of story production. News stories are constructed to be fairly short and to the point which would explain why 40 percent of the stories were less than one page in length. Website and Facebook architectural constraints could also be factor in how long a news story is. If a news organization's website content management system only allows for a certain amount of content to be posted, the reporter must make executive decisions about what information to include in the story and what to leave out. Similarly, Facebook posts only allow for a certain number of characters per post because the platform is meant to provide short, sweet snippets of information for users to consume. Issues like readability are also important factors in this result. Rarely are users going to read long texts of information because it may be difficult to read or fail to effectively answer reader's questions about the High Park fire development in a reasonable amount of time.

Multiple Feature Comparisons

By this logic, since 50 percent of the posts had either comments and/or likes in it, the results from the triage comparison between post feature (e.g. photos) and whether the post received comments or likes, indicates that text, links and photo features are the most conductive for soliciting comments. One page posts garnered 58 percent of the comments indicating that one page posts (which comprised 21 percent of the total posts length), although a small fraction of the total post length, was a fairly significant feature in garnering user comments. Features that are most conducive for soliciting likes on a post include text, links, and articles that are more

than one paragraph but less than one page in length. These three components together make a user more likely to like a news meme. Overall, the data triage comparison tells the researcher that users will comment on posts that have text, links, and photos as long as the article is at least one page long. The triage comparisons also tell the researcher that posts that have text, links, and that are more than one paragraph but less than one page will garner the most likes.

Comment Types and Likes

The most frequent comment types included news comments, general comments, question comments, weather comments, and thankful comments. Since news and general comments were such high values in the data set, these were considered outliers in the data. Again because news comments were so prevalent due to the one news post that had 1117 comments on it, which were mainly news updates from a firefighter and police scanner, these were considered special circumstances that were not seen across any other news organizations' website or Facebook posts. Similarly, general comments were so prevalent because many of the comments could not be coded into the preset comment categories prompting the researcher to place them in a general, hodge-podge category.

The researcher created a series of pivot tables to understand if certain comment types solicited likes of the news meme post. If so, this would indicate that comment types do play an important role in whether or not a news meme is propagated, that is, shared. Comment types that solicited 50 percent or more likes included funny comments, complaint comments, and opinion comments. This is an interesting result because these comment types were the least frequent out of the total 2806 comments posted. However, the most frequent comments of news, general, questions, weather-related, and thankful comments, though popular, can still be considered driving forces in prompting propagation levels of a news meme because the more comments that are made, the more likely the comment and the post will be disseminated on a user's news feed.

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The most frequent comment types are also an indications that these are the kind of discussions occurring during the High Park fire. The public is seeking news information and commenting on it, developing questions, monitoring weather conditions, and offering praise and gratitude for those fighting the fire and covering the event. The frequency of these comment types shows that when there is a natural disaster, people seek information, ask questions, monitor weather, and provide thanks.

Nevertheless, these results show that quantity of comment types or any other feature is not a sole indicator in determining the popularity or propagation of a news meme. Only when multiple features are combined is it more likely a news meme will propagate. This statement further supports Dawkin's (2006) overarching proposition that the great the three characteristics of fidelity, fecundity, and longevity, the greater the likelihood of the meme propagating within its environment.

Visual Typology

The researcher conducted a visual typology of the content within the photos and videos on the news organizations' website pages to find a significant amount of repeated visual information across all posts collected. There was a total of 1866 photos and 159 videos. The most repeated imagery included burning homes, aerial shots of the fire, large plumes of smoke and high flames, firefighters fighting the fire, evacuees at refugee centers, air tankers dropping retardant, and fire, police, and governmental authority figures (e.g. Governer Hickenlooper and Incident Commander), and orange skies/sunsets. These repeated images indicate that even though photo posts were the third most prominent feature in news meme posts, the fact that so much of the High Park fire imagery was seen across all web posts tells the researcher that perhaps a great variety of imagery would have been beneficial to the news memes propagation

levels. However, since the researcher reached saturation with visual imagery by looking at web

posts alone, there is a clear understanding that the aforementioned images observed in the data

collection process were the most popular and frequently used images to convey information

about the High Park fire in such a manner that allowed the photo and video posts to remain a

fairly important fraction of the total posts analyzed. It is clear that posts that contain images of

burning homes, trees, and large smoke plumes are captivating images enough to create a

spectacle out of the High Park fire disaster and capture audience attention. These types are

images, because of their frequency across all news organization's website platforms, are

preferred images to be used repeatedly by media personnel in order to convey ideas about the

High Park fire developments.

Longevity

Even though fidelity and fecundity characteristics of the High Park fire news meme were

effectively measured, coded, and analyzed, longevity proved to be a more difficult meme

characteristic to measure accurately. The researcher recorded the date and time of the published

posts and the date and time reader comments were made on each post. However, the website

content management system display of these dates and times offered conflicting spans of time

between published post dates/times and reader's comment's dates/times. It was found that on 25

web and Facebook posts the published post date was later than the date and time at which a

reader comment was made. For example, a Collegian post showed it was published one day *after*

a reader comment was made. This logically did not make sense. After investigating the mismatch

in post and comment dates/times, the researcher found that the High Park fire archived stories

were referencing the "last updated" time entry instead of the "first posted" time entry (Awtry,

email communication, 2013). Based on this database glitch from the Collegian and the trends of

this issue on other news organizations' website posts, the data for measuring longevity was deemed corrupted or flawed. Thus, any of the researcher's recorded dates and times for posts and/or comments cannot be trusted due to not knowing the exact dates and time post were published and the exact dates and time comments were made. As a result, longevity was not analyzed as originally planned and is not a factor in determining news meme survival on news organization's website and Facebook pages in this study.

Connection to Meme Theory

Based on the aforementioned findings, it is clear the High Park fire news meme was a fairly successful entity within online web environments given the features of text, links, and photos that made such memes propagate via user comments and likes. This result supports Dawkin's meme theory of cultural evolution and spread of ideas via the High Park fire's memorable qualities, which contributed to its sustenance online. According to the visual typology, specific characteristics like the high flames and plumes of smoke were prone to spread quicker and more frequently than other visual aspects whereas the "meme idea itself [remained] relatively intact" but the overall presentation and delivery of the meme changed with each post variation and user comment or like (Knobel & Lankshear, 2006, p. 208). Such results of evolution are supported by Dawkin's (2006) meme theory, which states that one aspect or piece of information must be replicated or imitated by another human in order for transmission to occur—an essential process that describes the evolution of ideas.

Salingaros mentions that a meme must have something "attractive" about it that makes humans want to interact with it in some way and such was the case as illustrated by the repeated imagery from the visual typology results (2002, p. 6). Clearly, spectacular yet horrifying imagery captured audience attention enough that it was constantly repeated across multiple news meme

variations, liked, and commented upon. As mentioned in the literature review section of this study, other factors like human interaction can increase the likelihood if its propagation and spread and such was the case with the High Park fire news meme where there were six times more comments than actual news meme posts, indicating that human interactions via comment contributions and likes facilitated the number of variations of the meme itself.

Additionally, the fact that such a large percentage of the High Park fire news meme were present on news organizations' web pages supports prior Internet meme research which purports that the Internet is an ideal space for memes to grow and thrive (Dunung, 2008, p. 6). The instantaneous nature of the Internet was a strong force in facilitating the propagation of the High Park fire news meme on both Facebook and web pages—further contributing to the High Park fire field of knowledge about the event. The online environments of the High Park fire proved to be social connectors, that is, networks that solicited online discourse (Burgess, 2008).

Research Questions Answered

Based on the results of the data set and the above interpretations of meaning, the following answers were generated based on the research questions asked.

RQ1: What characteristics and/or qualities contribute to news meme survival and success?

News meme posts that have text, links, and photos as long as the article is at least one page long will garner the most comments, while news meme posts that have text, links, and that are more than one paragraph but less than one page in length will garner the most likes. Page length on the web was defined as an article that did not require the researcher to click on additional page numbers at the bottom of the article to view the remaining content. Comment types that solicited 50 percent or more likes included funny comments, complaint comments, and

opinion comments whereas the most frequent comment types included news, general, questions, weather-related, and thankful comments.

RQ2: How can news meme characteristics and/or qualities be identified and measured?

News meme characteristics can be identified by looking for the presence or absence of text, links, photos, videos, and length of articles. The researcher was able to identify and measure news meme characteristics by looking for the components that make up these characteristics. Text was identified by observing the letters and numbers that make up the written language. Links were identified by observing and noting a reference to another document or resource embedded within the text, usually indicated by a blue, underlined word or phrase. Photos were identified by observing the presence of aesthetic elements like objects created by light, color, and depth. Landscapes, figures, people, and other objects like helicopters and police cars were portrayed through static imagery via a photograph. Videos were identified by the researcher through the observation of embedded media in the article where moving images comprised a story of the High Park fire. Typically, the video content was observed by pressing a "play" button or icon and such start, pause, and stop buttons were other indicators that the feature being observed was a video. Finally, article length was determined by observing the text's longest dimension within the post. Article length was categorized into one paragraph (usually only a few sentences long), more than one paragraph but less than one page (usually comprising two to three paragraphs), one page (the article didn't ask the user to click on multiple pages to view the entire content of the article) and more than one page (the article had multiple pages that the user had to click on to access the entire article of information).

RQ3: Do news organizations' Facebook pages influence how frequently a meme propagates?

The potential impact or influence of a meme's web environment can have on the likelihood of the meme propagating proved to be strong. Since 89 percent of the 456 posts collected came from the web, website environments are clearly conducive to housing news memes and all its content. As mentioned earlier, websites may be a central hub for news meme dissemination of the High Park fire event because content can be easily shared on user's social media pages with the utilization of social media buttons or plug-in features on the news organization's web content management system.

RQ4: Do news organization's Facebook pages influence how frequently a meme propagates?

The potential impact or influence of a Facebook page environment on a meme's propagation level is fairly low compared to the impact a website environment can have on a meme's likelihood of propagating. Since only 50 of the 456 posts were from news organizations' Facebook pages, news memes on this social media platform was not as prevalent as it was on website pages. Again, this could be due to Facebook's website structure and layout (i.e. information architecture), the capacity of the news staff to manage their Facebook page during high volume coverage of natural disasters like the High Park fire, and/or because Facebook pages lack the ability to produce detailed content about the fire for users to consume. Therefore, Facebook pages are not conducive environments for news memes to propagate quickly and for long periods of time even though the purpose of content on the platform is for it to be shared, liked, and re-posted. The minimal detail of the High Park fire provided from the post, circulation of other content on a user's news feed, and direct links to news organization's website from the post indicate that Facebook is not yet an appropriate platform for news memes to be successful and propagate. Any photos or videos posted on the site are shrunk down to a size that fits within

the news feed architecture and layout and any content posted is constrained to a character limit

affects the meme's fidelity, fecundity, and longevity levels on the site.

Conclusion

Based on an analysis of the data, perhaps social media does not have the components necessary to affect the purpose and function of the news meme, as a travelling, dynamic, and adaptable tumbleweed of cultural expressions formulated by users. Since news memes of the High Park fire were not frequent on Facebook pages and lacked frequency of comments and discussion of the event online, they lack the ability to grow and thrive within this online social media environment. As a result, the social media environment is not conducive to serve as a cultural expresser of ideas for news content at this time.

However, this conclusion does not mean that future news memes would not be successful on social media platforms like Facebook. Future analysis should consider comparing a news meme event (and its fidelity and fecundity characteristics) with a non-news meme to see if there is, at all, a relationship between characteristics, content types, and audience response. Such research would provide a deeper understanding of how or if news memes possess characteristics of non-news memes and if so, what additional development or human creation needs to occur to increase its propagation levels. Likewise, if news memes did not possess characteristics of a non-news meme, further research may consider what non-news, popular meme characteristics can be incorporated into the news meme mosaic of characteristics that may help it evolve and change within social media environments. This kind of examination would allow researchers and fire science experts to understand what qualities can make complex, fire science news memes attractive, readable, and comprehensive to the end-user. It would arm fire scientists with the tools necessary to effectively communicate fire science issues and natural disasters in a way that captivates audiences while sharing the true nature of the story that otherwise would have gone untold.

Study Limitations and Future Research Recommendations

Limitations to this study included the lack of accurate longevity measurements, the fact that only 10 day's worth of data was collected, that only two online platforms were compared, and only local media coverage was considered. However, this does not mean that further research is not warranted. Future studies on news meme propagation within social media environments should consider collecting data on the High Park fire for a longer period of time to confirm or deny the meme's fidelity and fecundity characteristic influences on propagation levels. Additionally, other natural disasters or wildfires should be studied to see if news meme characteristics are similar to or the same as what has been identified in this study and in order to assess to what effect certain characteristics have on user's compellation to comment or like a post. An examination of other wildfires could potentially supply the fire scientists with the information they need to effectively convey complex fire science information to media personnel and the general public in a manner that effectively prompts users to share such information. Other social media platforms should be observed with the High Park fire to see if environments like Twitter or Google+. Further research can be conducted on how to effectively and accurately measure longevity. Perhaps direct access to news organizations' content management systems is a requirement to do this.

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APPENDIX A

Comments Category	Total number	Percentage
General comments	604	4.6456
Funny/Humorous	44	.0156
Suggestions	84	.02993
Advertisements	15	.00534
Complaints	167	.05951
Thankful Comments	203	.07234
Questions	257	.09158
Religious/Political	172	.06129
News	967	.3446
Empathetic	141	.0502
Positive thoughts/Hopeful (not religious)	155	.05523
Weather-related	219	.0780
Opinion	92	.0327
Take action/Recommend to take action	8	.0028
Concern/Worried	33	.0117

Sample of News Meme Fidelity Chart

Fidelity Chart 2	Text	Photo	Video	Link	One paragraph or less	More than one paragraph, less than one page	One page	more than one page
AW1	1	49	0	2				1
AW2	1	0	0	0	1			
AW3	1	11	0	0			1	
AW4	1	0	0	3			1	
AW5	1	1	0	1				1
AW6	1	0	0	1		1		
AW7	1	1	0	1			1	
AW8	1	22	0	1			1	
AW9	1	1	0	0				1

Sample of Facebook and News Organization Website Comment Categories and Post/Comment Data (adapted from Gerolimos, 2011)

	Date comment was posted	Time comment was posted	#likes	#comments	General Comments	Funny/Humorous Comments
AW1	N/A	N/A	1200	17		
AW1C	6/9/2012	1:44PM	13	1		
AW1C	6/10/2012	9:34am	0	0		
AW1C	6/9/2012	6:23pm	5	2	1	
AW1C	6/9/2012	11:24pm	1	0		1
AW1C	6/10/2012	7:39am	1	0	1	
AW1C	6/9/2012	12:19pm	5	3		1
AW1C	6/9/2012	12:38pm	8	0		
AW1C	6/9/2012	1:22pm	22	0	1	1
AW1C	6/9/2012	1:30pm	0	0	1	
AW1C	6/9/2012	10:13pm	4	0		
AW1C	6/9/2012	6:29pm	3	0		
AW1C	6/9/2012	10:28pm	2	2	1	
AW1C	6/10/2012	12:19pm	0	0	1	

Ratio of comments and "likes" on Facebook and Websites

News Organization	No. of likes	% of likes	No. of comments	% of comments
A	9158	.1510	224	.0798
B	110	.0018	0	0
C	2	.00003	0	0
D	3235	.0533	1794	.6393
E	1778	.0293	37	.0131
F	295	.0048	5	.0017
G	9435	.1555	274	.0976
H	36277	.5982	266	.0947
I	0	0	0	0
J	196	.0032	150	.0534
K	0	0	0	0
L	0	0	0	0
M	135	.0022	55	.0196
N	71	.0011	1	.0003
Average	132.98 likes per post		6.1535 comments per post	

APPENDIX E

News Meme Fecundity Chart

AW1	BW1	CW11	DW23
AW2	BW2	CW12	DW24
AW3	BW3	CW13	DW25
AW4	BW4	CW14	DW26
AW5	BW5	CW15	DW27
AW6	BW6	CW16	DW28
AW7	BW7	CW17	DW29
AW8	BW8	CW18	DW30
AW9	BW9	CW19	DW31
AW10	BW10	CW20	DW32
AW11	BW11	CW21	DW33
AW12	BW12	DW1	DW34
AW13	BW13	DW2	DW35
AW14	BW14	DW3	DW36
AW15	BW15	DW4	DW37
AW16	BW16	DW5	DW38
AW17	BW17	DW6	DW39
AW18	BW18	DW7	DW40
AW19	BW19	DW8	DW41
AW20	BF1	DW9	DW42
AW21	BF2	DW10	DW43
AW22	BF3	DW11	DW44
AW23	BF4	DW12	DW45
AW24	CW1	DW13	DW46
AW25	CW2	DW14	DW47
AW26	CW3	DW15	DW48
AF1	CW4	DW16	DW49
AF2	CW5	DW17	DW50
AF3	CW6	DW18	DW51
AF4	CW7	DW19	DW52
AF5	CW8	DW20	DW53
AF6	CW9	DW21	DW54
	CW10	DW22	DW55

DW56	DW91	EW31	FW9
DW57	DF1	EW32	FW10
DW58	DF2	EW33	FW11
DW59	DF3	EW34	FW12
DW60	DF4	EW35	FW13
DW61	EW1	EW36	FW14
DW62	EW2	EW37	FW15
DW63	EW3	EW38	FW16
DW64	EW4	EW39	FW17
DW65	EW5	EW40	FW18
DW66	EW6	EW41	FW19
DW67	EW7	EW42	FW20
DW68	EW8	EW43	FW21
DW69	EW9	EW44	FW22
DW70	EW10	EW45	FF1
DW71	EW11	EW46	FF2
DW72	EW12	EW47	FF3
DW73	EW13	EW48	FF4
DW74	EW14	EW49	FF5
DW75	EW15	EW50	FF6
DW76	EW16	EW51	FF7
DW77	EW17	EW52	FF8
DW78	EW18	EW53	FF9
DW79	EW19	EW54	FF10
DW80	EW20	EW55	FF11
DW81	EW21	EW56	FF12
DW82	EW22	EW57	FF13
DW83	EW23	FW1	FF14
DW84	EW24	FW2	FF15
DW85	EW25	FW3	FF16
DW86	EW26	FW4	FF17
DW87	EW27	FW5	FF18
DW88	EW28	FW6	FF19
DW89	EW29	FW7	GW1
DW90	EW30	FW8	GW2

GW3	HW8	JW3	KW23
GW4	HW9	JW4	KW24
GW5	HW10	JW5	KW25
GW6	HW11	JW6	KW26
GW7	HW12	JW7	KW27
GW8	HW13	JW8	KW28
GW9	HW14	JW9	KW29
GW10	HW15	JW10	KW30
GW11	HW16	JW11	KW31
GW12	HW17	JW12	KW32
GW13	HW18	JF1	KW33
GW14	HW19	JF2	KW34
GW15	HW20	JF3	KW35
GW16	HW21	KW1	KW36
GW17	HW22	KW2	KW37
GW18	HW23	KW3	KW38
GW19	HW24	KW4	KW39
GW20	HW25	KW5	KW40
GW21	HW26	KW6	KW41
GW22	HW27	KW7	KW42
GW23	HW28	KW8	KW43
GW24	HW29	KW9	KW44
GW25	HW30	KW10	KW45
GF1	HW31	KW11	KW46
GF2	HW32	KW12	KW47
GF3	HW33	KW13	KW48
GF4	HW34	KW14	KW49
GF5	HW35	KW15	KW50
HW1	HW36	KW16	KW51
HW2	HW37	KW17	KW52
HW3	HF1	KW18	KW53
HW4	HF2	KW19	KW54
HW5	IW1	KW20	KW55
HW6	JW1	KW21	KW56
HW7	JW2	KW22	LW1

LW2	MF3
MW1	MF4
MW2	MF5
MW3	MF6
MW4	MF7
MW5	NW1
MW6	NW2
MW7	NW3
MW8	NW4
MW9	NW5
MW10	
MW11	
MW12	
MW13	
MW14	
MW15	
MW16	
MW17	
MW18	
MW19	
MW20	
MW21	
MW22	
MW23	
MW24	
MW25	
MW26	
MW27	
MW28	
MW29	
MW30	
MW31	
MW32	
MF1	
MF2	

Percentage of posts that had no comments

News Organizations	No. of Posts	Posts without a comment	% of posts without a comment
A	32	15	.4687
B	23	23	1
C	21	21	1
D	95	51	.5368
E	57	38	.6666
F	41	37	.9024
G	30	25	.8333
H	39	19	.4871
I	1	1	1
J	15	5	.3333
K	56	0	0
L	2	2	1
M	39	22	.5641
N	5	4	.8
Total	456	717	.2555

APPENDIX G

Table 14: News Organizations Selected for Study

News Organization Name	Facebook URL	Website URL
Fort Collins Coloradoan	http://www.facebook.com/#!/Coloradoan	http://www.coloradoan.com/
NoCo5	http://www.facebook.com/#!/noco5	http://www.noco5.com/
Rocky Mountain Collegian	http://www.facebook.com/#!/pages/The-Rocky-Mountain-Collegian/80941352421	http://www.collegian.com/
KUSA-TV	http://www.facebook.com/#!/ilike9news	http://www.9news.com/
KCNC-TV	http://www.facebook.com/#!/CBSDenver?rf=116177315063641	http://denver.cbslocal.com/
KWGN-TV	http://www.facebook.com/kwgnchannel2	http://kwgn.com/
KMGH-TV	http://www.facebook.com/DenverChannel	http://www.thedenverchannel.com/index.html
KDVR-TV	http://www.facebook.com/fox31denver	http://kdvr.com/
KBDI-TV	http://www.facebook.com/#!/CPT12	http://www.cpt12.org/
KUNC	http://www.facebook.com/KUNC915	http://www.kunc.org/
The Denver Post	http://www.facebook.com/#!/denverpost	http://www.denverpost.com/
Viva Colorado	http://www.facebook.com/#!/TuVivaColorado	http://www.vivacolorado.com/
Westword	http://www.facebook.com/#!/denverwestword?fref=ts	
Colorado Community Media	http://www.facebook.com/pages/Colorado-Community-Media/258084364225185	http://www.ourcoloradonews.com/

Table 15: Coding of news organizations during data collection

Code	News organization
A	Fort Collins Coloradoan
B	NoCo5
C	Rocky Mountain Collegian
S	KUSA-TV
E	KCNC-TV
F	KWGN-TV
G	KMGH-TV
H	KDVR-TV
I	KBDI-TV
J	Denver Post
K	Viva Colorado
L	Colorado Community Media
M	KUNC
N	Westword