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A Quantitative Content Analysis on K-12 Public Education in the News Media: An Analysis of Word Sentiment and Tone in Different Media from 2015 to 2020

Thomas Butler

A Quantitative Content Analysis on K-12 Public Education in the News Media:

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Lindenwood University

by

Thomas Butler

A Dissertation submitted to the Education Faculty of Lindenwood University

in partial fulfillment of the requirements for the

degree of

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School of Education

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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Abstract

The researcher used quantitative content analysis techniques and explored how the media used language, sentiment, and tone, when reporting on United States K-12 public education (USPE) in four different media types and over a five-year period. The researcher used positive and negative word frequencies on stories in four different news media: *New York Times* (print & online), *Huffington Post* (online), ABC/NBC broadcast (TV), and *Time/ Newsweek* magazine (magazine); across a five-year period. The researcher converted positive and negative word frequencies in each news story to an overall tone rating scale from 1 to 5 indicating an overall positive or negative tone for each news story. The researcher collected news stories from 2015 to 2019 on K-12 USPE and categorized them based upon media type and year. Year and media types defined the independent control variables, while positive and negative word frequencies and overall tone ratings defined the dependent variables. With computer aided-sentiment analysis software, the researcher used a sentiment dictionary and determined the positive, negative, or neutral polarity, or sentiment, of all words within a sample of news media stories on USPE. The researcher analyzed overall tone ratings and sentiment frequencies with ANOVA testing, test of proportions, and z test of proportions to determine a difference in media tone and media sentiment word frequencies. The researcher also compared overall tone ratings in news media on USPE and public opinion poll responses on USPE to determine whether overall tone ratings found in news media had a relationship to the public's opinion results on USPE. Study results revealed differences in frequency of positive, negative, and neutral words and overall tone throughout the various news media outlets and between years. However, there was little difference in

the use and proportions of positive, negative, and neutral words across all media and

years combined, and little relationship between public opinion and the overall tone

ratings of news media on USPE. More research is necessary to determine if media

reporting on USPE is becoming more negative, positive, or fluctuating over time.

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Chapter One: Introduction

Background

Education and the media

The American media reported, manufactured, and shaped content about United

States K-12 public education (USPE) and used education as a backdrop for news stories

since the rise of television. Many of the early ongoing education images and ideas

throughout media served as models and frames retold in various outlets over time (Coe &

Kuttner, 2018; Kaplan, 1992). The repetition of education themes in the media increased

salience and easily ignited consumers' prior knowledge on educational issues. Often,

education frames and schemas reinforced stereotypes about the education system, blamed

those seemingly responsible for any shortcomings, and introduced the public to

individuals capable of fixing the education problem. Media presented themes through

print, radio, television, and film (Kaplan, 1992). Education in the media portrayed failing

students, heroic male teachers, inept school boards, and underprepared teachers, but

failed to induce public concern for education like other larger institutional issues

(Alhamdan, et al., 2014; Goldstein, 2011). While some news organizations attempted to

form education centered columns or beats like the *New York Times*, the news media

failed to understand education's history in the United States and how to produce

interesting, positive news content. Compared to "elite" stories individuals within the

media viewed education stories as a second-rate topic which plagued positive educational

topics in news cycles and reiterated education as a failure for U.S students and the public

(Coe, et al., 2020; Kaplan, 1992). The news media often compressed and distorted

education news to fit news time frames which took detailed education stories and

simplified the content into an easily packaged and understood framework for uncomplicated public consumption. The newspapers reporter's ability to "mobilize opinion" on education officials and systems in print and television news was apparent (Kaplan, 1992). The relationship between education, the public, and the news media allowed for deeper investigation into parts of each; the interactions and ultimately the analyses.

The researcher was interested in the topic of U.S. K-12 public education (USPE) in the media because few studies used quantitative data to analyze news content on the topic. Communication literacy and how message encoding, transmission, and decoding by the end consumer transformed news messages interested the researcher as an educator and student of communication while at University of Missouri-Columbia. How the public interacted and transformed decoded messages into information and knowledge was a primary reason the researcher analyzed news media messages on United States K-12 public education. Many news stories about education often portrayed the hardships and downfalls of local and regional schools. The researcher wanted to learn if the news media reports had a negative or positive (sentiment) relationship on people's perceptions of education and contemplated the origins of the publics' opinions. One area of the researcher's focus included the words news organizations used to portray topics in the news. Gallup and EdNext polls (2019) found many respondents rated local schools as higher than the nation's schools. The researcher considered personal proximity and experiences with an issue in the news, as potentially altering the opinion of people, when responding on educational topics in polls. If an individual's opinion differed between a micro system (local school) and a macro system (public education as a whole), where the

disconnect originated and how the opinion formed was a problem surrounding the

researcher's initial development of the study's hypotheses. The researcher concluded

prior to the study, analyzing news for frames through overall tone and sentiment might

illuminate one aspect of opinion formation of the news; and more specifically, the

language used when an education event or story occurred and reported by news media

outlets.

The researcher found other news media content analysis but was unable to find

research on the topic of analysis, U.S. K-12 public education, and how the topic was

framed through negative and positive language across four different news mediums,

print, digital, TV, and magazine, from 2015 to 2019. No quantitative examination

occurred between news reports and public opinion. However, the specificity and

uniqueness of the Gallup and EdNext public opinion polls on the state of education

allowed the researcher an opportunity for comparison of two data sets on an aligned topic

and measurement. The study required a data set minimum of five years to compare

quantitative data over time. The researcher hypothesized whether a potential relationship

existed between variables and designed the study around emotional language evidenced

by sentiment (emotive) words the news media used and how the words related to public

opinion centered on an aligned topic of USPE. Typically, researchers performed content

analyses and focused on one media type and one publication. Researchers often selected

unambiguous topics in the news media like "Banning Sugar Sweeten Drinks" reported by

the *New York Times* newspaper and often used qualitative methods (Barry et al, 2015). A

multitude of content analysis studies existed on specific events like school shootings in

news but few content analysis studies focused on social systems in the news like

education in the nation (Salas-Zarate, et al., 2017; Schildkraut & Muschert, 2014).

Although the researcher's study was traditional quantitative content analysis

methodologically and used news media reports for analyses, the researcher diverged from

previous studies and used positive and negative sentiment as a variable when the

researcher evaluated the overall tone of a media report on USPE. The tone rating scale

described in Chapter Three can be generalized to all news media reports on any topic

across different media types. The researcher used words as the unit of analysis and how

the words created a frame or schema about how individuals understood a topic. Mediated

news messages, framed and encased by a positive or negative sentiment, could potentially

have played a role in how the public decoded and later expressed opinions on topics like

education evidenced in public opinion polls. Some research indicated, the further an

issue was from a person's personal experience, the more the individual relied on external

factors for opinion and attitude formation and fact retrieval (Barry et al., 2013; Phi Delta

Kappa/Gallup, 2015).   News media reports rarely nor directly referenced USPE, unless

addressed by the President of the United Stated or the U.S. Secretary of Education. The

researcher was interested in how the media conveyed an issue through words or pieces of

text when the news story used USPE as a backdrop for an event, rather than a stand-alone

story. The idea led the researcher to question if the public appropriated pieces of topics

to form larger opinions about entire institutional systems in the U.S. and globally. The

idea of "rescaling" introduced by critical discourse analysis researcher Fairclough (1995)

could be a force at work when the public interacted with media reports on topics. For

example, the researcher wanted to know if news stories about violence in the news in a

local community over time related to the public opinion of violence in the region, or even

violence in the country. Although little connection, other than topic, may have existed,

"genre chains" may have explained how the public linked together media events about

USPE (Fairclough, 1995). The researcher was interested in if similar interactions, like

"genre chains" existed for other parts of news reporting, like language devices, such as

sentiment or overall tone or when news reported on national and global benchmark

testing and if the public linked test results with the national education systems' successes

or failures.

      The researcher hoped to fill in a piece of the puzzle on how news media portrayed

USPE in the media through tone, positive and negative sentiment, and public opinion.

The researcher often heard of the expectation of neutrality of news media and the ability

to report the news without creating the news or creating a biased frame around news

media topics. The researcher's review of the current literature revealed the act of

encoding the news was inherently biased. The gatekeeping theory is an initial process to

news media bias, additionally word choice added to bias in news media stories (Lewin,

1943). Often research depicted news as generally negative (White, 1950), leaving the

researcher to question the possible extent of negativity in the news media. The researcher

questioned if the expectation of neutrality extended to USPE recently and over the past

five years and if events in the education sphere altered news tone, or if media tone on

USPE influenced public opinion and if public opinion polls imitated media tone.   News

media reports of national and local institutional systems like health care and education

had connections through local, regional, and national affiliates linked through sentiment

and reflected in media reports. All systems could benefit from an understanding of how

news media reports related to public understanding, schema formation and expression, if

at all, through public opinion polls.

The researcher hoped the study would inform four areas specifically, educational

stakeholders, media outlets, the public, and researchers. Educational stakeholders could

better understand how schools and education events portrayed through frames in the news

media added to the perpetuation of school frames and schemata by news media; and how

education stakeholders can be active participants in changing news media frames through

communications from school districts, exemplars in news stories, and generating news

that benefits USPE. This may allow educational leaders to have more control in created

identities of education as a larger system. Through the study, educational leaders may

understand how news and descriptive language about public schools informs public

opinion, how news media outlets framed messages through sentiment and tone and

anticipated reactions to news media reports on USPE. Educational leaders may have

increased insight on how to shift media sentiment and tone through media

communication departments and statements made to media by education

stakeholders. Additionally, journalists, reporters, and media industry would understand

how language portrayed sentiment and how media outlets language differed across media

types on USPE news. It may provide insight into the possible overall tone of media and

draw attention to how news language and word choice, as a discourse device, may change

the meaning and sentiment of topics in the news such as USPE. Through the study, the

public may understand more thoroughly how news media language assisted in the

formation of public opinion. The public may understand how media language may have

changed individual positive or negative associative schema formation and frames around

topics and make the public audience aware of media literacy trends and the subconscious

linking of language in media to opinions about USPE when it pertains to their local,

regional, and national educational system[s]. The study may increase awareness on how

the public responds to an issue and increase metacognition of how the opinion originated,

whether from personal interactions, experience, news media or other sources.

       The study extended research quantitative content analysis studies on language in

the media and informed communication research design through use of computer aided

sentiment analysis. Researchers interested in quantitative content analysis could use

computer aided sentiment content analysis to perform reproducible measurements using

sentiment dictionaries and transform news reports into an easily quantifiable tone rating,

to which individuals could compare topics within news media to evaluate and study

topics. The study may also inform researchers on the limitations of computer aided

sentiment analysis on various media types. Known limitations on quantifying TV

transcripts, magazine sampling limitations, and other media nuances may help inform

methodologies and analyses possibilities.

Purpose of the Study

       The purpose of the quantitative content analysis was to unveil a potential

relationship between how different news media portrayed United States K-12 public

education from 2015 to 2019 through positive and negative sentiment frequencies and

overall tone. Also, the study potentially unveiled a relationship between media sentiment

and tone and public opinion polls on the topic of USPE. Through computer aided

sentiment analysis, the researcher looked at how language played a role in opinion

formation on topics deemed further away from one's own front door. The researcher also

developed an overall tone rating system to identify news into categories as a quantifiable

1 to 5 rating compared to other Likert-scale measurements. The researcher analyzed the

differences in sentiment frequencies across media type in print, digital, TV, and magazine

news while the researcher attempted to predict public opinion on USPE through news

media tone ratings of USPE.

Definition of Terms

Agenda-Setting

According to McCombs and Shaw (1972) leaders in news agenda-setting research

the "ability to influence the importance placed on the topics of the public agenda" (p.1) in

the media.

Media Frame

According to Entman (1993) a leader in frame research, framing in news media is

media's ability to "define causes, make judgments, and suggest remedies" (p.52).

Media Salience

According to Entman (1993), salience is "making a piece of information more

noticeable, meaningful or memorable to audiences" (para. 7).

Media Valence

For the purpose of this study, the media's ability to elicit public emotions as

positive or negative towards a topic, actor, or issue in the news

Overall Tone Rating

For the purpose of the study, the score given, 1to 5, for each news story based

upon frequency percentage of coded positive and negative words (sentiment) and or

phrases.

For the purpose of the study, the researcher defined the following specific overall tone ratings:

1 - Very negative: The total percentage difference of coded positive and negative words and phrases. The difference of negative words or phrases was greater or equal to 10% of negative coded words and phrases.

2 - Negative*:* The total percentage difference of coded positive and negative words and phrases. The difference of negative words or phrases was between 3% and 9.9% of negative coded words and phrases.

3 - Neutral*:* The total percentage difference of coded positive and negative words and phrases. The difference of negative words or phrases was greater or equal to 0% to 2.9% of positive or negative coded words and phrases.

4 - Positive*:* The total percentage difference of coded positive and negative words and phrases. The difference of positive words or phrases was between 3% and 9.9% of positive coded words and phrases.

5 -Very positive*:* The total percentage difference of coded positive and negative words and phrases. The difference of positive words or phrases was greater or equal to 10% of positive coded words and phrases.

Public opinion polls

Results from Phi Kappa Delta/Gallup and Ed Next polls, *The publics' attitudes towards public schools*, results on the question, "What grade would you give the nation's schools as a whole on public education?" (Phi Delta Kappa International/Gallup, Inc.,

2019, p.21) and the Education Next poll on how the public grades the nation's public

schools.

News media

  For the purpose of the study, the top circulated or viewed original written print,

digital and online news reporting entities according to research and data reported from

Alliance for Audited Media (2021), the Pew Research Center, and Nielsen Media

Research. Due to reprinting and linking of second news stories by mainly digital news

outlets, the study excluded news outlets who relied on reprinted or linked news

stories from other media sources such as *Twitter* and *Facebook* news.

  For the purpose of the study, the researcher defined the following specific types of

news media:

  Broadcast Tv news media, outlet, and/or publication: Original produced and

reported stories on ABC/NBC evening network news reports according to Neilson

Corporation from 2015 to 2019.

  Online or Digital news media, outlet, and/or publication: The *Huffington

Post*.com digital news outlet from 2015 to 2019 according to Alliance for Audited Media

(2021).

  Print news media, outlet, and/or publication: The *New York Times*

print newspaper and online version from 2015 to 2019 according to Alliance for Audited

Media (2021).

  Magazine news media, outlet, and/or publication: The *Times* magazine and

Newsweek news magazine publication for each year from 2015 to 2019, according to

Alliance for Audited Media (2021).

Natural Language Processing (NLP):

For the purpose of the study, the categorization of words, sentences, and documents written or transcribed by an individual or group of individuals for use in studying patterns including but not limited to classification of sentiment or opinion. NLP referred to unstructured data in its original format (Fairclough, 1995).

News media frame

The viewpoint of a news story from the publishing media "selecting some aspects of a perceived reality and making them more salient . . . to promote a particular problem definition . . . or treatment recommendation" (Entman, 1993, p. 52).

Sentiment

For the purpose of the study, sentiment was the positive, negative, and neutral association given to a word based upon Provalis internal sentiment dictionary. The researcher also defined specific types of sentiment words as positive or negative for the purpose of the study:

Positive sentiment words: Words and phrases with a positive connotation in the context of the news story coded by an internal sentiment dictionary assembled by Provalis, Inc. from various sentiment dictionaries including Harvard Sentiment dictionary. Positive words, in version 2.0 of sentiment dictionary, include approximately 4700 words.

Negative sentiment words: Words with a negative connotation in the context of the news story coded by an internal sentiment dictionary assembled by Provalis, Inc. from various sentiment dictionaries including Harvard Sentiment dictionary. Negative words, in version 2.0 of sentiment dictionary, include approximately 9500 words.

Neutral sentiment words: Words with neither positive nor negative polarity coded by an internal sentiment dictionary assembled by Provalis, Inc. from various sentiment dictionaries including Harvard Sentiment dictionary. Neutral words are all words not coded as positive or negative and are also known as "to be ignored" and included but not limited to the parts-of-speech: articles, conjunctions, and prepositions.

Schema

According to Widdowson (1983), "schema is the knowledge structure of known things or information that stored in the mind" (p. 1).

United States K-12 Public Education or USPE

As the researcher defined, the system of publicly funded education in the United States including its teachers, students, schools, administration, governing bodies, buildings, curriculum and standards, and any event either planned or unplanned, sponsored or unsponsored that occurs in the presence of a school or about its actors; not including charter schools but does include interactions and discussions about charter and public education where public education was the majority or equal part of the news story. USPE also does not include universities or colleges but may include acceptance into these higher learning institutions based upon events reported on that occur within the scope of U.S. K-12 Public Education.

Hypotheses

Null Hypothesis 1:

There is no difference in overall tone rating between ABC/NBC Tv broadcasts, *New York Times* digital & print, *Huffington Post* online, *Time* and *Newsweek* magazine news stories about USPE for the years 2015, 2016, 2017, 2018, and 2019.

Null Hypothesis 2:

There is no difference in overall tone rating between ABC/NBC Tv broadcasts, *New York Times* digital & print, *Huffington Post* online, *Time* and *Newsweek* magazine news stories about USPE for the all-combined years 2015 to 2019.

Null Hypothesis 3:

There is no difference in overall tone rating between 2015, 2016, 2017, 2018, and 2019 for all-combined news media type stories about USPE.

Null Hypothesis 4:

There is no difference in frequency of positive or negative sentiment words between ABC/NBC TV broadcasts, *New York Times* digital & print, *Huffington Post* online, *Time* and *Newsweek* magazine news stories about USPE for the all-combined years 2015 to 2019.

Null Hypothesis 5:

There is no difference in frequency of positive or negative sentiment words between 2015, 2016, 2017, 2018, and 2019 for all-combined news media type stories about USPE.

Null Hypothesis 6:

There is no relationship between overall tone rating of all news media stories and public opinion responses to surveys about USPE in 2015, 2016, 2017, 2018, 2019.

Null Hypothesis 7:

There is no relationship between overall tone rating of all news media stories and public opinion responses to surveys about USPE for the combined years 2015 to 2019.

Null Hypothesis 8:

There is no relationship between overall tone rating of news media and public opinion responses for 2015, 2016, 2017, 2018, and 2019.

Null Hypothesis 9:

There is no difference between the hypothesized proportions of positive and negative words in all media for 2015 to 2019 from observed proportions.

Limitations

The collection of news media stories about U.S. public education limited the research sample. The researcher observed, during the data collection process, rarely did UPSE run as a feature news story in media outlets. Edcuation events deemed newsworthy by the media often included USPE as a backdrop or setting for an isolated event. USPE, as a backdrop, limited the researcher's ability to pull a wide variety of topics on USPE for analysis and relied on a search engine relevance filter which delivered results closely aligned with USPE. The news media replaced USPE topics for stories that had "legs" which ran for multiple news cycles and used various perspectives and viewpoints to refresh content. Data collection of USPE news included stories of school shootings which news outlets ran for long periods and often shared among secondary media outlets.

The researcher was restricted by the internal sentiment dictionary which coded words and phrases as positive or negative. The computer aided internal dictionary provided by Provalis limited the collection of positive and negative words to only those that coincided to the internal dictionary and may have differed to other sentiment dictionaries. Words and phrases improperly coded resulted in percentage positive or negative being incorrect. Errors in sentiment coding by the computer included negation

words falling three or more words before or after the sentiment word, or sarcasm usually found when news used a direct quote from an exemplar speaker.

The researcher restricted the current analysis to quantitative only to compare media type, sentiment, and public opinion which differed from other news content analysis studies which used descriptive qualitative data int heir methodologies. The researcher decided qualitative research and analysis could accompany the data in future research opportunities. Due to news sharing by media outlets and overlap between original and secondhand sources, the researcher eliminated other national print news and digital news due to accessibility and lack of validity of the source particularly in digital online formats like YouTube and Facebook News.

News cycles limited data collection by reducing news stories on USPE in summer months and semester breaks where USPE salience declined. Lack of news stories in these months made stratified sample gathering more difficult for much of Quarter Three from July to September.

The researcher explored the opportunity to extend research to a longer time-frame to incorporate more samples. However, with the ever-changing delivery methods of news including secondary aggregation of news by social media outlets the researcher consulted with the dissertation committee and decided a five-year period of originally sourced news stories would encapsulate a valid section of news media reports. As indicated by Pew research (2019), 43% of more than half the population receive news from a tablet, therefore the researcher limited collection to media whose reports were original to the publication and not aggregated to a news stream from multiple sources. An analysis of aggregated news from social media applications and sights

needed further analysis. Excluded social media sources focused analysis but limited the scope of influence for public opinion as examined through yearly survey results.

The researcher categorized media stories from 1 to 5, based upon positive and negative word sentiment percentages. Due to internal coding errors by the computer program or internal sentiment dictionary, articles coded with sentiment percentages close to the next overall tone rating could potentially have skewed overall tone ratings. For example, a news story which contained a frequency of 3.9% more positive words than negative received an overall tone rating of 3 or neutral because it did not reach the 4% threshold to receive a positive tone rating based upon the researchers coding criteria. Miscoded sentiment of a few words could have inaccurately changed the articles overall tone rating therefore altering means.

Summary

The ever-evolving field of mass media research had neither a clear beginning nor clear path for the future. Researchers explored the codependent relationship between mass media as encoder/sender and audiences as decoder/receiver. News media outlets and publications used a multitude of language discourse devices to communicate messages to the public, and although studies delved into areas of communication research, definitive answers eluded concrete influences of media on the public. No research analyzed U.S. K-12 public education in media from 2015 to 2019, based upon sentiment and tone (Heller, 2019; Preston, 2019, Williams & Schoonvelde, 2018)

Previous research hinted at news media influences on society, however a full picture of how language use and discourse devices such as gatekeeping, valence, salience, sentiment directly change public opinion eluded researchers and media

influences are more nuanced and complex making silver bullet effects difficult for researchers to isolate among many factors that seem to influence public opinion. By continued analyses the researcher hoped to unveil more connections between U.S. K-12 public education in the various media types and how language sentiment, tone, and audiences interplayed. The study quantified words in news stories and TV news transcripts to create a tone rating used to compare media types reporting of USPE. The researcher used any potential quantitative differences in sentiment frequencies and tone among media types about USPE to search for a potential correlation within media type, year, and public opinion on USPE. While the study hoped to reveal potential relationships in language sentiment usage, it also utilized computer aided content analysis technology that may add methodologically to the field of big data content analysis research. Additionally, the methodology added to previous studies by creating a rating scale to convert sentiment word frequency percentages in news stories to a single overall tone rating which allowed the researcher to compare metrics containing a similar 5-point rating scale such as reviews using 1 through 5 stars.

The research increased understanding of USPE in the media and allowed educational journalists and leaders information into a potential interplay of USPE in the news and public opinion. The research illuminated media sentiment trends and tone in the different media types (print, TV, magazine, digital) and provided insight to the fields of education, media research, sentiment analysis, and news content analysis. The implications of the research informed education professionals and the public on media tendencies to intentionally or unintentionally frame stories with sentiment or tone.

Chapter Two: Literature Review

History of News and Mass Communication

Communication began with word-of-mouth transfer of messages through spoken language from encoder to receiver. With the advent of written languages, once only oral languages now transformed into lasting messages archived by tools, such as pigments and carvings on media, such as paper, vellum and in stone (Gleik, 2011; Poe, 2011). Early messages often related historical past events of cultural, religious, and/or personal importance. In 59 B.C., Rome produced the *Acta Diurna* (The Daily Acts) written in stone or metal slab to disseminate public messages, which relayed government news and announcements, like births and marriages. Posted in a town forum for the community, the *Acta Duirna* was one of the first news publications written for the general public (Gleik, 2011; Poe, 2011; Schramm, 1988).

In 1040, the Chinese developed and expanded the movable woodblock-type printing processes to print manuscripts. Although Asia used the printing press much before Johannes Gutenberg's movable metal type printing press in 1440, grammar schools increased literate European readers and this increased in the literate public pushed the demand for printing fast and cheaper texts to disseminate information and messages (Briggs & Burke, 2005; Burke et al., 2020; Poe, 2011). By 1605, a printed news publication called the *Relation* was the first newspaper published and distributed, which used the now recognizable column format to organize and structure text for stories like todays' newspapers (Briggs & Burke, 2005; Diringer, 1982). By 1641, English propaganda appeared in newspaper publications, which supported preferred sides of the war in England. Recognized as the one of the first official journals, *The Oxford Gazette*

in 1665 established newspapers as a mainstream source of print news for government and

public information labeled by communication historians as a news media publication

critical to maintaining democratic ideals and society (Burke et al., 2020; Fowler, 1991;

Grabe & Myrick, 2016). In 1690 a newspaper, the *Public Occurrence,* began and in 1704

published the first known advertisement (Gleik, 2011; Poe 2011).

      In 1837, Edison and the telegraph and subsequently the "wire" increased the

distance and speed of news communication, which transformed news cycles and structure

of news reporting from issue-based or thematic stories with legs to an increase in episodic

stories. (Iyengar, 1991; Simonson et al., 2013). With the addition of the camera in 1839,

news media outlets provided images joined with text to elicit more emotion and

storytelling to news events. The introduction and combination of images, eyewitness

accounts, and natural unelevated language in news stories increased the public's

accessibility and interest in news outlet publications (Poe, 2011; Schramm, 1988;

Simonson et al., 2013). The telephone appeared in 1876 as the first social media

communication tool allowing for interpersonal communication and news sharing in real

time. The telephone allowed for personal mediation of encoded messages to travel

among family and throughout social groups uncontrolled by companies or special

commercial interests (Briggs & Burke, 2005; Poe, 2011). In 1895, the movie camera and

radio added to the news medium and merged moving images and sound created more

engaging news, which relied heavily on emotion and action, as a driver of public news

consumption (Briggs et al., 2002; Schramm, 1988;).

      The television in 1927 allowed viewers to experience news media in another

format without reading or going to the theatre and required much less time and effort to

access and understand news and increased in media formats which led to sharp increases

in news subscribers as passive viewers (Deringer, 1982; Ponce de Leon, 2015; Poe, 2011;

Schramm 1988). Dissemination of the original messages lacked range and breadth

among the public, due to the limited audience feedback and discourse, news was

contained to a smaller more intimate loop of publishers and consumers until World War

II and in 1940 the need for news skyrocketed, seen through the increase in U.S. print

subscriptions (Leetaru, 2019; Schramm, 1988).

　　　　News publishers acted as a gatekeeper of what news was accessible to the

consumers, while consumers trusted that news stories and outlets prioritized truth and

objectivity. Prior to digital formats, reading local and regional print, television, or radio

news programs limited consumer news options (Nielsen, 2016; Wettstein et al., 2018;

White, 1950; Vos, 2019). In 1940 the U.S. print news subscriptions included 41,000,000

copies and by 1984 newspaper subscriptions jumped to 63,000,000 subscribers; but, in

2011 dropped back to 44.4 million (Wall Street Journal, 2018, Slide 3, AAM, 2021). The

first news television program, the *Today Show* (1952) and the later 24-hour cable news

station, CNN in 1980, led to a news cycle that extended beyond traditional morning and

evening news reporting (Iyengar, 1991; Ponce de Leon, 2015). The Fairness Doctrine

Bill, passed in 1949 by the Federal Communications Commission (FCC) with support

from the federal government, required TV and radio stations to "afford reasonable

opportunity for the discussion of conflicting views on issues of public importance"

(Fairness Doctrine Bill, 1949, para 1). In 1987, the FCC nonrenewed the policy and

freed news stations from FCC oversight, which led to unchecked news stories with any

message the organizations or the sponsors deemed in the interest of the station or

advertisers, if no libel occurred (Burke et. al., 2020; Poe, 2011).

With the ease of news reporting restrictions, tabloids exploded and loaded readers

with entertainment content packaged as legitimate news also, while news became

increasingly faster from few too many news sources and to larger audiences. As media

production, dissemination, and consumption rapidly increased, news outlets offered

stories promoted as "up-to-the-minute," or "breaking news," that lacked depth but

provided audiences with fresh news that often was highly emotional and fleeting (Ciuk &

Rottman, 2020; Usher, 2018). Also, news outlets repackaged news events and crafted a

story with "legs" that was easier to produce, ran longer, and drew upon audiences' prior

topic knowledge or salience for easy audience consumption. Stories of general public

interest made way for more nuanced and specific stories, or one story from multiple

perspectives that filled the longer news cycles, and entertainment news reports packaged

as general interest news known as "infotainment" (Boukes, 2019; Otto et al., 2017). The

incorporation of news from informative to "infotainment" blurred the lines for readers of

what was newsworthy. With the development of the world wide web in 1989,

introductions of social networking in 1997, web 2.0 in 1999, and the iPhone in 2007,

digital news consumption skyrocketed (Gleik, 2011; Simonson et al., 2013; Slide 3; Wall

Street Journal, 2018).

Pew Research's yearly State of the Media Report (2019) noted digital circulation

revenue grew more than three times from 2015 amounts, and almost half of people who

owned a tablet used the tool to consume digital news. Approximately half of a

newspapers' overall revenue came from both print and digital subscriptions, and in 2016

digital circulation revenue saw a one-quarter increase from 2015 to 2016. While digital circulation revenue increased one fifth to over three billion subscribers from 2015-2016, digital advertising revenue increased to almost 10 billion in 2015-2016 (Krouwer et al., 2020; Pew, 2019).

Early Communication Research

Mass communication research and media's role in dissemination and formation of ideas through news, played a major role in research as news media grew and evolved with technological advances in printing, distribution, and journalistic styles (Laswell, 1949; McCombs & Shaw, 1972; McCombs & Stroud, 2014). Early researchers and pioneers in mass media communication, such as Goffman (1974) and Entman (1993) discussed agenda setting and framing influences shaping how the public understood and formed opinions based upon news structure, sentiment, tone, and word usage within news stories. Much of the early research theorized media's role in democracy and its potential outcome on the audience as a passive receiver; however, later research explored how media shaped the public's role in political processes and public opinion (Goffman, 1974; Laswell, 1948; Lasswell, 1949). As news media evolved from few print news media outlets, to many news print options, to visual images accompanying broadcast television news, to 24-hour news coverage on news cable networks, and to digital news, news media research changed and evolved reigniting the need for new pathways in communication and news content research (Gerbner, 1987; Goffman, 1974). The new research pathways included how the news media shaped and framed issues for consumers and audiences and the changes to public opinions and behaviors through news devices such as bias through front page reporting, gatekeeping, agenda setting, sensationalism,

lexicalization, punctuation, and over-simplification of content (Bernays, 1923; Lazarsfeld & Katz, 1955; McCombs & Shaw, 1972).

Evidence of bias existed from the earliest public communications messages (Entman, 2004; Lippmann, 1922). The gatekeeping of messages was one of the earliest forms of control and bias in news distribution and newsworthiness and saw publishers deciding what was news and how and when the information was distributed through news channels (Iyengar, 1991; Park, 1940). Media outlets, editors, and media conglomerate owners intentionally and unintentionally manufactured gates or avenues for controlled news flow. White (1950) and Laswell (1948) introduced how news media used gatekeeping in mass communication, which decided how information and communications flowed in or out of a group. Often times, gatekeeping processes like word choice, headlines, value judgments, or front page printing was one of a multitude of decisions determined by the news media gatekeeper, who position became increasingly harder in media as more stakeholders including owners, editors, and advertisers wanted their messages prioritized (Shoemaker & Reese, 1996; White, 1950). Martin and Chaudhary (1983) said on access to media, "The raw materials from which the news is fashioned are events that may or may not be readily accessible to all" (p.1). Examples of the complexity of gate keeping came into play when TV broadcast news was accessible to only those families with television, which included middle upper class, while the media themselves prioritized news for which they had video to accompany the news story. Individuals witnessed how news media gatekeeping depended on audience demographics, access to video, and media type (Vos, 2019; White, 1950). Galtung and Ruge (1965) leaders in the field of newsworthiness created criteria for establishing

newsworthiness in news media, which depended on frequency, intensity, unambiguity, meaningfulness, consonance (fitting expectations), unexpectable, continuity, composition, elite persons, personalization, and negativity.

1. The more aspects of a news story which satisfy the criteria mentioned, the more likely news media recognized a news event as newsworthy (selection).

2. Media outlets accentuated the news worthy aspects of an event and make those instances more prevalent known as news event distortion.

3. Both the process of selection and the process of distortion will take place at all steps in the chain from event to reader (replication).

(Galtung & Ruge, 1965, p.71)

Current News Media Trends

According to Pew Research Center (2019) newspapers both print and digital subscriptions declined approximately 10% from the previous year; however, digital subscriptions were on the rise from previous years (para.1). With the combined decrease in print subscriptions and increase in digital subscriptions, the subscription totals had not changed significantly since 2016 (Pew, 2019). Over the past five years, a decline in newsroom employees coincided with the decreased print subscriptions dropping to levels seen in the 1940's; however, the increase in digital subscriptions resulted in the number of digital native news employees doubling from 2008 to 2018. Additionally, over the past five years news magazines like *Time* and *Newsweek* hard copy subscriptions and newsstand sales dropped while online subscriptions rose, which issued in an audience three times more likely to view news magazines on a mobile device than on a desktop

computer (Newman et al., 2020; Pew, 2019). Network evening news broadcasts on ABC,

NBC, and CBS from 4 pm to 7 pm, since 2016 experienced little change in viewership

during the evening news and newsmagazine shows, and only cable TV news saw an

increase in both viewership and revenues. Digital native (original source) news outlets

like, Associated Press found more audiences through various secondary aggregator news

outlets, like *Yahoo News*, *Apple News,* or *Flipboard* which disseminated other outlets

native news (AAM, 2021; Newman et al., 2020; Pew, 2019). Figure 1 from Reuters

Digital News Report (2020) showed the use of media formats to consumer news;

however; the figure did not reflect the many newspapers like the *New York Times* who

offered print and online jointly (Newman et al., 2020; Reuters, Digital News Report,

2020).

Figure 1

Proportion That Used Each as a Source of News in the Last Week (April 2020) – Selected Countries

	Online (incl. social media)	TV	Social media	Radio	Print (incl. mags)
UK	79%	71%	47%	35%	18%
USA	73%	60%	47%	21%	16%

(Reuters, Digital News Report, 2020, reprinted with permission).

Content Analysis Research

"Quantitative content analysis is the systematic and replicable examination of

symbols of communication, which have been assigned numeric values according to valid

measurements using statistical methods, to describe the communication, draw inferences,

about its meaning, or infer from the communication to its context, both of production and

consumption" (Rife et al., 2019, p.19). While more specifically, sentiment analysis is an

"instrument for the approximation of human judgement" (Puschmann & Powell, 2018,

p.10). Quantitative content approaches and computer aided-content analysis allowed

researchers to analyze larger amounts of data or "big data" with relative ease, compared

to traditional qualitative human-coded content analysis, which relied on agreement

between coders.   Quantitative analysis became increasingly specified and eventually

allowed researchers to analyze an author's feelings about topics through computer-aided

quantitative sentiment analysis programs. Researchers developed programs to capture

word usage, sentiment, opinion, and emotion by applying numerical scores to words

based upon polarity within domain-specific content, which determined an emotional tone,

opinion, and attitude towards a topic (Balshetwar et al., 2019; Hao et al., 2020). Types of

common quantitative sentiment analysis included Natural Language Processing

techniques such as bag-of-words, and lexicon-based approaches while machine learning

approaches included Naïve Bayes which calculated the probability of words belonging to

a tag or category, and Support Vector Learning. These methods attempted to determine

the sentiment, opinion, or tone of a piece of spoken, visual, auditory, or textual content.

At the simplest form, quantitative sentiment analysis relied on numerical coding of

words, phrases, sentences, and texts based upon a positive, negative, or neutral strength

or emotion. Many researchers determined that combining multiple forms of quantitative

sentiment tools, dictionaries, and methods resulted in more accurate reflection of the

author's intended sentiment and a text's tone (Rife et al., 2019). Computer coding

identified and corrected natural language anomalies, such as the use of slang, sarcasm,

negation, and double negation and emoticons that a straight bag-of-words approach may

miss during analysis (Ahmed et al., 2020; Argawal & Mittal, 2016; Dong et al., 2015).

Researchers used sentiment analysis to forecast events and trends, such as elections, financial markets, and sporting events; while other sentiment analysis required a look back on trends and patterns, which determined source biases, and framing techniques on topics and ideas in many audio, visual, and textual media types, including news, social media, music, radio, and television; and other sentiment research was used for companies to determine reviews of products from users to improve and enhance sales, service, and revenues (Kiewiet De Jonge et al., 2018; King et al., 2017).

Individuals used common sentiment analysis to identify opinions on online social media posts in *Twitter* and movie reviews by viewers which revealed underlying user sentiment patterns once described as ineffective by just human coders who differed when coding news to determine an overall tone (Bahrainian & Dengel, 2015; Gozalvez et al., 2019; Nagalakshmi & Radhika, 2018; Sharma et al., 2020). Researchers viewed opinion mining and emotion mining differently in some studies where opinion mining, which indicated the positive, negative, or neutral attitude towards an issue or topic, while emotion mining indicated how a person or people felt about the issue.

Opinion sentiment analysis resulted in a generalized indicator for a news event like positive or negative opinion a topic, while emotion sentiment analysis tended to be more specific like sad or happy; and at times news created conflicting opinion and emotion where a story created a sad emotion for the reader but a positive opinion of the topic (Hui et al., 2017; Yadoolahi et al., 2017). For example, news media stories may have referred to an event in the positive opinion, but the emotion tied to the event could have been sad. Conflicting multiple sentiments within a single thought or news story

posed problems for computer-aided sentiment analysis and sentiment dictionaries

(Balshetwar et al, 2019; Yadoolahi et al., 2017).

Sentiment analysis researchers analyzed reviews of consumer products to devise

accurate ways of extracting sentiment useful to commercial manufacturers and product

sellers. Researchers viewed sentiment extraction from consumer product reviews

including movie, books, restaurants, and other sellable merchandise as a critical area of

research and because reviewers often wrote contradictory reviews or reviews which

contained natural language nuances like sarcasm, it was difficult for computer sentiment

tools to decipher sentiment accurately and more important for researchers to study and

improve on an accurate method of opinion extraction (Argawal & Mittal, 2016;

Nagalakshmi & Radhika, 2018). Computer-aided sentiment analysis tools' handled

analysis of large data well; however, computers struggled to detect accurately the

intricacies and complexity of natural language used by reviewers. Much of sentiment

analysis depended on the machine's ability to recognize polarity and frequency of

positive and negative phrases specific to the analyzed topic, called aspect-level evaluation

(Dong et al., 2015; Sharma et al., 2020).

Sentiment dictionaries differed between domains and non-English sentiment

dictionaries were even scarcer, which required researchers in foreign countries to develop

language-specific tools and sentiment dictionaries (Batanovic et al., 2020). Often a mix

of machine learning and bag of words resulted the most accurate results. Some sentiment

analysis research used an over simplified three tiered rating of content containing the

categories positive, negative, or neutral, however some studies found that a variety of

sentiment within texts would be better analyzed and coded using a sliding scale that

indicated strength of sentiment which allowed for the rating of complex pieces of content.

For example, something being "extremely cheesy" may be a very positive sentiment

review for a food item but a negative sentiment for a movie review (Ahmed et al, 2020;

Argawal & Mittal, 2016; Vargas-Calderon & Sanchez, 2018).

     Researchers of news media sentiment on topics such as health found that different

types of texts and topics related to the sentiment results for example news used negative

sentiment and tone when stories talked about the rejection of health resources for

children; however, neutral sentiment was found when news article, journals, and medical

research papers were sampled for sentiment (Ahmed et al., 2020; Vinkers et al., 2015).

Researchers theorized the type of content and topic played a role in finding mixed

sentiment when analyzing health (Sharma et al., 2020). For example, research papers

may use intensified positive sentiment to make findings and results seem more

meaningful for readers, while topics in health, like vaccines, diabetes, and head trauma

used more negative language. Health researchers indicated a positive sentiment in media

focused on the benefits of medicine instead of focused on the negatives of not following

medical advice possible reframed public's view of certain medical content (Curiel, et al.,

2018; Todd et al., 2019; Salas-Zarate, et al., 2017; Xu & Guo, 2018).

     Researchers applied sentiment analysis predictor models to financial and

economic news reports in real time and saw sentiment as a slight predictor of market and

stock prices where positive news about financial markets in social media groups and

financial blogs corresponded to a rise in stock prices. Although financial news sentiment

analysis showed positive and negative fluctuations throughout the day, researchers were

able to predict some market prices through the sentiment analysis of investor-published

textual content on the internet and overall financial news created by investors was

overwhelmingly positive (Ren et al., 2019; Sidorov et al., 2018). Sentiment research

often used dictionaries where a words polarity remained constant unable to change from

positive to negative or neutral to negative, but other researchers viewed a words polarity

as variable being more complex than many sentiment analysis studies propose in their

methodologies (Ahmed et al., 2020; Vinkers et al., 2015). Researchers studied the issue

of some neutral words having some sentiment strength and how some neutral words

coded by sentiment dictionaries contained elements of positivity and negativity. Studies

ranked texts based upon the strength of the sentiment words and reflected the move to a

rating scale from simply positve, negative, or neutral (Colhon et al., 2017; Batanovic et

al., 2020). Lexicon-based sentiment analysis referred to the use of a sentiment dictionary

to identify the polarity of words previously set. The other approach of aspect-based

machine learning used machine learning to identify tone and sentiment polarity of

through providing exemplar phrases specific to the topic or domain to teach the computer

what phrases to code positively or negatively (Vargas-Calderon & Sanchez, 2018).

Researchers found increased accuracy of word sentiment orientation/polarity by building

a sentiment topic specific dictionary with intensifiers. The content specific dictionary

which modified the polarity and the sentiment strength of words or phrases could identify

various types of content purely through sentiment word usage. For example, studies

found fake news to have more intensified word sentiment as well as linguistic features

not found in credible news content (Dong et al., 2015; Hardolov et al., 2018; Taboada et

al., 2011).

News topic, source, and author caused variations in sentiment usage and tone of news content. Sentiment was different for news topics and among different sources, and in speakers on the Autism spectrum research saw a reduced use of sentimental words when retelling stories compared to the control group, while news stories on nuclear power and politics contained similar positive and negative numbers of articles. Technology and entertainment news contained more negative reports while business and sports news contained higher numbers of positive sentiment articles (Burscher et al., 2016; Chojnicka & Wawer, 2020; Samuels & Magonical, 2019).

News Media Concepts and Language

Language is often not neutral but a highly constructive mediator which assisted in the social construction of reality for public playing a cognitive role in forming mental representations about topics and meshes the functions with an individual's experiences and influences thoughts (Fowler, 1991; Rife et al., 2019). Philosopher Michael Foucault (1972) said,

> Concepts, schemata and frames are a way to classify statements in a series based on a set of rules indicated by the media. Therefore news and the press created how readers relate and interact with concepts and the interplay between the set of rules used and the reoccurrence of concepts in news media creates a reciprocal foundation of knowledge on concepts of information where what is articulated in a series of news statements is observed, learnt, deduced and what is acceptable information and what is postulated forms concepts. (p.48)

Geiber (1955) identified good news events as those which elicited emotional pleasure

within readers, while negative news reflected drama, crime, and natural disasters.

Newspapers depended on released reports and packaged statements to fill news times and

education news seasons, as seen in the increase in education news searches by Google

Inc. (2020) in August, prior to the start of a new school year and decreased education

news searches in the summer and over winter break (Boorstin, 1964; Fowler, 1991).

Google Inc. (2020) revealed news audiences searched for news about USPE during times

when a personal experience, like going back to school or taking a break from school,

drove these individuals to actively search out news topics. News media researchers and

communication theorists found some news consumers continually return to a few news

sources that match their schema or thinking about issues. These returning news

consumers were vital to the media salience effect or a normative influence created by

outlets reporting certain views useful to specific ideologies (Djerf-Pierre & Shehata,

2017; Grabe & Myrick, 2016).   Commercial and government stake holding entities

benefited from having a base audience primed for stories and messages that already fit

exiting frames and agendas, which in turn drove news media reporting and advertising

revenue in a continuous positive reaffirming feedback loop (Krouwer et al., 2017;

Schildkraut & Muschert, 2014). Fowler (1991) discussed news discourse and how news

media act as gatekeepers, mediators, and the section process of real events representing a

skewed and judged schemata or frame of information. Although the origin of news

events are real, according to leaders in newsworthiness researchers Galtung and Ruge

(1965) and Lewin (1943), news media sort and select events according to socially

constructed newsworthiness categories that favor unambiguous events that are episodic,

using stereotypes and familiar paradigms to avoid complicated issues which disengaged

audiences (Ciuk & Rottman, 2020; Vos, 2019). News may have avoided unfamiliar

schemata and frames and instead pushed highly salient and emotional (valence) news

issues (Otto et al., 2017). Tankard, (2001) defined a frame as "a central organizing idea,

for news content that supplies context and suggests what the issue is through the use of

selection emphasis, exclusion, and elaboration" (pp. 100-101). Dominant frames formed

when the text and content matched the audience's previous schemata while audience

autonomy determined the acceptance of new frames or initiated dominant frames to a

higher normative status in public opinion.   Media's created a normative influence on

audiences from repeated news features like familiar metaphors and recognizable language

and sentence structure that increased readability of stories, not centered around fact, but

around the values and beliefs of the audience, and required little production effort by

news outlets (Halliday, 1978; Happer & Philo, 2016; Hui yet al., 2017). Fowler (1991)

agreed noting audiences' low salience on unfamiliar news media topics may have a

greater influence on public opinion formation than a highly salient (familiar) topic. News

media created continuity and ease of thought for media consumers through generalized

and stereotyped story frames, single unambiguous events that were episodic and

emotional and fit into 24-hour news cycles, which were important to effective news

media reporting (Entman, 1993; Gottfried & Forman-Katz, 2021). Zhang and Jin (2015)

found that commercial newspapers, influenced by advertisers, advertising dollars, and

increased audience circulation numbers, favored episodic news stories that focused on

individually compelling stories. Favoring rare but compelling story narratives and frames

led consumers to believe topics and certain societal issues in the news prevailed more in

the region, country, or world than the data on the events indicated raising the perceived

problem to a higher status in public opinion and creating agreement (consonance)

between issues in the news and public awareness (King et al., 2017; Pinker, 2018).

Digital news media grew more quickly with mobile news and fake news

spreading quickly. Around a quarter of respondents stated social media did a good job of

separating fact from fiction; however, respondents cited distrust and negative feelings as

reasons for avoiding news. Half of online users received news from social media sites,

but the data lacked clarity on the number of sites which included original sourced news

media and reproduced disseminated news stories (Mukerjee et al., 2018; Newman et al.,

2020; Pew, 2019). Third-party news aggregators, linked to commercial interests,

repackaged digital news from original sources and generated revenue through 'clickbait'

news stories and created news feed algorithms that delivered news to users that fit an

individual's online behaviors and habits. News stories created revenue for third party

vendors and the increase of side-door news and the use of smartphones for decreased

advertising dollars for original content authors (Dalen et al., 2017; King et al., 2017;

Puschmann & Powell, 2018). Digital news stories may have confused users, and often

times through fake news outlets tried to make money or discredit an opposing entity,

spun news to fit an agenda, whether it be political, financial, or institutional, and news

that made users feel uncomfortable or had a disagreement with (Hardolovet al., 2018;

Osmundsen et al., 2021). Pinker (2018) indicated news was more of a play-by-play

commentary, and up-to-the-minute. Data scientist Leetaru (2019) applied sentiment

mining to news stories in the *New York Times* and broadcast news and articles from

around the world and found trends that indicated from 1945 to 2005 news had become

more negative based upon sentiment; although slightly more positive in the 80's and 90's as indicated by Figure 2.

Big data news researcher Leetaru (2019) revealed the rise in online news outlets and stories negativity correlated with a drop in overall tone of news stories. Research into rating news stories on average tone that used human coders found that headlines, and first paragraphs more often reflected the average tone of an article than other parts of news and adjectives contained more sentimental words than other parts of speech (Hui et al., 2017).

Figure 2

Average tone of all New York Times Articles from 1945-2005, Forbes.com.
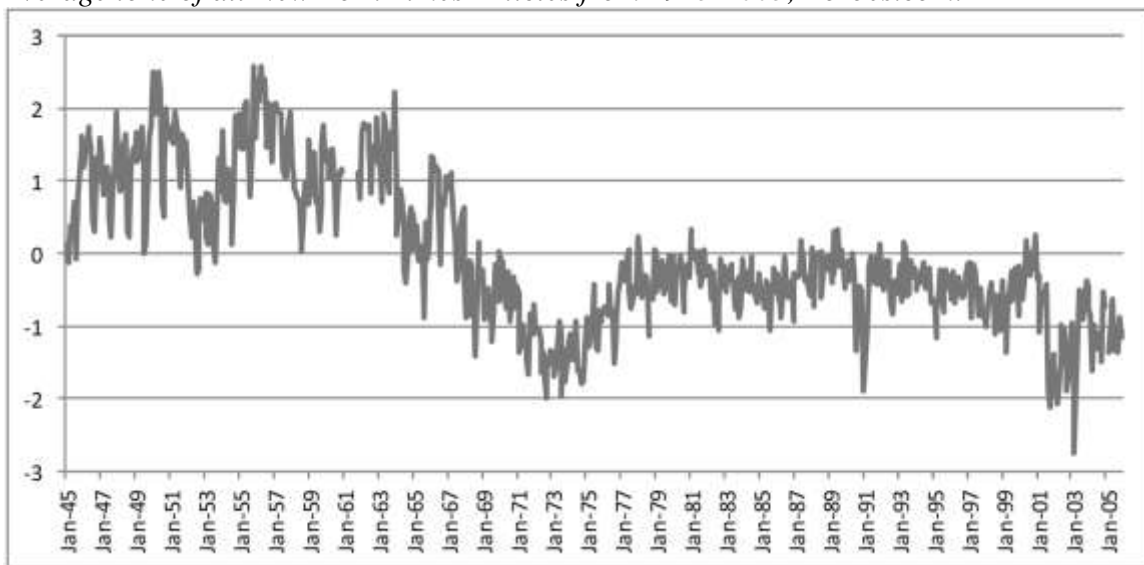
(Leetaru, 2019, reprinted with permission).

News Media and the Public

Researchers studied how news media influenced the public's opinion on various topics in the news and "more Americans now say [2021] that news organizations are gaining influence than say their influence is waning, a stark contrast to just one year ago [2020] when the reverse was true" (Gottfried & Forman-Katz, 2021, para.1). Pew

Research Center (2019) also noted increased public trust in news media positively

correlated to the public's perceived influence of news media over public opinion.

Research topics, such as political polarization, fake news, and media trust changed

public's support for institutions and public sentiment towards news topics through news

devices such as framing, gatekeeping, and the overplay of negative news. For example,

fake news contained more negative sentiment in headlines and political opponents shared

fake news more often to degrade political opposition (Osmundsen et al., 2021; Robison &

Mullinix, 2016). Negatively-toned news stories negated positively-toned stories for

audiences on political reporting and even lowered their trust towards an elite political

contributor when political contributor's statements differed from prior political schema.

Readers had a stronger positive and negative reaction when they are primed by prior

news issues and it was discovered that *New York Times* may set the agenda for other

news sources reporting known as exemplar gatekeeper, which identified noteworthy news

stories (King et al., 2017; Vos, 2019). McIntyre and Gibson (2016) discovered that

reading positive news made audiences feel momentarily happier and media benefited by

what the researchers called silver-lining reporting where news media reported a

traditionally negative story but conclude the new story with a positive silver lining that

left the reader with momentary good feelings (Gieber, 1955; McIntyre & Gibson, 2016).

In crisis communication, news media research traced responsibility of actors in

stories and how the public placed blame on actors in news. When news framed a crisis

event with preventable causes the public strongly placed responsibility on the actors in

the story, and when news media framed crisis as an accident, readers placed low

responsibility and blame on the actors in the story (Iyengar, 1991; Kim, 2016). Although

news television remained a major source for the public's political information, research

into television and political influence declined replaced during election times by social

media and digital news media studies. Television news media manufactured heightened

tension through devices such as game-framing which took often mundane media topics

and transformed story actors and political opponents into winners and losers (Hopmann et

al., 2017 Robison & Mullinix, 2016). Television news and television broadcast anchors

added to game-framed reporting by politicizing Supreme Court rulings as winners and

losers. Public opinion and support may have declined for public and democratic

institutions when news media used game-framed reporting tactics (Hitt & Searles, 2018;

Robinson et al., 2018) enhanced emotional sensitivity and awareness to issues through

the use of exemplars in media stories which added personal or expert accounts to stories

enhancing public debate and opinion on news topics. Whether news stories used

everyday accounts from uninvolved exemplars or insider accounts from involved

exemplars, media influenced public opinion and sentiment (Iftikhar et al., 2016; Zerback

& Peter, 2018). Gerbner's (1987) cultivation theory said continued television

consumption over time cultivated attitudes in public opinion and eventually news frames

and the public's opinions would align without conscious awareness of the origin of the

attitudes or ideas. Television news and traditional print news media may have cultivated

a condensed and sensationalized view of crime for audiences, compared to online digital

news that may have offered users more options and led to less intense opinion on crime

(Otto et al., 2017; Roch et al., 2016; Williams & Schoonvelde, 2018).

Media reports in newspapers are directly linked to the public's attention and

responsiveness to United States policies, and research showed how news media priming

and salience of topics strengthened public responsiveness to U.S. policies. As the media

moved from few outlets to many outlets, research revealed no drop in the agenda-setting

effects of media outlets and even found that small digital outlets seemed to have similar

agenda-setting influences to large media outlets (Djerf-Pierre & Shehata, 2017; King et

al., 2017). Researchers discussed how digital news had an interactive quality in which

popular and public opinion were mixed through social media and found that existing

social online news media audiences seemed to have less political polarization than non-

digital news consumers, and existing online news audiences more often mentioned

broader socio-political topics and ignored details about authors, sources, and nuances.

The mixed and fragmented views on online digital media led some audiences to question

the credibility and trust of certain sources, as well as public figures contributing to stories

(Happer & Philo, 2016). Researchers found more exposure to different political views in

online digital news and expected the polarization through online media may be less

influential than once thought (Gozalvez et al., 2019; King et al., 2017).

　　　　News audiences and readers reacted with "stronger intentions" to help a cause

outlined in news after reading a news article compared to viewing a video only on a

similar topic. Although online news videos alone did not create stronger reactions from

the public, research has shown that images along-side articles known as multimodal news

presentation produced change on the audience in the forms of increased compassion, an

intention to help those in need in the articles, and clearer opinions on the news topic

(Powell et al., 2018; Roch et al., 2016). Embedded videos in online articles and digital

news sites received more digital interaction with the news article than those articles

without a video. News videos required less focus and attention and may have led to a

generalized overview of news topics, compared to reading articles that led to more

processing effort by the reader and therefore more reflection and synthesis on the topic.

News articles elicited more public support for causes outlined in stories compared to

online videos alone (Martinez, 2019; Powell et al., 2018). Uncertainty in the news

affected public opinion on economic topics and triggered pessimism and negativity when

responding about such topics in news, however consuming negative news did not cause

uncertainty on topics. Negative news caused stronger emotional responses from research

participants which pointed to negative news created stronger valence in readers (Dalen et

al., 2017; Pinker, 2018; Gieber, 1955).

Education in the News, Media, and the Public

In an opinion article written by Horton (2015) called, *Will media destroy public*

education? Horton (2015) explored media investors increased influence and role in news

media framing education as negative to expand control over the privatization of

education. Media portrayed a negative USPE frame and positive privatization in news

media's reporting of education events, which cited non-peered-reviewed reports and

packaged releases from think tanks, organizations, and foundations; all invested in media

and education privatization (Coe et al., 2020; Cohen, 2010).

Consistent national education news coverage and education media research was

rare and usual centered on portrayals of education in entertainment television or focused

on single traumatic education events (Catalano & Gatti, 2017; Kim, 2016). Education

journalists and education polling entities agreed that framing and agenda setting were

factors in the development of the public's perception of national education, and one-

quarter of journalists indicated that access to education stories was a major problem in

covering USPE locally and nationally (Education Writers Association, 2021; Phi Delta

Kappan, 2020). Media researchers often analyzed content through language, sentiment,

and tone and discovered more negative toned news articles in TV and print than positive

toned. Education as the setting or backdrop of negative news events and reports

dominated headlines and stories about education while media reported on lack of "school

quality," as the most negatively-toned and negatively-framed topic about USPE

(Bahrainian & Dengel, 2015; Coe et al., 2020).

Researchers, Niemann and Martens (2013) used content analysis to study

education headlines on international benchmark tests, but rarely did studies explore

framing of U.S. K-12 public education over time and throughout various media outlets

(Coe et al., 2020; Murphy, 2013). While news on education policy and education quality

ranked high on the public's meaningfulness scale, news of school shootings replaced

news of systemic deficiencies and convoluted societal education issues took a backseat to

often single negative traumatic events (Kim, 2016). Coe and Kuttner (2018) sited

educational violence as the most-covered television news topic, while school quality was

second in television news stories from 1980 to 2014. K-12 public education lacked

coverage in television news media compared to other national news topics of interest

because of educations seasonal interest from the public and inability to sustain year-round

coverage. Television news media presented episodic education topics with maximum

valence and salience, like school shootings, the release of education test scores, or the

anniversary of a major educational event and often included video interviews with

involved and uninvolved exemplars (Bali, 2016; Catalano & Gatti, 2017; Ciuk &

Rottman, 2020; Cohen, 2010; Martinez, 2019; Zerback & Peter, 2018). Television news

audiences ages skewed higher and therefore news media networks may have been

inclined to run stories reflected in audience ages and less on education topics like school

quality which targeted parents of school-aged children. Chingos et al. (2012) said,

"Citizens perceptions of the quality of public schools reflect available information about

the level of student achievement in those schools." (p.411). The public may choose

sources of information based upon cost and indicated that direct experience with schools,

like local newspapers, communications from the school district, and performance data,

were easily accessible information and played a role in defining the perception of public

schools. Individuals with little personal experience with public schools may have relied

on news more for information and created a negative or cynical view of education,

known as a "mean world effect" (Chingos et al., 2012; Newton, 2019; Strauss, 2018).

Frame changing in school shootings occurred when one story covered from

multiple angles and perspectives caused a refreshing of media events. Frame changing

constructs used by media in traumatic events increased audience salience, filled news

cycles, created false interest by legitimizing a story's newsworthiness, activated prior

audience knowledge to increase ease of transmission, and often focused on victims that

reflected the audience (Kim, 2016; Schildkraut & Muschert, 2014). Polling organizations

and surveys, such as Gallup Organization surveyed the public and reported findings and

results to news media outlets on topics of public interest and the relationship between

polling organizations, media outlets, power elites, and the public experience of poll

manipulation and trust concerns (Kerby & Marland, 2015; Phi Delta Kappan, 2020).

For example, news source had little motivational effect on public's trust or discredit of

polling results, but citizens' preexisting attitudes, ideas, and information on familiar news

topics were the largest determinant of whether the public accepted or rejected poll results

published in the media. Audiences with little preexisting information or knowledge

towards news topics supported the public majority and trusted poll results (Kerby &

Marland, 2015; Kiewiet De Jonge et al., 2018; Kuru et al., 2017; Tryggvason &

Stromback, 2018). Public opinion about public schools recorded by polls from *EdNext*

(2020) and *Gallup* (2020) consistently reported the public graded the nation's schools

consistently lower than local schools, which conflicted with national testing in which

student's academic results improved nationwide. Also, frames and narratives in news

media could have led consumers to believe certain problems or issues were more

prevalent than the data actually indicated and increased salience (noticeability) and

consonance (agreement) between the topic and the public, and in turn raised the

perceived problem to a higher status in public sphere (Bali, 2016; Coe et al., 2020;

Henderson et al., 2020; Zhang & Jin, 2017).

Education news research into a teacher standardized test-cheating scandal in

found that often news agencies used episodic framing or a single event to frame these

teachers as responsible for what occurred. Research revealed media stories on USPE

often ignored complex causes for media events and settled for simplified failure

narratives in education. News media ignored multifaceted causes for public education

failures in news stories like testing bias, government incentives, and funding; and often

replaced these intricate factors with simplified narratives containing good guys and bad

guys (Catalano & Gatti, 2017; Grey & Shudak, 2018; Zhang & Jin, 2017). Kinder and

Sanders (1996) studied how news frames changed public support for education funding.

When media outlets framed education funding news as benefitting the poor funding

support increased, while support for funding decreased when the story framed funding

education as benefitting African-Americans. Zhao (2009) pointed to *A Nation at Risk*

(1983), a report by the U.S. government which continued to be activated and habituated

in the news media by journalists, elites, and stakeholders focused on U.S.

underperformance compared to other countries on K-12 international benchmarked

educational assessments, which legitimized business elites and international education

organizations as spokespersons for what is wrong with national public education

(Murphy, 2013; Niemann & Martens, 2013). News media lacked coverage of federal

spending on education per pupil, federal expenditures, and public attitudes on increased

federal education spending and framed the U.S. education system as obsolete and broken,

while news media rushed education stories to press packaged as "breaking news" and

reported live to elicit crisis frames. Audiences unfamiliar with school topics formed

opinions on education from limited news stories that reported easily recollected

educational rankings (Phi Delta Kappan, 2020; Preston, 2019; Wagner, 2008). The news

media allowed non-media industries to influence media reports on education issues and

disseminated the "broken school system" frame in news reports and in the packaged

release of international test scores. Often, on-air live news broadcasts used dual

polarizing experts debated upon over-simplified and sensationalized educational issues to

create newsworthy news from U.S. educational standing in the world (Murphy, 2013;

Peck, 2015).

Summary

Historical and current research into the fields of media theory, content analysis,

computer-aided sentiment analysis, public opinion and education in the news rarely

intersected in research to create a picture of education language in the various media and over time. With current research, audiences have a fractured picture of language and news content as it pertained to education in the news. Many factors aligned to create frames in the news media, but it was unclear how different media frame through language the representation of one singular topic. Positive and negative language use in different news media through quantitative content analysis is a new field and researchers with the use of computer aided sentiment software challenged the amount of analyzed content. Researchers like Kaplan (1992) with education in entertainment media and led by big data news researcher Leetaru (2019) and education in news media Coe and Kuttner (2020) added to the news sentiment analysis as well as education in the news media and with the addition of sentiment and tone the studied attempted to merge these fields.

Chapter Three: Methodology

Introduction and Overview

The study methodology reflected current and established collection and analysis for quantitative content analysis, based upon research conducted by Lui (2015), and authors Rife et al. (2019). The researcher explored potential quantitative relationships between news media type, overall tone rating, sentiment, time, and public opinion. The researcher used content analysis software to count positive and negative sentiment words and phrases, which revealed potential relationships, correlations, and trends on U.S. K-12 public education (USPE) in the news media from 2015 to 2019. The researcher mitigated human error procedures while expanded upon the current methods for content analysis and developed a positive and negative word frequency tone rating system for news articles. This tone rating system for news articles could be applied to other Natural Language Processing documents which contained textual content. The researcher divided the analysis into two parts using two different data sets. Analysis 1 included the independent variables of news media type (print, online, TV, and magazine), time (2015 through 2019), and dependent variables of overall tone rating from 1 to 5, and sentiment frequency percentages on the topic of USPE. The researcher conducted analysis 2 including independent variables public opinion responses on grading USPE from A to F and then converting to a numerical scale from 1 to 5, media type, and time (2015 through 2019), as well as the dependent variable of overall tone rating score from 1 to 5.

Overview of Analysis 1

The researcher explored relationships and proportions for analysis 1 using sentiment frequencies and overall news media tone on articles related to U.S. K-12 public

education over a five-year period from 2015 to 2019, among different media types. The

percentage of positive and negative sentiment words and phrases within an individual

news story determined the overall tone rating of each USPE news story. The difference

in sentiment percentage of positive and negative words led to the ranked categorization of

a news article and determined its overall tone rating on a scale from 1 to 5. The

researcher used an Analysis of Variance (ANOVA) and determined if *New York Times*

print, *Huffington Post* digital, Newsweek / *Time* Magazine, and ABC / NBC TV

broadcast news differed in overall tone rating for the years 2015 through 2019. The

researcher also used an ANOVA and determined if overall tone rating differed for each

year for all media types combined. The ANOVA explored a potential relationship

between means at a $p < .05$ significance level for overall tone rating by media type and

time. The researcher also used a Binomial Test of Proportions and tested whether

frequency proportions of positive sentiment words versus negative sentiment words

represented .5 / .5 proportions compared to the observed proportions.

Overview of Analysis 2

The researcher further explored a relationship between the overall tone rating, 1 to

5, of news media on USPE and public opinion results on USPE. The researcher used the

1 to 5 overall tone rating of media determined by sentiment percentages and public

opinion data on USPE from public opinion polls. The researcher explored potential

interactions, and relationships between the variables. The researcher used linear

regression and Pearson Product Moment Correlation, *r*. Because the 1 to 5 rating scale

was similar for both variables, the researcher used linear regression modeling. The linear

regression noted overall tone ratings as a predictor for the outcome of responses on public

opinion and explored a potential relationship between variables. The Pearson *r*

correlation explored a potential correlational relationship between public opinion

responses on USPE and news media overall tone ratings. Both analyses used a $p < .05$

significance level.

Preparation for Research Project

Content Analysis Software Choice and Training

Once the researcher received Institutional Review Board approval, the researcher

prepared for analysis of the data through the training of Provalis Content Analysis

Software. The researcher rejected manual coding for computer aided coding which

analyzed and coded in a variety of ways and over time with required options to do further

statistical content analysis and qualitative content analysis research on the same data set.

Provalis software package aided in the importation of news stories, coding sentiment,

creating variables, running frequencies, and statistical analysis of data. The software

provided capabilities that analyzed large amounts of textual, image, and numerical data,

and coded content according to a set of rules outlined by the research methodology.

Advantages to computer-assisted coding included reliability, fidelity in repeatable

methodology and reduced human error through limited subjective decisions. The

computer-aided content analysis counted, coded, sorted, and quantified content data

according to schemas set up by the researcher or auto coding options available.

The Provalis software auto coding option used an internal sentiment dictionary,

which categorized words and phrases into three codes based upon sentiment. These three

codes or categories were to be ignored, positive, and negative. The number of positive

words in the internal dictionary totaled 4669, negative words totaled 9526, and to be

ignored included all other words not included in positive or negative categories (Provalis

Presentation, 2020). The sentiment dictionary accounted for and corrected natural

language devices that otherwise would be falsely coded in a "bag of words" approach to

sentiment content analyses that led to false negatives and false positives. The less

accurate "bag of words" approach to sentiment content analysis included dictionaries that

categorized words into three categories: positive, negative, and neutral. The researcher

ultimately rejected the approach by the researcher due to the decreased sentiment

accuracy compared to Provalis sentiment dictionary curated for computer-aided natural

language sentiment analysis. Provalis internal sentiment dictionary accounted for

phrases, which contained double negatives, negation words found directly before and

after words, such as the word "not." Negation words were responsible for changing the

polarity of words either from positive to negative or vice versa. The software's internal

sentiment dictionary predicted positive and negative sentiment more accurately than other

sentiment dictionaries and included more change of polarity exceptions than other

dictionaries from other content analysis software platforms, as seen in Figure 3

(Peladeau, 2020, slide 3, reprinted with permission).

Figure 3

Dictionary Sentiment Accuracy
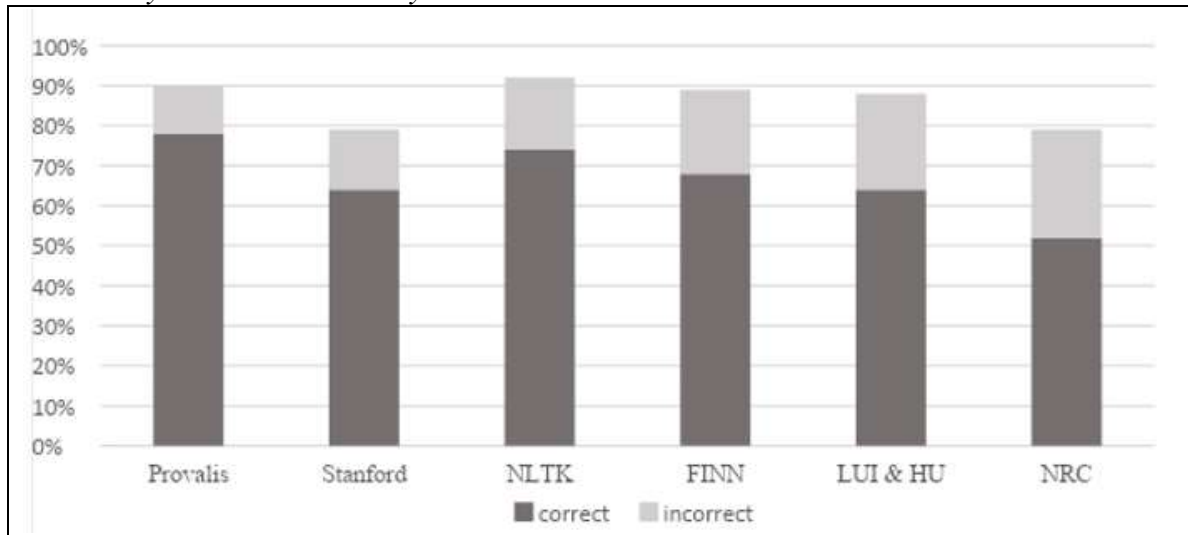
As seen in Figure 4, Provalis software and its integration of sentiment prediction performed better when comparing correct and incorrect sentiment retrieval (Paleadeau, 2020, slide 5, reprinted with permission).

Figure 4

Tool Sentiment Accuracy
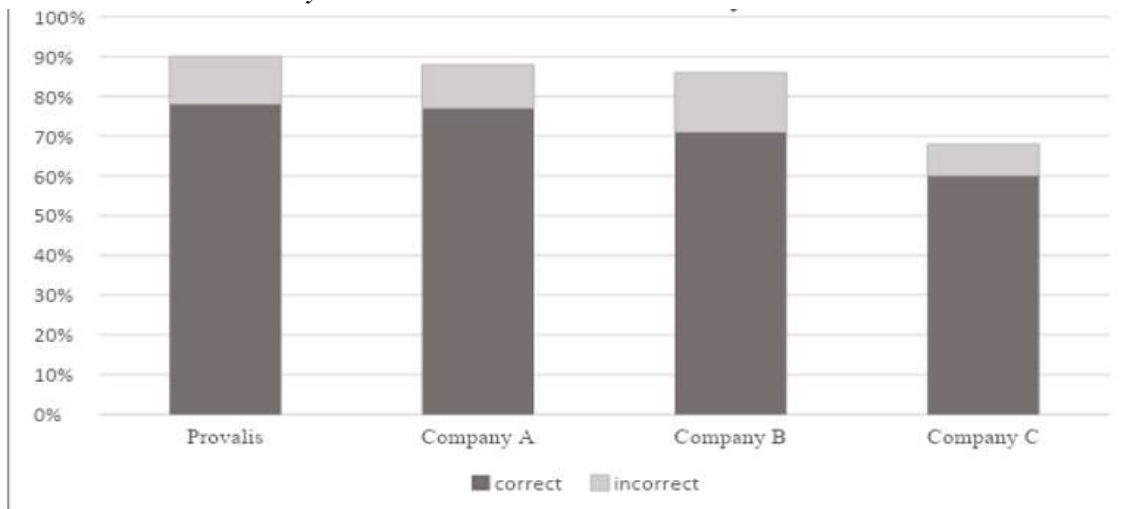
Creating an "Overall Tone Rating" Scale

The researcher created a reproduceable rating scale for the measurement of overall tone rating of news stories, based upon sentiment frequencies (see Table 1). The overall tone rating categorized articles into five rating groups from 1 to 5, based upon percentage of total positive and negative sentiment words and phrases identified and coded by the computer software. The Provalis computer software embedded an internal sentiment dictionary to assign words and phrases as positive, negative, or to be ignored. The difference in percentage of positive and negative sentiment words in each news story resulted in an overall tone rating or average tone. The numeric overall tone rating was equivalent to 1 as very negative, 2 as negative, 3 as neutral, 4 as positive, and 5 as very positive overall tone of each news story. Therefore, the researcher determined that a neutral article (3) contained a frequency of positive and negative words plus or minus 3% points. For example, if a news article had 22% positive and 25% negative sentiment, the researcher gave a neutral 3 overall tone rating, while a sentiment score of 4% to 6% points difference was given an overall tone rating of 2 or ,4 depending on which side of the sentiment scale the percentage fell. For example, the overall tone rating system coded an article as a 4 (positive) if the computer coded an article as 30% positive words and 24% negative words. With percentages reversed, the article received an overall tone rating of 2 as negative. To receive a score of 1 or 5, very negative or very positive, the percentage needed to differ by more than 7% points. For example, an article coded as 32% negative and 25% positive would be given an overall tone rating of 1 as very negative overall media tone towards USPE.

Table 1

Determining Overall Tone Rating from Dummy Sentiment Frequencies

Case #	% Positive	Negative	Difference	Overall Tone Rating	Description of Overall Tone Rating
1	25	24	1	3	neutral
2	32	45	-13	1	very negative
3	21	25	-4	2	negative
4	29	22	7	4	very positve
5	40	35	5	5	positive

Note: +_ >3% = 3 neutral, +_ 4%-6%= 4 or 2 positive or negative, +_<7%= 5 or 1 very positive or very negative

The researcher used the same overall tone rating scale for public opinion poll results.   Public opinion polls from *Gallup* and *Ed Next* asked respondents to give USPE a letter grade from A through F. The researcher used the A through F graded response and converted it to the overall tone rating scale from 1 to 5 to mirror the overall tone rating scale for USPE news stories. A given letter grade of F by respondents equated to a 1 as very negative opinion towards USPE, grade of D as 2 for negative opinion, C as 3 for neutral or no strong opinion, B as 4 for positive, and A as 5 for very positive opinion on USPE.

Stratified Sampling and News Story Collection

The researcher retrieved articles and transcripts through databases *Ebsco Host* and *Gale Onefile* including the *New York Times*, *Time* and *Newsweek* magazine, *Huffington Post* online, and ABC and NBC nightly news TV broadcast transcripts. The researcher selected specific news publications because of the high number of viewers, subscribers, and salience for the public and searched and collected articles for each year from 2015 to 2019 and used keyword search words U.S. K-12 public education. The searched terms

included "U.S. K-12," "public education," "teacher," "student," "schools," and all included combinations, variations, abbreviations, roots, and synonyms, including but not limited to students, curriculum, testing, facilities/resources, finances/funding, international comparisons, policy. Much of each article body and headline centered on or encompassed a topic within U.S. K-12 public education by filtering results using relevance. Excluded search terms comprised of "higher education" and "universities" but included stories about U.S. public education stakeholders, such as U.S. government political officials, international ranking organization officials, citizens, academic researchers/journalists, and education professionals. Analysis samples included duplicate articles from the same media outlet, if published on different dates and gathered a stratified sample of articles on the topic of U.S. K-12 public education using the filter of relevance to ensure a strong connection between each story and USPE. Lacy et al. (1995) showed a stratified sample to be more efficient and better suited than a random sample for news content analysis and reduced the occurrence of homogenous subsets of news stories. Sampling from each quarter of the year ensured news media content cycles refreshed.

From the stratified sample the researcher chose a minimum of seven articles per quarter for each year of each media type. For example, the researcher collected a minimum of seven articles for January 1, 2019 through March 30, 2019 from the *New York Times*. The seven minimum samples for each quarter of the year resulted in a large enough data set to run a yearly analysis and included times of year when USPE was in the news more often and times of year where reporting of USPE was less often. The researcher used the following quarterly dates January 1 through March 30; April 1

through June 30; July 1 through September 30; and October 1 through December 31. The

sampling represented each media type and each year from 2015 through 2019 on

USPE. Once the researcher collected the maximum of 12 articles from each quarter a

total of no more than 48 articles and no less than 28 were used for each year and media

type. See the example of stratified sampling for the *New York Times*, in Table 2.

Table 2

Stratified Sampling, Quarterly

| | Number of Articles Sampled per quarter | | | |
Year	NYT Jan 1 - March 31	NYT April1 -June30	NYT July 1 - Sept 30	NYT Oct 1 - Dec 31
2015	7 - 12	7 - 12	7 - 12	7 - 12
2016	7 - 12	7 - 12	7 - 12	7 - 12
2017	7 - 12	7 - 12	7 - 12	7 - 12
2018	7 - 12	7 - 12	7 - 12	7 - 12
2019	7 - 12	7 - 12	7 - 12	7 - 12

Note: This table shows sampling for New York Times print (NYT). Each media type
(digital, magazine, TV) will be sampled similarly to the above table.

The researcher found *Time* magazine had the fewest articles to sample, due to its

once weekly publishing cycle and tended to have more words and more in-depth content

compared to other media type stories on USPE. For weekly magazine samples, the

researcher used all stories on USPE. Due to the small weekly magazine sample, the

researcher included *Newsweek* magazine to meet the minimum sampling requirement of

seven new stories for each quarter for each year. Broadcast TV news transcripts tended

to include transitions made by news broadcasters, which the researcher included in the

samples. Often the transition statements were confined to the very beginning and very

end of news stories. The articles and transcripts were saved on a USB drive, hard drive,

and *Google* Drive.

The researcher collected *Gallup* and *Ed Next* disaggregated survey responses from

the public for the question about grading the USPE system. *EdNext* (2019) asked, "How

about the public schools in the nation as a whole? What grade would you give them?"

While *Gallup* (2019) asked, "How about the public schools in the nation as a

whole? What grade would you give the public schools nationally?" The researcher

found the results on each respective website reports and entered the individual responses

to the question into an Excel spreadsheet organized by year and title of public poll.

Storage and Import of News Articles into Software

After finding and filtering for articles based upon search criteria, the researcher

downloaded free access articles from *Lexis Nexis*, *Ebsco Host*, and Gale *Onefile* into a

password protected *Google* Drive and backup USB drive. The researcher imported

articles from *Google* Drive into Provalis software on a dedicated hard drive containing

Windows operating system with stored files by document number in a project called

Quantitative Sentiment Analysis Dissertation. The software accepted all formats of text

including pdf, doc, docx, html, and removed images and formatting that reduced

information and allowed for speedy import and processing of data.

Labeling Articles and Variables in Software

The researcher stored and categorized news stories and cases by independent,

dependent, and nominal variables extracted from the null hypotheses. These variables

included media type, year, word frequencies, and overall tone. Independent, nominal

variables for each article included case number, publication, and media type, while

ordinal included year. The dependent variable included overall tone rating calculated by

percent difference between positive and negative sentiment. As seen in Figure 5,

Provalis software stored, compared, and analyzed news stories by variables located in the

variable column and extracted sentiment percentage frequencies of positive and negative

words and phrases and used these frequencies to populate variable OVRLTNR as seen in

Figure 5.

Figure 5

Sentiment Percentage Frequencies Extracted by Provalis Software
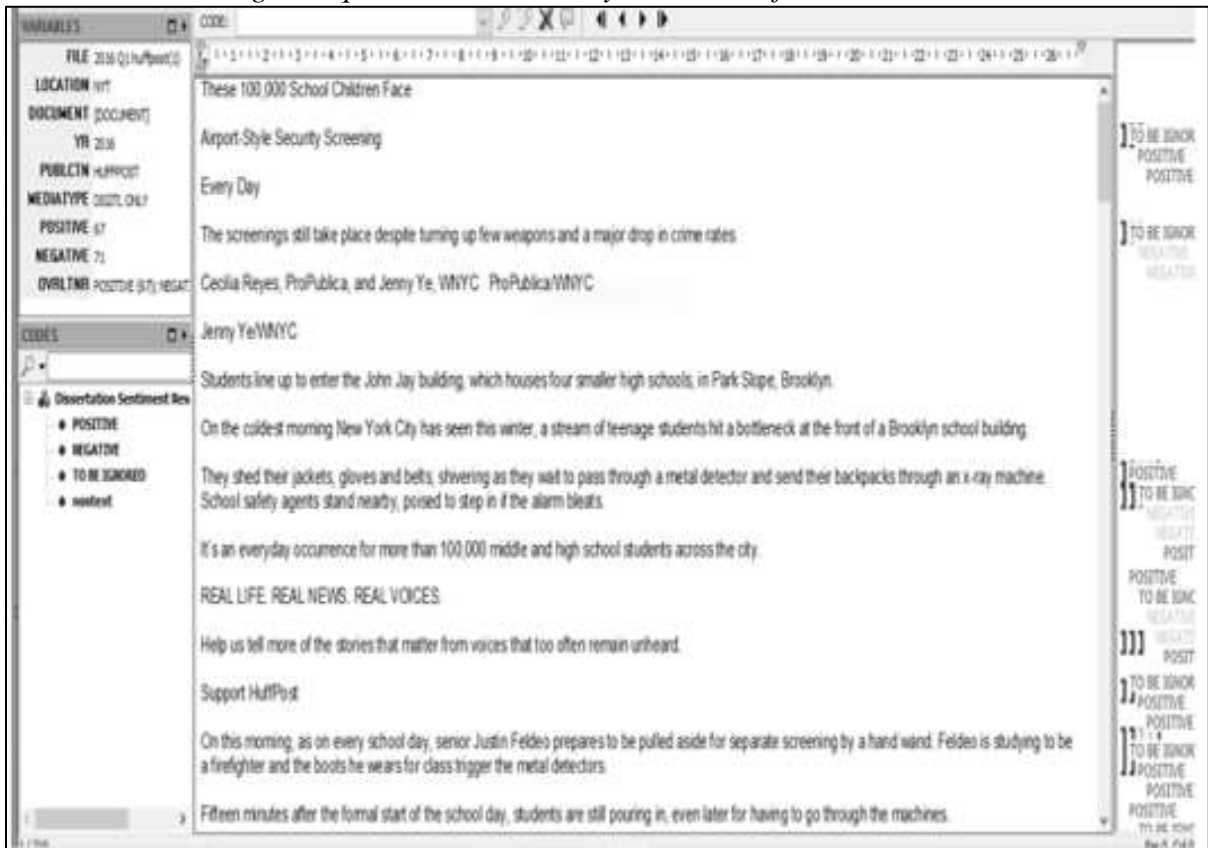
The overall tone rating dependent, control variable was quantified into categories

including 5 as very positive, 4 as positive, 3 as neutral, 2 as negative, and 1 as very

negative, based upon total percentage of positive and negative sentiment in each

article. The researcher transformed the sentiment frequencies into a numerical overall

tone rating of 1 to 5 (see Table 1) based upon the coded positive and negative words

identified by the Provalis software. Of the five total variables in the Provalis

categorization, three were used for analyses, including year and media type, resulting in

an overall tone rating. The researcher used and stored articles in Provalis based upon the

nominal variables: publication name and document/case number which ensured clarity

and fidelity in the sample identification and storage and allowed for easy identification

for future research options.

The researcher entered each public opinion survey response as one case for each

response from *Gallup* and *EdNext* poll results on grading public education int he nation.

One respondent was equivalent to one news article or transcript. The survey's public

opinion responses included a letter grade given to public education as either A, B, C, D,

or F. The researcher translated the letter grades into a numerical integer as follows: A as

5, B as 4, C as 3, D as 2, and F as 1, to align with overall tone ratings for news articles

indicating 5 as very positive, 4 as positive, 3 as neutral, 2 as negative, and 1 as very

negative. The researcher used each respondent's letter grade on their opinion on public

education in the nation and transformed the letter grades A, B, C, D, F into a tone rating

of 5, 4, 3, 2, 1to mirror the overall tone rating of articles on USPE (see Table 3).

Table 3

*Overall Tone Rating from Public Opinion Response on "Grade Public Schools
(Nationally)"*

Survey Respondant	Letter Grade Response	Overall Tone Rating	Description of Overall Tone Rating
1	C	3	neutral
2	F	1	very negative
3	D	2	negative
4	A	5	very positve
5	B	4	positive

Coding and Retrieving Content

To code sentiment words as positive, negative, and to be ignored, the researcher enabled an automatic sentiment coding tool and internal sentiment dictionary contained in the software. The tool used a dictionary of words categorized as positive, negative, and to-be- ignored. The software scanned all text and placed words in three categories called codes based on the designation by the dictionary. The software and dictionary accounted for words and phrases where a positive or negative word had its sentiment reversed, due to negation words before and after the sentiment word like "not" or "not very." For example, the phrase "not happy" contained the neutral word "not" and the positive word "happy." The software and sentiment dictionary recognized the negation word "not" preceding "happy" and correctly coded the term as negative. The dictionary adjusted for double negatives and negation before and after sentiment words which increased machine validity and reduced false coding. Neutral or words to be ignored included parts of speech, such as pronouns, articles, many proper nouns, and forms of the verb "to be." Words to be ignored or neutral words counted towards final word frequencies and counted towards neutral words. The positive and negative sentiment codes allowed the researcher to determine an overall tone rating based on the percentage of positive and negative codes within each article on USPE. The researcher added an additional code called "non-text," as seen in Figure 5. The researcher created the code "non-text" to remove text not original to publication. The areas of unoriginal text included citations, database information, and identifiers unintentionally imported into the text field. The researcher used "non-text" code as a more efficient way for this information to be excluded from analysis and coding.

Hypotheses and Statistical Data Analysis

Hypotheses

  Null H1: There was no difference in overall tone rating between ABC/NBC Tv broadcasts, *New York Times* digital & print, *Huffington Post* online, *Time* and *Newsweek* magazine news stories about USPE for the years 2015, 2016, 2017, 2018, and 2019.

  Null H2: There was no difference in overall tone rating between ABC/NBC Tv broadcasts, *New York Times* digital & print, *Huffington Post* online, *Time* and *Newsweek* magazine news stories about USPE for the all-combined years 2015 to 2019.

  Null H3: There was no difference in overall tone rating between 2015, 2016, 2017, 2018, and 2019 for all-combined news media type stories about USPE.

  Null H4: There was no difference in frequency of positive or negative sentiment words between ABC/NBC Tv broadcasts, *New York Times* digital & print, *Huffington Post* online, *Time* and *Newsweek* magazine news stories about USPE for the all-combined years 2015 to 2019.

  Null H5: There was no difference in frequency of positive or negative sentiment words between 2015, 2016, 2017, 2018, and 2019 for all-combined news media type stories about USPE.

  Null H6: There was no relationship between overall tone rating of all news media stories and public opinion responses to surveys about USPE in 2015, 2016, 2017, 2018, 2019.

  Null H7: There was no relationship between overall tone rating of all news media stories and public opinion responses to surveys about USPE for the combined years 2015 to 2019.

Null H8: There was no relationship between overall tone rating of news media and public opinion responses for 2015, 2016, 2017, 2018, and 2019.

Null H9: There was no difference between the hypothesized proportions of positive and negative words in all media for 2015 to 2019 from observed proportions.

The researcher used the statistical tests in Table 4 based upon the null hypotheses and variables described in the methodology. The researcher chose the analyses based upon the tests reproducibility and validity indicated by Riffe et al. (2014) and described by the SPSS Guidebook (2019). The researcher separated variables into multiple one-way ANOVA's and ensured that results did or did not show a clear difference in means.

Table 4

Analysis Testing

Analysis	Hypothesis	Variables		Test
		Independent	Dependent	
	H 1, H 2, H 3	media type, year	overall tone rating	ANOVA
1	H 4, H 5	media type, year	sentiment +/- frequencies	ANOVA
	H 9	hypothesized sentiment +/- frequency proportions	observed sentiment +/1 frequency proportions	Binomial Test of Proportions
2	H 6, H 7	public opinion responses	overall tone rating	Pearson's Correlation Coefficient
	H 8	public opinion responses	overall tone rating	Linear Regression

The researcher used a significance level of $p < .05$ for the following ANOVA analyses. The researcher used a 2-way Analysis of Variance (ANOVA) and searched for a potential relationship between media type and year for overall tone rating of USPE in the media reflected in Null Hypothesis 1 and dummy data set.

Table 5 explained the organization of data by variables: media type, year, positive/negative frequency percentage, and overall tone rating used for quantitative data analysis in the statistical tests. SPSS (2019) stated a two-way ANOVA was appropriate

for two independent categorical / nominal variables and one quantitative dependent variable.

The researcher used a one-way Analysis of Variance (ANOVA) and searched for a potential relationship for effect of media types among *New York Times* print, *Huffington Post* digital, *Newsweek / Time* magazine, and NBC/ABC broadcast news, from 2015 to 2019 on overall tone rating of USPE reflected in Null Hypothesis 2. SPSS (2019) stated a one-way ANOVA compared means and whether they differed between groups.

The researcher used an ANOVA and searched for a potential relationship for effect of the year 2015, 2016, 2017, 2018, and 2019 for all-combined media types for overall tone rating of USPE reflected in Null Hypothesis 3. The potential effect of year on overall media tone on USPE was significant to the researcher due to its implications for gatekeeping, news cycles, and newsworthiness.

Table 5

Overall Tone Rating Dummy Set Table

2015 Media Type

Case# or Respondent	NBC ABC nightly Tv news				New York Times print				Huffington Post digital				Time / Newsweek Magazine				EdNEnt/ Gallup Poll
	%				%				%				%				
	positive	negative	difference	overall tone rating	positive	negative	difference	overall tone rating	positive	negative	difference	overall tone rating	positive	negative	difference	overall tone rating	Response grade A-F converted to 1-5
1	23	25	-2.00	3	33	31	2.00	3	21	25	-4.00	2	43	42	1.00	3	2
2	43	41	2.00	3	43	41	2.00	5	23	21	2.00	3	23	25	-2.00	3	3
3	25	35	-10.00	1	21	23	-2.00	3	24	16	8.00	5	16	25	-9.00	1	2
4	16	18	-2.00	3	16	25	-9.00	1	25	35	-10.00	1	31	25	6.00	4	1
5	32	30	2.00	3	30	21	9.00	5	26	21	5.00	4	42	25	17.00	5	2
6	45	44	1.00	3	28	25	3.00	3	27	31	-4.00	2	27	38	-11.00	1	4
7	28	21	7.00	5	20	15	5.00	4	29	30	-1.00	3	22	36	-14.00	1	3
8	29	38	-9.00	1	41	45	-4.00	2	35	25	10.00	5	36	39	-3.00	3	3
9	21	26	-5.00	2	15	23	-8.00	1	39	34	5.00	4	43	40	3.00	3	2
10	36	31	5.00	4	24	27	-3.00	2	41	38	3.00	3	21	15	6.00	4	1

Year All Media

Case# or Respondent	2015				2016				2017				2018				2019			
	%				%				%				%				%			
	positive	negative	difference	overall tone rating	positive	negative	difference	overall tone rating	positive	negative	difference	overall tone rating	positive	negative	difference	overall tone rating	positive	negative	difference	overall tone rating
1	43	42	1.00	3	21	25	-4.00	2	23	25	-2.00	3	33	31	2.00	3	25	31	-4.00	2
2	23	25	-2.00	3	23	21	2.00	3	43	41	2.00	3	43	41	8.00	5	21	40	-19.00	1
3	16	25	-9.00	1	24	16	8.00	5	25	35	-10.00	1	21	23	-2.00	3	16	23	-7.00	1
4	31	25	6.00	4	25	35	-10.00	1	16	18	-2.00	3	16	25	-9.00	1	35	25	10.00	5
5	42	25	17.00	5	26	21	5.00	4	32	30	2.00	3	30	21	9.00	5	21	21	0.00	3
6	27	38	-11.00	1	27	31	-4.00	2	45	44	1.00	3	28	25	3.00	3	31	25	6.00	4
7	22	36	-14.00	1	29	30	-1.00	3	28	21	7.00	5	20	15	5.00	4	30	15	15.00	5
8	36	39	-3.00	3	35	25	10.00	5	29	38	-9.00	1	41	45	-4.00	2	25	45	-20.00	1
9	43	40	3.00	3	39	34	5.00	4	21	26	-5.00	2	15	23	-8.00	1	34	23	11.00	5
10	21	15	6.00	4	41	38	3.00	3	36	31	5.00	4	24	27	-3.00	2	38	27	11.00	5

The researcher used a one-way ANOVA and searched for a potential relationship between effect of media type (*New York Times* print, HuffPost digital, *Newsweek*/*Time* magazine, and ABC/NBC broadcast news) for the combined years 2015 to 2019 on sentiment frequency percentages reflected in Null Hypothesis 4. This relationship may reveal how different media types vary on sentiment usage, based upon the medium. One medium may have used more negative sentiment due to its ability to communicate a message. For example, does broadcast news, due to its reliance on visual video, use less negative language than another medium?

The researcher used a one-way ANOVA and searched for a potential relationship between effect of the years 2015, 2016, 2017, 2018, and 2019 on positive and negative sentiment frequency percentages for all-combined media reflected in Null Hypothesis 5. This potential relationship may reveal yearly differences and raise questions about how the relationship related to events in the news media and on USPE.

The researcher used a Binomial Test of Proportions to test proportions of positive and negative sentiment percentages at a .5/.5 ratio, compared to observed proportions in news media stories on USPE, as reflected in Null Hypothesis 9. This test of proportions may reveal which way media tone leans and raise questions about the validity of claims of negative news and neutral news.

The researcher used Pearson Product Moment Correlation Coefficient at a significance level of $p < .05$ and explored a potential relationship between overall tone rating of USPE for all media types in the years 2015, 2016, 2017, 2018, and 2019 and public opinion polls on USPE. This potential relationship reflected in Null Hypothesis 6 may reveal yearly correlations. The researcher kept in mind that public opinion polls

collected responses throughout the year and ended data collection late in the third quarter
and in the beginning of fourth quarter.

The researcher used Pearson Product Moment Correlation Coefficient at a
significance level of $p < .05$ and explored a potential relationship between overall tone
rating of USPE for all media types for all-combined years 2015 to 2019 and public
opinion polls on USPE. This potential relationship reflected in Null Hypothesis 7 may
reveal positive or negative correlation between two different quantitative variables over a
five-year period.

The researcher used Linear Regression at a Confidence Level of .95 and explored
a potential relationship between overall tone rating as a potential predictor for public
opinion polls on USPE in each year 2105, 2016, 2017, 2018, and 2019. This potential
relationship reflected in Null Hypothesis 8 may reveal a way to predict survey responses
from media trends on a similar topic. Although media tone was not the singular reason
for public opinion formation, a regression led to more questions about opinion formation
and the media. Was media tone reflected by public opinion or was public opinion
reflected by media tone on USPE news media coverage?

Summary

The above methodology reflected established sentiment content analysis
methods. The researcher chose and trained on a content analysis software, created a
rating system to score the tone of news articles, However, because of ever evolving
technology and the ability to dive deeper into content analysis, the researcher used
computer-aided software to analyze larger amounts of data than through manual coding
alone and used an unmodified internal sentiment dictionary. The researcher utilized

coding criteria by Provalis to create a method that ensured fidelity and validity for a data set consisting of news reports stored electronically and provided further on the same data set of data to reveal additional relationships. Analysis 1 consisted of a data set dedicated to news media reports on U.S. K-12 public education and the sentiment, overall tone, words, and language contained therein. Analysis 2 used the same data set for sentiment and overall tone of media on USPE but compared it to public opinion polls on the topic of USPE. The researcher decided the statistical tests identified in Table 4 would be best suited to explore variable relationships and differences.

Chapter Four: Results

Introduction

The researcher measured news media positive and negative sentiment. or "sentiment," and overall tone ratings, or "tone," on the topic of U.S. K-12 public education (USPE) in various news media types, years, and public opinion polls. The analysis quantified characteristics present in content from news media and public opinion sources and computer-aided sentiment analysis tools coded words and phrases as positive or negative. The methodology framework in Chapter Three guided exploration and analysis of the quantitative data and resulted in additional statistical testing and exclusion of specific tests to maintain a clear picture of U.S. K-12 sentiment and tone in the news media and public opinion.

The results tables, figures, and accompanied data tables included a confidence interval of 95% and $p < .05$. The researcher determined Chapter Three statistical testing required modification to accurately reflect the Null Hypotheses while retaining the original research study. Chapter Four results required post hoc tests, originally lacking in the original research design; however, the modifications led to more meaningful and concise results, while maintaining the study's complexity and core research questions. The researcher organized the results into three sections, based upon variables to be tested as indicated by Table 6.

Table 6

Results Organization and Statistical Tests

Section	Dependent Variables	Control Variables	Statistical Tests
1	overall tone ratings	year and media type	one-way ANOVA, Tukey-Kramer
2	positive negative sentiment frequencies	year and media type	one-way ANOVA, Tukey-Kramer, test of proportions, T-test for means,Pearson r correlation
3	overall tone ratings and public opinion survey results	year	Chi square test of proportions

After consultation with the researcher's dissertation committee, the researcher

separated each of Null Hypotheses 1, 4, 5, 9, and 10 into Null A and Null B, indicating

the analysis of two variables within one Null Hypotheses. For example, Null Hypothesis

1 compared the variables year and media type on overall tone rating on USPE. Instead of

a two-factor ANOVA, which only revealed if there was a difference in a single paired

group amongst many groups, the researcher separated and ran a single factor ANOVA for

variable year, Null Hypothesis A, and variable media type into Null Hypothesis B. The

split resulted in clearer results and more easily identified significant differences within

paired groups that required a post hoc Tukey-Kramer analysis when results met the

threshold of $p < .05$ significance.

Overall Tone Ratings

Table 7 data set reflects the dependent variable, overall tone rating means by news

media type, and year. Overall tone ratings ranged from 1 to 5, as indicated in Chapter

Three and calculated by the difference in negative and positive word frequencies

identified by the computer-aided sentiment dictionary. The researcher deemed a rating of

1 as a very negative tone rating towards USPE in the news media, 2 as a negative tone

rating, 3 as a neutral tone rating, 4 as a positive tone rating, and 5 as a very positive tone

towards USPE in the news media.

Table 7

Means for Overall Tone Ratings, Years 1 to 5

Media Type		Year			
	2015	2016	2017	2018	2019
New York Times print and online	3.23	3.20	3.38	3.02	2.93
Huffington Post online	3.45	3.34	4.09	3.40	3.50
Time and Newsweek Magazine	2.60	3.40	3.20	2.40	3.00
ABC and NBC braodcast TV	2.50	3.00	2.42	2.42	2.38

The researcher conducted one-way ANOVAs to measure the differences in

overall tone rating means for the two independent factors year and media type on the

topic of U.S. K-12 public education in media. Due to unequal sample sizes across year

and media type, the researcher replaced a two-factor ANOVA with one-way ANOVAs to

compare means of the paired groups categorized by factor's media type and year on

overall tone rating. The researcher conducted the ANOVA analysis with means to

identify initial big picture trends and guided post hoc analyses. News media type

consisted of four levels: The *New York Times* print and online, *Huffington Post* online

only, *Time* and *Newsweek* magazine, ABC and NBC TV broadcast news, and year

consisted of five levels: 2015, 2016, 2017, 2018, and 2019. The researcher conducted the

analysis using only the final means in a 4 by 5, $n = 20$ Table 7.

Null Hypothesis 1a: There was no difference in overall tone rating means among media type: ABC and NBC TV broadcasts, *New York Times* digital and print, *Huffington Post* online, *Time* and *Newsweek* magazine from 2015-2019 for USPE in the news media.

Based upon the results of the one-way ANOVA, the researcher rejected the null hypothesis in favor of the alternative that there is a difference in overall tone rating means among news media types at the $p < .05$ significance level. The test resulted in $F(3,4) = 13.43$, p < .000, M = 3.04, and SD = .29.

Null Hypothesis 1b: There was no difference in overall tone rating among media types: ABC and NBC TV broadcasts, *New York Times* digital and print, *Huffington Post* online, *Time,* and *Newsweek* magazine for the individual years 2015, 2016, 2017, 2018, and 2019 on news media stories about USPE.

The researcher **c**onducted a one-factor ANOVA to compare the news media type at four levels: ABC and NBC TV broadcasts, *New York Times* digital and print, *Huffington Post* online, and *Time* and *Newsweek* magazine on overall tone rating for each individual year of 2015, 2016, 2017, 2018, and 2019. The researcher conducted post hoc Tukey-Kramer for statistically significant results.

Based upon the results, the researcher failed to reject the null hypothesis; there is no evidence at the $p < .05$ level that there is a difference in overall tone rating by news media type on the topic of USPE for the year 2015. The test resulted in $F(3,120) = 2.19$, $p = .09$, M = 2.95, and SD = 1.53.

Based upon the results, the researcher failed to reject the null hypothesis; there is no evidence at the $p < .05$ level that there is a difference in overall tone rating by news

media type on the topic of USPE for the year 2016. The test resulted in $F(3,167) = 0.26$, $p = .85$, M = 3.26, and SD = 1.57.

Based upon the results, the researcher rejected the null hypothesis in favor of the alternative; there is significant evidence at the $p < .05$ level that there is a difference in overall tone rating by news media type on the topic of USPE for the year 2017. The test resulted in $F(3,114) = 4.09$, $p = .008$, M = 3.3, and SD = 1.29.

The researcher then performed a Tukey-Kramer test and determined which paired groups contained the significant difference for the year 2017. Table 8 shows a significant difference between *Huffington Post* online (M = 4.09, SD = 1.16) and ABC and NBC broadcast TV (M = 2.58, SD = 1.73). The test resulted in $CD(3.71) = 4.58$ and MSE = .33.

Table 8

2017 Tukey-Kramer Post Hoc Test of Difference Between Paired Media Type Groups

Media Type	Mean difference	N (group 1)	N (group 2)	SE	q value	significant
NYT & Huff	0.71	66	34	0.21	3.44	no
NYT & Time/News	0.21	66	6	0.42	0.51	no
NYT & TV	0.80	66	12	0.31	2.59	no
Huff & Time/News	0.92	34	6	0.43	2.13	no
Huff & TV	1.50	34	12	0.33	**4.58	yes
Time/News & TV	0.58	6	12	0.49	1.19	no

**q critical = 3.71 at a alpha = .05

Based upon the results, the researcher rejected the null hypothesis in favor of the alternative; there is significant evidence at the $p < .05$ level that there is a difference in overall tone rating by news media type on the topic of USPE for the year 2018. The test resulted in $F(3,142) = 3.17$, $p = .03$, M = 2.84, and SD = 1.5.

The researcher then performed a Tukey-Kramer test and determined which paired groups contained the significant difference. Table 9 shows a significant difference

between groups *Huffington Post* online (M = 3.4, SD = 1.45) and ABC and NBC

broadcast TV (M = 2.44, SD = 1.49). The test resulted in *CD*(3.71) = 4.02 and MSE =

.24.

Table 9

2018 Tukey-Kramer Post Hoc Test of Difference Between Paired Media Type Groups

Media Type	Mean difference	N (group 1)	N (group 2)	SE	q value	significant
NYT & Huff	0.38	49	34	0.24	1.61	no
NYT & Time/News	0.52	49	10	0.37	1.42	no
NYT & TV	0.58	49	57	0.21	2.82	no
Huff & Time/News	0.90	30	10	0.39	2.33	no
Huff & TV	0.96	30	57	0.24	**4.02	yes
Time/News & TV	0.06	10	57	0.36	0.17	no

**q critical = 3.71 at a alpha = .05

Based upon the results, the researcher rejected the null hypothesis in favor of the

alternative; there is significant evidence at the *p* < .05 level that there is a difference in

overall tone rating by news media type on the topic of USPE for the year 2019. The test

resulted in *F*(3,144) = 4.24, *p* = .007, M = 2.95, and SD = 1.46.

The researcher then performed a Tukey-Kramer test and determined which paired

groups contained the significant difference. The Table 10 shows a significant difference

between groups *Huffington Post* online (M = 3.5, SD = 1.3) and ABC and NBC broadcast

TV (M = 2.36, SD = 1.63). The test resulted in CD(3.71) = 5.03 and MSE = .23.

Table 10

2019 Tukey-Kramer Post Hoc Test of Difference Between Paired Media Type Groups

Media Type	Mean differenc	N (group 1)	N (group 2)	SE	q value	significant
NYT & Huff	0.57	56	40	0.22	2.62	no
NYT & Time/News	0.07	56	5	0.49	0.15	no
NYT & TV	0.57	56	47	0.21	2.72	no
Huff & Time/News	0.50	40	5	0.50	1.00	no
Huff & TV	1.14	40	47	0.23	**5.03	yes
Time/News & TV	0.64	6	47	0.46	1.40	no

**q critical = 3.71 at a alpha = .05

Null Hypothesis 1c: There was no difference in overall tone rating means

between 2015, 2016, 2017, 2018, and 2019 news stories about USPE for the media types

ABC and NBC TV broadcasts, *New York Times* digital and print, *Huffington Post* online,

and *Time* and *Newsweek* magazine.

Based upon the results, the researcher failed to reject the null hypothesis; there is

no difference in overall tone rating means among 2015, 2016, 2017, 2018, and 2019 at

the $p < .05$ significance level. The test resulted in $F(3,4) = 2.41$, $p < .11$, M = 3.04, and

SD = .46

Based upon the results, the researcher failed to reject the null hypothesis; there is

no difference in overall tone rating for 2015, 2016, 2017, 2018, and 2019 among New

York Time print and online at the $p < .05$ significance level. The test resulted in $F(4,344)$

= 2.4, $p < .43$, M = 3.15, and SD = 1.42. Additionally, based upon the results, the

researcher failed to reject the null hypothesis there is no difference in overall tone rating

for 2015, 2016, 2017, 2018, and 2019   among ABC and NBC broadcast TV at the $p <$

.05 significance level. The test resulted in $F(4,149) = 2.43$, $p < .73$, M = 2.54, and SD =

1.81. The researcher failed to reject the null hypothesis there is no difference in overall

tone rating for 2015, 2016, 2017, 2018, and 2019 among *Huffington Post* online at the *p*

< .05 significance level. The test resulted in $F(4,162) = 2.43$, $p < .15$, M = 3.56, and SD

= 1.35. Finally, the researcher failed to reject the null hypothesis there is no difference in

overall tone rating for 2015, 2016, 2017, 2018, and 2019 among *Time* and *Newsweek*

magazine at the $p < .05$ significance level. The test resulted in $F(4,32) = 2.67$, $p < .57$, M

= 2.94, and SD = 1.37.

Null Hypothesis 2: There was no difference in overall tone rating between ABC

and NBC TV broadcasts, *New York Times* digital and print, *Huffington Post* online, and

Time and *Newsweek* magazine news stories about USPE for the combined years, 2015 to

2019.

The researcher conducted a one-factor ANOVA to analyze the relationship of

news media type at four levels: ABC and NBC TV broadcasts, *New York Times* digital

and print, *Huffington Post* online, and *Time,* and *Newsweek* magazine on overall tone

ratings for all years combined, 2015 to 2019. The researcher performed a Tukey –

Kramer post hoc analysis for statistically significant results (see Table 11).

Based upon the results, the researcher rejected the null hypothesis in favor of the

alternative, noting significant evidence at the $p < .05$ level that there was a difference in

overall tone rating among news media type on the topic of USPE for all years

combined. The test resulted in $F(3,702) = 14.67$, $p < .000$, M = 3.05, and SD = 1.46.

Table 11

Tukey-Kramer Post Hoc Test of Difference Between Paired Media Type Groups

Media Type	Mean difference	group 1	group 2	SE	q value	significant
NYT & Huff	0.39	349	167	0.10	**4.00	yes
NYT & Time/News	0.20	349	37	0.18	1.11	no
NYT & TV	0.68	349	154	0.10	**6.76	yes
Huff & Time/News	0.59	167	37	0.19	3.13	no
Huff & TV	1.07	167	154	0.12	**9.22	yes
Time/News & TV	0.48	37	154	0.19	2.52	no

**q critical = 3.64 at a alpha = .05

The researcher then performed a Tukey-Kramer test and determined which paired groups contained the significant difference at an alpha $< .05$. There was significant difference between paired groups *New York Times* print and online (M = 3.17, SD = 1.41) and *Huffington Post* online (M = 3.56, SD = 1.36). The test resulted in $CD(3.64) = 4.00$ and MSE = .10.

Additional testing revealed a significant difference between paired groups *New York Times* print and online (M = 3.17, SD = 1.41) and ABC and NBC broadcast TV (M = 2.49, SD = 1.72). The test resulted in $CD(3.64) = 6.76$ and MSE = .10.

As well, there was a significant difference between paired groups *Huffington Post* (M = 3.56, SD = 1.41) and ABC and NBC broadcast TV (M = 2.49, SD = 1.72). The test resulted in $CD(3.64) = 9.22$ and MSE = .12.

Null Hypothesis 3: There was no difference in overall tone rating between 2015, 2016, 2017, 2018, and 2019 for all-combined news media type stories about USPE.

The researcher conducted a one-way ANOVA to analyze the relationship of 2015, 2016, 2017, 2018, and 2019 , on overall tone rating of news stories about USPE for all media combined. Based upon the results, the researcher rejected the null hypothesis in favor of the alternative; there is significant evidence at the $p < .05$ level that there is a

difference in overall tone rating among 2015, 2016, 2017, 2018, and 2019 on the topic of

USPE for all media combined. The test resulted in $F(4,702) = 2.38$, $p < .000$, M = 3.12,

and SD = 1.47. The researcher conducted a post hoc Tukey- Kramer to identify

significant paired groups (see Table 12).

Table 12

Tukey-Kramer Post Hoc Test of Significance in Year Paired Groups

Year	Mean difference	group 1	group 2	SE	q value
2015 & 2016	0.07	124	171	0.12	0.61
2015 & 2017	0.34	124	118	0.13	2.52
2015 & 2018	0.32	124	146	0.13	2.49
2015 & 2019	0.25	124	148	0.13	1.95
2016 & 2017	0.26	171	118	0.12	2.11
2016 & 2018	0.39	171	146	0.12	3.34
2016 & 2019	0.32	171	148	0.12	2.75
2017 & 2018	0.66	118	146	0.13	**5.08
2017 & 2019	0.59	118	148	0.13	**4.55
2018 & 2019	0.07	146	148	0.12	0.57

**q critical > 3.88 at a alpha < .05.

The post hoc Tukey-Kramer revealed significant difference between paired

groups for 2017 (M = 3.49, SD = 1.44) and 2018 (M = 2.84, SD = 1.53). The test resulted

in $CD(3.88) = 5.08$ and MSE = .13. Additionally, the researcher found a significant

difference between paired groups 2017 (M = 3.49, SD = 1.44) and 2019 (M = 2.91, SD =

1.54). The test resulted in $CD(3.88) = 4.55$ and MSE = .13.

Null Hypothesis 4a: There was no difference in frequency of positive sentiment

words between ABC and NBC TV broadcasts, *New York Times* online and print,

Huffington Post online, *Time* and *Newsweek* magazine news stories about USPE for the

combined years 2015 to 2019.

The researcher conducted a one-factor ANOVA to analyze the relationship of news media type at four levels: ABC and NBC TV broadcasts, *New York Times* digital and print, *Huffington Post* online, and *Time* and *Newsweek* magazine on positive sentiment frequencies for the combined years 2015 to 2019. The researcher conducted a Tukey – Kramer post hoc analysis for statistically significant results (see Table 13).

Based upon the results, the researcher rejected the null hypothesis in favor of the alternative; there is significant evidence at the p < .05 level that there is a difference in positive sentiment frequency among media type on the topic of USPE for all years combined. The test resulted in $F(3,702) = 2.62$, p < .00, M = .25, and SD = .07. The researcher conducted a post hoc Tukey- Kramer to identify significant paired groups.

Table 13

Tukey-Kramer Post Hoc Test of Difference for "Positive Sentiment" Word Frequency Between Paired Media Type Groups

Media Type	Mean difference	N group 1	N group 2	SE	q value
NYT & Huff	0.02	349	167	0.00	**3.66
NYT & Time/News	0.01	349	37	0.01	1.25
NYT & TV	0.03	349	154	0.00	**7.06
Huff & Time/News	0.03	167	37	0.01	3.08
Huff & TV	0.05	167	154	0.01	**9.19
Time/News & TV	0.02	37	154	0.01	2.55

**q critical = 3.64 at a alpha = .05

There was a significant difference in positive sentiment frequencies between paired groups *New York Times* print and digital (M = .26, SD = .06) and *Huffington Post* online (M = .27, SD = .06). The test resulted in $CD(3.64) = 3.66$ and MSE > .00.

Additionally, the researcher found a significant difference in positive sentiment frequencies between paired groups *New York Times* print and digital (M = .26, SD = .06)

and ABC and NBC broadcast TV (M = .22, SD = .09). The test resulted in $CD(3.64) =$ 7.06 and MSE = .01.

There was a significant difference in positive sentiment frequencies between paired groups *Huffington Post* online (M = .27, SD = .06) and ABC and NBC broadcast TV (M = .22, SD = .09). The test resulted in $CD(3.64) = 9.19$ and MSE = .01.

Null Hypothesis 4b: There was no difference in frequency of negative sentiment words between ABC and NBC TV broadcasts, *New York Times* online and print, *Huffington Post* online, *Time* and *Newsweek* magazine news stories about USPE for the combined years, 2015 to 2019.

The researcher conducted a one-factor ANOVA to analyze the relationship of news media type at four levels: ABC and NBC TV broadcasts, *New York Times* digital and print, *Huffington Post* online, and *Time* and *Newsweek* magazine on negative sentiment frequencies for all years combined, 2015 through 2019. The researcher conducted a Tukey – Kramer post hoc analysis for statistically significant results.

Based upon the results, the researcher rejected the null hypothesis in favor of the alternative; there is significant evidence at the $p < .05$ level that there is a difference in negative sentiment frequency among media type on the topic of USPE for all years combined. The test resulted in $F(3,702) = 2.62, p < .00$, M = .25, and SD = .07. The researcher conducted a post hoc Tukey- Kramer to identify significant paired groups (see Table 14).

Table 14

Tukey-Kramer Post Hoc Test of Difference for "Negative Sentiment" Word Frequency Between Paired Media Type Groups

Media Type	Mean difference	N group 1	N group 2	SE	q value
NYT & Huff	0.02	349	167	0.00	3.55
NYT & Time/News	0.01	349	37	0.01	1.30
NYT & TV	0.04	349	154	0.00	**7.32
Huff & Time/News	0.01	167	37	0.01	1.24
Huff & TV	0.05	167	154	0.01	**9.33
Time/News & TV	0.02	37	154	0.04	0.67

**q critical = 3.64 at a alpha = .05

There was a significant difference in negative sentiment frequencies between paired groups *New York Times* print and digital (M = .24, SD = .06) and ABC and NBC broadcast TV (M = .28, SD = .09). The test resulted in $CD(3.64) = 7.32$ and MSE < .00.

There was a significant difference in negative sentiment frequencies between paired groups *Huffington Post* online (M = .22, SD = .06) and ABC and NBC broadcast TV (M = .28, SD = .09). The test resulted in $CD(3.64) = 9.33$ and MSE = .01.

Null Hypothesis 5a: There was no difference in frequency of positive sentiment words between 2015, 2016, 2017, 2018, and 2019 about USPE news stories for all news media combined.

The researcher conducted a one-factor ANOVA to analyze the relationship of year at five levels: 2015, 2016, 2017, 2018, and 2019 on positive sentiment frequencies for all media combined. The researcher conducted a Tukey – Kramer post hoc analysis for statistically significant results.

Based upon the results, the researcher rejected the null hypothesis in favor of the alternative; there is significant evidence at the $p < .05$ level that there is a difference in

positive sentiment frequency among 2015, 2016, 2017, 2018, and 2019 on the topic of

USPE for all media combined. The test resulted in $F(4,702) = 2.38$, $p < .00$, M = .25, and

SD = .07. The researcher conducted a post hoc Tukey- Kramer to identify significant

paired groups (see Table 15).

Table 15

Tukey-Kramer Post Hoc Test for "Positive Sentiment" Frequency in Year Paired Groups

Year	Mean difference	group 1	group 2	SE	q value
2015 & 2016	0.01	124	171	0.01	2.09
2015 & 2017	0.03	124	118	0.01	**4.00
2015 & 2018	0.01	124	146	0.01	1.38
2015 & 2019	0.01	124	148	0.01	1.95
2016 & 2017	0.01	171	118	0.01	2.11
2016 & 2018	0.02	171	146	0.01	3.34
2016 & 2019	0.02	171	148	0.01	2.75
2017 & 2018	0.03	118	146	0.01	**5.08
2017 & 2019	0.03	118	148	0.01	**4.55
2018 & 2019	0.00	146	148	0.01	0.57

**q critical > 3.88 at a alpha < .05.

There was a significant difference in positive sentiment frequencies between

paired groups 2017 (M = .28, SD = .07) and 2015 (M = .25, SD = .07). The test resulted

in $CD(3.88) = 4.00$ and MSE = .01.

There was a significant difference in positive sentiment frequencies between

paired groups 2017 (M = .28, SD = .07) and 2018 (M = .24, SD = .07). The test resulted

in $CD(3.88) = 5.08$ and MSE = .01.

There was a significant difference in positive sentiment frequencies between

paired groups 2017 (M = .28, SD = .07) and 2019 (M = .24, SD = .08). The test resulted

in $CD(3.88) = 4.55$ and MSE = .01.

Null Hypothesis 5b: There was no difference in frequency of negative sentiment words between 2015, 2016, 2017, 2018, and 2019 about USPE news stories for all news media combined.

The researcher conducted a one-factor ANOVA to analyze the relationship of year at five levels: 2015, 2016, 2017, 2018, and 2019 on negative sentiment frequencies for all media combined. The researcher performed a Tukey – Kramer post hoc analysis for statistically significant results.

Based upon the results, the researcher rejected the null hypothesis in favor of the alternative; there is significant evidence at the *p* < .05 level that there is a difference in negative sentiment frequency among year on the topic of USPE for all media combined. The test resulted in $F(4,702) = 2.38$, $p < .00$, M = .24, and SD = .07. The researcher conducted a post hoc Tukey- Kramer to identify significant paired groups (see Table 16).

Table 16

Tukey-Kramer Post Hoc Test for "Negative Sentiment" Frequency in Year Paired Groups

Year	Mean difference	group 1	group 2	SE	q value
2015 & 2016	0.01	124	171	0.01	2.06
2015 & 2017	0.03	124	118	0.01	**4.01
2015 & 2018	0.01	124	146	0.01	1.49
2015 & 2019	0.01	124	148	0.01	1.35
2016 & 2017	0.01	171	118	0.01	2.27
2016 & 2018	0.02	171	146	0.01	3.78
2016 & 2019	0.02	171	148	0.01	3.63
2017 & 2018	0.04	118	146	0.01	**5.63
2017 & 2019	0.03	118	148	0.01	**5.50
2018 & 2019	0.00	146	148	0.01	0.16

**q critical > 3.88 at a alpha < .05.

There was a significant difference in negative sentiment frequencies between

paired groups 2015 (M = .25, SD = .07) and 2017 (M = .22, SD = .07). The test resulted

in CD(3.88) = 4.01 and MSE = .01.

There was a significant difference in negative sentiment frequencies between

paired groups 2017 (M = .22, SD = .07) and 2018 (M = .26, SD = .07). The test resulted

in CD(3.88) = 5.63 and MSE = .01.

There was a significant difference in negative sentiment frequencies between

paired groups 2017 (M = .22, SD = .07) and 2019 (M = .26, SD = .07). The test resulted

in CD(3.88) = 5.50 and MSE = .01.

Null Hypothesis 9a: There was no difference between observed proportions of

positive and negative words in all media for 2015 to 2019 from test proportions.

The researcher conducted a test of difference in proportions to analyze the

relationship of positive and negative sentiment for all media combined and all years

combined for USPE in the news media. The researcher used the test proportions of .25

for positive and .25 for negative frequencies. The remaining .5 was attributed to words

"to be ignored" having no sentiment. The researcher used .25 as test proportions based

upon initial sampling of data in which the researcher observed sentiment patterns close to

50% of words having no sentiment. This led the researcher to create a test proportion of

.25 for positive and negative sentiment.

The researcher failed to reject the null hypothesis there is no difference in

observed proportions from the hypothesized proportions of .25 for negative and positive

frequency proportions at a CI = 95%. The test resulted in negative proportions p = .73, z

= .3, observed sample M = .24, and a CI critical of .21 to .28. The test resulted in

positive proportions $p = .83$, $z = .2$, sample proportion M = .25, and a CI critical of .22 to

.29.

Table 17

Negative and Positive "Sentiment" Word Frequencies by Year: All Media Types Combined

Year	N	Mean		Variance		SD	
		positive	negative	positive	negative	positive	negative
2015	123	0.25	0.25	0.005	0.005	0.067	0.068
2016	170	0.26	0.24	0.004	0.005	0.067	0.067
2017	117	0.28	0.22	0.004	0.004	0.067	0.067
2018	145	0.24	0.26	0.005	0.005	0.072	0.073
2019	147	0.24	0.26	0.006	0.006	0.079	0.080

The researcher explored United States K-12 public education in the media and

created an overall tone rating based upon a news story's positive and negative sentiment

proportions. The overall tone rating scale used a 1 to 5 score to indicate how positive or

negative a news story was towards USPE. The rating was like public opinion polls by

Gallup and *EdNext*, asking respondents to grade U.S. public education using a letter

grade A, B, C, D, or F. Both the letter grades provided by respondents on public opinion

polls and overall tone rating scale used a five-tiered score. The researcher converted

letter grades to a 1 to 5 numerical overall tone rating score to be used for the hypothesis

in the following statistical tests and results.

Because the variables were independent from each other, except from topic

similarity (USPE), a linear regression and Pearson Product Moment Correlation, *r*,

indicated by previous testing tables could not be performed to predict nor search for a

relationship. Instead, the researcher used an independent two-sample *t*-test of difference

in means to search for a difference between the two variables, public opinion responses

and overall tone ratings or sentiment frequencies. The means were normally distributed

with similar variances and the large sample size of n > 30. The researcher conducted the

following analyses with a *t*-test for difference to determine if positive and negative

overall tone ratings of USPE in the news media were different than positive and negative

public opinion ratings on USPE across all media for each year and combined years. The

researcher also conducted *z* tests of difference in proportions to compare public opinion

and overall tone and positive and negative sentiment frequencies.

The researcher used the data from the *Gallup Poll: State of Education* as well as

EdNext on "grading of public education in the nation." Each of the two public opinion

surveys used an approximately 100 stratified sample, for a total of n = 200. For data

analysis, the researcher converted survey response letter A and B to overall tone rating

scores of 5 and 4 and categorized as positive sentiment towards USPE, while letter grades

D and F to overall tone ratings 2 and 1and coded as negative sentiment towards USPE,

and letter grade C to overall tone rating score of 3 and coded as neither positive nor

negative sentiment towards USPE.

Null H6: There was no difference between the of overall tone rating of all news

media stories about USPE and public opinion responses to surveys about USPE in 2015,

2016, 2017, 2018, nor 2019. The researcher conducted an independent two sample *t*-test

for difference to determine a possible difference in means

2015

Based upon the results of the *t*-test of independent sample means, the researcher

failed to reject the null hypothesis; there is no evidence at the *p* < .05 level that there is a

difference between overall tone rating (M = 3.15, SD = 1.39) and public opinion polls (M

= 2.93, SD = .87) on the topic of USPE for the year 2015. The test resulted in $t(184)$ = -1.57 and p = .12.

2016

      Based upon the results of the *t*-test of independent sample means, the researcher rejected the null hypothesis in favor of the alternative; there is evidence at the $p < .05$ level that there is a significant difference between overall tone rating (M = 3.23, SD = 1.46) and public opinion polls (M = 2.97, SD = .9) on the topic of USPE for the year 2016. The test resulted in $t(277)$ = -1.97 and p = .05.

2017

      Based upon the results of the *t*-test of independent sample means, the researcher rejected the null hypothesis in favor of the alternative; there is evidence at the $p < .05$ level that there is a significant difference between overall tone rating (M = 3.49, SD = 1.44) and public opinion polls (M = 2.97, SD = .9) on the topic of USPE for the year 2017. The test resulted in $t(174)$ = -3.55 and $p < .001$.

2018

      Based upon the results of the *t*-test of independent sample means, the researcher failed to reject the null hypothesis; there is no evidence at the $p < .05$ level that there is a difference between overall tone rating (M = 2.84, SD = 1.53) and public opinion polls (M = 2.87, SD = .9) on the topic of USPE for the year 2018. The test resulted in $t(217)$ = .22 and p = .82.

2019

Based upon the results of the *t*-test of independent sample means, the researcher

failed to reject the null hypothesis; there is no evidence at the *p* < .05 level that there is a

difference between overall tone rating (M = 2.91, SD = 1.54) and public opinion polls (M

= 2.94, SD = .82) on the topic of USPE for the year 2019. The test resulted in *t*(210) =

.24 and *p* = .81.

The researcher was unable to conduct an analysis for Null Hypothesis 7 because a

Pearson Product Moment Correlation Coefficient, *r*, is most effective when it described

the positive or negative relationship between two variables of different measurements

indicated by a positive or negative slope. Because public opinion responses and overall

tone rating used the same five-tiered measurement scale and were independent,

regression and correlation results would be inconclusive. The researcher replaced

Pearson r correlation with a *z* test for difference of proportions. A *z* test for difference of

proportions allowed the researcher to compare positive and negative tone of public

opinion responses on USPE and positive and negative news media tone of USPE. The

researcher renamed the new null hypotheses below, Null H10a, Null H10b, and Null

H10c. and Table 18 shows frequency of survey responses about USPE by letter grade

response and year for *Gallup* and *EdNext*.

Table 18

Survey Responses from Gallup and EdNext: "What grade would you give public education in the nation?" Data for Proportion.

Letter Response	Year and Frequency of Respondents					Total
	2015	2016	2017	2018	2019	
A	5	7	6	5	4	27
B	39	42	41	38	39	199
C	103	94	95	98	106	496
D	36	37	33	43	39	188
F	13	12	13	16	10	64
Total	196	192	188	200	198	974

Table 19 showed overall tone rating scores for all news media reports/stories about USPE by year for all media types and the researcher compared proportions of positive and negative poll responses and positive and negative overall tone ratings.

Table 19

Overall Tone Ratings Data from News Stories About USPE for z-Test of Proportion

Overall Tone Rating	Year and Frequency of Respondents					Total
	2015	2016	2017	2018	2019	
5	29	43	23	54	51	200
4	11	13	8	8	8	48
3	36	39	23	31	39	168
2	11	14	12	10	2	49
1	37	62	52	43	48	242
Total	124	171	118	146	148	707

Null H10a: There was no difference between proportions of negatively toned (overall tone rating 1 and 2) news articles about USPE and proportions of negative public opinion responses (letter grade of D and F) on surveys about USPE for the combined years, 2015 to 2019.

The researcher conducted a *z* test for difference of proportions to compare the

proportions of negative survey responses to negative overall tone ratings.

Based upon the results of the *z* test of proportions, the researcher rejected the null

hypothesis in favor of the alternative; there is significant difference at the *p* < .05 level in

the proportions of negatively toned news articles to the proportions of negatively toned

public opinion survey responses about USPE. The test resulted in a significantly higher

proportion of negatively toned news articles on USPE (.09) than negatively toned public

opinion responses on USPE. The test resulted in z = 4.08, and *p* < .001.

Null H10b: There was no difference between proportions of positively toned

(overall tone rating 4 and 5) news articles about USPE and proportions of positive public

opinion responses (letter grade of A and B) on surveys about USPE for the combined

years, 2015 through 2019.

Based upon the results of the *z* test of proportions, the researcher rejected the null

hypothesis in favor of the alternative; there is significant difference of at the *p* < .05 level

in the proportions of positively toned news articles about USPE to that of positively toned

public opinion survey responses about USPE. The test resulted that there was a

significantly higher proportion of positively toned new article about USPE (.18) than

positively toned public opinion responses about USPE. The test resulted in z = 7.88, and

p < .001.

Null H10c: There was no difference between proportions of neutral toned

(overall tone rating of 3) news articles about USPE and proportions of neutral public

opinion responses (letter grade of C) on surveys about USPE for the combined years,

2015 to 2019.

Based upon the results of the z test of proportions, the researcher rejected the null hypothesis in favor of the alternative; there is significant difference at the $p < .05$ level in the proportions of neutrally toned news articles to that of neutral public opinion survey responses about USPE. The test resulted that a significantly lower proportion of news article had a neutral tone (-.27) than neutral public opinion responses. The test resulted in $z = 11.25$ and $p < .001$.

Summary

The analysis revealed over a five-year period and among media types that there are noticeable differences in sentiment and tone of news article and stories reporting on USPE for some years and media types. Television network news resulted in the most negative tone ratings while *Huffington Post* resulted in the most positive tone ratings for news media reporting on USPE. These two media types and communication formats varied greatly in audiences and relied on different mechanisms for reporting. Television network news relied much more on images to drive stories, which may have resulted in more negative language and therefore, tone. *Huffington Post* analyses revealed stories containing more positive words and therefore positive tone overall. The year 2017 resulted in much more positive media sentiment on USPE compared to most other years.

When comparing the differences between media tone and public opinion using a *t*-test for independent means, the researcher found that the overall tone rating based upon sentiment frequencies did not result in normally distributed data and had large tails in the very positive and very negative ends, which differed greatly from public opinion polls on USPE, which was normally distributed showing slight skew towards very negative tone towards USPE on public surveys. The normally distributed survey data and resulting

differences with news media overall tone ratings may have revealed an inequitable rating scale for news media stories on USPE.

  The resulting *z*-test of proportions showed a proportion of sentiment words were consistent across media types and years. The results showed that news media, when reporting on USPE, used positive and negative words similarly across news stories on USPE.   The researcher found that one-quarter of words used in USPE news stories were positive and one-quarter negative while the remaining 50% of words had neutral sentiment. These results indicated news media implemented positive and negative language equally across news stories about USPE. The year 2017 resulted in the most positive among the five years for overall tone of USPE in news media. Public opinion on USPE follows a traditionally normal distribution while average tone based upon word frequencies skews more positive and more negative while TV resulted in overly negative language use compared to *Huffington Post* online which had the most positive language use of all media.

Chapter Five: Discussion

Introduction

The researcher conducted a quantitative content analysis to study overall tone and

sentiment on the topic of U.S. K-12 public education in four different news media types

over a five-year period from 2015 to 2019. The study focused on three main variables

and analyzed potential differences between the variables and how the variables revealed

trends in media, as well as public opinion on United States K-12 public education. The

analysis revealed potential relationships about news media's reporting of USPE and how

the positive and negative sentiment compared to the public's sentiment.

To analyze large amounts of textual data, the researcher used computer-aided

coding of content, which increased validity and fidelity by removing judgement made by

individual human coders. The coding and subsequent analysis revealed much about the

language and word usage in various media and over time regarding sentiment. The study

highlighted positive, negative, and neutral language within news media, as well as

showed how words and language conveyed the message of USPE to audiences. The

following discussion of results led to further questions about tone and sentiment in news

media, as well as the future of computer-aided content analysis to analyze larger amounts

of data or big data. The researcher concluded the results and discussion provided insight

into news media neutrality and reporting, as well as patterns in USPE reporting.

Discussion

Null Hypothesis 1a: There was no difference in overall tone rating means among

media type: ABC/NBC TV broadcasts, *New York Times* digital & print, *Huffington Post*

online, *Time* and *Newsweek* magazine, and years: 2015, 2016, 2017, 2018, and 2019 for

USPE in the news media.

The researcher found a difference in the means of media type and years. The

initial indication revealed potential trends in news media coverage of USPE. The result

may have indicated news media type differed in overall tone and positive and negative

language use. Different media may treat similar news differently and gatekeeping theory

suggested one media type: TV, Magazine, Print and Online, and Digital may have an

interest in reporting USPE as negative or positive to suit the needs of the medium or the

company reporting the stories. Additionally, the variable year also showed a difference

in overall tone rating. The researcher theorized the two variables, media type, and year

may have coincided to create news reporting more negative or more positive than based

upon media special interests.

Null Hypothesis 1b: There was no difference in overall tone rating between

media types: ABC/NBC TV broadcasts, *New York Times* digital & print, *Huffington Post*

online, *Time* and *Newsweek* magazine for the years 2015, 2016, 2017, 2018, and 2019 on

news media stories about USPE.

Based upon the results, the researcher found for the years 2017, 2018, and 2019

Huffington Post digital and TV news were significantly different in overall tone when

reporting on USPE. The findings may have indicated *Huffington Post* used more positive

language and TV news used more negative language. Because more negative traumatic

images and videos accompanied television news reports on stories about USPE, negative

language might have followed the images and negative language narrated and described

video more often because of the ability to elicit an emotional response from viewers and

in turn be more likely to be a news story in television news. Also, drama and chaos could

be more prevalent on television in general, which could result in a more negative

language leading to more negative tone. Because of the relatively new medium of

original digital-only news sources like *Huffington Post*, there could have been less time to

establish norms for negative reporting like traditional news media. Although there was

not a significant difference for all years surrounding *Huffington Post* and ABC/NBC

broadcast news, the most recent years showed the most significant difference potentially

indicating digital only is trying to reflect differences within positive and negative

sentiment tone and story selection specifically about USPE.

Another alternative explanation could emerge from broadcast TV news used

stories with "legs" or multiple perspectives, which increased the frequency of one

negative story being published multiple times over extended days or weeks, while digital-

only news may be more inclined to run episodic stories to grab a variety of viewers and

consumers in new models of circulation; broader than pay to read subscription news

organizations. For example, if television news ran stories on a school shooting and

continued to find new angles for one story, a pattern may have emerged of negative

stories about USPE continually being ran or having legs in television, while *Huffington*

Post online would benefited more from various stories on varied topics. Potentially

positive stories lead to more advertising dollars for online only new sources.

Also apparent in the data, *Huffington Post* online as well as ABC/ NBC broadcast

TV news average (mean) overall tone rating was highest in the year 2017. Although

there was a significant difference in mean overall tone rating between the two groups, the

data revealed trends in USPE reporting higher in 2017 than other years of the study.

Reasons for higher positive language and overall tone ratings in 2017 may be events or

lack of events about USPE in 2017 or in the sampling size, which showed 2017 had the

smallest sample size at n = 114.

Null Hypothesis 1b: There was no difference in overall tone rating means between

2015, 2016, 2017, 2018, and 2019 news stories about USPE for the media types

ABC/NBC TV broadcasts, *New York Times* digital & print, *Huffington Post* online, *Time*

and *Newsweek* magazine.

The null hypothesis considered year as a factor for overall tone rating means.

When the researcher used only overall tone rating means and ran an ANOVA, the

analysis resulted in no significant difference for any year within a media type. The

researcher considered, based on overall tone rating means, media types remained

consistent in positive and negative language and subsequent overall tone when reporting

on USPE. This similarity of means of overall tone ratings later disappeared when the

researcher used the full sample data and implemented post hoc analysis. Null Hypothesis

1b indicated an uptick in overall tone for 2017, when looking at media types individually,

a difference appeared across the five-year period of the study. All media overall tone

rating means fluctuated between .56 above and below neutral, indicated that the

researcher's method for overall tone ratings were consistent for the four different media

types. *Huffington Post* overall tone ratings were above neutral, while *New York Times*

were very slightly above neutral, *Time* and *Newsweek* magazine slightly below, and TV

news below neutral. The difference between overall tone rating mean was 1.02 which

indicated clear differences while maintaining a consistent spread. The spread of means

validated the overall tone rating method of using positive and negative word percentages

to determine overall tone rating for each article or story in the study, but frequency

thresholds set by the researcher categorized many news stories about USPE toward the

tail end of ratings.

Null Hypothesis 2: There was no difference in overall tone rating between

ABC/NBC TV broadcasts, *New York Times* digital & print, *Huffington Post* online, *Time*

and *Newsweek* magazine news stories about USPE for the all-combined years 2015 to

2019.

The researcher conducted a one factor ANOVA and found significant difference

of overall tone rating means between three paired groups of media types over the

combined five-year period. The analysis resulted in significant results for paired groups

New York Times and *Huffington Post*, *New York Times* and ABC / NBC broadcast news,

and *Huffington Post* and ABC / NBC broadcast news.

The strongest difference indicated by the post hoc test identified *Huffington Post*

overall tone rating mean as significantly higher than broadcast TV news on USPE. The

researcher found a difference in overall tone among media types and years 2017, 2018,

and 2019 in Null Hypothesis 1 analysis. The significant difference in the three-year

sample was enough to change the difference over the five-year period and confirmed the

difference in media type seen in both analyses. U.S. K-12 public education in ABC and

NBC broadcast TV news stories were significantly lower than both *Huffington post* and

New York Times, which showed slightly positive overall tone rating means over time.

The negative TV tone rating may have indicated negative stories on USPE were more

news worthy on TV or that TV news used negative stories to drive viewership. Another

explanation could be matching positive and negative language with video footage. For

story continuity, TV news may pair scripts for broadcasters with obtained video or stock

footage on USPE stories. Images and videos available to news outlets to accompany

USPE news reports might have increased negative language editorial choices and written

transcripts especially if video and images are overtly shocking or negative. Although,

with the increase in media outlets providing users with digital formats, future research

may see an increase in online video, which may or may not have driven written news

stories.

Null Hypothesis 3: There was no difference in overall tone rating between 2015,

2016, 2017, 2018, and 2019 for all-combined news media type stories about USPE.

The researcher conducted a one factor ANOVA and identified paired groups for

each found to be significantly different. Paired groups 2017 and 2018, as well as 2017

and 2019 showed a significant difference in overall tone rating. The year 2017 showed

the most positive overall tone rating mean of 3.49 out of a 1 to 5 tone rating scale. The

positive overall tone rating for the year 2017 compared to relatively neutral mean tone

ratings of 2018 and 2019, may be due to various factors. Some of the factors may have

included USPE events, while others may have included news trends and others sampling

and research design. The researcher used large samples to minimize the sampling effects

in the data analysis, so potentially 2017 may have more positive language use across

many news topics and media types and not isolated to USPE.

Null Hypothesis 4a: There was no difference in frequency of positive sentiment

words between ABC & NBC TV broadcasts, *New York Times* online & print, *Huffington*

Post online, *Time* & *Newsweek* magazine news stories about USPE for the all-combined

years 2015 to 2019.

The researcher conducted a one factor ANOVA and found a significant difference in the frequency of positive words in paired groups based upon the Tukey Kramer post hoc analysis. Paired groups included *New York Times* and *Huffington Post*, *New York Times* and ABC NBC broadcast news, and *Huffington Post* and ABC and NBC broadcast news. The largest and most significant difference appeared between *Huffington Post* and TV for stories about USPE. For all years there was a 5% mean difference and showed *Huffington Post* positive word sentiment frequency mean as 27% compared to 22% positive word frequency for TV news when reporting on stories about USPE.

Null Hypothesis 4b: There was no difference in frequency of negative sentiment words between ABC & NBC TV broadcasts, *New York Times* online & print, *Huffington Post* online, *Time & Newsweek* magazine news stories about USPE for the all-combined years 2015 to 2019.

As seen with positive word frequencies, negative word frequencies revealed similar patterns in word sentiment, and showed significant differences between paired groups *New York Times* and TV news, and *Huffington Post* and TV news for stories about USPE. Negative word frequency mean was highest in TV news and may have indicated a pattern where the TV format favored negative sentiment language and word choice by TV news anchors and editors or that video and images guided spoken words. An explanation could also be because of use of interviews the interviewees' responses may have entailed descriptions of events using more negative language than would one voice from an article's author. The multiple voices and perspectives may have explained an increase in negative word frequency compared to *New York Times* and *Huffington Post*, who usually had one author for articles on USPE. Another explanation for an increase of

positive language and decrease of negative could be a result of a "beat writer" who continually wrote stories about USPE. Over time, the beat writers may have naturally decreased negative language in writing on a topic, like USPE, tending to consciously or sub consciously favor neutral or balance word sentiment usage. Also, beat writers may have been desensitized to education issues within their beat due to a normative effect and therefore struggled to find and report on stories other than the mundane drawing little strong valence and emotion from readers.

Null Hypothesis 5a: There was no difference in frequency of positive sentiment words between 2015, 2016, 2017, 2018, and 2019 about USPE news stories for all news media combined.

The researcher conducted a one factor ANOVA to search for a difference in positive word frequencies by year and found significant differences in paired groups 2015 and 2017, 2017 and 2018, and 2017 and 2019. The results confirmed previous results and revealed 2017 news language to be more positive on USPE than other years. Education news in 2017 may be the positive difference as Valerie Strauss (2017) from the Washington Post stated that 2017 saw the reduction in the importance of student standardized tests to determine teacher evaluations and school quality.

Null H5b: There was no difference in frequency of negative sentiment words between 2015, 2016, 2017, 2018, and 2019 about USPE news stories for all news media combined.

The researcher conducted a one factor ANOVA to search for a difference in negative word frequencies by year and found significant differences in paired groups 2015 and 2017, 2017 and 2018, and 2017 and 2019. The results confirmed previous

results and showed 2015, 2018, and 2019 as more negative than 2017. Because news

stories contained sentiment words coded as neutral or "to be ignored," the researcher

distinguished between the three sentiment words and found approximately 50% of words

in any news article about USPE had no positive or negative sentiment. And while

analysis revealed negative language differences by year, 2017 had the least negative

language use in news.

Null Hypothesis 9a: There was no difference between observed proportions of

positive and negative words in all media for 2015 to 2019 from test proportions.

The researcher conducted a test of proportions to see if proportions of positive

and negative word frequency differed than 25% of words across all media and years

analyzed. The researcher found no difference between the proportions from 25%. The

results indicated news stories on USPE used a similar amount of positive and negative

language over the five-year period when looking at all media combined. However, due to

disproportionately large *New York Times* sample and small news magazine sample the

five-year result is less valid for all media on USPE and may have reflected *New York*

Times more than other media.

Null Hypothesis 6: There was no difference between the of overall tone rating of

all news media stories about USPE and public opinion responses to surveys about USPE

in 2015, 2016, 2017, 2018, 2019.

The researcher converted letter grades of A, B, C, D, and F into overall tone

rating scores of 5, 4, 3, 2, 1 for the purpose of comparison. The national surveys asked

respondents to grade the public school system nationally. Each survey respondent's

answer converted to a single overall tone rating score, was equal to one news article or

news story's overall tone rating about USPE. The researcher conducted an independent

two sample *t*-test to determine if the means differed between overall tone rating of news

articles on USPE and public survey responses about USPE. The researcher found similar

results to other hypotheses; 2016 and 2017 which showed a significant difference

between the means. The researcher found public opinion responses followed a normal

distribution; and therefore, 2016 and 2017 with a positive overall tone rating mean would

show a significant difference. However more telling was 2015, 2018, and 2019 public

opinion did not differ from overall tone ratings. USPE opinion and USPE reporting did

not show consistent agreement over time; and therefore, the researcher was unable to

draw a conclusion that linked a relationship between news reporting on USPE and public

opinion on USPE.

Null Hypothesis 10a: There was no difference between proportions of negatively

toned (overall tone rating 1 and 2) news articles about USPE and proportions of negative

public opinion responses (letter grade of D and F) on surveys about USPE for the

combined years 2015- 2019.

The researcher conducted a *z*-test of proportions to compare the proportions of

negative survey responses to negative overall tone ratings. The *z*-test of proportions

revealed a significant difference of proportions between overall tone of USPE in the news

media and public opinion. News media overall tone was much more negative than public

opinion and confirmed that survey results followed, and normal distribution of responses

compared to overall tone rating scale developed and applied by the researcher. Based

upon the research methodology, USPE in the news media was 9% more likely to have a

negative overall tone rating than public opinion about USPE.

Null Hypothesis 10b: There was no difference between proportions of positively toned (overall tone rating 4 and 5) news articles about USPE and proportions of positive public opinion responses (letter grade of A and B) on surveys about USPE for the combined years 2015 through 2019.

The researcher conducted a *z*-test of proportions to compare the proportions of positive survey responses to that of positive overall tone ratings. The *z*-test of proportions revealed a difference of proportions and USPE in the news media was positively toned, based on overall tone ratings at a higher proportion than survey respondents rated USPE. Based upon the research methodology, USPE in the news media was 18% more likely to have a positive overall tone rating than public opinion.

Null Hypothesis 10c: There was no difference between proportions of neutral toned (overall tone rating of 3) news articles about USPE and proportions of neutral public opinion responses (letter grade of C) on surveys about USPE for the combined years 2015 through 2019.

The researcher conducted a *z*-test of proportions to compare the proportions of neutral survey responses (C) to that of neutral overall tone ratings (3). The *z*-test of proportions revealed a difference of proportions and USPE in public opinion was neutral or average toned, based on responses at a higher proportion than survey respondents rated USPE. Public opinion polls respondents were 21% more likely to rate USPE as neutral compared to news media stories overall tone ratings. The normal distribution found in *EdNext* and *PDK/Gallup* poll responses about USPE differed than overall tone ratings. The cause of the discrepancy could have been due to the researcher's creation of the overall tone rating scale, or the news media reporting USPE as episodic events which

sensationalized extremely positive and negative stories causing extremes compared to generalized public opinion which may be a more thematic less extreme reflection of USPE.

Summary of Findings and Future Research

The findings revealed USPE in the news media differed in positive and negative sentiment language and tone among media type and year. Some potential factors for these findings could have included newsworthiness and reporting behaviors and standards, positive and negative language identification, overall tone rating scale, sampling, USPE events, and images and video driving language. Digital news media, such as *Huffington Post* revealed more positive tone and sentiment about USPE than TV evening news transcripts. Also, news media language use was not significantly different between media outlets like, *New York Times* and news magazines. These findings echoed Coe and Kuttner's (2018) research which found that education news on TV often centered around violent events, which could explain negative tone and word usage in USPE in TV evening news. While Coe and Kuttner (2020) used TV news transcripts and human coders to identify qualitative and quantitative, their research did not look at positive and negative word sentiment usage to determine overall tone. As well, this study compared USPE in different media, which adds to a small developing body of research to understand USPE in media. Also, the researcher did not see a gradual increase in negative-toned news stories about USPE over the five years compared to Leetaru's (2019) analysis of *New York Times* for all news over 50 years, which did see news becoming negative. From the analysis the researcher concluded that media type and format may be more of a driver for positive and negative news in USPE than previously

thought and that news organizations and journalists valued USPE episodic, dramatic events more than thematic issues in education. Year did not seem to be a large variable in determining positive or negative tone and although 2017 showed an upward sentiment trend, more research would be needed to find more evidence that years do change significantly in tone as seen in Leetaru's (2019) research across all topics but limited to New York Times.

In this study the researcher identified patterns and quantitative trends, and by eliminating human coding, controlled factors and increased fidelity and repeatability. The researcher created a tone rating scale available to other researchers for analysis on news media topics, and future research is necessary to identify media's role in framing topics through devices, such as language. In the researcher's opinion studies on news media reporting and language were important for media outlets, journalists, the public, education spokespersons, and stakeholders to understand and control how media portrays topics in the news. Big data quantitative media research combined with qualitative media and public opinion may be the future of research.

Future research into news media, language, and USPE could include source of news and origin of public opinion. The researcher is interested in studying positive and negative tone of different media types and the psychology and physiology of language in opinion formation. From the study the researcher determined that source of news and opinion were multi-dimensional, and language and images may be 2-dimensions in a complex system of news transmission and public opinion. Following studies by Yakov et al. (1991), Alhamdan et al. (2014), and Cohen (2010) on teachers in the media, the researcher was interested in news reports of school districts in local media and language,

topics, and public response. The advancement of computer-aided sentiment and data mining could allow for increased big data research that could result in valuable findings, understandings, and advancements in future communication techniques by stakeholder entities. Future research into using sentiment to find average tone of news content and applying the medias cultivation effect on public opinion may offer insight into long term attitude formation. Determining a solid methodology for average tone of news that reflects the accuracy of human coders but applies computer aided sentiment to draw upon large data sets is an interesting future research path. This may be important as more news sources are created and the abundance of news aggregators increases so does the potential for sentiment and tone to identify fake news from objective news.

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VITA

Thomas P. Butler received his Doctor of Educational Administration and Missouri superintendent certification from Lindenwood University in St. Charles, Missouri in 2021 following the completion of his Master of Arts in School Administration and Missouri principal certification in 2011. Beginning in 2010 Thomas worked as an elementary art teacher at North Glendale Elementary School in the Kirkwood R-7 School District in St. Louis, Missouri where he is currently employed and belongs to the following professional organizations: National Arts Education Association, Missouri Arts Educational Association as well as the Alpha Chi Honor Society. As an elementary art teacher, Thomas has enjoyed teaching art and creative problem solving to kindergarten through 5th grade.

Prior to attending Lindenwood University, Thomas attended Webster University from 2003-2006 where he received his Master of Arts in Teaching and initial teacher certification in Art and Mathematics. Upon graduation Thomas gained employment at Northwest Valley Middle School in the Northwest R-1 School District teaching 7th grade Mathematics for one year and Art for the next 5 years. While teaching at Northwest Valley Middle School Thomas coached high school football as an assistant.

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