

Watching the Watchers: A Meta-thematic Analysis of Media Effects Studies of Visual Communication

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ABSTRACT

The world produces and consumes images at an unprecedented rate. Therefore, the need to understand the effects of these media is greater than ever before. Though the effectiveness of visuals in communication is widely assumed, it is also poorly understood. The great bulk of visual studies is in rhetoric. Visual studies of media effects are relatively few. Though there is little theory specific to visual communication, the growing body of literature on the effects of visual messages presents this question: What are the most influential media effects studies of visual communication, and how are they situated within communication theory? A meta-thematic analysis of the communication literature answers these questions using the Web of Science database to identify the most-cited papers on media effects of visual communication. A content analysis studied the types of visual media, communication theory, participant populations, experimental variables, research paradigms, and journals that publish these papers. This analysis describes several themes in this body of literature. Information-processing models dominate theory in this research, with "recall" surfacing as the most used dependent variable. These studies typically use either no guiding theory or a theory that differs from the larger communication field. Further analysis demonstrates the need for additional theory.

Keywords: Visual Communication, Meta-thematic Analysis, Media Effects, Highly Cited Papers, Theoretical Analysis.

INTRODUCTION

Humans like to think of themselves as being great communicators, and we are. No other creature has any ability to communicate that approaches our own. However, as an academy, we tend to think of communication in terms of language and technology. This somewhat limited scope can overlook other essential means of communication. Technology and speech do not account for most of human history as we have a heritage much older than either. Perlmutter acknowledges this by saying, "We are visual animals. Everything we do and have done has a visual component" (2014, p. 12). Though life has a visual component, the communication literature historically lacks one. *Journalism and Mass Communication Quarterly*, established in 1924, rarely published studies of visual communication over its first six decades. The portion amounted to just one article out of 40, or 2.5% (Tsang, 1984). This poor representation in the literature points to a slow start in visual communication research that is changing as the field gains recognition in the academy.

In a 2004 analysis of visual communication studies, Barnhurst, Vari and Rodriguez found that "Visual studies has become central to the communication discipline" (2004, p. 631). The following year, Moriarty and Barbatsis (2005) conducted a rhizome analysis that linked visual attributes to virtually all inquiry forms. Perlmutter states that by 2008 "[visual studies] had definitely 'arrived' in the academy" (2014, p. 11). Moreover, by 2020, the power of visual communication was widely assumed: "Visual stimuli are powerful because they are arbiters of the reality

humans perceive, which necessarily affects the way they live that reality" (Newton, 2020, p. 409). Also, by 2020, the reality lived by most people had incorporated visual communication in ways never before realized. For the first time in history, most adults in the industrialized world carried a camera with them every day (Newzoo, 2020). Unprecedented access to photography and the internet means society now makes, shares, and views more photographs than ever before. Though widely integrated into daily life (Humphreys, 2018) and holding a position as central to communication (Barnhurst et al., 2004; Goransson & Fagerholm, 2018), most visual communication studies were far from centered. Rather than reflecting the diversity of the field, visual communication studies were overwhelmingly semantic, pragmatic, and rhetorical (Barnhurst et al., 2004).

LITERATURE REVIEW

There remains a clear need to understand how receivers process visual messages. However, most visual communication research does not study media effects. Instead, this research often uses content analysis, image analysis, and mixed methods, of which a fraction may include experiments (Goransson & Fagerholm, 2018). Messaris states, "There is a need for more sophisticated ways of exploring visual meanings and investigating viewers' responses to images" (2003, p. 551). An important method in filling that need is media effects research. Given visual communication's greater importance to the academy and its unprecedented relevance to daily life, it begs the question of how well the academy is filling that need. Rather than answering this by identifying the top journals using impact factor (Geise et al., 2021), it may be better answered by identifying the top media effects visual communication studies published in any journal. To trace the development of communication theory, Neuman and Guggenheim (2011) looked at what literature was cited. Similarly, to gauge the impact of media effects studies on visual communication, we may begin by asking:

RQ1: What are the most-cited media effects studies of visual communication?

Visual communication may include several media. Still, photographs and video recordings often come to mind when we think of visuals. However, informational graphics, illustrations, and even video games are all common visual media and may lead us to consider:

RQ2: Specifically, what media are studied in the most-cited media effects studies of visual communication?

We may then ask what communication theories are most used in media effects studies of visual communication. There have been five meta-analyses of general communication theory (Valkenburg & Oliver, 2019). Many of these are relevant to visual communication, but the issue is murky regarding media effects studies. Of the 547 pages McQuail devotes to media theory, there is less than one devoted to "visual language" (2010, p. 347). McQuail acknowledges that images have "considerable potential for skilful communication in certain contexts" (2010, p. 348) but offers no compelling models. He concludes, "The initial outlook for progress is not very good" (2010, p. 348). This poor outlook perhaps explains the slow start in visual communication research. Even so, studies continue. Given the weak theoretical basis cited by McQuail, one could ask:

RQ3: What communication theories are used in the most-cited media effects studies of visual communication?

The broad reach of visual media suggests that they are relevant to virtually every population. This poses the question of who participates in this research. Are participants as diverse as the media they consume? We may answer this with:

RQ4: What populations are studied in the most-cited media effects studies of visual communication?

In defining the state of research on media effects of visual communication, it may be valuable to consider what research variables these studies employ. The most obvious of these are independent and dependent variables to gauge what effects are found through what manipulations. However, Levine (2013) states that moderating and mediating variables are increasingly considered in communication research. These questions may prompt us to ask, "What variables are considered in the most-cited media effects studies of visual communication?" Specifically:

RQ5a: What independent variables are considered in the most-cited media effects studies of visual communication?

RQ5b: What dependent variables are considered in the most-cited media effects studies of visual communication?

Though visual communication is relatively new to the larger field, much of this research likely predates the internet and the new media it enables. However, it is unknown how much will be found in mass communication contexts, computer-mediated communication (CMC), or other contexts altogether. Despite the convergence of traditional media with new media as well as each other, exploring the production context of visual media may

offer more insights into the state of media effects studies:

RQ6: What are the production contexts of the most-cited media effects studies of visual communication?

Though the goal is to analyze the most influential media effects studies of visual communication, there may be additional insights gained in considering which journals publish these studies. Though scholars may guess which journals are most influential, considering the papers first and the journal second may yield different results than choosing top journals and then analyzing their published papers (Geise et al., 2021). Instead, the most influential media effects studies of visual communication could be identified first and then the journals which published them:

RQ7: Which journals publish the most-cited media effects studies of visual communication?

Geise et al.'s 2021 normative study of communication research relied on a journal's impact factor to tease out major trends in the field. However, this might best be done by first identifying the most influential papers. Though Martín-Martín, Orduna-Malea, and López-Cózar (2018) found that the Web of Science underreports highly-cited documents in the humanities and social sciences by 8.6 - 28.2%, Harzing (2013, p. 23) found the Web of Science was used "in the majority of bench-marking analyses and bibliometric research projects". However, the goal was not to identify the most accurate citation counts but to identify the most influential papers. The most-cited papers were expected to top the lists of both databases, and the Web of Science allowed several search strategies not afforded by Google Scholar.

METHODOLOGY

Sample

A Web of Science search on Nov. 1, 2021, for media effects studies of visual communication included a search that incorporated several data fields. First, the document title included "image* or visual or photo* or picture* or video or graph*" and included "communication or journalism or news". Second, the document title did not begin with "critical*" or include "discourse or rhetoric". The document type was "article", the document language was "English", and the publication title did not start with "critical*". Finally, results were limited to the category of "communication". The syntax of this search was ((((((TI=(image* or visual or photo* or picture* or video or graph*)) AND TI=(communication or journalism or news)) NOT TI=(discourse or rhetoric)) AND DT=(Article)) AND LA=(English)) NOT SO=(critical*)) AND WC=(Communication).

This search yielded 537 records. The total cited count for all records was 7,517. Only the records which were cited ten or more times were considered. Combined, this totaled 6,699 citations. These top-cited records accounted for 89.1% of all citations captured in this search. These records were pruned by 12 book reviews, 50 book chapters, 13 articles from discursive journals, and one that was in Spanish. Of the 461 remaining records, 167 were cited ten or more times. In comparison, 244 were cited five or fewer times. Abstracts and/or manuscripts of the 167 records which were cited ten or more times were acquired for analysis.

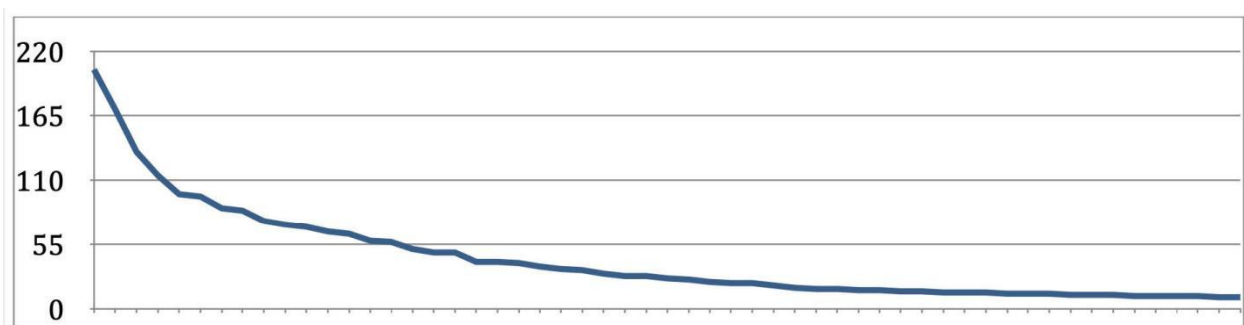


Figure 1. The Graphed Cited Count for the 167 Most-Cited Papers of Visual Communication

Note: There is little variation at the cited count of ten at the right end of the curve.

Coding

The analysis began with reading abstracts where available and reading the article itself when there was either no abstract or the abstract did not clearly state the nature of the study. Twenty-four papers dealt with social

impressions or other intangible concepts as an independent variable. Though they used the term "image" in the title, they did not study media effects, and these papers were excluded. Many other visual media studies do not study media effects but are descriptive, such as content analyses. Content analyses formed a significant portion of the 143 remaining articles and were coded separately for comparison. Media effects studies ($k = 55$) formed the largest division with roughly equal numbers of content analyses ($k = 43$), and others ($k = 45$). This last category included qualitative studies, critical and rhetorical analyses, and theoretical and procedural essays. A content analysis (White & Marsh, 2006; Neuendorf, 2007) on the media effects studies was performed in three waves, with fewer corrections found on subsequent iterations.

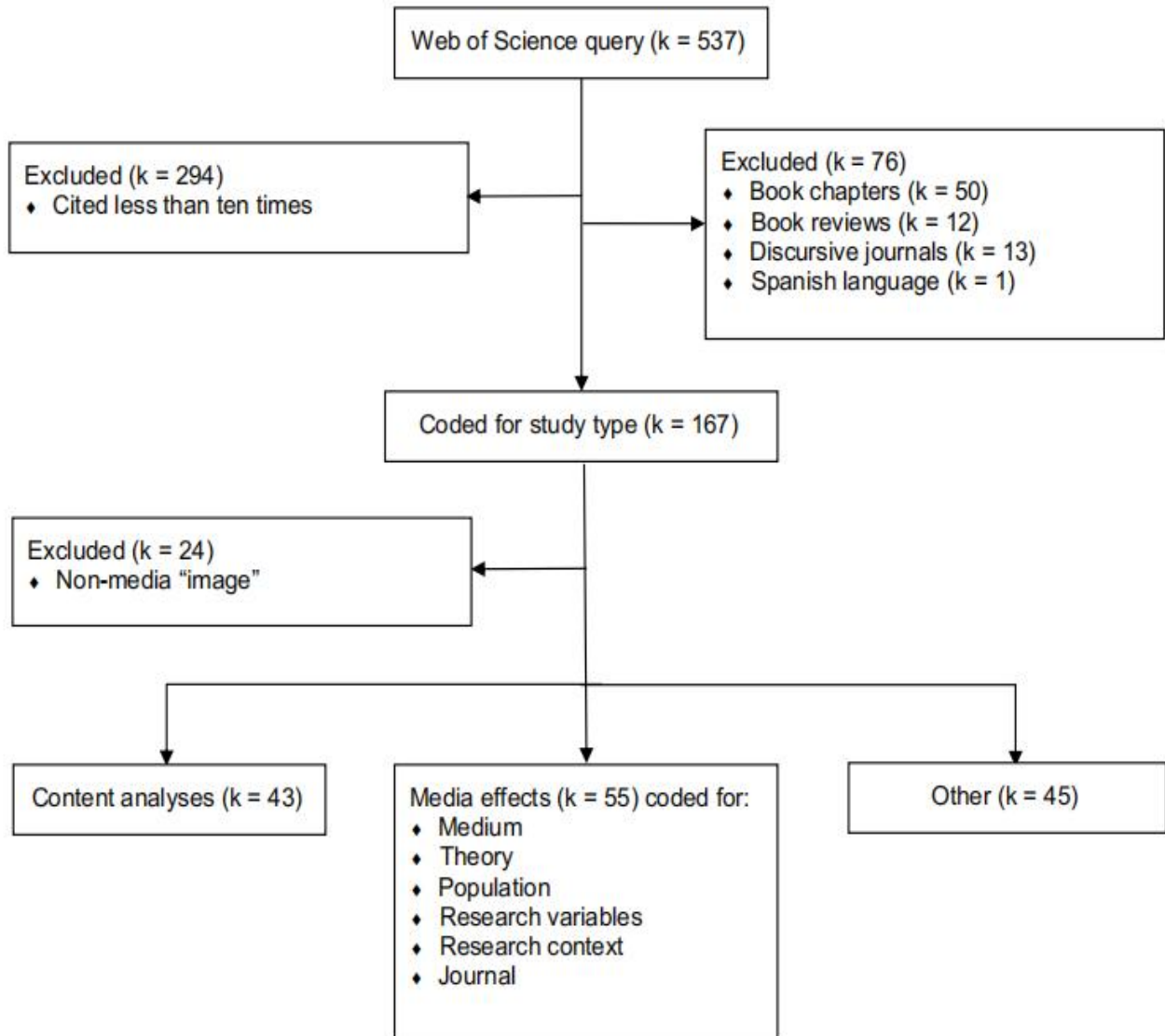


Figure 2. The Process of Article Selection

meaningful only within the study context. In these cases, they were replaced with a more general term, not to reduce precision but rather to improve interpretation. Many studies used recall as a dependent variable though stated in different forms. Measured comprehension, learning, encoding, recognition, storage, and retrieval; from either short-term or long-term memory were all coded as recall.

Production Context

Given the growing complexity of media production, there is the potential for confusion over the research context. For example, a video message could be found in a TV news, online news, CMC, or education environment. For this study, production context was coded not for its consumptive mode, but its production paradigm. In other words, TV news presented via a social network and/or viewed on a website was coded as "TV news." The other codes used were CMC, education, health communication, online news, print news, social network systems, and strategic communication.

Journals

Publication names were coded as stated except in the case of a journal name changing, such as in the case of Journalism Quarterly changing to Journalism & Mass Communication Quarterly. These publications were coded as the contemporary name. The rest of the list included AV Communication Review, Communication Research, Communication Research Reports, Cyberpsychology & Behavior, Education Communication and Technology Journal, Environmental Communication, Human Communication Research, Howard Journal of Communication, IEEE Transactions on Professional Communication, Information Communication & Society, Journal of Broadcasting & Electronic Media, Journal of Communication, Journal of Applied Communication Research, Journal of Mass Media Ethics, Journal of Human Communication, Journalism Studies, Mass Communication and Society, Media Psychology, Public Relations Review, and Social Media + Society.

Procedure

All variables of medium, theory, population, research variables, etc., were weighted by the study's respective cited count. Where a paper used more than one variable of a given type, these variables were weighted as a representative portion of the paper's total cited count. Where cited counts could not be divided evenly, earlier variables were weighted with the greater value. These weighted variables were then used to generate word clouds using the \sqrt{n} scale at <https://www.jasondavies.com/wordcloud/> (Davies, 2022).

RESULTS

Complete results of cited count (n) for each variable, (k) papers using that variable, and the 55 most-cited papers are available at https://osf.io/jfzxc/?view_only=4ae8560cf4164018b11c4ddc18f54a9b.

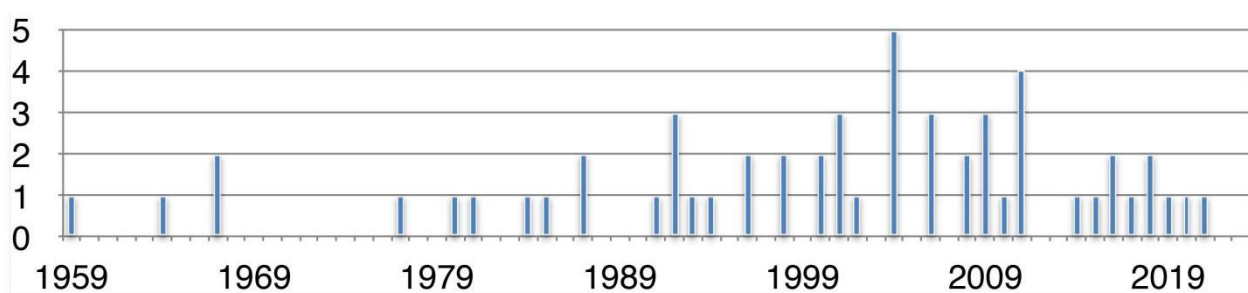


Figure 4. The 55 Most-cited Media Effects Studies of Visual Communication (RQ1) by Publication Year

Note: The 55 most-cited media effects studies of visual communication range from an early exemplar from 1959 to a single paper from 2021. The peak number was in 2004 (k = 5).

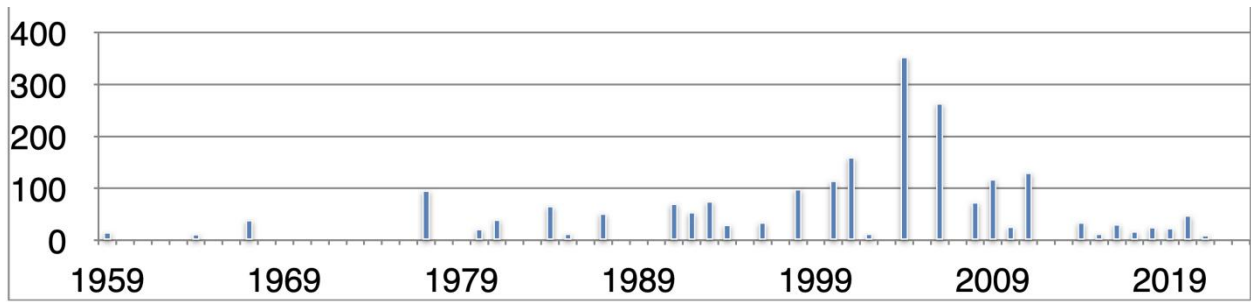


Figure 5. The Cited Count of the 55 Most-cited Media Effects Studies of Visual Communication



Figure 6. The Media Under Study (RQ2)



Figure 7. The Most-commonly Cited Theories (RQ3)



Figure 8. Participant Populations (RQ4)



Figure 9. Independent Variables (RQ5a)

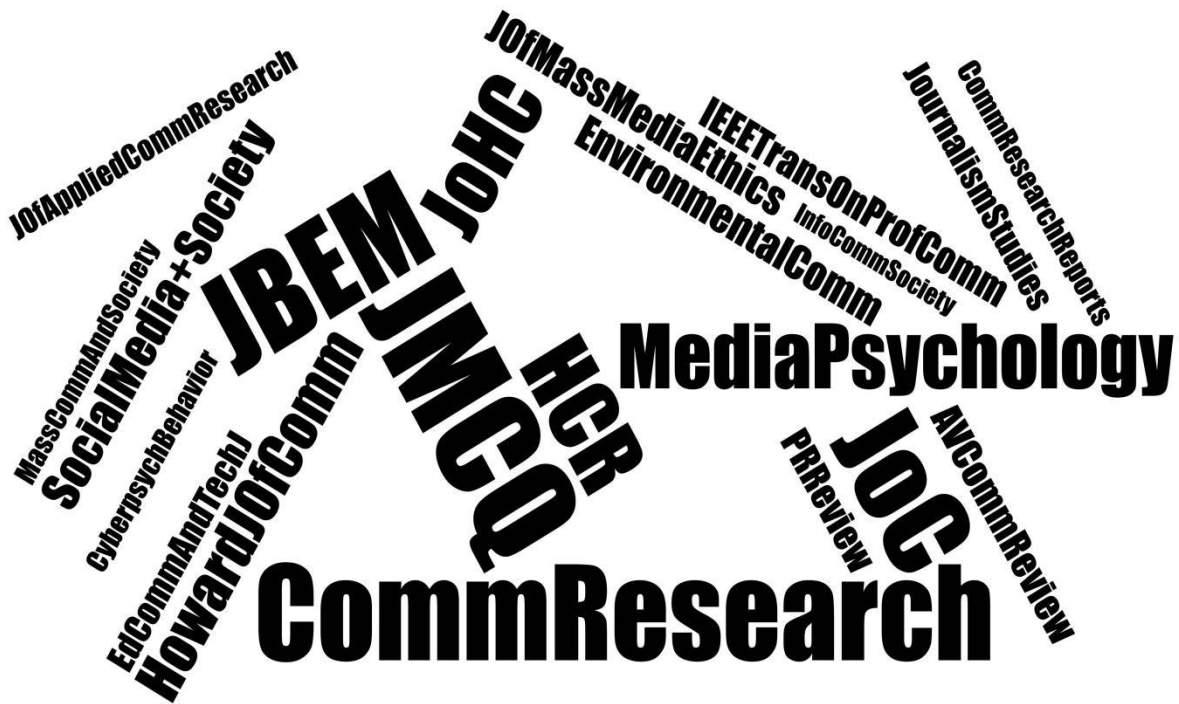


Figure 12. Publishing Journals (RQ7)

THEORETICAL ANALYSIS

The widespread citation of information processing studies stimulates a deeper analysis of how theory informs visual media effects studies. Five meta-analyses have ranked the prevalence of communication theories from 1956 to 2016. The top ten theories in each meta-analysis have been assigned point values and their aggregate ranking is shown in Table 1. The cited counts of theories found in this current analysis have been weighted to reflect an equivalent sum. The results show a dramatic departure from the larger field of communication. Not only do information processing studies dominate these studies, but visual media effects studies largely ignore the most popular communication theories.

The prevalence of information processing research (Figure 7) prompts a considered examination of its usefulness. Research in the limited capacity for message processing (LC4MP) model presents some of the most sophisticated studies in visual communication (Lang, 1995, 2000; Lang, Potter, & Bolls, 1999, 2007). In one example, Lang, Park, Sanders-Jackson, Wilson and Wang (2007) found that valence, arousing content, structural complexity, and information density lead to greater viewer attention and liking of the content. However, these factors overwhelmed viewers' ability to encode the information due to limited available cognitive capacity. This is an important finding for video messages. However, it is important to note that LC4MP research primarily relies on structural variation rather than image content because image content has not been theorized or operationalized. However, for viewers, content can be far more significant than structure. Sanchez-Nevarro, Martinez-Selva, Roman and Torrente (2006) found that affective pictures have effects that are orders of magnitude above that of size or structure. The reliance on structure, though necessary without theoretical guidance on content, may miss aspects of media consumption that are most meaningful to viewers.

Table 1. Meta-analyses of Prevalent Theories in Communication Studies Compared to Current Study

Points Assigned by Rank in Meta Analyses	Sum	Bryant & Miron, 1956-2000	Kamhawi & Weaver, 1980-1999	Potter, 1993-2005	Chung et al., 2000-2009	Walter et al. 2010-2016	Current Study Equivalent
Agenda Setting	40	10	7	8	7	8	
Cultivation Theory	34	8	8	10	8		5.6
Uses & Gratifications	30	10	9	7		4	

Points Assigned by Rank in Meta Analyses	Sum	Bryant & Miron, 1956-2000	Kamhawi & Weaver, 1980-1999	Potter, 1993-2005	Chung et al., 2000-2009	Walter et al. 2010-2016	Current Study Equivalent
Framing Theory	29		5	4	10	10	24.5
Priming Theory	23		3	6	9	5	11.2
Social Cognitive Theory	17	7		3	4	3	
Diffusion of Innovations	15	6	6		3		
Information Processing & Limited Capacity Models	15		10				163.4
Third-Person Effect	14			9	5		
Elaboration Likelihood Model (Narrative)	14			2	6	6	
Entertainment	9					9	
Medium Dependency	8	4	4				
Selective Exposure	7					7	2
McLuhan's Medium Theory	5	5					13.3
Linear Theory	4	4					
Knowledge Gap	3		3				
Laswell's Communication	2	2					
Theory of Reasoned Action	2				2		
Mood Management Theory	2					2	
Dual-Coding Model	0						14.7
Exemplification Theory	0						13.3
Emotion	0						11
Social Identity Model of Deindividuation Effects	0						8.4
Persuasion Knowledge Model	0						3.9
Social-Mediated Crisis Communication Model	0						1.6
Total Points	273			Weighted by Cited			272.9

Note: Points assigned to rankings collected by Valkenburg and Oliver (2019, p. 19) show clear winners in communication theory from 1956 to 2016 through five meta-analyses. These theories are organized by the sum of ranking points. When current results are weighted to equal the same point total, as seen in the right-hand column, they demonstrate a dramatic departure from the larger field of communication research. In this table, social learning, listed by Bryant and Miron (2004), has been reclassified as social cognitive theory to link the two concepts.

According to the criteria provided by Chaffee and Berger (1987), information processing models also have limited application in theory. Chaffee and Berger state that useful theory should explain observed phenomena and organize existing knowledge. It should be internally consistent, make predictions, and be falsifiable. Furthermore, it should be parsimonious and prove to be heuristically provocative. In other words, it should inspire more research. Information processing models successfully explain, make predictions, and predict some limited phenomena. Though they are parsimonious, they do little to expand our understanding of larger cognitive processes and do almost nothing to organize existing knowledge or theory. Subsequently, they are not heuristically provocative.

The studies that use visual media to explore priming or framing effects do not explain how images contribute to the process. It is simply noted that effects are greater when an image is included than when there is no image. In this way, the inclusion of images seems to support whatever theory is offered as justification for the study. However, understanding image reception often stops there. When it comes to images, most research asks, "What are the effects of having one?" Many independent variables are simply the condition of having an image, as shown in **Figure 9**, which includes headshots and news photos as major components of studies. The variable "AV mode" also only considers sound alone compared to sound with pictures.

Gibson's (2003) review of studies of visual news messages shows that all that matters in many studies is that there is a message, and it is expected to have effects. There is another theory that describes this communication process. It is the transmission model (McQuail, 2010). If a study does no more than test the difference between including a photograph and not including one, the result is a test of transmission theory regardless of the study's stated rationale. There is much more theory than transmission to explain the communication of verbal messages. We need comparable theory to explain visual communication. Until we tease apart the meaning-making processes of image interpretation, we functionally have a theoretical hypodermic needle.

Barbara O'Keefe (1988) provides a valuable method of organizing message purposes in a hierarchy of three message design logics. The first design logic is the expressive message, which is meant to simply convey information. The second is conventional, which conveys information in a socially relevant way. The third logic is rhetorical, which conveys information in a way that is socially relevant with the purpose of influencing the receiver. O'Keefe states these "design logics form a natural developmental progression" (p. 88). Expressive messaging must be mastered to effectively use conventional messaging, which is further nested within rhetorical messaging. This hierarchy suggests that conventional and rhetorical messages cannot be studied productively without a firm understanding of expressive messaging. However, we lack a theory that identifies and organizes the visual attributes of messages. We have little understanding of how viewers interpret images. From a theoretical perspective, many studies attempt to build the upper stories without completing the foundation.

A possible explanation for the detachment between literature and image attributes may be that the bulk of communication theory was developed to explain the effects of verbal messages. These theories were then retroactively applied to visual communication to varying effects. In much research, the question is whether images work like words. In rhetorical scholarship, images are analyzed based on how they function linguistically. Barry (2005) says this presents a fundamental problem. "Semiotic criticism or rhetorical criticism, like all verbal communication, therefore has the inherent weakness of using verbal grammar and expression to explain the inherently nonverbal" (p. 53). An analogy may help illustrate the differences. Explaining visuals with language may be like explaining the game of football in terms of baseball. Neither game makes any sense within the rules of the other. There are similarities, but fundamental differences cannot be fully appreciated from a different modality. However, this is the case for much scholarship on visual communication.

DISCUSSION

This study methodically examines the most-cited media effects studies of visual communication. It analyzed the medium, theory, population, research variables, research context, and publication outlet associated with these papers. Visual communication is a relatively new branch of the field, and media effects studies are poorly represented in the visual communication literature (Barnhurst et al., 2004). Content analyses of media products can describe the "who", "what", "when", and "where" of media practices. Qualitative research can uncover the "why." Media effects research reveals the "how." This analysis charts this literature's progression as well as identifies major themes within these studies.

Most-cited Articles

The results of this study are consistent with Wang, Fang and Sun (2016). Their analysis found that usage fits a power law like the result in **Figure 1**. They say, "A small part of papers accumulated most usage counts, while most other papers were rarely used" (p. 921). They reason that "Highly cited papers are more likely to be used in the future than the lowly cited ones due to the impacts they have made" (p. 924). This analysis desired to identify the impacts of individual media effects studies of visual communication. As a relatively recent subfield of communication, it is illuminating to chart this development. The pace of research has hastened with one or two such studies in each of the past eight years. It is reasonable to assume that even more will fit the criteria of this study in the coming years as recent papers have not yet had much time to be cited in subsequent studies. However, as seen in **Figure 4**, there is a curve in the number of highly cited papers that peaks in 2004 ($k = 5$). There were 44 papers cited ten or more times in the recent half of the 62 years compared to just 11 such papers in the first half.

Though most of the papers considered in this study appear in recent years, it should not be assumed that no early work was done. There are exemplars of visual communication literature dating back to 1943 (Flynn, 1943) that were perhaps ahead of their time and were never cited.

Regarding cited count, media effects studies of visual communication peaked in 2001. This was the year that Walther et al., the top-cited paper in this analysis, was published alongside Zillmann et al.'s fifth-cited paper. This year also anchors the seven-year window from 1998 to 2004. This period accounts for 37.0% of the cited count over the 62-year scope of the study. One may assume there was a Renaissance during this period. However, the peak cited counts of 322 for 2001, 214 for 2004, and 48 for 2020, graphed in **Figure 5**, form a roughly straight line with variation between these years. Though skewed toward 2001, this pattern suggests that cited counts build over time. What now may appear to be an early swell may ultimately become the ramp to an even larger curve in the future.

It may seem ironic that Walther, Slovacek and Tidwell's (2001) study tops the cited count in this analysis as Walther is best known for theorizing on computer-mediated communication (1996, 2009, 2011; Walther & Bazarova, 2008; Walthe & Whitty, 2021). He is not recognized for research in media production or strictly media effects. Perhaps Walther's success in other realms draws scholars to this paper. In general, the studies in this analysis are not highly cited compared to other studies in communication. "Highly cited" in this context could mean cited just one or two score times. The larger communication field dwarfs these numbers. The Web of Science shows five communication papers cited more than 3,000 times.

Furthermore, communication does not garner the citation numbers of some other fields. Engineering has five papers cited more than 20,000 times. Other than authorship, there is no discernable difference between highly cited and lowly cited papers other than the time needed for recognition. For example, this Web of Science search identified 32 papers published since 2019 that had not yet been cited. The count for the prior two years is ten, the two years before that, seven, and for 2014-2015, the count is one. This pattern shows that time increases the chances of being cited, at least in the digital era. Many papers published before 1990 are effectively lost to time.

Media

Video leads other media (**Figure 6**) though still photographs come in at a close second. These two media accounts for 85.8% of the cited count and 89.1% of the portion of papers. Though relatively close in the cited count, twice as many papers studied video than photographs. Illustrations were a distant third, with just one paper studying mixed visual media and another studying video game effects. There is a much larger body of research on video games than presented in this analysis. However, these studies may not use a form of "communication" in their title.

Theory

This analysis shows a marked theoretical departure from the larger field of communication. The results were dominated by information processing studies which accounted for 59.8% of the total cited count. Information processing was the eighth-most cited communication theory in five meta-analyses (Bryant & Miron, 2004; Chung et al., 2013; Kamhawi & Weaver, 2003; Potter, 2012; Walter et al., 2018). However, these results show that information processing commands most of the cited research on media effects of visual communication.

Framing theory came in a distant second though both Chung et al. (2013) and Walter et al. (2018) found framing to be the most common communication theory. Agenda setting did not appear in this analysis, yet it arguably has been the most widely used theory in communication. These results also depart from Fahmy, Bock and Wanta (2014) who list the prime theories of visual communication research as framing, agenda setting, cultivation, and semiotics. One explanation for this difference may be the type of research. Many of the 43 content analyses reviewed in this study used framing theory. Another explanation may be the school of thought. The major strains of thought in visual communication identified by Barnhurst et al. were "visual rhetoric, visual pragmatics, and visual semantics" (2004, p. 629). It may be argued that media effects studies are best situated within social psychology, which does not have a large footprint in visual communication and uses radically different approaches than the more common traditions cited by Barnhurst et al. (2004).

Given the assumed surveillance function of news products, it may be surprising that uses and gratifications were not reflected in this study. As noted earlier, Zillmann's exemplification theory (1999) may be related to uses and gratifications as it theorizes the effects of news images. However, exemplification theory was kept as stated. None of these papers cited uses and gratifications and the relationship between the two theories is tenuous. Again, the lack of uses and gratifications is surprising considering its popularity shown in **Table 1** and the fact that news messages dominated the results in a variety of contexts. News messages have often been considered related to uses and gratifications.

Populations

Perhaps it should be no surprise that undergraduates (**Figure 8**) represent 77.4% of the cited counts in 29 papers. More notable is the variety of populations represented in the other 16 studies. However, it could be argued that the field should work harder to recruit from other populations.

Variables

Research variables showed the greatest diversity in these studies. As noted, variables were coded as they were stated as often as useful. Some were replaced with a more general term to make them more interpretable outside the context of their study. There were 41 different independent variables, 71 dependent variables, 36 moderating variables, and eight mediating variables. This is a great variety of variables from just 55 papers. This variety reflects a diverse curiosity among researchers as well as ample creativity in exploring their interests. Some concepts may be an independent variable in one study and a dependent variable in another or vice versa. Though the independent variable of "headshot" appeared in only two studies, its use in the popular Walther et al. (2001) study raised its prominence. However, it was led by "audiovisual mode" ($k = 5$) and "news photo" ($k = 4$) due to their wider use.

Dependent variables were dominated by recall ($k = 29$), as seen in **Figure 10**. Recall alone accounted for 44.3% of the dependent variable cited count. The dominance of recall is explained, in part, by the coding scheme. Measured comprehension, learning, encoding, recognition, storage, and retrieval were all coded under the umbrella of recall. Another explanation is that researchers need to identify levels of exposure to messages to assess their impact (Slater, 2004). Often, these levels of exposure are assessed through some form of recall.

Production Context

This analysis of the research context was dominated by news (**Figure 11**). Television news, online news, and print news accounted for 76.5% of the cited counts and represented 43 of the 55 papers. This is likely attributable to the use of "news or journalism" in the search strategy, and "news" was the most common word in these abstracts (**Figure 3**). Journalism may also provide fertile ground for empirically studying visual communication. Until relatively recently, most visual communication was done as journalism. In the future, it should be expected that social networks ($k = 1$) and computer-mediated communication ($k = 5$) will become more prominent. Though written in 2001, it is interesting that Walther et al.'s CMC context is the most-cited paper of this group. This paper was cited four times in 2002 but 11 times in 2019, so citations of the paper appear to be gaining momentum. It may be that Walther et al. (2001) benefit from the power law identified by Wang et al. (2016). However, it may also be that a growing literature in digital contexts finds this paper especially relevant.

Journals

Citation counts are balanced across top journals in communication, as seen in **Figure 12**. However, there is a distinct difference in publication outlets between photographs and video which should be expected given the research context of the Journal of Broadcasting & Electronic Media, which published no research using still images. This journal was represented by nine papers, a count second only to Journalism & Mass Communication Quarterly, which was represented by 11 papers. Of the 21 journals in this analysis, 13 were represented by only one paper each. Therefore, these publications did not accumulate high cited counts. Top-cited papers generally appear in top communication journals, and these journals publish more of these studies.

CONCLUSION

This meta-thematic analysis of media effects studies of visual communication identifies trends in media, theory, populations, research variables, research contexts, and publication outlets associated with this research. Further analysis of theory in this research identifies significant departures from the larger field of communication and demonstrates the need for additional theory. There are still far more questions than answers in media effects research of visual communication. It is hoped that these findings may spark additional research and theory development in this growing field. There is now more visual communication than at any point in history. The need to understand the effects of these media is also greater than ever.

LIMITATIONS

It cannot be expected that this search captured every study of visual communication. If the opaqueness of

some of the reviewed abstracts could be any measure, some visual communication studies do not use these words in their title. For example, save for one study (Fox et al., 2004), where Annie Lang is the second author, a significant body of work developing her limited capacity for message processing model (Lang, 1995, 2000; Lang et al., 1999) is absent from this analysis for the above reason. The filter for the "communication" category further eliminated relevant research in related fields. Additionally, conference proceedings before 2010 are often misclassified for the social sciences. Harzing's (2013) analysis of Reuters' Web of Knowledge database, the predecessor to the Web of Science, found that "for the Social Sciences both the 'proceedings paper' and the 'review' document type were nearly always used incorrectly" (p. 32). Harzing found that all articles with 100 or more references were classified as review articles regardless of the presence of original research and findings. Despite these shortcomings, it is hoped this analysis captured the bulk of influential media effects studies of visual communication.

The use of cited counts is not without its flaws. Adler and Harzing (2009) challenge the legitimacy of measuring academic achievements with cited counts. They effectively demonstrate that cited counts cannot capture the entire value of scholarly work. Many analyses are organized not by cited counts but by top journals, such as Bryant and Miron's (2004) analysis of three journals. The current analysis sought the most influential papers and found studies published in 21 journals. Though every method has shortcomings, these results found a more egalitarian set of journals than studies limited to top communication journals. This study also used one coder and can offer no measure of intercoder reliability. However, a small number of variables were coded as anything other than those stated, and these cases are disclosed in the analysis section. Three discrete passes through the papers under study further ameliorated this methodological departure.

Another limitation is the narrow scope of the review which did not include content analyses. Content analyses may not directly build an understanding of media effects, but they are central to uncovering practices of media creation and description. Rosenthal and Rosnow (2008) state that descriptive research is a necessary first step in developing a research program. Content analyses serve an essential function in that endeavor. This focus on media effects also excluded qualitative studies which form a large body of visual communication research. Barnhurst et al. (2004) demonstrate that media effects studies are a small fraction of the literature on visual communication, which is dominated by rhetorical studies. The relatively narrow scope of this study does not fully represent the larger body of work in visual communication.

FUTURE RESEARCH

The exclusion of content analyses in looking for media effects presents a logical pairing. A study like this one that examines content analyses of visual communication may reveal additional trends and common themes in another significant body of literature. However, this study illuminated the scarcity of research in visual communication specific to media effects. We need more research to understand the effects of widely circulated media. However, current research suffers from two significant shortcomings. The first, identified by Reeves, Yeykelis and Cummings (2015), states that study design must be appropriate to the specific research goals, and many studies lack conceptual and operational consistency. They say construct validity is the largest problem in the field. "The problem with complex packages is the difficulty in isolating the features within a package that cause an effect" (p. 61). The study of news messages is inherently complex which presents significant methodological challenges. These challenges must be addressed in future studies.

Lang's LC4MP model (Lang, 1995, 2000; Lang et al., 1999, 2007) addresses a viewer's ability to encode limited information given a fixed time. The inverse of this function may apply to freely viewed still images. With stills, the viewer may spend as many cognitive resources on encoding as time and motivation allow. This difference may explain the case of an image of a flag raising over Iwo Jima. This is perhaps the most well-known image from WWII among Americans because we have seen it so often. The image inspired a war memorial in Washington, D.C. However, few Americans know that historic moment was also captured in moving pictures. Though rhetoricians debate the properties of an image that lead to its iconic use, this process remains impossible to predict. There are reasons the moving images were forgotten while the still image was elevated to a national monument. We have yet to learn what those reasons are.

Theoretical Extensions

Exemplification theory (Zillmann, 1999) is perhaps the most productive theory in understanding the differential effects of visual messages. It uses three concepts to study O'Keefe's (1988) expressive logic of visual messages. Repetition is already understood to aid learning. Concreteness contributes to differential learning from images (David, 1998; Paivio, 1986; Zillmann, 2002). Emotion is the research topic of Ekman (1993), LeDoux

(1994), and many others. However, the concepts of concreteness and emotion have not been quantified in exemplification research (Gibson & Zillmann, 1994; Zillmann, Knobloch, & Yu, 2001). Emotion has been consistently and effectively manipulated (Zillmann, Gibson, & Sargent, 1999). Emotive faces have effects that are exponentially greater than image size or structure (Sanchez-Nevarro et al., 2006). Yet, neither exemplification nor other media effects research has explained the function of just this one aspect of images. Future research must clarify the meaning of concreteness and emotion and verify that their operationalization is valid.

Furthermore, image attributes of implied motion, or physics, should also be considered. Zillmann (2006) suggests, "Pictures, especially pictures representing motion, can function as exemplars" (p. S225). The importance of motion is echoed by van Leeuwen, a semiotician who arguably holds a very different theoretical perspective from Zillmann. Regardless, he states, "challenging gravity is itself a source of salience" (2003, p. 199). These theoreticians may have identified the next logical step in studying the expressive logic of images: the effects of physics.

Most media effects literature is also silent on aesthetics, yet this is a fundamental aspect of visual messages. Aesthetics are employed in encoding and decoding social information (van Leeuwen, 2005). Aesthetics are significant in photograph interpretation (Cupchik, 2001), and Mendelson (2001) studies the significance of aesthetics to viewers. Aesthetics are commonly understood to be a significant property of visual media, but there is a need for more empirical literature about its contribution to visual communication.

Concreteness, physics, aesthetics, and emotion are arguably most differentially relevant to visual rather than verbal messages. We need a better understanding of their role in image reception. Holsanova (2014) says, "There is still a lack of empirical studies on recipients' interaction with visual and multimodal messages" (p. 332). Perhaps, the most significant progress can be made by studying reception effects. These effects should be expected to be a complex process. Nabi (2010) states, "Complex phenomena require more complex theorizing" (p. 154), but this requires first recognizing that image reception is a complex phenomenon. Theories that incorporate additional image attributes or reception effects will necessarily be more complex. Additional theory would ideally incorporate physics and aesthetics along with concreteness and emotion.

The need for additional theory is a significant shortcoming in studies of visual media effects. This shortcoming is demonstrated by the wide use of "information processing" as a theoretical category. This finding illuminates the need for a better theoretical definition and also belies the paucity of theory. Many studies of video messages offered no explicit theoretical framework at all. It may be that some communication traditions have not demanded theoretical relevance for their work. However, it may also be the case that these traditions have insufficient theory to guide their research. The finding that extant research is tied to theory very loosely or not at all illuminates the need for a theory that will more effectively direct future inquiry.

The lack of relevant theory has left researchers of these media effects to simply grope in the dark. The theory is not currently effectively tested and refined in this body of research, and little progress has been made, as McQuail predicted. Useful theories should advance understanding of how the use of these media generates effects. This understanding should inform pedagogy and curricula, move critique of these media from subjective to objective criteria, and promote more effective and purposeful use of visual media. Valkenburg and Oliver (2019) state that "a media effects theory at least needs to conceptualize media use and the individual or collective changes that this media use brings about" (p. 18). This need has not been met to a convincing degree. Future research in visual communication must strive toward fulfilling this goal.

CONFLICT OF INTEREST

The author has no conflicts of interest to report.

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