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Cueing Complex Thought

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CUEING COMPLEX THOUGHT

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Abstract Content

Does exposure to a complex description subsequently cue a person to be more complex?
To test this question, participants read a paragraph about a specific topic. Paragraphs
varied in their level of *Integrative Complexity*. Participants then wrote about either (1)
their opinion about the topic that they read about, or (2) their opinion about a topic that is
unrelated to the one that they read about. Participant responses were scored for
Integrative Complexity. Contrary to expectations, reading complex paragraphs did not
cue people to write more complexly, regardless of whether they were assigned to write
about a topic related or unrelated to the one they read about. Although findings did not
support the main hypotheses, some unexpected results emerged in terms of how people
perceived complex versus simple paragraphs. Specifically, participants were more likely
to agree with complex opinions, and also viewed them as more persuasive and thought-
provoking, compared to simple opinions. These unexpected findings provide some
potential avenues for future research to further understand the impact of complex
communications on other people's perceptions.

Human beings, viewed as behaving systems, are quite simple. The apparent complexity of our behavior over time is largely a reflection of the complexity of the environment in which we find ourselves.

-Herbert Simon

Cueing Complex Thought

Humans love simplicity. As captured in the above quote, people often think and behave in simple way. Simplicity is less arduous than complex thinking, and given that people tend to be cognitively lazy (Corcoran & Mussweiler, 2010), simplicity is favorable. Indeed, some research suggests that people often prefer simplicity (see, e.g., Conway et al., 2012).

Yet, humans are also adaptable and have the capacity to think complexly. So, when are we simple and when do we adapt to more complex thinking? As suggested by Simon's quote, we are indeed influenced by the situational context. For example, most people are inclined to expend more cognitive energy and produce more complex thinking when in a professional meeting than when at home watching television. We are aware that at times we can get away with being simple, and other times we are expected to think more complexly. The level at which we both process and produce complex thinking is in part dependent on the context. Indeed, a large body of research suggests that complexity is strongly influenced by situational factors (e.g., Conway, Schaller, Tweed, & Hallett, 2001; Conway, Suedfeld, & Clements, 2003; Conway et al., 2008; Suedfeld & Bluck, 1988; Suedfeld & Rank, 1976; Myrry, 2002).

As illustrated below, much research focuses on very overt influences of the situational context such as intense stress or direct manipulations of complex thinking.

Yet complexity may also be influenced by cues in the environment that are, on the surface, less psychologically powerful. The purpose of this paper is to discuss one such as yet unexplored aspect of the context. In particular, it tests the idea that the presence of complexity itself can subsequently cue a person to think more complexly.

Integrative Complexity

What does it mean to think complexly, exactly? Complexity refers to thinking about multiple aspects of a particular issue. Suedfeld and Tetlock (1977) formalized a scoring system that measures cognitive complexity by analyzing a person's speech or writing. This system, most commonly called *integrative complexity*, is the most widely used scoring system that measures complexity of thought of open-ended statements (see, e.g., Suedfeld & Bluck, 1988; Suedfeld & Leighton, 2002; Suedfeld & Piedrahita, 1984). Integrative complexity is dependent on two components: (1) differentiation (one's ability to distinguish between different dimensions of an issue), and (2) integration (the degree to which differentiated dimensions are connected into a larger framework). Differentiation must precede integration. In other words, one cannot reach an integrative level of complexity without first clearly differentiating between two or more dimensions (Baker-Brown et al., 1992a, 1992b).

What causes complexity?: Prior evidence and current implications

Multiple contextual factors influence how complex someone thinks at a given point in time. Some of those factors pertain to direct and intentional manipulation of complex thinking; others pertain to less direct influences. I distinguish between the types of influences below, and then discuss how complexity, in and of itself, is a factor that may influence complex thinking.

Direct Manipulation of Complexity

One's level of complex thinking can change as the result of a direct intent to produce complexity. For example, people can think complexly when they are explicitly told to do so (e.g. Hunsberger et al., 1992; Suedfeld 1968). One study found that when people were given instructions on writing complex paragraphs and were then told to write them, people wrote more complex paragraphs than they normally would have in comparison to a control group (Hunsberger et al., 1992). This and other research (e.g. Suedfeld, 1968) suggests that complexity is something that can be purposefully adapted.

Less Direct Situational Influences on Complexity

Of course, people are not often told to explicitly think complexly in their real lives, and rarely think about directly manipulating how complex their thoughts are. Thus, this research on intentional manipulation of complexity demonstrates that people can manipulate complexity directly if they want to, but it is a different question if there are other things in the environment that might prod complexity in less direct ways..

A great deal of research suggests that people's complexity can be responsive to a variety of less-intentional contextual factors. One of these pertains to the audience that the communication in question is directed towards. For example, Tetlock (1983) investigated how people think about topics when they know that they will be held accountable for defending their position to a particular audience. Findings revealed when people perceive a "pressure to justify their opinions to others," complexity increases.

Feeling pressure on a more general level also has direct effects on a person's

complexity.   Stress itself can change how complexly a person thinks.   For example, political leaders are much less complex during international crises, which are times that likely induce a high amount of stress (for a review, see Conway, Seudfeld, and Tetlock 2001).

Other research suggests that familiarity with an issue can influence a person's complexity.   Specifically, complexity increases on issues in which a person has had previous involvement or experience (Ceci & Liker, 1986; Conway, Schaller, et al., 2001; Dasen, 1974,1975; Judd & Lusk, 1984; Linville, Fischer, & Salovey, 1989).

Complexity as a Contextual Influence

As illustrated above, previous research suggests that people are responsive to a number of contextual influences.   Most of these influences, however, are fairly powerful and overt psychological influences such as direct commands or international crises. Yet people rarely intentionally alter their complexity in a direct fashion; and few people are leaders during international crises. Many everyday influences on complexity probably occur in a more subtle fashion.   The present study is designed to investigate one such cue that is a part of everyday conversation: The presence (or absence) of complexity itself.   Perhaps it is possible that people adapt their thinking after being exposed to a complex description about a particular topic.   The primary question of the present paper is: Can complexity itself be manipulated in order to cue people to think more complexly?

Rationale for the Present Project

Prior evidence about what causes complexity is useful, but leaves some gaps to fill.   There is a considerable amount of research on situational influences on complexity, such as the audience, familiarity, and stress.   However, little research has examined

more pervasive everyday cues that might occur on a regular basis in typical conversation. And no known research has examined the effect of descriptive complexity as a mechanism that influences a person's subsequent complex thinking. In contrast to other previous research that involves the use of overt manipulations that focus on explicitly telling someone to be complex (Hunsberger et al., 1992; Suedfeld 1968), the current project investigated the less direct effect of only *presenting* descriptive complexity. This unique approach expands and improves upon previous work by concentrating on descriptive complexity as a factor that indirectly creates subsequent complex thinking. Additionally, the present study may lead to future work that addresses even more subtle factors affecting complexity, such as unconscious priming. This is an area that is largely untapped in the complexity literature.

The Current Theory: The Complexity Theory of the Domain Cue

The present paper tests a new theory called the Complexity Theory of the Domain Cue, in which seeing or hearing a complex opinion will cue people to be more complex. In particular, when a person is introduced to a complex perspective on an issue, they are going to generate a more complex response. Complexity begets complexity. Yet, this effect has its limitations. Namely, when one hears a complex perspective, they will respond more complexly, but only relative to the topic at hand. For example, a complex perspective on abortion will cue the listener to think complexly about abortion, but not about any other topic. In other words, complexity begets complexity, but only for the same topic domain. Below, I elaborate on why complexity might beget complexity at a broad level, and then explain why the effect should be domain-specific.

Why Does Complexity Beget Complexity?

Why are we more apt to think and respond in a complex way after hearing an argument that includes multiple perspectives? Complexity requires multi-dimensional thinking. Exposure to an opinion that contains multiple dimensions might prod people to think about aspects of the topic that they otherwise would not have thought about. This increases the likelihood that one will process the information from more than one angle. This processing in turn creates complex thinking.

Because it is dependent on simply hearing multiple dimensions concerning a specific issue, this process should occur irrespective of one's stance on the issue. If a listener agrees with the speakers' opinion on an issue, then they are likely to think about all of the dimensions of that issue that align with their own opinion. In doing so, they are recognizing and thinking about different dimensions of that issue by processing the various points of view. Similarly, if a listener disagrees with the speakers' stance on an issue, then they will likely recognize the aspects of the speakers' opinion that differ from their own. The awareness of discrepant perspectives encourages the listener to think about both their own views, as well as those they heard from the speaker, which involves processing the issue from more than one angle. For every dimension that the listener hears, that increases the likelihood that they will think about and generate a new dimension. It is the recognition of more than one dimension that causes one to think complexity, irrespective of one's stance on the issue.

Of course, it is not always the case that people have a firm stance on every issue. As often happens, one can agree with certain aspects of an opinion and disagree with others. In the case where a listener both agrees and disagrees with a

speakers' opinion, they are still processing multiple dimensions of that issue just by hearing and attending cognitively to the various sides.

Consider the following illustration: Imagine that Susan is talking with a friend about whether or not wearing seatbelts should be legally required. She listens to her friend deliver an intelligent argument, in which she provides several reasons why people should be obligated by law to wear their seatbelt, while at the same time acknowledging the challenges in balancing personal freedoms and safety. Her friend argues that on the one hand, requiring people to wear seatbelts will almost certainly reduce traffic fatalities and will generally keep people safer in their vehicles.   On the other hand, people have the right to make choices about their lives and it is important that personal rights are not infringed upon. After all, if someone chooses not wear his/her seatbelt, they are not affecting anyone's safety but their own.

Let's say Susan is adamantly opposed to wearing seatbelts. How will her views be affected by listening to such a developed and multi-dimensional perspective? While she may be inclined to disagree with the parts of her friend's views that she opposes, she is nonetheless forced to deal cognitively with them. She will thus address the arguments that were presented in some way, either to discredit them or to present "better" alternatives. In doing so, she is apt to respond with a similar level of complexity, because she is forced to process the dimensions of the argument that she heard. For example, she might say that while she agrees with the argument that maintaining personal freedoms is important, she may point out that she disagrees with the argument that a person's right to make choices about wearing a seatbelt takes precedence over and above personal safety. This response addresses two dimensions, both of which

were put forth in the original argument: (1) recognizing the merit of protecting personal freedoms, and (2) recognizing that safety trumps personal freedoms in this instance. It is the exposure to those separate dimensions that cue one be more multi-dimensional, and thus produce a complex response.

The Domain-Specificity of the Complexity Cue Effect

Research suggests that complexity is in part domain-specific (Conway et al., 2008, 2011; Feist, 1994; Suedfeld, 2000; Tetlock, 1986), and this has implications for the current theory. Domain specificity refers to the idea that cognitive processes are specific to the content at hand. For example, one might be a complex thinker on gun control issues but not about education. If it is possible to cue someone to think complexly about wearing seatbelts, for example, then this cueing effect will take place relative to wearing seatbelts alone, and not any other topic.

Why does descriptively cueing complexity operate in a domain-specific way? When one listens to an argument about a particular topic domain, one is processing information about that domain alone. It is the presence of more than one perspective on a specific domain that cues people to think more multi-dimensionally about that domain. Thus, there is no reason to assume that hearing more than one side of one topic domain will cue people to think about multiple sides of every other unrelated domain. The complexity cue effect is domain-specific.

Consider a similar example to the one described above. After hearing her friend's complex argument about wearing seatbelts, Susan processes the different dimensions of seat belt wearing, such as safety and freedom of choice, which increases the complexity of her thinking about seat belts. Now suppose that her friend asks her

an unrelated question about drilling for oil in ANWAR. This is a completely unrelated topic domain, one that Susan was not forced - in hearing an opinion about seat belts - to process in terms of its different dimensions. She was not exposed to any new "oil drilling" dimensions and thus was not cued to think complexly about drilling for oil. It is certainly possible that she may have already had a complex perspective on oil drilling. But she would not have had the complexity of her opinion increased at all by cueing complexity on another topic.

Evidence Relevant to the Domain Cue Theory

While there is no direct evidence on the effects of descriptively cueing complexity, there is indirect evidence to suggest that simply hearing complexity might produce complexity. For example, Tetlock (1985) examined differences in complexity between American and Soviet foreign policy statements throughout the Cold War. Although observed changes in complexity were influenced by a number of factors, findings suggested that complexity levels of Soviet policy makers influenced complexity levels of Americans, and vice versa. American statements impacted Soviet complexity within the same time period, whereas the complexity level of Soviet statements impacted American complexity in the following quarter year period. Although indirect, this evidence is consistent with the idea that one person's level of complexity can be responsive to another person's complexity, even without any explicit attention to the actual level of complexity.

Other evidence relevant to the theory involves the domain specificity of complex thinking. Although no research directly tests the impact of descriptive complexity on subsequent complexity on that domain, research suggests that the effect on a person's

complexity is in part dependent on the actual topic domain that they are forced to think about and process. Some topic domains are inherently more complex than others. This is illustrated by Tetlock's (1986) value pluralism model, which specifies that value conflicts encourage individuals to think more complexly, but only when they perceive issues as important. In these types of controversies there is often no clear right or wrong solution, and as a result, people tend to reason in terms of trade-offs, which increases complexity.

One implication of the value-pluralism model is that some domains will be different than others in the degree of value conflict they inspire; value conflicts differ from person to person depending on each individual's values and whether or not a particular domain is perceived as important. As a result, some domains will be more complex than others for each individual. Similar research has found that people are more complex in regards to personal issues as compared to professional issues (Tetlock 1983), more complex on topics that are important to them (Conway et al., 2008), and more complex on topics high in attitude heritability (Conway et al., 2011). This body of research indirectly supports the theory that the complexity cue effect will operate in a domain-specific way, because changes in complexity are largely dependent upon the individual that is processing information about a particular domain.

Design Overview

The present study is a 2 (Topic Domain Match) X 3 (Complexity of the Paragraph Participants Read) between-subjects design. Participants read an opinion paragraph prepared by the author and subsequently wrote their opinions about a pre-assigned topic. These participant responses were then scored for integrative complexity. Two

key factors were manipulated: (1) The match between their read-about topic and the one they wrote about – some participants wrote a response pertaining to the topic they read about, while others wrote a response that is unrelated to the topic they read about, and (2) the level of complexity in the paragraph that participants read – some received a simple paragraph, some received a moderately complex paragraph, while others received a very complex paragraph.

Hypotheses

Given this design, the complexity theory of the domain cue suggests the following hypotheses:

Hypothesis 1: Participants who are given a complex description of a topic domain will respond more complexly (as measured by integrative complexity scores) than participants who are given a simple description of a topic domain. The higher the complexity level of the description read by participants, the higher the subsequent complexity level of their own opinion.

Hypothesis 2: This effect on a person's level of complexity will be observed in a domain-specific way. Participants who are given complex descriptions about a topic will respond more complexly (as measured by integrative complexity scores) relative to that topic in particular, but not about different topics.

Methods

Power Estimation

Power analyses revealed that with a projected effect size of $f = .25$ and a power criterion of .81, an N of 216 was needed (see Figure 1).

Participants

Two hundred and sixteen University of Montana undergraduate students in the Psychology Department participated in this study in two large mass testing sessions. Participants included both males ($N=84$) and females ($N=125$; 6 unreported) between the ages of 18-24. In return for completion of this study, each participant received two research credits to be applied toward their psychology 100 course requirements.

Integrative Complexity Scoring

Because complexity served as both an independent variable and the dependent variable in the present study, it is important to first elaborate on how complexity is scored. Integrative complexity is measured on a 1 to 7 scale, wherein a score of 1 indicates simplistic thinking (no differentiation of dimensions) and a score of 7 reflects the highest level of complex thinking (marked by both differentiation and integration of dimensions). A score of 3 indicates clear differentiation of at least two dimensions. In other words, it represents the recognition of more than one perspective, but does not contain any integrative language. A score of 5 contains both differentiation (of at least two dimensions) and subsequent integration of those differentiated dimensions. It is an indicator of viewing alternate perspectives/dimensions as being connected in some way. Complexity scores are assigned based solely on the structure of the writing rather than its meaning or content.

In addition to assigning an overall complexity score, participant responses were scored for two sub-types of integrative complexity: Dialectical complexity and elaborative complexity. Dialectical complexity involves the acknowledgement of different viewpoints along the same domain. Elaborative complexity, on the other hand, is described by the recognition of several components along the same singular perspective (Conway et al., 2008, 2011).

Materials and Assignment

Participants were assigned to read one of thirty-two descriptive paragraphs that were used to prompt responses from them. All paragraph assignment in the study was quasi-random and was accomplished by sorting packets prior to the study and having experimenters hand out all materials face-down. While not fully random, this approach accomplished the twin goals of (1) ensuring that there was no systematic bias for participant assignment to each of the key conditions, and (2) ensuring that experimenters were blind to the condition of each participant.

The author of this study wrote all paragraphs, which are approximately equivalent in length (60 words per paragraph on average). The paragraphs were constructed to vary along two primary dimensions relevant to the key hypotheses: 1) Complexity, and 2) Topic domain.

Manipulations Directly Relevant to Primary Hypotheses

Manipulating Complexity

Participants were assigned to read a paragraph that either scored a 1, 3, or 5 on the integrative complexity scale. These specific levels were chosen because they conceptually capture the fundamental properties within the scale, from simple (score of

1), to moderately complex (score of 3), and then to integratively complex statements (score of 5). Paragraphs were written and scored by two expert coders (including the author). Subsequently, three additional coders (who were blind to the nature of the study and hypotheses) scored all paragraphs to legitimize the assigned complexity scores. The additional coders' scores almost perfectly paralleled the assigned complexity scores (1, 3, and 5) for the paragraphs (see Figure 2). All coders had previously obtained a reliability rating of .85 with an expert scorer.

In order to control for other factors that might influence complexity and to increase generalizability, across each topic domain I also wrote paragraphs accounting for the sub-type of complexity (dialectical and elaborative; Conway et al., 2008; 2011) and whether or not the opinion statement was for or against the proposed topic domain. As a result, each topic domain had eight different possible descriptive paragraphs for that domain (4 topic domains X 8 paragraphs per domain = 32 total paragraphs).

Of the eight paragraphs for each domain, two represented simple paragraphs (score of 1 on the integrative complexity scale); such that one paragraph argued in support of the topic and the other argued against the topic (pro vs. con). The other six paragraphs represented complex arguments, yet differed from one another in both their type of complexity (Conway et al., 2008; Conway et al., 2011) and level of complexity. Three of these scored a 3 on the integrative complexity scale, and included (1) a paragraph that argues in support of the topic and contains elaborative complexity, (2) a paragraph that argues against the topic and is also elaborative in complexity, and (3) a paragraph that contains both pro and con arguments about the topic and as such is dialectical in complexity. Lastly, three paragraphs scored a 5 on the complexity scale

and were sub-categorized in the same manner as described above for paragraphs that score a 3.

Manipulating Topic Domain Match

Participants were assigned (in the same quasi-random fashion described above) to read an opinion about one of four topic domains: (1) Abortion, (2) death penalty, (3) doing physical activities, and (4) doing crossword puzzles. These specific topics were selected because they have been shown to be effective topic stems for measuring complexity in previous research (Conway et al., 2008, 2011). Multiple topics were included to account for the possibility that the nature of the topic itself could influence changes in the complexity of participants' responses, rather than the level of complexity presented in the description.

Two topic domains (abortion and the death penalty) are considered to be socially or politically controversial, while the other two topic domains (doing physical activities and doing crossword puzzles) represent relatively more neutral issues. No matter the type of paragraph that participants received to read, they were assigned to either write about the same topic (Matched condition) or one of the other three topics (Unmatched condition).

<u>Matched Condition</u>

Participants in the matched condition were assigned to read about a topic and then write a response. Participants only wrote their opinions about their read-about topic. For example, if a participant read a paragraph about the death penalty in the Matched Condition, they were instructed to write about their opinions on the death penalty.

Unmatched Condition

In the unmatched condition, participants were assigned a topic to read about, but were then asked write their opinions about a separate, unrelated topic. For example, if a participant read a paragraph about the death penalty, they were asked to write their opinions about one of the three other possible unmatched topics (abortion, doing physical activities, or doing crossword puzzles). They had an approximately equal chance of writing about each of the three unmatched topics.

Sample of Paragraph Prompts (See Appendix A for all paragraph prompts and Appendix B for directions to participants)

Integrative Complexity (IC): Score of 1 (Pro-Death penalty)

The death penalty is absolutely necessary. It is really the only option for punishing convicted murderers. We need to think about the families of the victims. The best way to provide retribution for the victims' family is to sentence killers to death. We are simply too soft on criminals and it is imperative that we serve justice through death sentences.

IC: Score of 3 (Con-Death Penalty)

The death penalty has several shortcomings. One of these is: How can we justify punishing even guilty murderers by killing them? We then become murderers ourselves. A completely separate problem with the death penalty is the risk that innocent persons may be wrongfully sentenced to death. There are other methods with which to deter crime, such as life sentences.

IC: Score of 5 (Pro/Con Death Penalty)

The death penalty has both advantages and disadvantages. On the one hand, the death penalty is a strong crime deterrent. On the other hand, there is the risk that innocent persons may be wrongfully sentenced to death. There is tension between the possibility of sentencing the innocent versus its crime deterrent properties; perhaps this tension can be resolved by considering its use on a case-by-case basis.

Dependent Variables

Four trained scorers, who had previously achieved a reliability of at least .85 with an expert coder on a standard test, scored all participants' responses for integrative complexity. Reliability between coders on these types of open-ended responses is typically between .70 and .90 (Conway et al., 2008; Conway et al., 2011). Reliability between coders on each type of complexity was satisfactory (Integrative Complexity *alpha* = .80, Dialectical Complexity *alpha* = .89, and Elaborative Complexity *alpha* = .75)

Additional Questionnaires

Participants also completed a series of questions relevant to either their views of the topic domains used in the study or their own personality traits. These additional questionnaires were administered after all of the other variables. Some questions pertained to participants' perceptions of the paragraphs they read about. In particular, a set of four single-item questions, anchored by 1 as "not at all", and 7 as "a great deal" asked participants (1) The degree to which they agreed with the opinion they read, (2) How persuasive they viewed the paragraph, (3) How thought-provoking they viewed the paragraph, and (4) How complex they viewed the paragraph.

Other questions related to the topic domains participants both read and wrote about. For example, participants were asked the following two-item scale questions: (1)

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How important they viewed the topics (*alpha on current sample*= .89), (2) their past involvement and personal experience with the topics (*alpha*= .89), (3) the effort they extended thinking about the topics in the past (*alpha*= .87), and (4) how much confidence they had in their opinions about the topics (*alpha*= .44). Participants were also asked single-item questions about their overall attitude about the topics, the degree to which society's opinion matched their own, and the general consensus in society about the topic (See Appendix C).

Some questions involved information about the participant themselves, such as participants' political and social beliefs (Conway et al., 2008), and need for cognition (Cacioppo, Petty & Kao, 1984; see Appendix D). These personality and values questions were included largely to look for potential individual-level moderators of the expected complexity cueing effect. I expected, for example, that need for cognition was one possible moderating factor in the present study.

Finally, participants were also asked for the following standard demographic information: Academic year, gender, sexual orientation, age, ethnicity/race, political ideology, and religious affiliation (see Appendix D). All of these questionnaires have been used in similar prior research (Conway et al., 2008, Conway et al., 2012).

Procedure

The present study is a 2 (Topic Domain Match) X 3 (Complexity of the Paragraph Participants Read) between-subjects design that was completed by participants in large mass testing sessions (of roughly 100 participants each).

Experimenters introduced the study by explaining to participants that they would be asked to read a short paragraph about a topic and then asked to write about their

opinions. In accordance with typical methods for this kind of research (e.g., Conway et al., 2008; 2011), responses were not restricted in length, but participants were limited to one hour for completion. Materials were then distributed to participants, face-down so that experimenters remained blind to all independent variable conditions.

Results

Primary Analyses

A 2 (Topic Domain Match) X 3 (Complexity of Paragraphs Participants Read) ANOVA was conducted on the DV (Participant Integrative Complexity). Contrary to expectations, analyses did not reveal a significant main effect of Complexity of Paragraphs Participants Read on subsequent Participant Integrative complexity (F [2, 205] = .03, p = .97; *partial eta squared* = .000). Reading complex paragraphs did not cue people to write more complexly in this sample. There was also no main effect of Topic Domain Match on Participant Integrative Complexity (F [1, 205] = .14, p = .707, *partial eta squared* = .001). Also contrary to expectations, analyses did not reveal a significant interaction between Topic Domain Match and Complexity of Paragraphs Participants Read on Participant Complexity (F [2, 205] = .44, p = .643, *partial eta squared* = .004).[1] Please see Figure 3.

Moderating Variables

I examined a number of potential individual-level moderators of the effect of paragraph complexity that participants read about and topic domain match on subsequent complexity produced by participants.

Need for Cognition

I first examined whether Need for Cognition was a moderating factor. To do this, I used commonly accepted methods for testing interactions between variables via regression (e.g., Aiken & West, 1991; for exemplars, see Conway & Schaller, 2005; Conway et al., 2009; Conway et al., 2011). Specifically, I (1) converted the Need for Cognition, Topic Domain Match, and Complexity of Paragraphs Participants Read variables to z-scores, (2) created all possible interaction terms between those variables by computing their products, and then (3) entered Need for Cognition, Topic Domain Match, Complexity of Paragraphs Participants Read, and the interaction terms as predictors in a regression for the DV. No main effect or significant interactions emerged for Need for Cognition (all p's > .10).

Participant Views of Topics as Moderators

Following the same methods for testing interactions described above, I also evaluated whether participants' views of the topics they read about moderated the effect of Complexity of Paragraphs Participants Read and Topic Domain Match on Participant Integrative Complexity. In particular, I examined the perceived importance of the topics, personal involvement with the topics, and past experience thinking about the topics as potential moderators. No significant interactions emerged (all p's > .097).

Additional Analyses

Analyses were also conducted using the two secondary manipulations: (1) Topic type and (2) the two sub-types of complexity (dialectical and elaborative) represented in the paragraphs read by the participants.

Topic Type and Sub-types of Complexity

To determine whether each sub-type of complexity (dialectical and elaborative) for the paragraphs that participants read about influenced the effect, a 2 (Topic Domain Match) X 3 (Complexity of Paragraphs Participants Read) X 3 (Type of Paragraph Complexity) was conducted on the key dependent measure (Participant Integrative Complexity). No main effects emerged ($p's > .232$, *partial eta squared* $< .02$), and there were no significant interactions ($p's > .160$, *partial eta squared* $< .03$).

To determine if the type of the topic participants read about influenced the effect, a 2 (Topic Domain Match) X 3 (Type of Paragraph Complexity) X 4 (Topic Type) was conducted on the key dependent measure (Participant Integrative Complexity). No main effects emerged ($p's > .658$, *partial eta squared* $< .01$), and there were no significant interactions ($p's > .421$, *partial eta squared* $< .04$).

Perceptions of Read-About Paragraphs

In order to further understand how participants viewed the various paragraphs they read, and particularly to see if complex versus simple paragraphs were perceived differently, I examined participants' perceptions of the read-about paragraphs. Full results for each topic are presented in Table I.

First, I conducted a 2 (Topic Domain Match) X 3 (Complexity of Paragraphs Participants Read) ANOVA using how much people agreed with the topic they read about as the dependent measure. There was a significant main effect of Complexity of Paragraphs Participants Read on Agreement with the topic ($F[2, 208] = 11.02$, $p < .001$, *partial eta squared* $= .10$). Those who read more complex paragraphs were more likely to agree with the topic they read about compared to those who read less complex paragraphs. There was no main effect of Topic Domain Match ($p = .115$, *partial eta*

squared= .01), and no interaction emerged between Complexity of Paragraphs Participants Read and Topic Domain Match on Agreement with the read-about topic (*p*= .288, *partial eta squared*= .01).

I also conducted the same 2 (Topic Domain Match) X 3 (Complexity of Paragraphs Participants Read) ANOVA using the persuasiveness of the read-about topic as a dependent measure. Analyses revealed a significant main effect of Topic Domain Match on Topic Persuasiveness (*F* [1, 208] = 5.96, *p* = .015, *partial eta squared*= .03). Participants in the unmatched condition perceived the topic they read about as more persuasive compared to those in the unmatched condition. There was also a significant main effect of Complexity of Paragraphs Participants Read on Topic Persuasiveness (*F* [2, 208] = 5.25, *p* = .006, *partial eta squared*= .05), such that those who read more complex paragraphs thought that the opinion they read about was more persuasive compared to those who read less complex paragraphs. No significant interaction between Complexity of Paragraphs Participants Read and Topic Domain Match on Topic Persuasiveness emerged (*p*= .486, *partial eta squared*= .01).

Using how thought-provoking participants viewed the read-about paragraph as the dependent measure, I ran the same 2 (Topic Domain Match) X 3 (Complexity of Paragraphs Participants Read) ANOVA. A significant main effect of Complexity of Paragraphs Participants Read on the Thought-Provokingness of the topic emerged (*F* [2, 208] = 6.03, *p* = .003, *partial eta squared*= .06). Those who read more complex topics viewed those topics as more thought-provoking than those who read less complex paragraphs. There was no significant main effect emerged for Topic Domain

Match (*p*= .303, *partial eta squared*= .01), and no significant interaction emerged (*p*= .692, *partial eta squared*= .00).

Lastly, I conducted the same 2 (Topic Domain Match) X (Complexity of Paragraphs Participants Read) ANOVA using participants' perceptions of how complex the topic they read about was as a dependent measure. Analyses revealed a nearly significant main effect of Topic Domain Match on Perceived Complexity of the read-about paragraph (F[1, 208] = 3.66, p = .057, *partial eta squared*= .02). Those in the unmatched condition were more likely to rate paragraphs as more complex than those in the matched condition. Complexity of Paragraphs Participants Read also emerged as a significant main effect on Perceived Complexity of the read-about topic (F[2, 208] = 11.56, p = .000, *partial eta squared*= .10). More complex paragraphs were indeed recognized by participants as more complex. Analyses did not reveal a significant interaction between Topic Domain Match and Complexity of Paragraphs Participants Read on Perceived Complexity (*p*= .287, *partial eta squared*= .01).

Taken in total, these results suggest that people perceived complex paragraphs differently than simple paragraphs in a number of ways. In particular, complex paragraphs led to more agreement about the topic, and were more persuasive. Complex paragraphs were also considered more thought-provoking and more complex compared to simple paragraphs.

Characteristics of the Topic Domains Participants Read About

Consistent with expectations about how people might cast these different topics, participants considered both topics that were intended to represent controversial issues (abortion and the death penalty) as more controversial compared to topics that were

selected because of their neutrality (doing crossword puzzles and doing physical activities). Specifically, descriptive analyses revealed abortion and the death penalty were viewed as topics with relatively lower consensus among people in society (*M*= 3.89 and *M*= 4.18 respectively) compared to doing crosswords (*M*= 4.45) and doing physical activities (*M*=4.59). This is consistent with the idea that the topics used to prompt participant responses served their objective of representing controversial and relatively more neutral issues.

In order to further understand how participants viewed the topic domains that they read about, I examined other characteristics of the topic domains using the same descriptive mean analyses discussed above. Full results for each topic are presented in Table II. The descriptive mean pattern suggests that overall, participants held more favorable attitudes towards the topic of doing physical activities (*M*= 5.54) compared to the other three topics (*M's*= 4.33, 4.17, 4.25). Surprisingly, doing physical activities was viewed as the most important issue (*M*= 5.48), with abortion only slightly less important (*M*= 5.32), compared to the death penalty (*M* =4.33), and doing crossword puzzles (*M* =3.41). Further, as revealed in Table II, participants were also likely to have spent more time in the past thinking about doing physical activities, had more personal involvement, and were more confident in their opinions concerning physical activities compared to other topics.

Discussion

First and foremost, these results did not lend support to the complexity theory of the domain cue. Inconsistent with expectations, participants who read complex paragraphs did not have higher mean complexity scores in their responses than

participants who read simple paragraphs in either topic domain match condition. While

it is unclear exactly why the expected findings did not emerge, below I discuss some

possible reasons why the complexity cueing effect was unsuccessful in this sample.

Explaining Null Findings

One possible explanation for these null findings is that the complexity theory of

the domain cue is incorrect. It may be that subtly cueing people with complexity does

not subsequently cause them to produce more complexity. This study tested a new

theory of which there was no prior direct evidence to support it; one reasonable

conclusion is that this sample provides some evidence that the theory is invalid. On the

other hand, there are other potential reasons that could in part explain why the expected

effects did not emerge. It is important to consider the possibility that the proposed

theory may indeed still be correct, but that other factors interfered with finding an effect.

Potential Problems with Topic Selection

The nature of the topics used to prompt participant responses could partially

account for the null findings. Because participants recognized that complex paragraphs

were in fact more complex than simple paragraphs, some other aspects of the

paragraphs – beyond the paragraph complexity manipulation – must be considered. In

particular, factors relevant to the read-about topics may have impacted participant

responses in ways that interfered with the complexity cueing effect. For example,

participants might not have been motivated to write their opinions about their assigned

topic, especially if the topics were perceived as uninteresting. If the topics were not

engaging, then consequently, unmotivated participants would likely have extended less

effort into thinking and writing about their opinion, which in turn would have minimized the level of complexity they produced.

Some evidence relevant to participant's views of the specific topics supports this explanation. Overall, participants did not view the topics as particularly thought provoking. Mean responses (based on a 1 to 7 scale) about the thought-provokingness of topics were fairly low (Death Penalty M= 4.56, Abortion M= 3.69, Doing Crosswords M= 3.35, and Doing Physical Activities M=3.03).

However, for the topics that participants did consider to be relatively more thought-provoking (Death Penalty and Abortion), there was no clear descriptive pattern to suggest that more thought-provoking topics showed a stronger effect for the complexity cue. And indeed, the degree of thought-provokingness of the read-about topics was not a statistically significant moderator of the complexity cueing effect. This suggests that the complexity cue effect is not dependent on the degree to which people find topics interesting or thought-provoking. Thus, on balance, even though the topics were not entirely engaging, this is unlikely to explain the null findings.

Problems with the Testing Environment

Given that this study was distributed in a mass testing session, it is possible that participants were cognitively depleted from expending effort on the other studies that were administered during the same session. Because the complexity theory of the domain cue requires that participants are cognitively attentive to both the opinion they read about and the opinion they produce, cognitive depletion would prevent the processes involved in the complexity cueing effect from operating. A second drawback of mass testing is that participants may not have had sufficient time to invest in writing

about their opinions, given their additional tasks from other studies in the session. This potential lack of cognitive energy as a result of completing multiple studies in one session, in addition to the time constraint for completing numerous studies, could have impacted the level of complexity that participants produced in their responses.

If this were true, however, it would suggest that the means for Participant Complexity ought to be lower in the present sample compared to mean complexity scores found in similar work. Yet, the average complexity scores that participants produced in this study were actually higher (*M's*> 2.1) than typical findings from other work (*M's*< 1.83) that also used a college sample, but did not use mass testing data (e.g. Conway et al., 2008). Complexity research in other contexts provides further evidence that participants in the current study produced higher than average complexity. For example, Thoemmes & Conway (2007) found that the mean complexity score for 41 U.S Presidents was 1.77, which is lower than the present sample (*M's*> 2.1). Finally, other published work on complexity that has used data from mass testing sessions produced similar mean complexity scores to those observed in the present study (Conway et al., 2008; Conway et al., 2011; Conway et al., 2012). Given findings from other work, it seems unlikely that the environment of mass testing substantially impacted participants' ability to produce complex responses, and as such does not offer a particularly compelling explanation for the null findings.

Problems with Power

Although I expected a medium-sized effect, it is possible that the real effect is simply much smaller than I anticipated. Thus, as an alternative explanation to potential problems with the topic selection or testing environment, perhaps the complexity cueing

effect is indeed real – and could be captured using the current design – but it is a very weak effect that requires a larger sample to produce it. In short, it is possible that the effect was not observed in this sample because the real effect size was underestimated. However, it is important to note that additional analyses did reveal several significant results on other dependent measures that were not directly relevant to the theory (with some effects having p-values less than .001).

Unexpected Findings

Additional analyses revealed some unexpected findings that might suggest avenues for future research. Although it did not clearly impact subsequent written complexity, the complexity of read-about paragraphs did affect people's views of those paragraphs in multiple ways. For example, people were significantly more likely to agree with complex opinions compared to less complex opinions ($p < .001$), and also viewed complex arguments as more persuasive ($p = .006$).

This is in part consistent with some prior work (Conway et al., 2012) on the relationship between the complexity of political candidates' rhetoric and public opinion of those candidates. Although the finding held for only one of two political candidates – and did not occur for perceived persuasion for either candidate – that work suggested that people were more likely to agree with candidates' opinions when they were complex. It is unclear why one candidate's complexity impacted agreement while the other's complexity did not. Nevertheless, aggregating the candidates' results suggests a general pattern for complexity and agreement that is consistent with, but considerably weaker than, the present study.

Why might that prior work show a weaker and less robust effect? It is hard to know for sure, but it is worth noting that there are some distinct differences between the present study and this prior work that leave some potential gaps for future research to fill. For example, in the prior study, the authors of the paragraphs were political candidates who were not only known to participants, but were intentionally trying to persuade people to support their opinions. In contrast, paragraph authors in the present study were unknown to participants. It is also possible that paragraphs in the present study were somewhat more artificial because they were constructed to include different elements, whereas the paragraphs in the prior work were derived from real political speeches and debates. Finally, the average complexity of the paragraphs in the prior study was lower; in fact, there was not any integrative language (paragraphs that scored a 5 for Integrative Complexity), while paragraphs in the present study represented a greater variety of complex opinions (including paragraphs that scored a 5 for Integrative Complexity).

Some of these differences suggest possible courses for future research. For example, future research could explore the impact of anonymity as a factor involved in subsequent agreement with complexity. Perhaps people respond differently to others' complex opinions if they have pre-existing knowledge about the speaker. It may also be worth exploring how a speaker's intentions (e.g., persuasive intent vs. no persuasive intent) in complex versus simple communications might influence the degree to which people agree with the opinion.

Limitations

Of course, as with all studies, this study is not without its limitations. First, I used a sample comprised entirely of college students, and as a result, the generalizability of this study is constrained because of the homogenous characteristics of the sample. Second, administering this study during a mass testing session posed some potential problems. As previously discussed, participants may have had relatively limited cognitive resources given their shifting focus to other studies. Mass testing sessions in general are also more prone to distractions given the large number of people participating in research. Despite these challenges, other successful work on integrative complexity has been conducted during these mass testing sessions on this campus (Conway et al., 2008; Conway et al., 2011; Conway et al., 2012), so it seems unlikely that these drawbacks significantly influenced the null findings. Lastly, although I intentionally selected four topics to cover at least two different topic types, the topics that participants read about were nonetheless limited in their scope.

Concluding Thoughts

Although the main expectations of the complexity theory of the domain cue were not supported by the findings of this study, other promising findings arose in the additional analyses. In particular, complex opinions positively impacted agreement, and were also viewed as being more persuasive and thought-provoking. Future research ought to explore these ideas to further understand the impact of complex communications on other people's perceptions.

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Footnote

1. Due to an unintended typo, thirty-four packets had an error in the instructions to participants. This error occurred only in the matched condition. Specifically, for this subset of 34 packets, the instructions that were presented after participants read about their assigned topic were partially misstated, in that it contained an additional topic domain to write about. Consequently, this potentially caused some confusion for this subset of participants over which topic domain they were supposed to have written about, which led some participants to write about the correct (intended for) topic domain, some to write about the incorrect topic domain, and others to write about both topic domains.

To account for any potential influences that this packet error might have caused in terms of the reported findings, all analyses were conducted both using the erroneous packets, and also excluding those packets. Descriptive and inferential results that were relevant to the key hypotheses were not substantially different: Whether including or excluding the 34 packets in question, the resulting story from this study is the same. Therefore, I do not discuss this issue further.

Figure 1: Power Analysis

F tests - ANOVA: Fixed ef ects. special. main ef ects and interactions
Numerator df = 5. Number of groups = 6. α err prob = 0.05. Ef ect size f = 0.25
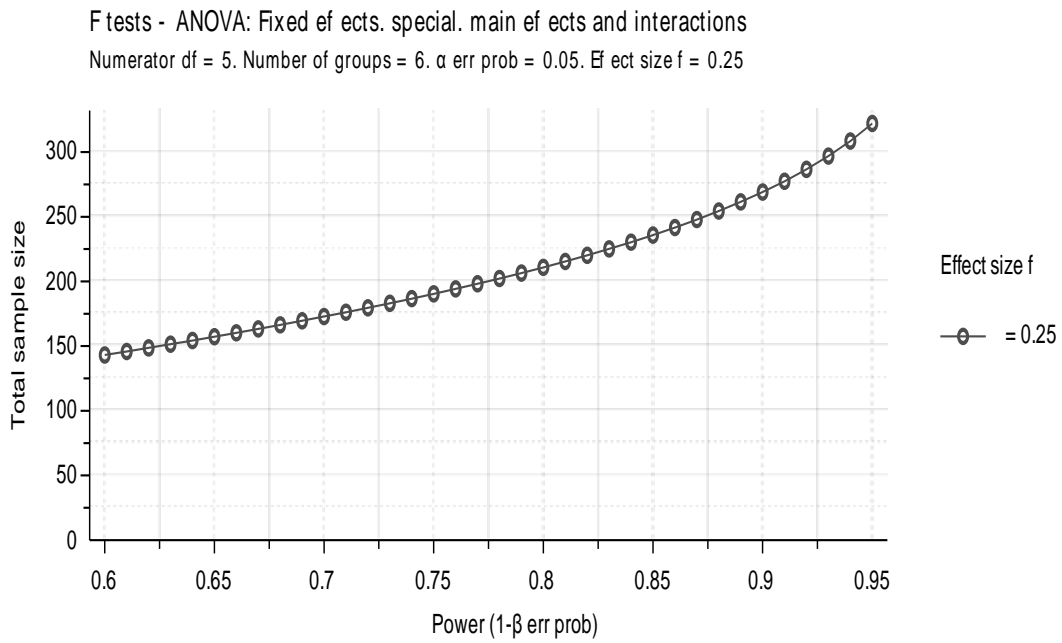
Figure 2: Assigned Versus Coders' Paragraph Integrative Complexity (IC) Scores by Topic Type
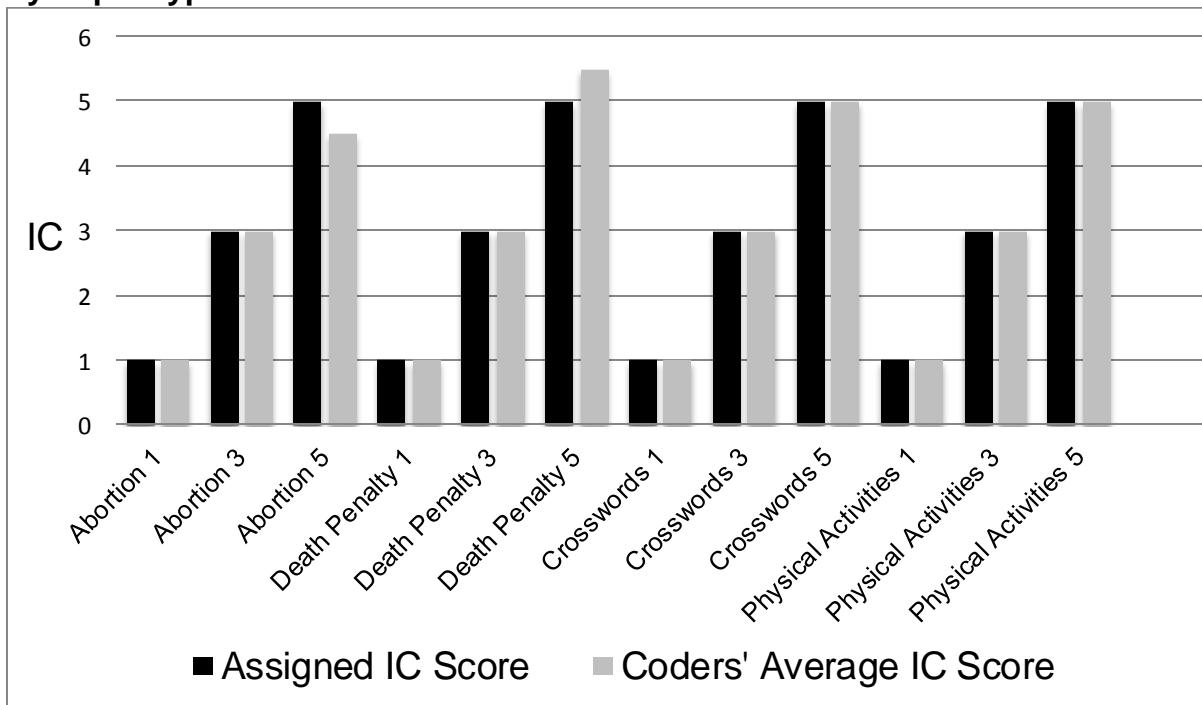
Figure 3: Participant Complexity Scores by Complexity of Read Paragraph and Domain Match
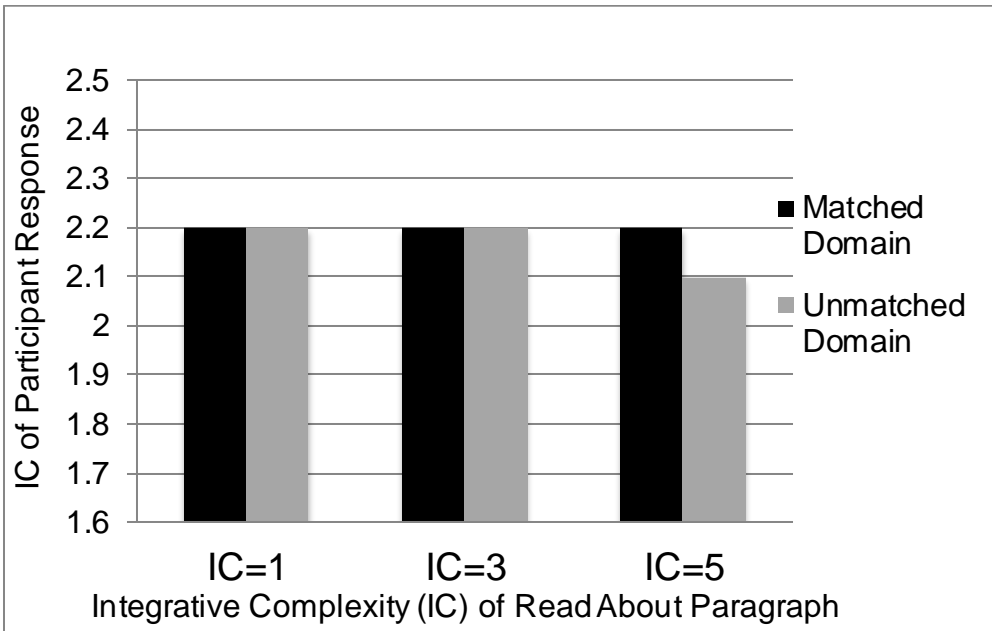
Table I: Participant's Perceptions of Complex versus Simple Paragraphs

Matched Topic Domain	Integrative Complexity=1	Integrative Complexity=3	Integrative Complexity=5
Agree with Topic	3.06	3.68	4.97
Persuasive	2.50	3.18	3.63
Thought Provoking	3.00	3.43	3.87
Complex	2.06	2.60	3.70
Unmatched Topic Domain	Integrative Complexity=1	Integrative Complexity=3	Integrative Complexity=5
Agree with Topic	3.59	4.50	4.87
Persuasive	3.09	4.11	3.91
Thought Provoking	2.94	3.87	4.22
Complex	2.62	3.33	3.67

Table II: Mean Responses for Participant Opinions of Read-About Topic Domains

	Abortion	Death Penalty	Doing Crosswords	Physical Activities
Overall Attitude Favorability	4.25	4.17	4.33	5.54
Topic Importance	5.32	4.33	3.41	5.48
Personal Involvement With Topic	3.68	1.93	2.71	5.50
Thought About Topic In the Past	4.83	3.63	2.25	4.98
Confidence in Attitude	5.13	4.50	4.50	5.52
Society Agrees With Me	4.20	3.98	4.52	4.85
Consensus About Topic	3.89	4.18	4.45	4.59

Appendix A: Descriptive Paragraph Manipulations

Abortion IC: 1

Pro-Abortion

Abortion is in no way wrong. Women should absolutely have complete control and choice in what they do with their own body no matter what. There is not a single reasonable criticism of abortion; it is in no way immoral or misguided and should definitely be an option for all women.

Con-Abortion

Abortion is simply immoral and wrong. It is nothing more than legalized murder and someone has to put an end to the killing of innocent babies. Women should not have the right to end a life. There is never a reasonable case for abortion. Murder is murder. Abortion should absolutely not be an option for any woman.

Abortion IC: 3

Pro-Elaborative

Abortion has several positive aspects. One of these is that is that women should have the right to make choices about their health, well-being, and their future. A completely separate reason is that it may be better to abort the pregnancy in cases where the baby will be born with a life-threatening medical condition. .

Con-Elaborative

Abortion has several downsides. One of these is that abortion is morally wrong; it is the taking of a life, and that is immoral. It is murder.   A completely separate reason is that abortion can have negative effects on the mother, including emotional trauma and feelings of guilt later on in life.

Pro/con-Dialectical

Abortion has both advantages and disadvantages. On the one hand, women should have the right to make choices about their health, wellbeing, and their future. On the other hand, abortion can have negative effects on the mother, including emotional trauma and feelings of guilt later on in life. So, I can see both sides of the issue.

Abortion IC: 5

Pro-Elaborative

Abortion has several positive aspects. It may be better to abort a pregnancy in cases where the baby will be born with a dangerous medical condition. Additionally, women should have the right to make choices about their heath and future. In fact, these two things work together in combination: the mothers' right to choose becomes even more important in cases where the child is medically at risk.

Con-Elaborative

Abortion has several negative aspects. First, abortion is morally wrong; it is the taking of a life, and that is immoral. It is murder. Additionally, abortion can have negative effects on the mother, including emotional trauma.. In fact, these two things work together in combination: the guilt from breaking a moral standard may contribute to emotional problems, and the emotional problems make lead to future moral problems.

Pro/con-Dialectical

Abortion has both advantages and disadvantages. On the one hand, abortion may be safer in cases where giving birth is medically dangerous for the mother. On the other hand, abortion can create emotional trauma and feelings of guilt for the mother. There is a tension between the medical risks during birth, and the potential for future emotional problems for the mother; perhaps this tension can be solved by considering its' use on a case by case basis.

<u>Death Penalty   IC: 1</u>

Pro-Death Penalty

The death penalty is absolutely necessary. It is really the only option for punishing convicted murderers. We need to think about the families of the victims. The best way to provide retribution for the victims' family is to sentence killers to death. We are simply too soft on criminals and it is imperative that we serve justice through death sentences.

Con-Death Penalty

The death penalty is simply wrong. The state-sanctioned killing of convicted murderers is nothing more than hypocrisy. How can we justify punishing murderers by killing them? We then become murderers ourselves. Killing is killing, no matter who does it. It is clear that the death penalty is completely unjust and absolutely immoral.

Death Penalty   IC: 3

Pro-Elaborative

The death penalty has several benefits. First, it is cost effective. It is more expensive to hold convicted murderers in jail for life, and taxpayers have to cover these expenses. A completely separate reason is the death penalty serves as a crime deterrent. Both cost-effectiveness and deterrence are reasons to support the death penalty.

Con-Elaborative

The death penalty has several shortcomings. One of these is: How can we justify punishing even guilty murderers by killing them? We then become murderers ourselves. A completely separate problem with the death penalty is the risk that innocent persons may be wrongfully sentenced to death. There are other methods with which to deter crime, such as life sentences.

Pro/Con-Dialectical

The death penalty has both advantages and disadvantages. On the one hand, the death penalty is a strong crime deterrent, which is very important from a preventative standpoint. On the other hand, there is the risk that with the death penalty, innocent persons may be wrongfully sentenced to death. So I can see both sides of this issue.

Death Penalty   IC: 5

Pro-Elaborative

The death penalty has several benefits. One of these is its' effectiveness in deterring crime. Additionally, it provides retribution to the victims' family. In fact, these two things work together in combination: the future deterring of crime makes the victims feel better, which in turn makes them less likely to commit future crimes of revenge themselves, thus further reducing murders.

Con-Elaborative

The death penalty has several shortcomings. First, if we kill even guilty murderers, we then become murderers ourselves. A completely separate reason is the risk of wrongfully sentencing innocent persons. In fact, these two things work together

in combination: Murdering guilty persons makes us less sensitive and thus more likely to convict the innocent, and convicting the innocent makes us more likely to murder the guilty.

Pro/Con-Dialectical

The death penalty has both advantages and disadvantages. On the one hand, the death penalty is a strong crime deterrent. On the other hand, there is the risk that innocent persons may be wrongfully sentenced to death. There is tension between the possibility of sentencing the innocent versus its crime deterrent properties; perhaps this tension can be resolved by considering its use on a case-by-case basis.

Doing Crossword Puzzles IC: 1

Pro-Doing Crossword Puzzles

Doing crossword puzzles is the best way to keep your mind sharp. It is absolutely the most important thing that people can do for their brain and everyone should do crossword puzzles every day. There is simply no reason not to do them. I absolutely love crossword puzzles!

Con-Doing Crossword Puzzles

Doing crossword puzzles is absolutely the most boring activity on earth. Crossword puzzles are simply not interesting to anyone. In fact, I can't think of one good reason why people should do crossword puzzles. No one needs to do them. I absolutely hate crossword puzzles!

Doing Crossword Puzzles IC: 3

Pro-Elaborative

There are several positive aspects about doing crossword puzzles. One of these is that they help people maintain their mental fitness, and it is possible that they can help prevent memory loss. A completely separate reason is that doing crossword puzzles is a way for people to stay connected to the world because they contain updated bits about society. For both of these reasons, doing crossword puzzles can be positive.

Con-Elaborative

There are several negative aspects about doing crossword puzzles. One of these is that doing crosswords takes a lot of time and they can be frustrating. A completely separate reason is that many people don't find them entertaining. For both of these reasons, doing crossword puzzles is not for everyone.

Pro/Con-Dialectical

Doing crossword puzzles has both advantages and disadvantages. On the one hand, they help people improve their mental fitness, and it is possible that they help prevent memory loss. On the other hand, doing crosswords takes a lot of time and they can be very frustrating.   So, I can see both sides of the issue.

Doing Crossword Puzzles   IC: 5

Pro-Elaborative

There are several positive aspects about doing crossword puzzles. Crosswords are a way for people to improve their mental fitness, and it is possible that doing them helps prevent memory loss. Additionally, crosswords help people to stay connected to the world. In fact, these two things work together in combination: doing crosswords helps prevent memory loss, which may lead a person to feel even more connected to the world.

Con-Elaborative

There are several negative aspects about doing crossword puzzles. Working on crosswords takes a lot of time and they can be frustrating. Additionally, many people don't find them entertaining. In fact, these two things work together in combination: the more frustrated a person is while doing the crossword puzzle, it will likely take longer to complete and this may contribute to the lack of entertainment, and the lack of entertainment in turn can be frustrating.

Pro/Con-Dialectical

Doing crossword puzzles has both advantages and disadvantages. On the one hand, they help people improve their mental fitness. On the other hand, doing crosswords can be very frustrating, and some people don't enjoy them.   There is a tension between the potential health benefits and the lack of enjoyment one might

experience doing crosswords; perhaps this tension can be solved by considering individual preferences.

Doing Physical Activities   IC:1

Pro-Physical Activities

Doing physical activities is the best way to maintain a healthy lifestyle. It is absolutely the most important thing that people can do for themselves and there is simply no reason not to. There is nothing else that can replace the benefits of doing physical activities. Everyone should be physically active everyday.

Con-Physical Activities

Doing physical activities is completely overrated and absolutely unnecessary. In fact, they are the worst form of activity on earth. I hate them! Being physically active is simply not for everyone. No one should have to do physical activities ever. In fact, I can't think of one good reason why people should feel obligated to be physically active.

Doing Physical Activities   IC: 3

Pro-Elaborative

There are several positive aspects about doing physical activities. One of these is that being physically active helps people maintain their overall health. A completely separate reason is that doing physical activities helps with social life because you meet people. For both of these reasons, doing physical activities are very important.

Con-Elaborative

There are several negative aspects about doing physical activities. One of these is that being physically active takes a lot of time, effort, and energy, which some people don't have. A completely separate reason is that many people don't enjoy doing physical activities. For both of these reasons, doing physical activities is not always good.

Pro/Con Dialectical

Doing physical activities has both advantages and disadvantages. On the one hand, being physically active can help people maintain their overall health. On the other hand, doing physical activities takes a lot of time and energy, and many people don't enjoy being active. So, I can see both sides of the issue.

<u>Doing Physical Activities   IC: 5</u>

Pro-Elaborative

There are several positive aspects about doing physical activities. Being physically active helps people maintain their overall health. Additionally, doing physical activities help with social life because you meet people. In fact, these two things work together in combination: the more physical activities a person does, the more likely they are to meet new people; meeting new people may in turn lead a person to keep doing activities, which helps them maintain overall health.

Con-Elaborative

There are several negative aspects about doing physical activities. Being physically active takes a lot of time, effort, and energy, which some people don't have. Additionally, many people don't enjoy doing physical activities. In fact, these two things work together in combination: the more time and energy being active takes, the less likely people are to enjoy being active.

Pro/Con Dialectical

Doing physical activities has both advantages and disadvantages. On the one hand, being active can help people maintain their overall health and longevity. On the other hand, they can take a lot of time and energy, and not everyone enjoys them. There is a tension between the health benefits and the lack of enjoyment one might experience doing physical activities; perhaps this tension can be solved by considering individual exercise preferences.

Appendix B: Directions to Participants

Example 1: Matched Condition

You have just read an opinion about **[Abortion].** Please write a paragraph expressing your opinion about the topic *listed below.* To do this, we want you to write a paragraph about whether your attitude is positive or negative (or a combination) towards the following topic and explain why that is so.

Topic: ***[Abortion].*** (Write opinion below):

Example 2: Unmatched Condition

You have just read an opinion about **[Abortion].** Please write a paragraph expressing your opinion about the topic *listed below.* To do this, we want you to write a paragraph about whether your attitude is positive or negative (or a combination) towards the following topic and explain why that is so.

Topic: ***[Doing Crossword Puzzles].*** (Write opinion below):

Appendix C: Additional Questions about the Topic Stems

Concerning the opinion topic (*the one you just read about*), please circle the number best representing your attitudes for each of the following questions:

1. To what degree were you in favor of the opinion topic that you just **read** about?

> 1   2   3   4   5   6   7
> extremely   neutral   extremely
> unfavorable   favorable

Concerning the opinion topic (the one *you just wrote about),* please circle the number best representing your attitudes for each of the following questions:

1. My overall attitude towards this topic is:
> 1   2   3   4   5   6   7
> extremely   neutral   extremely
> *un*favorable   favorable

2. How important is this attitude to you?
> 1   2   3   4   5   6   7
> not at all   very important

3. How strongly do you hold this attitude?
> 1   2   3   4   5   6   7
> not strongly at all   very strongly

4. How much do you feel like this issue has had a direct impact on either your life, or on the lives of those close to you?
> 1   2   3   4   5   6   7
> not at all   a great deal

5. In your past experience, how much personal involvement have you or those close to you had with this issue?
> 1   2   3   4   5   6   7
> not at all   a great deal

6. In the past, how often have you thought about this issue?
> 1   2   3   4   5   6   7
> not at all   a great deal

7. In the past, how much effort have you given to constructing a viewpoint about this issue?
> 1   2   3   4   5   6   7

not at all   a great deal

8. How sure are you that your opinion on this topic is the *right* opinion?
    1   2   3   4   5   6   7
    not sure at all   very sure

9. Concerning this issue, how likely do you think you are to change your opinion in the future?
    1   2   3   4   5   6   7
    not at all likely   very likely

10. How much effort did you put into writing your opinion just now on this issue?
    1   2   3   4   5   6   7
    not much at all   a whole lot

11. How hard did you try to think about this issue in writing your opinion just now?
    1   2   3   4   5   6   7
    not hard at all   very hard

12. With respect to the opinion topic, I would say that I am (please circle one):
        opposed   in favor   neither/both/cannot say

13. I think that, in our society, the *average person's* overall attitude towards this topic is:
    1   2   3   4   5   6   7
    extremely   neutral   extremely
    *un*favorable   favorable

14. To what degree do you think that most of society agrees with you on this topic?
    1   2   3   4   5   6   7
most people *dis*agree   most people *agree*
 with my opinion   with my opinion

15. To what degree do you think that most people in society have the same opinion on this topic (regardless of whether it is your opinion or not)?
    1   2   3   4   5   6   7
    not at all   a great deal

16. To what degree do you find the opinion persuasive?
    1   2   3   4   5   6   7
    not at all   a great deal

17. To what degree did you find the above paragraph thought-provoking?
    1   2   3   4   5   6   7
    not at all   a great deal

18. To what degree do you think the person in the above paragraph expresses a complex view of the topic?

     1   2   3   4   5   6   7

  not at all   a great deal

Appendix D: Additional Personality/Attitudes/Demographic Questionnaires
Need For Cognition Scale
Please write a number in the blank beside each item, where 1 = not true of me at all, 4 = sometimes true of me, and 7 = very true of me.

____1. I would prefer complex to simple problems.

____2. I like to have the responsibility of handling a situation that requires a lot of thinking.

____3. Thinking is not my idea of fun.

____4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.

____5. I try to anticipate and avoid situations where there is likely chance I will have to think in depth about something.

____6. I find satisfaction in deliberating hard and for long hours.

____7. I only think as hard as I have to.

____8. I prefer to think about small, daily projects to long-term ones.

____9. I like tasks that require little thought once I've learned them.

____10.The idea of relying on thought to make my way to the top appeals to me.

____11. I really enjoy a task that involves coming up with new solutions to problems.

____12. Learning new ways to think doesn't excite me very much.

____13. I prefer my life to be filled with puzzles that I must solve.

____14. The notion of thinking abstractly is appealing to me.

____15. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.

____16. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.

____17. It's enough for me that something gets the job done; I don't care how or why it works.

____18. I usually end up deliberating about issues even when they do not affect me personally.

General Values
In the blank next to each word or phrase, write a number from 1-7 representing how highly you value that item. Higher numbers mean you value the item more highly. So: 1 = "I value this item very little", 4 = "I somewhat value this item", and 7 = "I value this item a great deal."

____modern science

____authority
____an individual's right to pleasurable activities
____need for accuracy
____self-restraint
____salvation
____chastity
____individual freedom
____rigorous education
____God or Spirituality
____social equality
____hierarchical society
____intellectual independence
____inclusiveness/pluralism
____need for protecting children from harm
____immortality of the soul
____helping those in need
____national/personal security
____happiness
____self-respect

Political/Social Attitudes

1. Politically, I would say that I am (circle most appropriate answer):
Liberal   Conservative   Neither/Cannot say

2. Politically, I would be most likely to vote (circle most appropriate answer):
Democratic   Republican   Neither/Cannot say

3. Based on what I know about politics, I am (circle number that best represents your political attitudes):

      1   2   3   4   5   6   7   8   9
     Liberal   Conservative

4. Based on what I know about politics, I am most likely to vote (circle number that best represents your political attitudes):

      1   2   3   4   5   6   7   8   9
     Democratic   Republican

5. My attitude towards organized religion is:

      1   2   3   4   5   6   7   8   9
     Very Negative   Very Positive

General Background

1. Age:_____
2. Circle either: Male or Female
3. Ethnic Background:_____
4. Sexual Orientation:_____

5. How long have you lived in Montana?_____

6. (If applicable): Where did you live prior to moving to Montana, and how long did you live there?_____

7. Year of study at university (i.e., are you a 1st year student, 2nd year student, etc.?):_____

8. Are you an only child?

     Yes   No

9. Of your brothers and sisters, are you the oldest (i.e., are you first-born)?

     Yes   No