EXPLORING THE EFFECT OF NEWS MESSAGE COMPLEXITY ON COGNITIVE

COMPLEXITY AND ATTITUDE EXTREMITY

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by

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EXPLORING THE EFFECT OF NEWS MESSAGE COMPLEXITY ON COGNITIVE COMPLEXITY AND ATTITUDE EXTREMITY

Presented by Mallory Perryman

A candidate for the degree of master of arts

And hereby certify that, in their opinion, it is worthy of acceptance.

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EXPLORING THE EFFECT OF NEWS MESSAGE COMPLEXITY ON
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ABSTRACT

This thesis explores how the number of perspectives presented in a news story influences cognitive complexity and attitude extremity. I hypothesized that a news message featuring more than two perspectives – a complex story - would lead to an increase in cognitive complexity, defined as the number of elements a person associates with an issue (differentiation) and the strength of connections made between those elements (integration).

Additionally, I predicted that heightened levels of cognitive complexity would result in more moderate attitudes toward the subject of a news story and that cognitive complexity would mediate the relationship between story complexity and attitude extremity. The results from this 2 x 2 mixed-design experiment found that an increase in the number of perspectives in a news article leads to an increase in one component of cognitive complexity, integration, but not the other component, differentiation. The results do not support the hypothesis that cognitive complexity mediates the relationship between message complexity and attitude extremity. Aside from testing these hypotheses, a goal of this experiment was to measure integration, often thought of as cognitive cohesion, in two different ways. This paper compares these measurement techniques and how they reflect varying conceptualizations of cognitive cohesion throughout different streams of literature.

Introduction

Although assaulted with charges of bias from the outside, the news media

continues to consider balance one of the pillars still holding up the shaky structure of the

industry. Journalists have interpreted the idea of balance to mean the presentation of both

sides of an issue. Balance allows the journalist to remain objective and maintain

credibility amongst a politically diverse audience. Pressed for time and short on

resources, the easiest way for journalists to achieve balance is to gather two perspectives

from their sources: one perspective that comes down on one side of the issue and another

that comes down on the other. Does this storytelling technique do the news audience a

disservice by reducing layered, nuanced stories to a dichotomous choice? As Graber

(2003) notes, many media critics see the act of taking a story with endless layers of

context and package it into bite-sized pieces as an oversimplification of serious news.

This research paper is a starting point for exploring how changes in the number of

perspectives presented in a news story might affect how and what a news consumer

thinks about the topic in the story. Specifically, this experiment looks at how altering the

number of perspectives in a news story can influence cognitive complexity and attitude

extremity.

Prior research suggests that changes in the complexity of the information

presented in a news message can influence the complexity of a news consumer's thoughts

about the topic of the story and the consumer's attitude toward the topic. Schroder, Driver

and Streufert (1967) demonstrated that altering the amount of information in a message

could influence complexity of thought, referred to throughout this paper as cognitive

complexity. Taking that finding one step further, Sotirovic (2001) discovered that those who got their news from more complex media sources, such as newspapers, displayed more sophisticated cognitive complexity and more neutral attitudes toward prisoner rehabilitation compared to those who got their news from simple media sources, such as entertainment magazines.

This experiment takes a different approach to operationalizing simple and complex media messages. Whereas Sotirovic (2001) looked generally at simple and complex news mediums, this experiment alters the number of perspectives provided in a single news story. This results in two versions of the same story – one simple story that presents only two perspectives on the issue-at-hand and a more complex story featuring four perspectives. Those perspectives are still balanced: the complex version with four perspectives has two perspectives in favor of the issue in the story and two perspectives against it.

 One of the goals of the experiment was to see how altering the number of perspectives presented in the news story would influence an individual's cognitive complexity. An individual's cognitive complexity is best conceptualized as a point on a spectrum, ranging from simple to complex, determined by the degree to which a person identifies different elements of an idea, issue, or problem and makes connections between those elements (Schaap, Konig, Renckstorf, & Wester, 2009). Cognitive complexity is not a measure of the content of an individual's thoughts but rather the structure of those thoughts (Schroder, Driver & Streufert, 1967).

Schroder et al. (1967) hypothesized that as people gain information from messages, they are able to identify more elements associated with the topic-at-hand and

see more connections between those elements. This hypothesis became what Schroder and colleagues called integrative complexity theory. This experiment relies extensively on how this theory conceptualizes and measures cognitive complexity, while also exploring an alternative measure of the construct. A description of the general outline of this paper follows.

This thesis will begin with a review of scholarly literature about integrative complexity theory. The theory defines two components of cognitive complexity known as differentiation and integration. Differentiation can be defined as the basic building blocks, or individual elements, that a person associates with an issue, idea, or problem (Tetlock & Suedfeld, 1988; Schaap et al., 2009). Integration can be defined as the extent to which an individual makes connections between those elements defined during differentiation (Suedfeld, 2010; Schaap et al., 2009). Together, differentiation and integration indicate an individual's degree of cognitive complexity. Integrative complexity theory suggests that a person's level of cognitive complexity falls along a spectrum that ranges from simple to complex and that the level of cognitive complexity will move along that spectrum depending on what particular issue, idea, or problem a person is thinking about at the time (Schroder et al., 1967). Research shows that individuals think more complexly about some issues and more simply about others (Suedfeld, 2010).

After summarizing literature on integrative complexity theory, this thesis will address the techniques researchers have used to measure levels of cognitive complexity and in addition, will outline alternative measures of the construct. Measuring cognitive complexity in integrative complexity research typically involves asking participants to

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write an essay on an issue or problem. Multiple researchers are then needed to code the essays and determine the degree of differentiation and integration demonstrated by the essay-writer. This process has been criticized as subjective and labor-intensive for both participant and researcher (Carroll & Bright, 2010). This thesis proposes a new technique to measure one aspect of cognitive complexity, developed by Eveland, Cortese, Park and Dunwoody (2004). The technique was created to measure what Eveland et al. (2004) referred to as knowledge density structure; however, this paper will explain how the measurement tool is suitable for assessing the concept of integration that is central to integrative complexity theory.

Finally, this thesis will explore how changes in the complexity of a news message and subsequent changes in cognitive complexity might influence attitudes. Prior research has demonstrated that those who think more complexly about an issue, idea, or problem are more likely to balance competing values, resulting in more neutral attitudes (Linville, 1982). In contrast, people who think about problems in simple, dichotomous ways display more extreme attitudes (Sotirovic, 2001). This experiment also explores the idea that cognitive complexity might mediate the relationship between message complexity and attitude, as Sotirovic (2001) found evidence for such a model. In summary, this thesis proposes that the number of perspectives presented in a news message influences how complexly a person thinks about that particular news topic. In thinking complexly about an issue, a person may consider multiple perspectives and form a more balanced attitude.

Potential Contributions

  The following experiment is meant to help explore the complicated relationship between news messages, the structure of thoughts, and attitudes. From a theoretical perspective, this thesis will contribute to literature on integrative complexity theory and could potentially yield a new technique for measuring cognitive complexity. From a practical perspective, this thesis could demonstrate the effects of presenting issues in the news in categorical, dichotomous formats. It's hypothesized that a more complex, nuanced presentation of news will result in an increase in cognitive complexity. Research has shown that those who routinely engage in more complex ways of thinking are more tolerant of alternative ways of living (Perry, 1970). Indeed, there is ample evidence that cognitively complex people are more open to diverse information (Burleson & Caplan, 1998; Fiske & Taylor, 1991; Luskin, 1987; Neuman, 1981, Schroder et al. 1967). McAdams (1990) says it simply, "Here, complexity is superior to simplicity. The person who is integratively complex sees the world in more sophisticated terms..." (p. 552).

Literature Review

The news has traditionally been a source for people to find out information about topics of social or political interest. A recent survey from the Pew Research Center (2010) shows that a substantial majority, 83% of Americans, say consuming news is part of their daily routine. With a substantial majority of the population attending to news messages, it appears worthwhile to explore how those messages influence how individuals think about the issues, ideas, and problems presented in the news. Without a direct window into the brain, however; researchers must find other practical alternatives to tapping into the cognitions that occur after news consumption. One way of exploring how news messages influence the way individuals think about topics in the news is to look at how changes in a message impact cognitive complexity, or the amount of and connectedness between the ideas individuals become conscious of after exposure to a news message. Research involving integrative complexity theory provides conceptual insight into the concept of cognitive complexity, as well as techniques to measure outcomes that reflect cognitive complexity.

Integrative Complexity Theory

Integrative complexity theory emerged from research in social psychology as a way to explain individual differences in how incoming information is processed (Schroder et al., 1967). In the 1960's, this process was referred to in psychology literature as conceptual complexity; essentially, a character trait that described an individual's tendency to process information along a spectrum of complexity ranging from simple, dichotomous assessments to an interpretation that includes multiple elements and links

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between elements (Schroder et al., 1967). As Tetlock and Suedfeld (1988) note, conceptual complexity evolved into integrative complexity after roughly a decade of research on the topic. Rather than describing an individual disposition, as conceptual complexity does, integrative complexity describes the level of complexity an individual demonstrates in response to a particular situation or stimulus. For example, as a journalism scholar I may display complex thoughts about the current state of the news media but have quite simple thoughts about marine biology.

Schaap, Konig, Renckstorf, and Wester (2009) explain that cognitive complexity can be thought of as an individual's interpretation of a target and this interpretation can be measured by assessing cognitive structural components. Integrative complexity theory calls these structural components differentiation and integration (Suedfeld, 2010). Differentiation is the degree to which an individual uses elements in their interpretation of a target; essentially, the number of distinct ideas or thoughts that a person identifies as being related to an issue. Integration is the degree to which individuals link those distinct elements identified during differentiation. It is possible for someone to identify many different aspects of an event, problem, or idea without making any meaningful connections between them. In other words, as Schaap, Konig, Renckstorf and Wester (2008) explain, differentiation "refers to an interpretation's elaborateness, whereas integration refers to its cohesiveness" (p. 212-213). Together, an empirical assessment of an individual's levels of differentiation and integration indicate their level of cognitive complexity, a calculation referred to as a person's complexity score (Schaap et al., 2009; Suefeld, 2010; Sotirovic, 2001; Baker-Brown et al., 1992).

Generating thoughts in cognition research. One complication in any study involving cognitive complexity is figuring out how to measure an individual's thoughts in response to a target. Researchers in several fields have undertaken this task, mapping out a process for generating measurable "thoughts" and subsequently measuring the degree of differentiation and integration present in those thoughts (Baker-Brown et al., 1992). These methods assume that information stored in short term memory is easy to access and can be shared with little effort (Ericsson & Simon, 1993; Gilhooly & Green, 1996) and that the psychological significance of thoughts can be assessed by content analyzing reported thoughts and feelings (Cacioppo, von Hippel & Ernst, 1997). Specifically, researchers with the goal of studying cognitive complexity have used two methods: thought-listing and thinking-aloud. In the thinking-aloud method, participants are asked to verbalize their thoughts while doing a task and is a method used most often by researchers aiming to explore the thought process while solving problems (Ericcson & Simon, 1984). The thinking-aloud method results in a concurrent verbal report. In thought-listing experiments, the reported thoughts are retrospective: participants speak or write down their thoughts shortly after performing a task or being exposed to a stimulus.

There are limitations to the thought-listing technique. Cacioppo, von Hippel and Ernst (1997) note that these limitations include the possibility that participants are unwilling to accurately list their thoughts, some individuals may be incapable of accurately listing their thoughts (young children, for example), and finally, the process of collecting data and content analyzing it can be time-consuming for researchers. In integrative complexity research, the most common method of generating thoughts is to have participants engage in paragraph completion tests or to instruct them to write an

essay on a chosen target (Burtz & Bright, 2007), though some studies aiming to measure integrative complexity have instructed participants to voice their opinions out loud (Sotirovic, 2001) or periodically voice their thoughts during exposure to a target (Schaap et al., 2009). Additionally, political science researchers have applied integrative complexity techniques to evaluate archival material like speeches and personal letters from political leaders (Tetlock, Peterson, & Berry, 1993).

Assessing thoughts in cognition research. While there is no single method used for generating thoughts, the procedure for analyzing verbalized or written accounts for evidence of cognitive complexity has been fairly standard in integrative complexity research. The integrative complexity scoring manual created by Baker-Brown et al. (1992) is typically used to assess the presence and degree of the two concepts known as differentiation and integration. As previously discussed, differentiation is the number of elements, or ideas, a person identifies as belonging to an issue, problem, situation, or message. Integration is the degree of connectedness between those concept identified during differentiation. (Schaap et al., 2009; Baker-Brown et al., 1993; Suedfeld, 2010). According to the integrative complexity theory scoring manual seen in Figure 1, a final integrative complexity score is on a scale from 1 to 7 and reflects levels of both differentiation and integration. Scores of 1 reflect a low level of complexity in thinking whereas a score of 7 reflects a high degree of complex thinking. This scoring system is used in multiple studies exploring integrative complexity (Sotirovic, 2001; Carroll & Bright, 2010; Dillon, 1993).

Complexity Score	Explanation
1	No differentiation, individual sees the issue in only black or white terms
3	Individual acknowledges at least two viewpoints, and there may be positive and negative aspects of each.
5	Individual acknowledges not only multiple viewpoints, but that there is a moderate level of interactions and tradeoffs among the alternatives.
7	Suggests that the individual also has deeply held basic values between the alternative issues.

Figure 1. Standard integrative complexity scale based on original studies by Schroder et al. (1967) and adapted by Baker-Brown et al. (1992).

Alternative cognition-assessment methods. Carroll and Bright (2010) contend there are several drawbacks to this method of measuring integrative complexity. First, the process is labor-intensive for participants, especially when they must write essays in response to a target. Additionally, response rates have been lower than normal when researchers have attempted to gather essay responses through mailed surveys (Bright & Barro, 2000). Second, Carroll and Bright note that the process of scoring items for levels of differentiation and integration is somewhat subjective as well as difficult and time-consuming for researchers, resulting in the use of small sample sizes. Carroll and Bright observe that if measuring integrative complexity could be done in a more functional manner, the method could be applied more often in various disciplines concerned with measuring depth of processing.

Carroll and Bright (2010) attempted to create a more straightforward way to measure cognitive complexity by combining open-ended survey questions with scaled

item responses. Rather than instructing participants to write an essay about their feelings toward a particular topic (in their study, wildfire management), Carroll and Bright (2010) asked respondents to list potential arguments for and against the issue. The researchers argue the ability to list multiple arguments for and against something suggests the participant recognizes multiple dimensions of an issue or problem: differentiation. To calculate differentiation scores, Carroll and Bright counted the number of arguments listed in favor of the issue and the number of arguments listed against the issue, creating two sums. Next, they divided the lesser of the sums by the greater, resulting in a number between 0 and 1. The closer the score is to 1, the greater the level of differentiation. For example, a participant who listed 8 arguments in favor of the issue and 3 arguments against the issue would obtain a ratio of 8 to 3 and a differentiation score of .38. Someone who listed 3 arguments for and 3 against would have a ratio of 3 to 3 and thus a differentiation score of 1.

In order to measure integration, Carroll and Bright asked the participants to rate the strength of each of the arguments they listed, both for and against. The rating scale was from 1 (very weak) to 7 (very strong). The means of the strengths of the arguments for and against were calculated separately and then the smaller of the two means was divided by the larger. For example, if a participant listed 3 arguments in favor of the issue and rated those arguments as 6 (moderately strong), 7 and 7, the mean strength would be 6.67. If that same participant listed 2 arguments against the issue and rated the strength of those arguments as 2 (moderately weak) and 1, the mean strength would be 1.5. The integration score would then be calculated by dividing the smaller mean by the larger, so 1.5/6.67, yielding an integration score of .22. Just as it was with the differentiation score,

a number closer to 1 indicates a higher level of integration. Once a differentiation score and an integration score were obtained, Carroll and Bright (2010) calculated the product of those two scores. This gives equal weight to both differentiation and integration, in agreement with traditional measures of integrative complexity.

Carroll and Bright (2010) found that this method for calculating complexity scores strongly correlated with the traditional method of coding essays for evidence of differentiation and integration. This held true for both topics the researchers used to compare their new method with the traditional essay method. Carroll and Bright are not particularly clear about how their measurement of integration reflects how the concept as it originally appears in Schroder et al.'s work, though Schroder et al. (1967) do suggest that the weight a person assigns to a dimension can indicate more integrated thinking. They explain:

> One can argue that if the weights give unreasonable emphasis to one dimension at the expense of the others, there is evidence that not all relevant information concerning the dimensions was integrated during weighting process .... poor integration of this kind is evidence of low abstractness. (p. 181)

Knowledge structure density. It's possible another method may provide a purer assessment of how individuals make connections between the many dimensions they recognize as being a part of an issue or problem. In an experiment exploring linear versus nonlinear website design, Eveland et al. (2004) created a measurement tool to assess whether the two types of website design affected what the researchers called *knowledge structure density*, or KSD. KSD assesses the extent to which individuals make connections between various concepts in a domain. Eveland et al. (2004) measured KSD

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by exposing participants to a target and then asking them to freely recall concepts they remember from the target message. These concepts can include "names of individuals, objects, behaviors and ideas" (p. 222) and are meant to be expressed in a single word or short phrase. Next, the items the participant listed during free recall were organized into a matrix, with the elements listed horizontally along the top row and vertically along the first column. The participant was asked to indicate whether any of the items they listed during free recall were related to another element the listed. If two items are not related, the participant was instructed to put an "X" in the cell that corresponds to the meeting of those two items. At this point the cells without "X's" were the meeting of two items that the participant thought related to one another. In each open cell, the participant was instructed to rate the strength of the items' relationship from 1 (very weakly related) to 7 (very strongly related).

While some density assessments are calculated by merely evaluating whether a relationship is present or absent (Scott, 1990), the method used by Eveland et al. (2004) measures the degree of density, which could also be called the level of connectedness between concepts. The density formula can be seen in Figure 2.

$$\text{Density} = \frac{\sum kv}{n(n-1)/2}$$

Figure 2. Formula for knowledge structure density developed by Eveland et al. (2004).

Eveland et al. (2004) explain: "...where k is a given link in the network, v is the value (from 0 to 7) attached to the kth link, and n is the number of nodes (or concepts generated from free recall) in the network" (p. 222). Each participants ended up with a

KSD score ranging from 0 (low) to 7 (high). The researchers note that this formula is adjusted for the number of concepts named during free recall, so it does not provide an advantage for those who recall more concepts. Eveland et al. (2004) used the number of concepts identified during free recall as a separate variable.

It's clear that there is a conceptual connection between the knowledge structure density tool created by Eveland et al. (2004) and the concept of integration found in integrative complexity theory. Both integration and KSD are concerned with connections between elements. The KSD tool provides a straightforward way of asking participants to assess the relatedness of the "thoughts" they generate after being exposed to a news message.

News Message Complexity and Cognitive Complexity

The previous section dealt with measurement techniques that might be useful in assessing levels of cognitive complexity. These methods include exposing participants to a target message and then asking them to write an essay about the topic (Baker-Brown et al., 1992), asking them to say their thoughts out loud during or after exposure (Schaap et al., 2009), asking them to list arguments for and against the topic in the target (Carroll & Bright, 2010), and asking them to list short words or phrases associated with the target and then assess the relatedness of those items (Eveland, Cortese, Park & Dunwoody, 2004).

If cognitive complexity can be measured effectively, it should be possible to track changes in cognitive structure as the result of some sort of stimulus. Schroder et al. (1967) found that varying the content of a message resulted in a change in information processing. In their research, increasing amounts of information in a target message

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elicited more complexity in decision-making until the amount of information became

overwhelming and participants experience what the researchers describe as cognitive

overload. Sotirovic's (2001) research provides additional evidence of this relationship. In

her study, attention to complex news sources (such as newspapers) was a positive

predictor of more complex thoughts, or an increase in the levels of differentiation and

integration. Sotirovic provides a simple rationale for the relationship between complex

media and complex thinking, suggesting that if media messages "consistently activate a

wider range of different ideas about the issue, this can be reflected in one's use of

multiple ideas in thinking about that issue..." (p.17). Considering the evidence found in

Schroder et al. (1967) and Sotirovic (2001) - and by conceptualizing KSD as an

alternative measure of the concept of integration, I hypothesize:

H1a: Participants exposed to the complex news story will have higher differentiation

scores, compared to those who see the simple news story.

H1b: Participants exposed to the complex news story will have higher integration

scores, compared to those who see the simple news story.

H1c: Participants exposed to the complex news story will have higher KSD scores,

compared to those who see the simple news story.

Attitude Extremity and Cognitive Complexity

Research has shown that thinking more complexly about an issue leads to more

balanced, neutral attitudes about the issue (Sotirovic, 2001; Carroll & Bright, 2010).

Attitude can be defined as a "disposition to respond positively or negatively toward a

particular object, for example, a person, issue, or organization" (Binder, Dalrymple,

Brossard & Scheufele, 2009, p. 316). Attitude therefore has two components (Newcomb,

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1965). The first is valence, or the direction of the attitude. For example, when exposed to a news message about a new city council proposal, a person may report feeling positive or negative toward the proposal. A second component of attitude is extremity. If the person was asked how positive or negative their opinion is toward the city council proposal, this would indicate the extremity of their attitude. For example, they could report being anywhere from "not at all negative" to "extremely negative" toward the proposal.

Researchers have found that cognitive complexity is linked to political attitudes. As Suedfeld (2010) notes, "It has long been known that people in in the moderately left-of-center range of the political spectrum score as more open-minded and cognitively flexible..." (p. 1685). Tetlock (1986) hypothesizes this difference is due to value conflict: whereas those with moderate political ideals are likely to seek a balance between competing values (such as individual freedom and equality), those closer to the ends of the ideological spectrum tend to emphasize one value more than another. Tetlock notes that finding a balance between values requires more complex thinking than choosing one value over another. As Linville (1982) explains, thinking more complexly about an issue allows an individual to balance good and bad things, resulting in less extreme attitudes.

Carroll and Bright (2010) found that more complex thinking positively predicted more neutral attitudes toward the issue of wildfire management. Similarly, Sotirovic (2001) found that those who reported using more complex media not only demonstrated more complex thinking about the issue of prisoner rehabilitation but also had more moderate attitudes toward the topic. Thus, I predict:

H2: Participants exposed to the complex news story will have more moderate attitudes toward the topic of the news story, compared to those who see the simple news story.

It is possible that if the complex news message encourages cognitive complexity and if increased levels of cognitive complexity result in more moderate attitudes, then cognitive complexity may mediate the relationship between message complexity and attitude extremity. According to Preacher, Rucker and Hayes (2007), a mediator is a variable that represents the process by which an independent variable influences a dependent variable. A relationship should exist between the independent variable and the mediating variable, the mediating variable and the dependent variable, and the independent variable and the dependent variable. A mediating variable can be thought of as an explanation as to how or why the independent variable affects the dependent variable. As Sotirovic (2001) found evidence that cognitive complexity mediates the relationship between message complexity and attitude extremity, it is hypothesized:

H3: Cognitive complexity will mediate the relationship between message complexity and attitude extremity.

Method

Participants

Undergraduate students (48 women, 19 men, M_{age} = 20 years, age range: 18-24 years) were recruited through their course instructors at the University of Missouri - Columbia. Participants were offered a small amount of extra credit in their respective courses for their participation. An a priori power analysis using the program G Power suggested a sample size of 64 to detect a medium effect size, considering the experiment's 2 x 2 mixed design.

Materials and Procedure

This experiment was a 2 (news story complexity) x 2 (story topic) mixed design, with story complexity as the between-subjects factor and story topic as the within-subjects factor. Each participant was exposed to two video news stories which ranged from 1 to 2 minutes in length. Figure 3 shows the video format. Each participant saw either two simple stories or two complex stories.

Figure 3. This screenshot shows the video format for the Ugg boot ban story. The anonymous commenter story used the same format with a different photo.

Story topics. The stories covered two topics that the participants were very unlikely to have already heard about in the news. The first topic focused on a Pennsylvania middle school that banned students from wearing Ugg boots after several instances where students hid cell phones in the boots. The school did not allow cell phones in the classroom. The second topic dealt with a woman who wanted to sue an anonymous online commenter because she claimed the commenter made false claims about her on a news website's comment board. The topics were chosen because they reflect the sort of moderate-conflict, every-day news the participants might see on a regular basis but the topics are mostly inconsequential beyond the people directly involved in the stories. Additionally, it would be unlikely for participants to have pre-existing attitudes on these specific topics, so participants' responses to the stories reflect how people think about issues in an initial exposure situation.

Story complexity. The story topics were manipulated to create two versions for each story topic: a simple version featuring two perspectives and a complex version featuring four perspectives. In the simple version of the stories, one opinion from a supporter is present along with one opinion from an opponent. For example, in the anonymous commenter story, the simple version included the perspective that the news website has no legal obligation to reveal the names of anonymous commenters versus the perspective that the woman who was defamed in the comment has the right to face her accuser. The complex version of that story included four perspectives, adding one supporting argument (that anonymity enriches our online experiences) and one opposing argument (harmful speech isn't necessarily legally protected). Adding two additional perspectives did increase the length of the video, though this reflects what happens in

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reality when journalists add content to their stories: the stories get longer. The various

varying perspectives were attributed generally to either a supporter or opponent of the

issue-at-hand. Figure 4 shows that the perspectives were presented on screen as graphics.

Figure 4. The perspectives in the videos were presented as graphics. This allowed for a
unique pairing of video and text, helping ensure results wouldn't be a consequence of a
particular medium.

Dependent variables. After exposure to each story, the participants answered a

series of questions meant to assess their degree of cognitive complexity and attitude

extremity.

Differentiation scores. Differentiation is the first component of cognitive

complexity (Schroder et al., 1967). Differentiation scores were obtained using the method

outlined by Carroll and Bright (2010). This required participants to watch each news

story and then list arguments both for and against the issue in the story.[1] The participant

was asked to determine how many of the arguments he or she listed in favor of, or in

opposition to, the issue being discussed in the news story. Carroll and Bright assert that a

ratio of the number of arguments listed for and against an issue creates a variable

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[1] Further details on obtaining differentiation scores are provided in the literature review.

representing the participant's degree of differentiation, the first component of cognitive complexity.

To calculate this differentiation score, the smaller of the two numbers was divided by the larger, producing a number between 0 and 1. For example, if a participant reported listing three arguments "for" the issue and two arguments "against" the issue, 2 was divided by 3 for a differentiation score of .67. If a participant listed the same number of arguments both for and against the issue, the participant's differentiation score would be 1. Scores closer to 1 mean the participant listed a relatively equal number of arguments both for and against the issue. Scores closer to zero mean the participant listed an unequal number of arguments for and against the issue.

Integration scores. To find the second component of cognitive complexity using Carroll and Bright's (2010) method, each participant was presented with each of the arguments he or she listed and asked to assess the strength of each argument on a scale from 1 (a very weak argument) to 7 (a very strong argument). The sum of the participant's strength assessments for his or her listed "pro" arguments were then compared to the sum of the participant's strength assessment for his or her listed "con" arguments. This was done by taking the smaller of the two numbers and dividing by the larger.

For example, a participant who listed three "pro" arguments with strength assessments of 6, 7 and 5 would have a "pro" strength sum of 18. If that participant only listed two "con" arguments with strength scores of 2 and 3, for a sum "con" score of 5, then 5 was divided by 18 for a score of .28. A score of 1 would indicate the participant saw the arguments listed both for and against the issue as equal in strength. A score

closer to zero would indicate the participant saw arguments on one side of the issue as stronger than on the other side. This score represents a participant's degree of integration, the second component of cognitive complexity.

Knowledge structure density. Another technique also measured the participant's degree of cognitive complexity. This method was modified from the knowledge density structure (KSD) measurement created by Eveland et al. (2004). In this study, a measure of KSD was obtained by presenting the participant with pairs of each of his or her listed arguments and asking the participant to assess the degree of relatedness between those arguments on a scale from 0 (not at all related to one another) to 7 (very much related to one another). For example, one participant listed an argument in favor of the Ugg boot ban as "the school is in charge of the students" and one argument against the ban as "parents should make the final decisions about their children." Though these are opposing arguments, the participant reported these perspectives are very much related to one another.

For analysis, the relatedness scores for each pair of arguments were summed and then divided by the total number of relationships assessed, creating a mean "relatedness" score for each participant.

Attitude extremity. Three questions assessed the the participant's attitude toward the topic in the news story. Each participant assessed the Ugg boot ban and the potential anonymous commenter lawsuit on three aspects: good/bad, beneficial/harmful, and positive/negative. All three items were measured on scaled ranging from 1 (*very bad/harmful/negative*) to 9 (*very good/beneficial/positive*). Since this experiment focuses on attitude strength rather than attitude direction, the 1 to 9 scales were folded so that

scores of 1 and 9 became 5, scores of 2 and 8 became 4, scores of 3 and 7 became 3, scores of 4 and 6 became 2, and a score of 5 became 1. Lower scores reflect more moderate or neutral attitudes while higher scores represent more extreme attitudes.

Procedure

Participants were directed to the experiment through an e-mail from their course instructor. They followed one of four links to the online experiment, depending on the first letter of their last name.[2] After consenting to participate, participants were shown a prompt letting them know that they would soon watch the first of two video news stories and that they should make sure their computer's volume was at an adequate level. The participants then watched the first video news story. The settings for the video were modified so that the participants could only watch the story once and could not rewind or fast-forward during viewing.

After viewing the first story, the participants were asked to consider all the arguments someone could make for or against the topic at hand. They were then prompted to list those arguments in 20 blank text boxes on the page, placing one argument in each text box. The participants were informed that it was OK not to use all of the text boxes and to press "continue" when finished. On the next page, the participants were presented all the arguments they listed and asked to determine how many of the arguments were "for" the topic in the story and how many were "against" the topic. After completing this task, the participants moved on to the next page where they were again presented with each of the arguments they listed. This time, the participants were asked to

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[2] The survey host did not allow for the type of randomization needed to control for story order, thus four separate setups were needed. In both the simple and complex story conditions, half of the participants saw the Ugg boot story first and the anonymous commenter second. The opposite was true for the other half of participants.

assess the strength of each of their own arguments on a scale form 1 (*very weak*) to 7 (*very strong*).

After assessing the strength of each argument, the participants were presented with pairs of each argument they listed and asked to assess the relatedness of those two arguments on a scale from 0 (*not at all related*) to 7 (*very much related*). For example, if participant listed 3 total arguments, he or she would assess the relatedness of arguments 1 and 2, 1 and 3, and 2 and 3.

The participants repeated the entire process, from viewing the video to assessing relatedness, for the second news topic. After answering all questions relating to the second news story, the participants provided some basic demographic information: gender, age, education level, and political ideology. The participants then provided a student identification number so they could receive credit for participating. Finally, the participants were thanked and dismissed from the online questionnaire. This procedure took an average of 12 minutes from beginning to end

Results

A 2 x 2 experiment examined the effects of news story complexity on cognitive complexity and attitude extremity. The independent variable story complexity was a between- subjects factor with two levels: simple and complex. The simple story featured two perspectives on the topic-at-hand while the complex story presented four perspectives on that same topic. Participants either saw two simple stories (n = 39) or two complex stories (n = 28). Story topic was a within-subjects factor. Each participant saw a story about an Ugg boot ban which focused on a Pennsylvania middle school that banned Ugg boots due to the fact that students were hiding banned cell phones inside the boots. Each participant also saw a second story about a woman who wanted to sue an anonymous online user because that user posted falsities about her in the comment section of an online news story. Story order was experimentally controlled by swapping the story order for half of the participants in each condition.

A total of 67 undergraduate students provided the data used in the following analyses. Nearly 72 percent of the sample was female and the mean age was 20. A series of mixed-design repeated measures ANOVAs were performed to assess how story complexity influenced cognitive complexity and attitude extremity for both topics. A summary of the findings can be found in Table 1, followed by more detailed results in the sections that follow.

Table 1

How story condition (simple or complex) affects differentiation, integration, KSD and attitude extremity.

	Simple		Complex	
	M	SD	M	SD
Differentiation	0.62	0.32	0.67	0.29
Integration	0.55	0.31	0.56	0.27
KSD*	3.02	1.18	3.56	1.43
Attitude	2.52	0.94	2.72	1.05

Note: n= 67. *p < .05

Story Complexity on Differentiation

I used two techniques to assess a participant's thought-complexity. The first method was modeled after Carroll and Bright (2010) and required participants to watch the news story and then list arguments both for and against the issue in the story. The participant was asked to determine how many of the arguments he or she listed in favor of, or in opposition to, the issue being discussed in the news story. Carroll and Bright assert that a ratio of the number of arguments listed for and against an issue creates a variable representing the participant's degree of differentiation, the first component of cognitive complexity.

$H1_a$ predicted that participants who saw the more complex story would have higher differentiation scores compared to those who saw the simple versions. A 2 (story

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topic) x 2 (complexity) mixed-design ANOVA was calculated to examine the effects of the story topic (Ugg boot ban or anonymous commenter) and complexity (simple or complex) on the differentiation scores described above. The Topic x Complexity interaction ($F(1,65) = 1.54$, $p = .219$, $\eta^2_{Partial} = .023$, power = .231) and the main effect of complexity ($F(1, 65) = .724$, $p = .398$, $\eta^2_{Partial} = .011$, power = .134) were not significant. Neither story complexity or topic influenced differentiation scores. $H1_a$ was not supported.

A main effect for topic approached significance ($F(1,65) = 3.18$, $p = .079$, $\eta^2_{Partial} = .047$, power = .42). Upon further examination of the data, it appears that participants listed a more equal number of arguments for and against the topic after viewing the Ugg boot story (M=.68, SD= .30) compared to the anonymous commenter story (M=.60, SD= .32).

Story Complexity on Integration

To find the second component of cognitive complexity using Carroll and Bright's (2010) method, each participant was then presented with each of the arguments he or she listed and asked to assess the strength of each argument on a scale from 1, a very weak argument, to 7, a very strong argument. The sum of the participant's strength assessments for his or her listed "pro" arguments were then compared to the sum of the participant's strength assessment for his or her listed "con" arguments. This was done by taking the smaller of the two numbers and dividing by the larger.

$H1_b$ predicted that participants who saw the more complex story would have higher integration scores compared to those who saw the simple versions. A 2 (story topic) x 2 (complexity) mixed-design ANOVA was calculated to examine the effects of

the story topic (Ugg boot ban or anonymous commenter) and complexity (simple or complex) on the integration scores described above. No significant main effects or interactions were found. The Topic x Story Complexity interaction ($F(1,64) = .01$, $p = .92$, $\eta^2_{Partial} = 0$, power = .051), the main effect for topic ($F(1,64) = .349$, $p = .56$, $\eta^2_{Partial} = .005$, power = .09), and the main effect for story complexity ($F(1,64) = .068$, $p = .8$, $\eta^2_{Partial} = .001$, power = .058) were all non significant. Neither story topic or complexity influenced integration scores. H1$_b$ was not supported.

Story Complexity on Knowledge Structure Density

I used a second technique to measure a component of cognitive complexity. This method from Eveland et al (2004) is known as knowledge structure density, or KSD. In this study, a measure of KSD was obtained by presenting the participant with pairs of each of his or her listed arguments and asking the participant to assess the degree of relatedness between those arguments. The relatedness scores for each pair of arguments were summed and then divided by the total number of relationships assessed. For the Ugg boot ban topic, KSD scores ranged from 0 to 6.33 (M=3.15, SD=1.34). For the anonymous commenter story, KSD scores ranged from 0 to 7 (M=3.35, SD=1.29).

H1$_c$ predicted that participants who saw the more complex story would have higher KSD scores compared to those who saw the simple versions. A 2 (story topic) x 2 (complexity) mixed-design ANOVA was calculated to examine the effects of the story topic (Ugg boot ban or anonymous commenter) and complexity (simple or complex) on the knowledge structure density scores.[3] The main effect for story complexity was significant ($F(1,64) = 4.96$, $p = .029$, $\eta^2_{Partial}=.072$, power =.592). Story complexity

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[3] Data was transformed by squaring KSD scores. Reported ANOVA results are based on the transformed data. Means and standard deviations are presented in the original units.

influenced KSD scores such that participants had higher relatedness scores in the complex condition. $H1_c$ was supported. The Topic x Story Complexity interaction ($F(1,64) = 1.06$, $p = .306$, $\eta^2_{Partial} = .016$, power = .174) and the main effect for story topic ($F(1,64) = 1.99$, $p = .163$, $\eta^2_{Partial} = .03$, power = .285) were not significant.

Story Complexity on Attitude Extremity

Another question of interest was whether exposure to simple or complex content would influence attitude extremity. Attitude was measured with three questionnaire items asking the participant to evaluate the topic of the news story as good/bad, positive/negative, beneficial/harmful on scales from 1 to 9. The items were sufficiently reliable (Cronbach's $\alpha = .853$). (Will move this to Method section)

After establishing reliability, the items measuring attitude were folded into three separate 1 to 5 scales, where higher numbers represent more extreme attitudes and lower numbers reflect more neutral attitudes. The original scales were from 1 to 9, where 1 represented a strong negative attitude (very bad, negative, or harmful) and 9 represented a strong positive attitude (very good, positive, or beneficial. Since this experiment focuses on attitude strength rather than attitude direction, the 1 to 9 scales were folded so that scores of 1 and 9 became 5 - that is, a more extreme attitude - scores of 2 and 8 became 4, scores of 3 and 7 became 3, scores of 4 and 6 became 2, and a score of 5 became 1. Once each item was folded, a new attitude variable was created by finding the mean of the three items for each topic. Each participant thus had two attitude scores: one for the Ugg boot story and one of the anonymous commenter story.

H2 predicted that participants who saw the complex story would have more neutral attitudes toward the story topics compared to those who saw the simple versions.

A 2 (story topic) x 2 (complexity) mixed-design ANOVA was calculated to examine the effects of the story topic (Ugg boot ban or anonymous commenter) and complexity (simple or complex) on attitude extremity. The main effects for story complexity ($F(1,64)$ = . 973, p =.328, $\eta^2_{Partial}$ = .015, power =.163) and topic ($F(1,64)$ = .02, p = .889, $\eta^2_{Partial}$=0, power=.052) were not significant; however, the Topic x Story Complexity interaction was significant ($F(1,64)$ = 6.03, p = .017, $\eta^2_{Partial}$=.086, power =.667). Participants in the simple story condition had more neutral attitudes about the Ugg boot story (M=2.34, .SD=.9) than the anonymous commenter story (M=2.7, SD=.97). In the complex condition, the opposite was true: participants had more neutral attitudes toward the anonymous commenter story (M=2.5, SD=1.1) compared to the Ugg boot story (M=2.94, SD=1). The results do not support H2.

Mediation Analyses

Mediation analyses were performed to provide a clearer picture of how message complexity, thought complexity, and attitude extremity were relating with one another. The mediation analyses were performed by using a macro for SPSS provided by Preacher and Hayes (2004). This mediation test measures the indirect effect of the independent variable on the dependent variable through the mediating variable while employing a resampling technique called bootstrapping. Bootstrapping is used to generate a representation of the sampling distribution of the indirect effect from the existing data. Preacher and Hayes (2008) recommend bootstrapping as the "most powerful and reasonable method of obtaining confidence limits for specific indirect effects under most conditions" (p. 886). Essentially, the command takes a number of small samples with replacement from a larger data set and re-analyzes specific relationships. It is a

nonparametric resampling procedure that doesn't assume a normal sampling distribution of the indirect effect (Preacher & Hayes, 2004). A bootstrapping analysis produces confidence intervals to estimate total and single indirect effects of the individual variable on the dependent variable through a mediating variable. In this analysis, the bootstrapping criteria was set to 5000.

H3 predicted that cognitive complexity would mediate the relationship between story complexity and attitude extremity. I performed two separate mediation analyses, one for the Ugg boot story and one for the anonymous commenter story, using KSD scores as the measurement for cognitive complexity.[4] For the Ugg boot story, there was a significant direct relationship between story complexity and attitude extremity (β = .6, p = .013) that was still significant after including the mediator, KSD scores, in the model (β = .6, p = .016). However, the path between KSD and attitude extremity was not significant (β = -.03 , p = .774). As Figure 5 shows, the mediation model for the Ugg boot story was not significant (z = -.2, p = .84).

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[4] Mediation analyses were also performed using a cognitive complexity score calculated using the sum of each participant's differentiation and integration scores. The mediation models were non significant for both the Ugg boot (z = -.7, p = .484) and anonymous commenter (z = -.019, p = .913) stories.
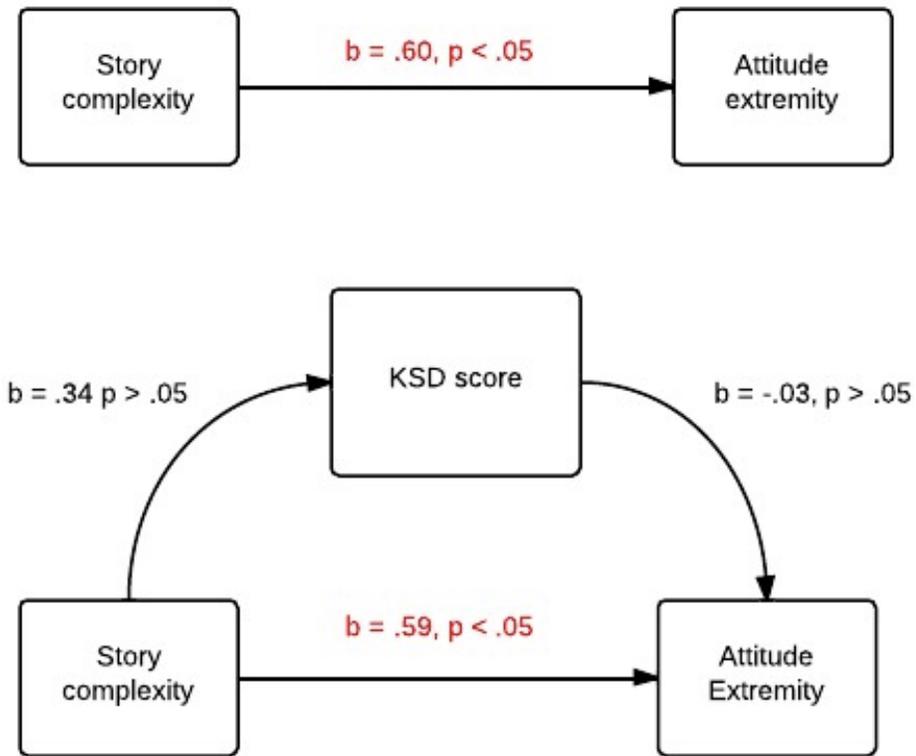
Figure 5. Mediation model for Ugg boot ban story using KSD as a measure of cognitive complexity

Note. Analysis shows KSD scores do not mediate the relationship between story complexity and attitude for the Ugg boot story. Coeffecients are unstandardized. Significant paths are red.

For the anonymous commenter story, there was no significant direct relationship between story complexity and attitude extremity ($\beta = -.258$, $p = .318$). That relationship was still non significant after including the mediator, KSD scores, in the model ($\beta = -.297$, $p = .272$). There was a significant relationship between story complexity and KSD scores ($\beta = .72$, $p = .02$) but as Figure 6 shows, the overall mediation model for the anonymous commenter story was not significant ($z = -.47$, $p = .64$).
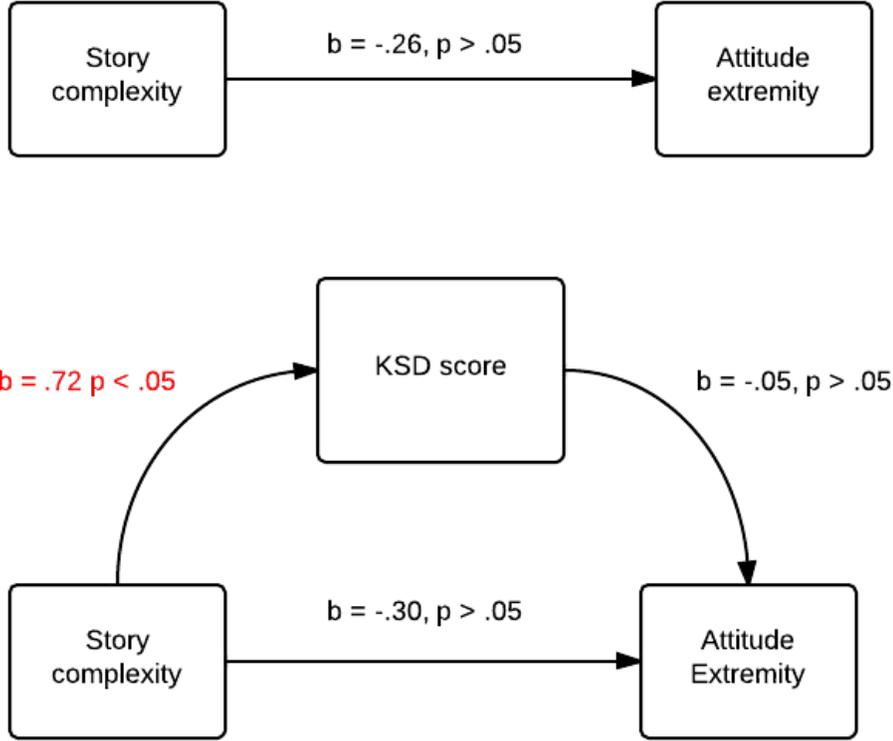
Figure 6. Mediation model for anonymous commenter story using KSD scores as a measure of cognitive complexity.

Note. Analysis shows KSD scores do not mediate the relationship between story complexity and attitude for the anonymous commenter story. Coeffecients are unstandardized. Significant paths are red.

The results do not support H3: cognitive complexity, operationalized as KSD scores, does not mediate the relationship between story complexity and attitude extremity.

Discussion

This experiment examined the effects of altering the number of perspectives presented in a news story on cognitive complexity and attitude extremity for two different story topics. The results suggest that the number of presented perspectives, referred to in this section as story complexity, influences cognitive complexity but only in terms of cognitive cohesion, observed with a measurement of knowledge structure density (KSD). Participants who saw the more complex version (four perspectives) of the news stories had higher KSD scores, compared to participants who saw the simple versions (two perspectives) of the stories. Those who saw more perspectives in a news story identified stronger connections between arguments associated with the issue-at-hand.

When cognitive complexity was measured in terms of differentiation and integration scores, there was not a significant difference in cognitive complexity between the participants in the simple and complex story conditions. Those in the complex condition did not list a more equal number of arguments in favor of or against the issues in the news stories, compared to those in the simple condition. The participants in the complex condition also did not see their own arguments for and against the issue as more equal in terms of argument strength, compared to those in the simple condition. Additionally, neither measurement of cognitive complexity (KSD or differentiation and integration) was associated with attitude extremity. These results do not lend support to the hypothesis that cognitive complexity mediates the relationship between story complexity and attitude extremity.

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The following section will explore the implications of the relationship between story complexity and KSD scores, specifically focusing on what it might mean for the storytelling structure of a news story to impact the extent to which news consumers make mental connections between ideas. It will also examine the alternative measure of cognitive complexity - Carroll and Bright's (2010) argument-listing method - and reflect on why the measure did not respond to changes in story complexity in the same way that KSD scores did. Additionally, this discussion section will revisit the attitude measurements used in this experiment and how story topic and question order may have impacted results. The section will conclude with a discussion of the limitations of this study and suggestions for future research.

KSD as a Measure of Integration

The knowledge structure density tool designed by Eveland et al. (2004) was not meant to be a measurement of cognitive complexity; however, the act of asking participants to assess the connectedness of their own ideas is, conceptually, a clean reflection of the integration concept discussed in integrative complexity research. Integrative complexity theory refers to integration as a measure of cognitive cohesion, where "simple interpretations have fewer connections between information elements than complex interpretations" (Schaap, Konig, Renckstorf & Wester, p. 213). This would suggest that the participants who saw the more complex news story were able to make more connections between the perspectives associated with an issue, thus scoring higher in cognitive complexity than those who saw the simple news stories. The practical implication of this finding is that as participants were exposed to more perspectives on an issue, they were able to see how various arguments related to one another. It is possible

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that an increase in incoming information triggered more deliberate or central processing of that information.

There are several ways to interpret how KSD might serve as a measure of cognitive cohesion. First, this experiment treated KSD as an alternative measure of the integration construct found in integrative complexity research. This study didn't compare KSD scores to the traditional integration scoring methods used in integrative complexity research, so it remains unclear whether this tool assesses integration in the same way as traditional complexity measures do. However, a change in the amount of information presented did result in higher KSD scores, which is in line with what integrative complexity theory would predict: an increase in information, as long as it does not induce cognitive overload, should enhance cognitive complexity (Schroder et al., 1967). If KSD is a valid measurement of cognitive integration, it could be a manageable alternative to the essay-writing techniques used in traditional integrative complexity research. It is a closed-ended tool that requires less effort from participants and can easily be used in online experiments.

Second, KSD as a measurement of cognitive integration is similar to the concept of elaboration found in cognitive mediation model research (Eveland, 2002). The cognitive mediation model posits that attention and depth of processing, or elaboration, impact how people learn from media messages. Eveland (2002) defines elaboration as the "process of connecting new information to other information stored in memory, including prior knowledge, personal experiences, or the connection of two new bits of information together in new ways" (p. 573).

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Complexity theory's integration and the cognitive mediation model's elaboration both focus on how people form and add to mental networks of information. Schaap (2004) argue that applying measures of integration to the cognitive mediation model can provide a clearer view of how people are making connections between bits of information. Creating stronger links between cognitions makes the information more accessible and increases understanding of the issue, according to memory research (Fiske & Taylor, 1991). Looking at KSD from this conceptual perspective suggests that an increase in KSD scores might reflect an enhanced ability to understand an issue in the news and to integrate that understanding into an existing set of knowledge. Moscovici and Doise (1994) argue that in order for people to make informed decisions in a democracy, they must first have a reasonable understanding of the issues affecting them. KSD might be an effective tool for assessing how changes in information can influence the ability to learn and make decisions based on media content.

This experiment didn't measure any effects that may result from an increase in cognitive cohesion, but this study can contribute the notion that altering the number of perspectives in a news story elicits a measurable cognitive change. Future research should further explore these changes in cognitive complexity, focusing not only on consequences of such changes but also on flushing out what such measures reveal about the cognitive processing of media messages.

Integration without differentiation. While KSD measures the integration construct that is central to integrative complexity theory, it doesn't take into account the construct that is supposed to precede integration: differentiation. Differentiation is conceptualized as the distinct elements that make up a network of thoughts, whereas

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integration refers to the connections between those elements. In this study, the elements were operationalized as listed arguments. Even though participants in the complex story condition identified stronger relationships between arguments, they didn't list any more arguments than the participants in the simple story condition — nor did they list a more equal number of arguments for or against the issue, compared to their counterparts in the simple condition. In other words, integration, operationalized by KSD scores, is present but differentiation, operationalized by the ratio of arguments listed for and against an issue, is missing.

The traditional integrative complexity tool for assessing differentiation involves comparing the number of positive and negative statements a respondent makes via thought-listing in response to a stimulus. In this experiment, a differentiation score was calculated by comparing the number of arguments listed for and against the topic in the story. Those who listed a more equal number of arguments for and against had higher differentiation scores than those who listed a disproportional number of arguments on one side or another. The results show that respondents who saw the complex stories didn't list a more equal number of arguments compared to those who saw the simple stories. Using this measurement technique, the cognitive element of differentiation did not change in response to story complexity.

Finding evidence of integration (KSD scores) but not differentiation is somewhat confounding, since integrative complexity research contends that differentiation is necessary for integration to happen. One explanation for the absence of differentiation may be that, because the measures in this experiment ignored the content of the listed arguments, participants who saw the more complex story may have produced more

thoughtful or sophisticated arguments and were thus able to identify stronger connections between those ideas. The measures of differentiation used in this experiment ignore quality and focus on quantity, or a comparison of quantitates, whereas the measure of integration (KSD scores) ignores quantity. Quality of arguments might be an important factor not measured in this experiment.

It is also possible that integration represents a different cognitive process than differentiation. In other words, two people may both list the same four arguments; the two people may identify all arguments as equal in strength, yet one person sees the connections between the arguments as weak and the other person sees the connections as strong. This interpretation means two people could have the same differentiation score (ratio of arguments listed for and against an issue) but have different integration scores (strength of connections between arguments). Differentiation still precedes integration, but the two scores won't positively correlate with one another.

Another explanation for the absence of differentiation in this study is that the participants weren't motivated to list arguments in favor of and against the issues in the news stories simply because they didn't find the topics important or interesting. As Wojcieszak (2012) notes, when people perceive an issue to be important, they are more likely to report the rationale for their own opinions, as well as the rationale for opposing opinions.

While the two explanations discussed above may account for the lack of differentiation evidence, I'm not convinced that the measurement of differentiation used in this study, the ratio method derived from Carroll and Bright's (2010) research, is an accurate reflection of the differentiation concept. Using a ratio to reflect a construct

implies that the two scores that are part of that ratio - in this case, the number of arguments for and the number of arguments against - should be compared to one another in order to be meaningful. But the concept of differentiation, as it's discussed by Schroder et al. (1967), is a simple sum of a person's thought dimensions.

This would explain why, even though Carroll and Bright's (2010) ratio of arguments may have utility, it does not appear to have any relationship with the measures of cognitive cohesion observed in this experiment. However, a method quite similar to Carroll and Bright's does correlate with the measurement of integration (KSD) used in this study. Cappella, Price and Nir's (2002) argument repertoire measure is a sum of the arguments a participant lists in support of an issue and the arguments a participant lists as possible arguments someone might make against the issue. Rather than treat the arguments for and against as a ratio, like Carroll and Bright do, argument repertoire is simply a sum of all the listed arguments.

When I exchanged the ratio of arguments and instead added the arguments a participant made both in favor of and against an issue, this argument repertoire variable shared a significant correlation KSD scores for both the Ugg boot story, r (64) = .245, p = .048, and the anonymous commenter story, r(64) = .216, p =.081.[5] These weak, positive correlations suggest that the argument repertoire measurement used by Cappella et al. may be an effective measure of differentiation when KSD is used as a measure of cognitive cohesion.

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[5] The significance level is two-tailed, since I did not make a directional prediction about this variable. It does not meet the standard alpha level of .05 as a two-tailed test, but it is included as evidence that future studies may find a significant correlation between argument repertoire and KSD.

Alternative Measurement of Integration

While the changes in story complexity significantly impacted integration when the construct was operationalized as KSD scores, story complexity did not have the same effect when integration was operationalized as a ratio of assigned argument strengths, a measurement derived from research in integrative complexity (Carroll & Bright, 2010). The method requires respondents to list arguments both for and against a topic and then rate the strength of each of those arguments. The integration score is calculated by comparing the mean strength of "for" arguments to the mean strength of "against" arguments. The rationale that this measurement reflects integration can be found in the Schroder et al.'s (1967) original work on integrative complexity, where the authors suggest that "the more evenly each dimension was weighted in any give sent of judgments or perceptions, the greater the probability that the response was generated by an integratively complex structure" (p. 26). A person who can identify and articulate strong arguments on both sides of an issue is capable of examining an issue from various angles. This cognitively complex person is able to recognize the value in perspectives he or she doesn't necessarily agree with.

It is possible that changes in the informational complexity of a news story do not impact this ability to identify and analyze various points of view; however, it is also possible that prompting respondents to list arguments for and against an issue - then asking them to rate the strength of their own productions - is an ineffective way of measuring cognitive complexity. The first issue is that this method requires participants to produce their own material. One of the criticisms of thought-listing, or in this case,

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argument-listing, is that it requires a great deal of cognitive effort from participants (Zhao et al., 2011). If the participants have an incentive to deliver this cognitive effort, this may not be an issue, but this experiment utilized an undergraduate sample that only stood to gain a few points of extra credit in exchange for their participation. The participants took an average of 12 minutes to complete the survey, suggesting they didn't spend a lot of time listing and evaluating their own arguments.

Additionally, this method forced the respondent to evaluate the quality of their own thoughts about issues that were inconsequential. Cappella et al. (2002) note that it is easier for people to elaborate on issues they find important or are familiar with, such as reasons for favoring a political party, versus issues they are unfamiliar with. It is likely the participants in this experiment found the issues at hand unimportant and uninteresting.

Cognitive Complexity and Attitude

The results of this experiment do not suggest that cognitive complexity mediates the relationship between story complexity and attitude extremity. There was not a significant association between cognitive complexity and attitude extremity. Overall, once the attitude scales were folded to signify extremity, attitudes toward the two news topics were fairly neutral.

These moderate attitudes might be attributed to a lack of interest in the story topics or a consequence of question order. The participants were prompted to consider arguments both in favor of and against the issue in the news story before they were asked to report their attitude toward the issue. Wilson, Dunn, Kraft and Lisle (1989) found evidence that asking participants to list reasons for their attitudes before reporting their

attitudes can have a disruptive effect on the attitude report. Zaller (1992) explains it this way:

...attitude reports made after a 'reasons analysis' may fail to predict the attitudes and behaviors that are based on a normal memory search. The problem, thus, is not with the extra thought per se, but with the extra thought that fails to mimic the normal process by which people search their memories for relevant considerations (p. 90).

It is possible that first asking participants to think of reasons for and against the issue and then asking them to report their attitudes created a situation where participants were prompted to consider perspectives they wouldn't have considered otherwise. If this is the case, a participant may have developed a more neutral attitude toward the topic during the argument-listing task simply because they were asked to consider arguments on both sides of the issue.

The only significant result from this experiment that concerns attitude is the relationship between story complexity and attitude extremity for the Ugg boot story. This relationship was not hypothesized. Those who saw the more complex news story about the Ugg boot ban reported more extreme attitudes, compared to those who saw the simple version of that story. Upon further examination, it appears that participants had negative attitudes toward the boot ban in the simple condition and those attitudes became even more negative in the complex condition. The mostly-female, student sample clearly didn't approve of the school's crackdown on fashion boots and that sentiment seemed to get stronger when the participants learned more about the issue in the complex story condition. This suggests that exposure to a counter-attitudinal message pushed participants toward a more extreme attitude. Wojcieszak (2012) discovered a similar

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trend, finding those with more extreme opinions (defined as those with opinions furthest from a neutral middle) were more likely than those with neutral opinions to report that their attitude moved strongly toward their prior position after involvement in a discussion about an issue. This experiment didn't measure pre-existing attitudes and thus cannot speak to whether participants became more extreme in the complex condition for the Ugg boot story. Future research might include both pre and post-test attitude measurements, as well as multiple story topics so the researcher can determine the context in which attitude change or reinforcement might occur.

Limitations

While this experiment focuses on psychological processes that should theoretically apply to a general population, this study only tests the stated hypotheses using a convenience sample of undergraduate students. The use of random assignment ensures internal validity but the lack of a representative sample limits the external validity of the findings. The sample was made up of mostly white, female, college-educated participants. This student sample varies considerably from an adult sample on attributes that might impact the relationships between story complexity, cognitive complexity and attitude extremity.

The size of the sample is another limitation of this experiment. Effect sizes ranged from small to medium and the power to detect those effects was low, even for the significant results. A larger sample would increase the likelihood of finding effects that exist.

Conclusion

The purpose of this experiment was to explore how changes in the number of perspectives presented in a news story might impact the way in which someone thinks and feels about a topic in the news. While the data only supports one of the stated hypotheses, the results also suggest that there are certainly cognitive and attitudinal consequences which can be attributed to changes in the number of perspectives presented in a news story.

During the initial literature review for this experiment, I failed to comprehend just how little research has been done concerning the storytelling format of news stories. Only one study (Sotirovic, 2001) looks directly at simple versus complex media, yet that study focuses on simple and complex mediums (newspaper vs. entertainment magazines, for example). To my knowledge, no existing study looks at the effects of altering the number and range of opinion perspectives presented in a news story. This study contributes a starting point for researchers interested in exploring this journalistic storytelling norm. It also applies a cognitive psychology approach, integrative complexity, to communication theory and explores how a measurement of learning, knowledge structure density, might be applied in a new context.

For professional journalists, this experiment provides evidence that the number of perspectives a journalist chooses to include in his or her story can impact the way a member of the news audience thinks about the issue-at-hand. Those who saw a story with more perspectives were able to draw stronger connections between ideas, suggesting that including additional perspectives in everyday news stories may lead to a better understanding of those topics by the public. It's currently unclear what the effects

of an increase in cognitive cohesion might be, but what is clear is that changing the number of perspectives elicited some kind of cognitive change. Adding more perspectives to a news story may not influence *what* people think about topics in the news but it does appear to influence *how* people think about the news.

Future research should explore the effects of altering the perspectives presented in a news story, albeit with a slightly different approach. The argument-listing technique, while useful if the focus is on argument content, is not as useful when the measurement focuses on quantity and ignores content. Zhao et al. (2011) suggest that researchers should determine the arguments to be assessed and then ask participants to evaluate those arguments for things like believability, importance and convincingness. A technique such as this would allow researchers to see whether changes to story format can influence how people react to perspectives that differ from their own, without requiring the participants to put forth the effort to actually list arguments. Additionally, Mutz (2002) takes a different approach by presenting participants with an issue position and asking the participant to list rationales for that position, regardless of whether he or she agrees with the position. These alternatives techniques may be an easier way of exploring whether the structure of news content can influence how people acknowledge and regard alternative perspectives. Exploring alternatives is certainly worthwhile, as Manosevitch (2009) argues, understanding alternative viewpoints "recognizes that a genuine quest for truth must give the benefit of the doubt to all perspectives — for fear of missing a desired opportunity or outcome" (p. 189).

The effects of altering the number of perspectives present in a news story on cognition and attitude may be small — and judging from this experiment — those

effects may vary depending on story topic, prior attitude, or a number of other factors. What is clear from this study is that the number of perspectives presented in a news story does have some impact on cognitive structure. What remains unclear are the more tangible changes in attitude, perception of public opinion, perception of the media, or behavioral outcomes that could be impacted by the number or range of perspectives in a news story. Future research should investigate the changes that might occur as a result of exposure to a wider range of views in the news, bearing in mind that "exposure to diverse political views is obviously tied to a wide range of outcomes that are valued in democratic systems" (Mutz, 2006 p. 62)

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