How Can I Persuade You?

The Development of Audience Awareness in Children's Oral and Written Arguments

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Psychology)
in the University of Michigan
2017

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Acknowledgements

This dissertation would not have been possible without the help, guidance, and support of faculty, friends, and family. I would first and foremost like to thank my adviser and committee chair, Kevin Miller. His mentorship, advice, and encouragement throughout graduate school equipped me with the skills I needed to pursue and succeed in new and exciting research areas, including this one. I could not have asked for a better adviser. I would also like to thank Kai Cortina for being a constant source of career and statistical advice throughout graduate school. I genuinely appreciate the positivity and excitement he brought to all the work we did together. Henry Wellman has also been a wonderful mentor to me, and his enthusiasm for all the work I have done with him has been an invaluable motivating influence on me throughout graduate school. Fred Morrison has also been a truly appreciated source of advice and mentorship over the years. My final committee member, Nell Duke, provided me with eye-opening insight and advice on this dissertation from an educational perspective that I truly appreciate. I thank all of my committee members for the passion, enthusiasm, knowledge, and advice they brought to this work.

I would also like to thank my research assistants as well as members of Kevin and Kai's lab for discussing my work with me and providing valuable feedback and assistance. My graduate school cohort and friends – particularly Guadalupe de los Santos, Abigail Williams Butler, and Patty Kuo—provided me with a great deal of support during the dissertation process, for which I cannot thank them enough. Finally, I would like to acknowledge the invaluable role of my family in this process – without them, none of this would have been possible.

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Abstract

Argumentation is a multi-faceted skill that is critical for both academic and social success. However, complex aspects of argumentation such as audience awareness and counterargumentation over the upper elementary school years have rarely been studied. This dissertation expands our understanding of child argumentation by investigating the role of audience similarity and mode of communication on argumentative competence.

Part I focuses on how effectively third- and fifth- graders write arguments aimed at different audiences, one similar and one dissimilar to them based on age. Results showed that fifth graders demonstrated higher audience awareness than third graders overall, and that both third- and fifth- graders produced more persuasive arguments when writing to the similar audience, a fellow child, than to a dissimilar audience, an adult. The challenge of audience awareness incorporates both attending to the audience in general, and elevating arguments made to a dissimilar audience closer to the level reached when writing to a similar audience. Fifth graders surpassed third graders on the former skill, but not the latter.

Part II focuses on children's written and oral argumentation. Children were better organized in their writing, but produced more words and elaborations in their speaking. They exhibited few mode of communication differences in complex features of argumentation such as audience awareness. Additionally, providing a spoken argument prior to a written one did not benefit the quality of the written argument, but being able to talk about an argument after initially writing it made it more likely that children would make substantive revisions such as adding new ideas to their argument.

The present dissertation also investigated children's knowledge of argumentation, and uncovered that by the third grade, children have a strong intuitive sense of audience awareness. Their explicit understanding of the role of the audience in content selection is less developed, however. This explicit audience awareness predicted the persuasiveness of children's own written arguments. Overall, this dissertation provides an in-depth investigation into the argumentative abilities of upper elementary-aged children and uncovers both struggles and competencies that hold important implications for instruction.

Chapter 1

Introduction

Argumentation has been widely regarded by developmental theorists since Piaget and Vygotsky as a crucial driver for development. Through argument, children develop new ways of thinking, resolve cognitive conflict between new information and existing representations, and develop a more sophisticated understanding of other people (e.g., Piaget, 1958, 1977; Vygotsky, 1980). This is no surprise given that argumentation requires far more than simply conveying information. It places children in the unique position of needing to convince someone with a potentially dissenting viewpoint to change their mind. Producing a successful argument therefore requires children to understand a perspective that is different from their own, and update the way they communicate accordingly. The heavy demands of the genre therefore make argumentation a significant cognitive challenge for children. Nonetheless, argumentation is an essential skill for children to develop to not only further their own cognitive development, but also succeed in a society in which oral and written argumentation are critical competencies (Horowitz, 2015).

The concept of argumentation has been at the core of Western Philosophy since Socrates, and this importance has been carried through to developmental psychology. Piaget (1958, 1977) described conflict as being at the center of development, driving children from a state of disequilibrium to cognitive reorganization through a process of re-equilibration. Conflict is often generated through argumentation with peers, and thus, social argumentation is a fundamental driver of cognitive development. Similarly, Vygotsky (1980) viewed social interaction as the

primary means through which learning and development occur. Vygotsky theorized that interaction with more competent individuals would be beneficial to learning, as that would expose children to new ways of thinking that they could then later develop. Conflict during a social interaction, as such, was considered a driving force of development by both Piaget and Vygotsky. The importance of understanding argument and the ability of children to produce successful arguments is therefore critical to our understanding of child development. The complexity of argumentation has driven scholars to delineate the characteristics that shape a logical argument. One such model of argumentation was developed by Toulmin (1958).

Toulmin's Model of Argumentation

Toulmin (1958) described an influential model that can serve as a basis for what an argument is, and the features it should possess. This model has been used to assess argumentation in numerous studies, and formed the basis for the assessment of argument quality in my dissertation.

At its core, Toulmin's model views argumentation as the development of a logical chain of statements that reflects the viewpoint a writer or speaker is trying to convey. Logic, as stated by Toulmin (1958, pp 7), "is concerned with the soundness of the claims we make – with the solidity of the grounds we produce to support them [and] the firmness of the backing we provide for them." Toulmin (1958) developed these ideas into a series of components that make an effective, logical argument.

Arguments should begin with a clear, justifiable claim that can both be challenged and supported. In order to support claims, we need to have access to facts or data, either from personal opinion/research, or from external sources, that connect to the claims we make. In order to complete the logical flow of the argument, Toulmin (1958) suggested that in many cases, a

link should be made between the claim and the supporting evidence for the claim, known as a warrant. These warrants show how the evidence provided clearly indicates that the claim is justified in the purported direction. For example, if we were to make a claim that we should run more often, a piece of data may be that exercise is beneficial to our health. The final connecting warrant would be that running is a form of exercise, thereby legitimizing the connection between the claim and the supporting data. In some circumstances, such as when this backing is self-evident or generally accepted, a warrant would need no further backing. However, in other cases a warrant might need further support. For example, a backing to the warrant in the aforementioned example might be a statement that proves that running is in fact a form of exercise.

In addition to these primary features of putting forth a logically supported viewpoint, two additional features were described to clarify the generalizability of the arguments. One such feature is the qualifier, which is needed to convey the extent to which claims and data can be considered valid. Similarly, rebuttals convey conditions where the claims or warrants may not hold (Toulmin, 1958). Since psychological arguments are rarely applicable under every condition, providing constraints within which an argument holds assists in making the argument more difficult to challenge.

In sum, Toulmin's (1958) model of argumentation provides a useful framework for understanding the elements of arguments as well as their effectiveness in implementation. Some of the primary components from this model serve as a basis for the qualitative judgments of arguments produced by children in this dissertation. Though Toulmin provided a comprehensive and influential model for the components of a logical argument, logic alone can sometimes be insufficient in producing an effective argument. For instance, an argument can be logically

sound, but still ineffective, if the evidence, warrants, and counterarguments are not appropriately aligned with the viewpoint of the audience. As such, another central component of argumentation that moves an argument from being logical to being effective is audience awareness.

Audience Awareness – Overcoming Egocentrism

In addition to the basic structure of an argument, an additional central feature of effective argumentation involves tailoring the data, warrants, and backing to the specific audience being communicated with as well as countering any potential arguments in opposition of your claim (e.g., Rubin & Piche, 1979). The role of audience awareness in writing grew out of the cognitive psychology of Piaget (1955), who described young children (ages seven and under) as being egocentric in their conversations with others, making verbal statements that were more related to their own personal stream of thought than a conversation with another person. Slightly older children, too, according to Piaget (1955), tended to be highly egocentric in their language. For example, they failed to provide necessary explanations or logical connections between ideas when describing narrative or expository elements to other children.

Piaget (1955) reasoned that egocentrism was not a result of a lack of interest in being clear. Rather he believed that "if the children fail to understand one another, it is because they think that they do understand one another" (pp 116). As such, young children rarely realized that their peers would find their sparsely elaborated discourse confusing. By the age of 8, Piaget (1955) believed that children would be better able to take the perspective of others in a conversation, but that the practice of delivering egocentric speech would take time to fully overcome.

Though Piaget's examples involved spoken discussion, the importance of avoiding egocentrism and displaying an awareness of the specific communication partner in an interaction is highly relevant to writing. In some ways, in a non-interactive setting in which no conversation partner is readily available, well-developed audience awareness is even more important as there are no opportunities for a conversation partner to indicate their understanding or lack thereof of the productions of the child.

The Unique Challenges of Argumentation

The numerous and complex features of argumentation make it a unique challenge for children and adults alike in comparison to other genres of communication. Crowhurst (1990) discussed distinguishing features of formal argumentation compared to the narrative and expository genres. The organization of arguments is complex, as productions are not chronological as they are in other genres, but rather need to be reorganized into logical sequences (Toulmin, 1958). Finding convincing pieces of evidence and warrants is also more difficult in argumentation than developing content in other genres (Crowhurst, 1990). Additionally, argumentation involves abstracting ideas from specific cases to more general claims; this can be challenging, particularly when arguments involve universal claims. Finally, Crowhurst (1990) discussed how written argumentation involved the most lengthy and sophisticated sentence structures of the genres. In sum, the genre of argumentation incorporates features that can require greater structural and cognitive complexity than either of the other genres.

Overall, producing an effective argument involves constructing a logical sequence of statements that include important structural features of an argument (such as data and warrants). Additionally, the decisions about what features to present as well as how to present them involve continuous audience awareness so as to cater to the audience being communicated with rather

than oneself. Finally, generating ideas, making abstract claims, and utilizing sophisticated sentence structures when executing a written composition make argumentation a cognitively demanding task for writers. In spite of the practical and developmental importance of understanding audience awareness in spoken and written argumentation in childhood, there has been surprisingly little recent work devoted to the topic, particularly during the elementary school years.

Argumentative Writing Curriculum Expectations in the Third and Fifth Grades

This dissertation focused on the argumentative writing and speaking abilities of children in the third and fifth grades. These grades are particularly critical to investigate because the concept of audience is initially introduced in the third grade curriculum (Common Core Initiative, 2010). Studying this specific age range provides insight into the development of audience awareness and argumentative ability for students who are new to the requirement of tailoring persuasive writing to the audience. Third graders are expected to be able to produce writing that is appropriate to the audience with some guidance, whereas fifth graders are expected to be able to do so independently. Students at both grade levels are expected to be able to write to a variety of audiences for a variety of purposes.

The curriculum expectations for persuasive writing, however, do not emphasize the concept of counterargumentation, a critical feature of providing an argument that is convincing to an audience who may have reasons supporting the opposing viewpoint. Instead, the standards expect students to be able to state an opinion and support that opinion with relevant reasons that are coherently written in a manner that is appropriate for the specific audience and purpose of the communication. In order to make counterargumentation possible given this, prompts were designed to include specific reasons for the opposing viewpoint that children could respond to

rather than expecting children to recognize the need to develop counterarguments independently. In this manner, the present study allows for an investigation of how effectively third- and fifth-graders select reasons and elaborations that match their audience and purpose of communication, a practice they have some exposure to, as well as how effectively they employ counterargumentation strategies, a practice they are less familiar with.

The Present Studies

This dissertation extends our understanding of argumentation and audience awareness in children by exploring the arguments produced by third- and fifth- grade students in two critical ways: when writing to different audiences, and when using different modes of communication. Taking a developmental perspective on understanding these distinctions in children can help us appreciate the cognitive competencies and struggles of children, as well as how these competencies vary by audience and mode of communication. In this manner, this dissertation adds to the sparse but growing literature on the connections and differences between the oral and written language skills of elementary-aged children.

There are two parts to this dissertation. The same participants were used for both parts of the dissertation, and data for Part I was collected 1-3 weeks prior to Part II data. Part I explores the concept of audience awareness (which includes audience awareness in evidence choice, counterargument response quality, and overall persuasiveness) in relation to other argumentative features (which includes number of reasons, number of elaborations, and organization). These features are discussed in greater detail in Chapter 3. The written arguments of third- and fifth-grade children are compared on these features when writing independent arguments to two audiences: an adult and a fellow child. This comparison highlights the development of argumentative features both related and unrelated to audience awareness, and whether audience

awareness is a distinct feature of argumentative writing quality in relation to other elements that comprise a logical argument.

In addition to exploring the compositions of children to different audiences, I assess student knowledge of argumentation in writing so as to determine the skills students comprehend but cannot yet successfully execute in their own written and/or spoken arguments. Children selected one of two options for completing an argument, one of which was appropriate for the audience, and the other inappropriate. Children also provided a written explanation of their choice. I explore the accuracy of children's understanding of audience awareness by their selection of the correct answer, which suggests at least an intuitive understanding of audience awareness, and by assessing their explicit understanding of audience awareness in their written explanations. Displaying intuitive and explicit knowledge of audience awareness in arguments reveals areas in which students need to bridge the gap between knowledge and execution vs. areas for which additional instruction may prove useful to make children's understanding of audience awareness more explicit.

In Part II of the dissertation, I use the same features of argumentation as Part I to investigate the similarities and differences in children's spoken and written arguments on the same topic. Speaking and writing have markedly different challenges and affordances. Therefore, understanding them in relation to one another provides insight into how task demands may influence the argumentative process. Writing requires numerous physical and cognitive components to successfully execute, and combining the task demands of argumentation and writing creates a daunting cognitive workload for students. This may be further exacerbated in elementary school students who are still developing their basic writing skills along with more sophisticated genre knowledge.

Removing the demands of writing by producing a spoken argument might allow children's limited cognitive resources to be allocated to more complex features of argumentation. At the same time, however, writing is an off-line process, whereby children are able to stop, think, plan, and revise as they compose their argument. Speaking, as an on-line process, does not allow for the same level of deliberate thought. As discussed by Horowitz (1995), "in writing, decisions are made about what speech to include, to give rhetorical prominence, to place in the background, or to conceal" (pp 49). As such, the quality of argumentation in oral communication may be less organized and more prone to including elements that may not be suitable for the context. Part II of the study helps illuminate how these relative affordances of mode of communication may impact argumentative competence in numerous ways. Much of the prior work on comparing children's written and spoken have used aggregate measures of quality, so in the present study, I investigate whether and how different features of argumentation differ based on mode of communication. Overall, the present dissertation provides an in-depth, nuanced investigation into the specific features of arguments produced by children that may be affected by task characteristics such as the audience being communicated with and the mode of communication.

Part I

Children's Audience Awareness in Knowledge and Practice

Chapter 2

Introduction to Part I

"Since the nature of speech is in fact to direct the soul, whoever intends to be a rhetorician must know how many kinds of soul there are…he will classify the kinds of speech and of soul there are, as well as the various ways in which they are affected… He will then coordinate each kind of soul with the kind of speech appropriate to it. And he will give … the reasons why one kind of soul is necessarily convinced by one kind of speech while another necessarily remains unconvinced." – Plato, *Phaedrus*, pp 43

Successful argumentation, and even communication more generally, requires that we attend to the thoughts and feelings of the person we are communicating with (Nilsen & Fecica, 2011). If this understanding of the other person is successfully translated into practice, we should be able to harness that information to modify our language to match the needs of the other person, and consequently make the communication much more effective. Unfortunately, the ability to attend to others when communication demands are complex may be difficult, particularly for children. Further, even if a child attends to the other person's mental state, it requires additional skill and effort to be able to translate that knowledge into practice (Nilsen & Fecica, 2011).

Part I of this dissertation focuses on how well children apply what they know about the person they are communicating with to writing a persuasive letter to this audience with the goal of changing their mind about an issue. I investigated how effectively children utilized the

information given to them about the audience and their circumstances when they constructed these persuasive letters. It is easier to communicate with an audience who shares characteristics with the self, as there is likely to be a greater synchrony between the perspectives of the communicator and the audience (Wong, 2005). Thus, taking the perspective of an audience who differs from the self is much more challenging as it requires that the communicator disregard their own perspective in favor of that of their audience (Rubin & Piche, 1979).

In the present study, third- and fifth- grade children composed two arguments- one to an audience who was superficially similar to them (a fellow child), and another to someone who was different from them (an adult). Level of similarity was distinguished exclusively based on age as opposed to other potential characteristics that might differ between individuals. The decision to use age as the distinguishing characteristic between audiences was that since all participants were elementary-aged children, we were guaranteed that the adult audience would be viewed as more different from the children compared to the child audience who was described as being a fellow elementary school student. Many other potential dimensions on which similarity may be judged, such as race or family background, would have varied in similarity to participants based on individual participant characteristics. As such, using age as the distinguishing feature between audiences allowed for a clear comparison of arguments composed to a relatively similar (same age) vs. dissimilar (adult) audience.

We predicted that children would be more effective when writing to a child vs. an adult on measures of audience awareness, or how effectively they tailored their arguments to the stated views, beliefs, and circumstances of their audience. This is because the child audience had a greater shared context with the participants compared to an adult audience, likely making it easier to compose an argument that was relevant to the child audience. On measures of general

argumentative writing ability (e.g., stating a claim or using elaborations), however, I believed that children would not be impacted by their age-based similarity to their audience, and therefore predicted that these measures would not differ by audience. I hypothesized that variables unrelated to audience awareness would not be affected by the audience being written to because these variables often reflected the structural (e.g. organization, stating a claim, introduction, or conclusion) or quantity rather than quality based scores (e.g. number of reasons, level of elaborations, word count) that would be related to the general persuasive writing style and abilities of students. I predicted that these general skills would likely translate to multiple contexts and audiences, and that it would be the degree to which these reasons and elaborations were appropriate for the audience that would be affected by how similar the audience was to the participants.

I additionally investigate whether children's knowledge about and understanding of audience awareness can predict how persuasive their writing is. Children answered four questions with binary response options that required them to select an answer that went against their personal inclinations in favor of the viewpoint of the audience. For example, children were given a scenario in which a child wanted to convince his parents to let him play video games. Participants needed to select between a child-centered reason (video games are fun), and a parent-focused reason (video games teach you skills) to indicate what the child in the scenario should tell his parents. Participants also wrote explanations of their reasoning for their answer choice for each question.

I was thus able to investigate the development of a partial, more intuitive understanding of audience awareness, as demonstrated by accuracy in selecting the correct answer but not necessarily recognizing the role of audience awareness in their explanations, as well as a

conscious, explicit, understanding of the role of the audience in reason selection. I also studied if either or both of these types of knowledge could effectively predict persuasiveness in children's actual writing.

I now discuss the challenges and importance of audience awareness, the role of theory of mind in argumentation, gender differences in factors related to writing and audience awareness, as well as some research on the development of argumentative knowledge and audience awareness in writing.

The Importance and Challenges of Audience Awareness

The idea of needing to take the perspective of the person you are communicating with rather than your own has been at the forefront of rhetoric and argumentation since the time of early philosophers such as Plato and Aristotle. Audience awareness is the ability to not only understand the mental states of an audience and the argumentative content and strategies that would be most influential to him, but to apply this knowledge in tailoring the argument you produce for that individual to match their specific needs (Kroll, 1978).

One feature of argumentative writing that is indicative of audience awareness is discussing and refuting opposing viewpoints. This feature of counterargumentation has been found to effectively predict the quality of arguments in terms of their persuasiveness and credibility (O'Keefe, 1999). Additionally, the quality of argumentative writing at the start of college has been found to be predictive of college academic performance even after controlling for socioeconomic status and early college performance (Preiss et al., 2013). As such, audience awareness is a strong determinant of the effectiveness of argumentative writing, and argumentative writing performance is critical for later academic success. Audience awareness, in spite of being important to develop, is also quite challenging to master.

Piaget (1955) described young children as being able to take only their own perspectives to start, but that the ability to see the perspectives of others would grow by the age of 7 (Piaget, 1955). Research has suggested, in line with the views of Piaget, that children are capable of adjusting their writing to the needs of the person they are writing to from the first grade onwards (Wollman-Bonilla, 2011; Frank, 1992). However, having the cognitive capacity to take other perspectives is necessary but not sufficient to demonstrate audience awareness in persuasive writing. High school students often struggle with written argumentation by failing to address opposing viewpoints or failing to add the elaborations necessary to make a reason clear and potentially persuasive (Felton & Herko, 2004). Even at the college level, Trimble (1975) suggested that the main issue with problematic writing was that students have a natural tendency to write with only themselves in mind, which hinders the clarity of writing. For elementary-aged children, the burden of argumentative writing is only heightened, as even basic, mechanical aspects of writing have yet to be automatized (Carvalho, 2002). Demonstrating audience awareness above and beyond generating content and physically writing it down is therefore quite difficult.

Research on Audience Awareness in Children's Writing

Research on younger children's audience awareness in writing generally indicates that it is a difficult aspect of argumentation, but not absent from their writing. In a case study of the letters written to family members by four first-grade students, Wollman-Bonilla (2011) showed that young children are capable of responding to letters from their parents in ways that indicate some level of attention to the audience. For example, first grade students were able to use statements that in some way responded to the content of letters from their parents, statements that maintained their parents' interest, and background information required by their parents to

understand the contents of the letter. In this naturalistic, dyadic situation, where there was continuous input from both the teacher and the familiar communicative partner of the parent, young children were able to accommodate to their audience in important ways. However, the accommodations made in written letters by these children were not in the persuasive genre, and largely related to fairly rudimentary aspects of attending to an audience.

A study by Frank (1992) similarly showed that older students (fifth-graders) were able to cater to an audience when writing a sales advertisement in which they were trying to sell an object of their choice to an adult or a younger child. After the initial task, they were prompted to revise their advertisements to cater to the other audience not previously written to (adult or younger child). She found that students were successfully able to make changes to their advertisement to match their new audience. However, though the advertisements had persuasive intent, they were not structured as complete arguments as would be required in writing projects and assessments. As such, it was unclear whether similar accommodations would be made when a complete persuasive essay or letter needed to be revised to match a new audience. Additionally, it was difficult to tell whether students would have demonstrated the same degree of audience awareness if asked to produce two advertisements independently rather than editing one advertisement to be suitable for a new audience, as the latter circumstance places particular salience on the audience being the sole factor of consideration in revisions.

Turgut (2012) specifically investigated how seventh-graders adapted their writing to an audience of peers (fellow seventh-graders) vs. an adult (the researcher) when producing independent argumentative essays on two topics- whether people should be vegetarian, and whether the school day should be extended. Data indicated that there were no differences overall in audience awareness scores (as reflected by overall scores on counterargument quality,

rebuttals, and engagement with the audience) based on the audience being written to. However, the participants who received the prompt topic of extending the school day in the peer audience condition (and the remaining topic of whether people should be vegetarian in the researcher audience condition) scored higher on both topics than the other half of participants who received each topic in the opposite condition.

Since the topics used varied in simplicity of tailoring to specific audiences (where it would have been easier to tailor to an audience of peers when writing about extending the school day), it is difficult to determine if topic-audience match or general writing proficiency resulted in these differences. In line with the former interpretation, Turgut (2012) found that there was a significant difference based on prompt topic specifically in the peer audience condition, in which students were more effective at writing about extending the school day to their peers than writing about whether people should be vegetarian. As a whole, this study suggests that it is much easier to write about a topic of personal importance to an audience who shares the same perspective about it than any other combination. Methodologically, the study highlighted that prompt topics should be as equivalent as possible to prevent specific prompt or prompt-audience match to be the driving force behind differences in student writing.

In sum, research on children's ability to tailor persuasive communications to a specific audience suggests that they have foundational skills in writing starting at a fairly young age, but that differences found based on audience awareness vary based on the methods used to assess audience awareness, the topic being written about, as well as the match between the topic and the audience. Nonetheless, it does appear that elementary-aged children are capable of attending to an audience in their writing in at least some ways, particularly when the content of their arguments is salient to themselves and the audience they are writing to. The level of adaptation

children demonstrate when writing independent arguments to different audiences, however, is much less clear.

Theory of Mind and Argumentation

Though the degree of adaptation to different audiences in persuasive writing has been largely unexplored, there has been some research delving into the role of theory of mind in predicting factors related to persuasion. Theory of mind relates to an individual's understanding of their own and other people's mental states, such as desires and beliefs (Wellman, 2011). An understanding of the goals and desires of others is a prerequisite to being able to adjust one's writing to them, and therefore likely related to success in persuasion.

Aligned with this view, research on the oral persuasion attempts of children has shown a connection between theory of mind abilities and persuasive attempts made by 3 – 8- year-old children (Slaughter, Peterson, & Moore, 2013). Slaughter, Peterson, and Moore (2013) assessed the first and second order false belief abilities (a component of theory of mind related to how well children appreciate that others may believe something that is incorrect) of 3 – 8- year-old children. They additionally assessed persuasion through a task where participants needed to convince a puppet to eat broccoli and brush his teeth. When children stopped providing spoken statements, the puppet would prompt the child to continue by stating that they still did not want to eat broccoli/brush their teeth. In this manner, children were given three verbal prompt opportunities to provide persuasive statements to the puppet. This study uncovered a link between theory of mind ability and persuasion such that false belief scores (theory of mind) were positively correlated with the number of persuasive statements children made to the puppet, even after controlling for age and verbal ability.

In a slightly older sample of 8-11- year-olds, Lonigro et al., (2017) similarly tested the associations between theory of mind abilities and oral persuasion. The persuasion task involved asking the participating children to convince a friend to share a toy with them and a parent to buy them a toy. Children provided their arguments orally and were then told that their parent or friend refused their request. Five refusals were provided including one refusal without a reason and four refusals each citing a different reason for wanting to refuse the request. The child was required to provide a statement following each refusal. Children's persuasive attempts were then coded as being self- vs. other-oriented. When including additional variables such as empathy, gender, age, and language ability in the analyses, Lonigro et al., (2017) found that theory of mind ability was the only predictor of using more other-oriented persuasive strategies and fewer self-oriented strategies.

As such, prior research on theory of mind abilities has often shown that the general abilities of children to understand the mental states of others is related to their ability to take the perspectives of others in interactive spoken communication tasks. Other research has additionally found that theory of mind abilities during the preschool years can longitudinally predict children's ability to adapt to an ignorant state of audience when producing an oral expository composition in the first grade (Peskin et al., 2016).

Overall, the work on theory of mind and argumentation has primarily focused on spoken communication rather than written arguments, but has largely demonstrated that children who are better at understanding the mental states of others in tasks unrelated to persuasion (theory of mind tasks) are similarly more effective in their persuasive attempts. As such, this line of research suggests that there are likely general underlying cognitive abilities (such as theory of mind) that influence children's abilities to take the perspective of the person they are persuading.

This suggests that in the present dissertation, children who demonstrate superior audience awareness are likely to do so across multiple assessments of audience awareness, such as tailoring evidence/elaborations and counterargumentation, as they may be at least partly driven by more general cognitive skills.

Gender Differences in Writing and Theory of Mind

Research has found that girls often outperform boys on writing tasks (Lee, 2013) as well as argumentative discussions (Asterhan, Schwarz, & Gil, 2012). Similarly, when looking at gender differences in theory of mind performance, research has often demonstrated that girls have a better ability to appreciate the mental states of both themselves and others (Bosacki, 2000; Devine & Hughes, 2013). It is therefore likely that in the present dissertation, girls will outperform boys on persuasive writing elements. Since theory of mind has been found to relate to persuasiveness and constructs related to audience awareness specifically, it may additionally be likely that girls will be particularly adept at demonstrating audience awareness in their writing, and may even be better able to account for the age difference when writing to an adult audience compared to a child audience more effectively than boys. As such, gender differences were investigated in the present study.

Research on Argumentative Knowledge

Much of the research discussed thus far has focused on the persuasive productions of children. Other research has investigated the argumentative knowledge of elementary-aged students rather than their argumentative productions. Farvart and Corier (2006) investigated the ability of third- through ninth-graders to restructure a list of eleven ideas presented in random order into a coherent argumentative sequence. They found that the ability to organize these ideas into a coherent text improved with grade level.

Leitao (2003) similarly investigated children's ability to understand argument in persuasion. Second-, fifth-, and eight-graders were asked to select a position on the issue of whether or not parents should make decisions about what their children should watch on television. They were then presented with six pieces of evidence, three in support of each side. After reading a statement aloud to a child, children were asked to select whether or not that statement should go into their argument and why.

Students included more evidence in favor of their own viewpoint than the opposing viewpoint, but still included an average of 40% of the three possible counterarguments presented to them. The majority of students made their decisions about whether or not to include a statement based on agreement or disagreement with the piece of evidence, qualifications (for example, by saying that a statement should/should not be included only under certain conditions), and finally, discussing reasoning in terms of the impact of the reason on the selected side of the argument. Though the last feature is most relevant to a strong understanding of the goals of persuasion, it was not frequently utilized (<10% of the time), while basic agreement or disagreement was the most frequently utilized explanation across all studied grade levels (approximately 60%).

In a follow-up study, Leitao (2003) found that students from the second grade to college had difficulty understanding the utility of counterarguments. In particular, over 90% of second graders believed providing counterarguments would hurt an argument's effectiveness, while this dropped to approximately 60% in the fifth grade. Finally, students of all grade levels most frequently endorsed a basic argumentative structure (Introduction, Viewpoint, Support) as well as a more sophisticated structure additionally incorporating a counterargument and response to the counterargument as being indicative of a good argument. These findings aligned with

research on writing production that suggested that even at higher grade levels, students struggle with the complexities of counterargumentation.

The Present Investigation

Part I of this dissertation focuses on the development of audience awareness in argumentative productions as well as the development of children's understanding of audience awareness. The central research questions are as follows.

1) How does the audience a child writes to influence their i) demonstrated audience awareness in writing and ii) use of other writing features relatively unrelated to audience awareness? Does the audience impact the different measures of audience awareness in similar or distinct ways?
2) What argumentative writing areas unrelated to audience awareness do fifth graders surpass third graders in?
3) In terms of audience awareness when writing to an adult vs. a fellow child, are fifth graders better than third graders at demonstrating i) audience awareness when writing to both audiences, and ii) the ability to elevate the quality of writing to a dissimilar audience to a closer level to the proficiency that is reached when writing to a similar audience? Are there gender differences in these abilities?
4) What level of intuitive and explicit understanding of audience awareness do third- and fifth- graders possess?
5) Do children's intuitive and explicit understandings of audience awareness predict the persuasiveness of the arguments they produce?

To answer these questions, I presented third- and fifth-grade students with two prompts to assess audience awareness when writing to an adult and child. Students also completed an

assessment of their knowledge and understanding of the features of an argument, with half (four) of the questions specifically pertaining to audience awareness. Even though the content of the prompts was very similar across the adult and child versions, I predicted that students would write more persuasive arguments with higher levels of demonstrated audience awareness to the child audience compared to the adult audience as they would be perceived as more similar to the child.

In contrast, I hypothesized that audience should not impact writing variables that are not integrally tied to audience awareness (e.g., number of reasons mentioned). This is because the similarity of the prompts should make basic content generation and organization comparable across audiences. If these predictions hold, it would suggest that it is not the ability to generate content or elaborations, but rather the process of adjusting the way they discuss this content that is difficult for students when writing to others different from themselves.

Based on the prior work of Leitao (2003) and others, I predicted that my simplified task of assessing argumentative knowledge would result in relatively high accuracy at the studied age range. Of more interest, however, was whether children would be able to explicitly identify the audience as a factor in selecting their answers, and whether this understanding could predict persuasiveness in their produced arguments. I hypothesized that children at both grade levels would do substantially worse at explicitly identifying audience characteristics as the reason for their answers than answering the questions correctly. I also predicted that knowledge of audience awareness in one or both ways would predict the actual persuasiveness of their arguments, even when including writing fluency and motivational factors into the model.

Chapter 3

Part I Method

Study Design

This study employed a mixed design in which children enrolled in the third- and fifth-grade responded to two prompts in their classroom. These prompts varied in terms of whether the audience the student was writing to was an adult or a child. This allowed for writing quality and audience awareness to be compared based on a within-subjects audience distinction (adult vs. child audience) in two different age groups to ascertain the development of audience awareness and other argumentative writing skills in elementary-aged children.

A third whole-class session addressed children's knowledge of argumentation. Students completed two short tasks in their classrooms. One task asked students to select one of two options that would result in a more effective argument in various contexts. Student responses were scored for accuracy, and children's explanations of their answer selection on four questions that assessed audience awareness were coded for whether or not the child indicated audience awareness in their response. The second task presented students with a scenario where they needed to build an argument that supported the reading and writing of fiction in schools. They were presented a list of sentences, and selected the best sentences to use in the argument. Many students failed to complete the second task due to time constraints, so results based on this task are not reported in this dissertation.

Participants

The sample for both Parts I and II consisted of 157 students total (84 females). The third-grade sample consisted of 71 students (37 females), and the remaining 86 students (47 females) were in the fifth grade. All students participated in the study during a 6-week period in the spring. Students were recruited from eight classrooms (four per grade level) from three high performing schools. All schools ranked in the top 10% of Michigan schools based on the top-to-bottom statewide ranking provided by the Michigan Department of Education, and all schools had at least 70% of students score as proficient on state assessments of English Language Arts. A relatively high-achieving sample was chosen because I was interested in having a sample proficient enough in fundamental writing skills to be able to highlight possible developmental issues related to the complex feature of audience awareness. However, due to this, the results should not be taken as representative of typical American students at the present time.

In total, 147 students (80 females) completed both written arguments during the in-class sessions. Nine students did not complete the whole class written arguments due to being absent on one or both days the writing prompts were administered. One student had unusable data due to illegible handwriting.

I obtained approval for this study from the Institutional Review Board (IRB) at the University of Michigan prior to recruitment. Permission from principals, district superintendents, and teachers were also obtained prior to the study according to the protocols of the relevant school districts. Participating teachers provided written consent to administer in-class study assessments to their students. Teachers were compensated $50 for their participation. Written parent consent was obtained prior to running the study. All children in participating classrooms

completed the whole class writing and knowledge of argumentation sessions, but researchers only photocopied the work of students with parental consent.

Procedure

Classroom-level prompts were administered by the teacher of each class. Teachers were given a script with instructions (see Appendix A for script), as well as copies of the prompt and lined writing paper to administer to the students in their class. Teachers began by introducing the task as a letter-writing task, where someone had written the class a letter and wanted to find out their opinion. The teacher then distributed the prompts and writing paper, and asked the students to read the letter silently. Students were instructed to raise their hand if they had any difficulty reading the prompt. The teacher then told the students to reply to the letter, and revise their written letter once complete. After some students finished their writing, the teacher once again reminded the class to read through and revise their writing before turning it in. Students were given 30 minutes of class time to write and revise their responses to each prompt.

The two prompts were administered on separate days within one week. Half of the classrooms in each grade level received one prompt topic (cheating) during the first session, and the other half received the other prompt topic (lying) prior to the cheating prompts. Within each classroom, students were randomly assigned to one of the two audience conditions (adult or child) to be presented during the first session. Researchers noted down the audience administered to participating students during the first session, and ensured each child received the prompt corresponding to the other audience during the second session. During the second session, teachers administered a 3-minute writing fluency assessment to their class before distributing the prompt letter (Block, 2013). For this assessment, students were given one minute to plan and three minutes to write all about their school (See Appendix B for the administration protocol). A

researcher was present during whole-class prompt administration to ensure the scripts were followed. After the class completed a prompt, the researcher photocopied the responses from participating students and returned the original written responses to the teacher. Teachers did not discuss persuasive writing or the prompts until after all data collection sessions were completed.

During a third session within a week of the first two sessions, students completed two tasks that assessed how much they understood about the process and features of argumentation. Scenarios and response options were read aloud to the class to ensure word reading ability did not interfere with the ability to understand the questions. Students first completed a worksheet in which they selected the better of two options to complete various short arguments. They then provided a written explanation of why they selected their answers. After this worksheet was complete, students completed a second worksheet in which they were asked to select which sentences should go into an argument to make it complete. Due to time constraints, some students were unable to finish the second task.

Materials and Measures

Argumentative Writing Prompts. Participants responded to two of four possible prompts. There were two possible prompt topics (convincing someone not to cheat and convincing someone not to lie), and two audiences (adult and child). Prompts are available in Appendix C. Prompt topics were devised to be similar to each other, relate to topics that were of high relevance to children, and be similarly applicable to an adult and child context. Each participant responded to one prompt for each topic and audience. Classroom-level prompts were formatted as letters that the child was asked to reply to. The letter prompt introduced the writer and highlighted his age, discussed the writer's circumstances and reasons for wanting to do the

wrong thing (cheat or lie), and explicitly asked for the reader to convince him to do the right thing instead (see Appendix C for complete prompts).

Knowledge of Argumentation Task. This task (see Appendix D) comprised eight questions that each asked students to select the better of two options in a given scenario. The eight questions covered student understandings of evidence, warrants, and counterargument quality. Four of the questions were unrelated to audience awareness, and response options varied in terms of whether or not they supported the claim being made. For example, a scenario involved a child making the claim that people who work at museums should know facts about the exhibits. The correct response option stated that museum visitors often ask the people who work there questions about the exhibits, while the incorrect response options stated that museum visitors get all their information about exhibits from written information packets. The options did not relate to the specific audience, but rather to their relevance to the claim being made.

The other four questions included an assessment of audience awareness. For these four questions, the incorrect response was more relevant to children whereas the correct response was more relevant to the audience. An example of such a question involved a scenario in which a child was trying to convince his mother to let him play video games. After reading the scenario, participating children needed to select one of two options for what the child in the scenario should say next.

One option was child-centered (video games are fun), and the other was parent-centered (video games teach important skills). This question related to audience awareness because the optimal response to parents (video games teach important skills) was the correct answer in the given scenario and the alternative option (video games are fun) was more relevant to the opinion of the child. Selecting the correct answer therefore required participants to favor the parent-

oriented reason over the self-oriented reason, thereby demonstrating audience awareness. In addition to indicating their answer choice, participants wrote an explanation of why they selected their answer for each question to assess their explicit understanding of how the audience relates to the type of evidence provided in the scenarios.

Scoring and Coding of Knowledge of Argumentation Task. Of the eight questions in this task, four assessed audience awareness and four assessed non-audience awareness features. Two accuracy scores were therefore computed from this data, one for audience awareness accuracy (range: 0-4), and one for non-audience awareness accuracy (range: 0-4). In order to assess whether children had an explicit, conscious understanding of the role of the audience in selecting their answers on the four audience awareness questions, children's written explanations of their answer choice were coded for whether or not they indicated an understanding of the role of the audience.

Examples of responses that were coded as indicative of an understanding of the audience for the aforementioned scenario on a child wanting to convince his parents to let him play video games included: "because his parents want him to be learning things" and "you need to make your parents think video games are good for you". Examples of responses that did not indicate awareness of the audience included: "because you can learn from video games about cars and boats" and "because kids can be brave in the future".

These codes were added to compute a separate score for audience awareness in explanations, which ranged from 0-4. Interrater reliability (Cohen's Kappa) ranged from 0.85 to 1.00 for explanations given for each of the four audience awareness questions.

Writing Fluency Assessment. A baseline assessment of writing fluency was conducted where children were given one minute to plan and then three minutes to write all about their

school. The number of words written in this three-minute period served as the score on writing fluency. Word counts on three-minute writing assessments have been found to be valid indicators of writing fluency (McMaster & Espin, 2007).

Oral Word Fluency Assessment. An oral word fluency assessment was conducted to assess word generation fluency independent of writing. The oral word fluency subtest of the Wechsler Individual Achievement Test – Third Edition (WIAT-III) was administered and scored according to the WIAT-III protocols. This task involved participants orally listing as many animals and colors as they could in one minute per category. Standardized scores by grade in the Spring were used in analyses.

Liking and Self Concept Questionnaire. Participants completed a short questionnaire that asked them to rate how much they liked writing (scale of 1-5) as well as how good they believed they were at writing (2 questions; scale of 1-4 each). The raw score on liking of writing and an additive score of the two self-concept questions were used in analyses. This questionnaire was administered during an individual session in which a different writing task was completed, and therefore included additional questions unrelated to Part I of the dissertation. Due to time constraints, only a small number of questions could be presented to participants, which prevented the use of longer established measures of liking of writing and writing self concept such as the Writer Self-Perception Scale, a 38-item questionnaire (Bottomley, Henk, & Melnick, 1997). However the questions used in this dissertation shared similar content and form as the aforementioned scale.

Data Preparation

All written arguments and student explanations of their answer choice on the knowledge of argumentation task were typed and corrected for spelling, grammar, and punctuation. This was

done to ensure that handwriting and errors in mechanics would not impact the coding of content, as prior research has suggested that such factors can play a role in quality ratings (Rafoth & Rubin, 1984). Typed, corrected versions of arguments on the two letter prompts were then coded on the following features.

Data Coding and Scoring

Count-based Scoring. Writing was coded for the presence of common features of argumentation as described by Toulmin (1958) as well as features of importance to the curriculum (Common Core Initiative, 2010). The features coded for were: 1) the presence of a claim, 2) the presence of an introduction beyond the claim, 3) the presence of a conclusion, 4) the total number of claim mentions in the argument, 5) the number of different reasons in support of the claim provided, 6) the number of counterarguments mentioned, 7) the number of counterarguments responded to, 8) the number of off-topic statements, 9) the number of unnecessary repetitions, 10) whether or not the argument contained an explicit source, and 11) total word count. Interrater reliability (Cohen's Kappa) was calculated based on 20 randomly selected arguments per prompt (40 total), and all variables attained high reliabilities (Kappa > .8). Reliability for each variable by prompt is available in Table 1.

Qualitative 6-point Analytic Scoring. Arguments were independently rated on overall persuasiveness and the following analytic features that were adapted from the 6+1 traits writing model (Culham, 2005) as well as a argumentative writing evaluation scheme developed for middle school students (Yeh, 1998), but altered substantially to capture variance in quality writing evidenced by third- and fifth- grade participants. The final 6 analytic features based on this model were: 1) overall persuasiveness, 2) claim clarity, 3) evidence/reason quality, 4) the level of audience awareness displayed in the evidence/reasons, 5) counterargument response

quality, and 6) organization. Each feature was rated on a scale of 1-6 (see Appendix E for coding criteria). Inter-rater reliability (Cohen's Kappa) was > .8 for all scored categories. See Table 1 for interrater reliability scores on each variable.

Of these six variables, all rated on a 6-point scale, four related to the dimension of audience awareness: overall persuasiveness, evidence/reason quality, audience awareness displayed in evidence/reasons, and counterargument response quality. The remaining two variables (claim clarity and organization) were unrelated to audience awareness. Claim clarity was an assessment of how clearly and explicitly stated the claim was near the beginning of the argument. Organization scores were evaluated based on the presence of an introduction and conclusion, how effectively ideas were grouped together, and avoidance of negative organizational features such as representing multiple reasons as a single one or having tangents and unnecessary repetitions.

The four audience awareness variables focused on different but overlapping features of audience awareness. Overall persuasiveness ratings were based on the relative presence of persuasive and unpersuasive elements in an argument as well as the quantity and quality of reasons and counterargument responses provided.

Evidence/reason quality focused on the level of elaboration and number of audience-relevant reasons provided in the argument. In order to obtain the highest score of a 6 on this scale, participants needed to include at least 2, audience-relevant, elaborated reasons, and at least 3 audience-relevant reasons total (though the third may not be well elaborated). The ratings on evidence/reason quality were focused more on whether a certain number of reasons were relevant and well-described than the overall proportion of audience-relevant vs. irrelevant reasons or elaborations. The separate variable of audience awareness in evidence/reasons focused

on how audience-focused the evidence and reasons used in the argument were overall, and additionally incorporated elements such as discussing specific information from the prompts and discussing reasons in relation to stated audience characteristics.

Some reasons were considered poor reasons for both audiences such as cheating/lying being bad (without much additional elaboration or connections to the audience). Many reasons were similarly audience-relevant for both audiences, such as discussing potential consequences for cheating and lying such as getting in trouble or feeling guilty. The main feature that needed to differ between the adult and child audience related to the way the reasons were discussed. For example, a relevant discussion of getting in trouble for the child audience would involve talking about getting punished by a teacher, principal, or parent. The adult audience was instead at risk for getting in trouble with a boss. Arguments for the adult that focused on the child rather than the adult context were considered as having lower audience awareness.

The final variable of counterargument response quality looked specifically at how effectively children responded to the reasons for cheating/lying given by the audience they were writing to. A score of "1" was assigned when no counterarguments were stated or refuted and a score of "2" was assigned if a counterargument was stated but not responded to. A score of "3" was assigned when responses to counterarguments were poor. Scores of 4, 5, and 6 were assigned based on the number of counterarguments effectively responded to.

For example, one reason provided in favor of lying in the prompts involved the audience not wanting to get into trouble for making a mistake (forgetting to shut the classroom door/ lock the door at a store). A poor response would be, "My mom said that if you lie you will get in even more trouble." An example of a more effective response would be, "If you do lie, you might get caught. Then, you will get in more trouble than if you tell the truth. And if you tell the teacher

you did forget, she will be happy you told her the truth. If you lied to her she will probably find out anyway. And she will not be very happy. Also, you may win the class prize still! You can win it for honesty. Honesty is one part of being a good leader and character".

Elaborations Scoring. All arguments were scored on a scale of 1-4 to determine the level of elaboration present in the argument. At level 1, arguments listed reasons without any elaboration, and at level 4, multiple reasons were well-explained and elaborated. Interrater reliability was $\kappa = .86$ for the cheating prompt, and $\kappa = .92$ for the lying prompt.

Persuasive Strategies Scoring. Written arguments were also coded separately on the use and effectiveness of persuasive strategies to convince the audience. Appeals were developed based on discussions of features of persuasive writing in Duke et al. (2012). Six appeals were scored on a scale of 0-2, where 0 indicated that the appeal was absent, 1 indicated an attempt at the appeal that was only partially successful, and a 2 indicated the successful use of the appeal.

The six appeals were: 1) appeals to the author's knowledge or credibility (e.g., by stating that the author has a lot of experience with the situation of the audience), 2) appeals to the goals or desires of the audience (e.g., by discussing how changing their mind will be more beneficial for the desired outcomes of the audience), 3) the use of persuasive reasons for a claim (reasons that would be valid in the view of the audience only, but do not explicitly relate to audience goals) 4) the use of emotional appeals to the audience (e.g., by emphasizing the emotional distress the lying/cheating would produce), 5) the use of rhetorical questions (e.g., Don't you think so?), and 6) the use of empathy (e.g., by discussing that they understand the difficulty of the situation the audience is in).

Inter-rater reliability (Cohen's Kappa) was >.8 for all appeals (See Table 1 for reliabilities for individual variables). The final variables used in analyses were the number of

successful persuasive strategies (score of 2) and the number of partially successful strategies used (score of 1).

Highest and Overall Audience Awareness. In addition to the analytic rubric-based scoring of audience awareness, audience awareness was investigated based on a rubric developed by Delia, Kline, and Burleson (1979), in which each component of the argument was scored on a scale of 0-8 based on how useful it would be for the specific audience. The highest level of audience awareness displayed anywhere in the argument was used as an indicator of audience awareness in Delia, Kline, and Burleson (1979) as well as the present study. In the present study, in order to obtain a better overall assessment of audience awareness, a second score was also used, from a scale of 1-5, which reflected the number of different displays of audience awareness at different levels. A score of 1 indicated the exclusive use of low-level devices (0-3), a score of 2 indicated the use of a moderate strategy at most (4 or 5), a score of 3 indicated the use of at least one higher-level strategy (6-8), a score of 4 required the use of 2 higher level strategies and the use of no more than 1 strategy at level 5 or below, and a score of 5 required the use of 3 higher level strategies and the use of no more than 1 strategy at level 5 or below. The scoring system is available in Appendix F.

Development of Coding Systems. Though many of the coding systems were loosely based on prior systems, like most other research, the coding systems used in this dissertation needed to be extensively modified or developed for the specific purposes and circumstances of the study. All of the aforementioned coding systems were therefore rigorously piloted and tested.

The first stage of coding system development involved searching the literature and speaking to experts in the field about the coding systems used in prior research. Much of the recent work on persuasive writing has taken a curriculum-based focus to coding, in which

systems were designed to assess how effectively students were meeting the expectations set forth for them by the Common Core Curriculum. As such, few focused on the elements of interest in my study such as audience awareness. I therefore adopted some rating systems used in prior work with both elementary aged populations and older students, and additionally developed my own systems to capture the concepts of interest to the present dissertation. Once the initial systems were developed, I met with some members of the dissertation committee as well as other experts in the field to discuss the systems and gain perspective on refining systems and adding new variables. Coding systems were further refined after these meetings as per the suggestions of experts in the field.

Once an initial coding system was in place, a random sample of ten arguments per prompt was used to test the coding systems. The process of pilot coding the ten arguments revealed areas of the coding system that needed further specification in order to ensure ratings could be more clearly determined between two adjacent score points. Additionally, adjustments were made to ensure the ratings reflected similar quality regardless of the prompt topic and mode of communication. Coding systems were revised, and then re-tested on the same ten arguments per prompt that were previously coded as well as an additional five arguments per prompt.

A small number of additional modifications were made to help clarify distinctions. Additionally, at this point, coding systems for some features were merged due to lack of variance between coding criteria. For example, in the 6-point rating systems discussed above, there are two scales related to evidence: evidence/reason quality, and audience awareness demonstrated in evidence/reasons. Initially, there was a similar distinction for counterargument responses. However, in the case of counterargument responses, it proved difficult to separate the overall audience awareness in the responses from the response quality as both were inherently tied to the

circumstances of the audience. As a result, only one variable was retained (counterargument response quality) and the other was dropped. Examples were added based on these 15 arguments per prompt to the coding document to help illustrate the differences between scores.

Once a refined coding system was in place, additional rounds of meetings with experts in the field occurred to help ensure that concepts of interest were being captured appropriately by the coding systems. Additional adjustments and additions were made as recommended based on these meetings. For scaled variables (as opposed to count variables), I additionally ensured the 30 scored arguments were relatively normally distributed, where the middle values were more represented than the extreme values.

After refined coding systems were developed, I trained research assistants to code arguments providing both descriptions of the various scales and examples. Research assistants initially coded five arguments per prompt to ensure they were not misinterpreting the information in the coding systems. Additional clarifying statements were added to the coding systems to address any misconceptions or confusion at this phase. After a testing round of five arguments per prompt that research assistants coded successfully, research assistants were assigned 20 random arguments per prompt (not including those used in examples or the test phases) to code for reliability. I served as the primary coder for all arguments. Interrater reliability for all variables was found to be high for all variables (Cohen's Kappa > .8).

Overview of Analyses. In order to analyze the above data, I first conducted a factor analysis (principal components) to ensure the variables that were theoretically linked to audience awareness would load on the same factor. I then sought to determine which of the between-subjects variables needed to be included in further analyses by performing two mixed multivariate analyses of variance with overall persuasiveness (adult and child audience) as the

dependent variables and the between subject factors of gender, the prompt that was used in each audience condition, and condition order.

Once this was complete, I conducted a mixed multivariate analysis of variance on the eight dependent variables related to audience awareness. This was followed by individual analyses of variance on each of the variables in the group. The same overall multivariate analysis of variance was then conducted on variables unrelated to audience awareness, followed by univariate analyses of variance on the variables in this group. Finally, knowledge of argumentation was analyzed using t-tests with grade as the grouping variable to assess whether fifth graders displayed greater knowledge of argumentation than third graders. I then conducted linear and stepwise regressions predicting overall persuasiveness of produced arguments with knowledge of argumentation and control measures as predictors to determine if the measure had predictive utility. The statistical analyses are discussed in more detail at the start of Chapter 4 prior to reporting the results. A flow chart of Part I analyses can be found in Figure 1.

Chapter 4

Part I Results

Statistical Analysis

Validation of Audience Awareness Variable Selection. The initial determination of which variables were related to audience awareness was done based on a close match between the coding criteria and the theoretical definition of audience awareness. The following 8 variables were determined to be theoretically related to audience awareness: number of counterarguments mentioned, number of counterargument responses, counterargument response quality, evidence/reason quality, audience awareness in evidence/reason use, overall persuasiveness, highest audience awareness, and overall audience awareness.

In order to confirm that the theoretical link between the variables and audience awareness was in fact reflected in the data, a factor analysis was conducted to verify that all 8 variables loaded on the same dimension.

Between-Subjects Categorical Control Variable Selection. In order to limit the number of comparisons based on between-subject categorical variables that were not central to the study purposes (gender, the prompt that was used in each audience condition, and condition order), two analyses of variance were conducted on overall persuasiveness scores (one for the adult audience and one for the child audience). Of the three between-subjects factors, only gender had a significant main effect on overall persuasiveness, and was therefore the only variable included as a between-subjects factor in further analyses.

Effects of Audience on Audience Awareness and Other Writing Features.

An overall F-test on audience awareness variables was first conducted to determine if there was a significant overall difference based on audience (within-subjects factor of adult vs. child). A significant difference was found, so individual mixed ANOVAs were then computed on each variable to determine audience, grade, and gender effects.

An overall F-test was then conducted on variables unrelated to audience awareness. This F-test showed that there was not difference based on audience (adult vs. child), but that significant differences were still present for grade and gender. Thus, individual mixed ANOVAs were then computed on each variable to determine grade and gender effects.

Knowledge of Argumentation. Grade level differences in knowledge of argumentation were determined by conducting independent samples t-tests with grade as the between-subjects factor (2: 3rd, 5th), and non-audience awareness accuracy, audience awareness accuracy, and audience awareness explanations as the dependent variables.

To determine whether knowledge of argumentation served as a significant predictor of the persuasiveness of produced arguments, linear regressions were conducted including a sub-score of non-audience awareness question accuracy, an accuracy sub-score of the other 4 questions that assessed audience awareness, a score for the presence or absence of explicit audience awareness reasoning in children's written explanations for their answers on the four audience awareness questions, and the other control variables that were not argument-specific (writing fluency, oral word fluency, self-ratings on writing liking and self-concept, Grade, and Gender). Four regressions were computed with these predictors, two with the dependent variable of the coded overall persuasiveness of the argument composed to a child audience, and the other two with the dependent variable of the argument composed to an adult audience. Regressions

were computed using both the standard and forward stepwise procedures to ascertain whether results were robust to variations in analysis types.

The results of the aforementioned analyses are presented below.

Validation of Audience Awareness Variable Selection

A factor analysis (principal components) on the 8 variables theoretically linked to audience awareness was conducted to verify that the data reflected the theoretical association. 16 variables were entered (8 per written argument) into the model. The rotated solution produced a 4-factor solution, which in total explained 75.93% of the variance. The first two factors explained the bulk of this variance: 62.02%.

The first factor that explained 32.34% of the variance included strong positive factor loadings on 7 of the 8 variables for the adult audience. The second factor that explained 29.68% of the variance represented strong positive factor loadings on the corresponding 7 variables for the child audience. The only variable that did not load on these factors was the number of counterarguments mentioned in both audience-directed arguments. This was likely due to the extremely low occurrence of explicitly stated counterarguments (M = .27 for the child audience and M = .14 for the adult audience). The final 2 factors related to this variable, the number of counterarguments in the adult and child audience.

The strong internal consistency of the variables theoretically related to audience awareness therefore validated our classification of these variables, and all 8 variables were included in the overall F-test computed on audience awareness variables. Correlations between the eight audience awareness variables can be found in Table 2.

Assessing Necessity of Between-Subject Controls: Order, Prompt, and Gender Effects

An analysis of variance was conducted with the dependent variable of Overall Persuasiveness when writing to an adult audience, and the independent variables of grade, gender, prompt used in each audience condition, and condition order. As predicted, grade level had a significant main effect on overall persuasiveness, $F(1, 136) = 19.73$, $p < .001$. Gender had a marginally significant main effect on overall persuasiveness, $F(1, 136) = 3.52$, $p = .063$, while there were no significant effects of prompt topic, $F(1, 136) = .39$, $p = .54$ or condition order, $F(1, 136) = .02$, $p = .902$.

An identical analysis of variance was similarly conducted on the overall persuasiveness variable when writing to a child audience. For the child audience variable, both grade, $F(1, 136) = 36.28$, $p < .001$ and gender $F(1, 136) = 11.26$, $p = .001$ reached statistical significance. Much like with the adult audience variable, there were no significant effects of prompt topic, $F(1, 136) = .44$, $p = .51$ or condition order, $F(1, 136) = .03$, $p = .860$.

As a result of these analyses, it was determined to only use grade and gender as between-subjects factors for subsequent analyses.

Audience, Grade, and Gender Differences in Audience Awareness Variables

Overall F-Test. A mixed analysis of variance was conducted with the within-subjects factor of audience (2: adult, child) and the between-subjects factors of grade (2: 3rd, 5th) and gender (2: female, male) on the 8 audience awareness variables (number of counterarguments mentioned, number of counterargument responses, counterargument response quality, evidence/reason quality, audience awareness in evidence/reason use, overall persuasiveness, highest audience awareness, and overall audience awareness) to determine if there was a significant difference in audience awareness demonstrated in arguments written to a child vs. adult.

As hypothesized, a significant effect of the within-subjects factor of audience was found, $F(1, 143) = 18.70$, $p < .001$, with audience awareness being higher in the arguments written to the child audience compared to the adult audience. Results also showed a significant effect of dimension, $F(1, 143) = 3981.45$, $p < .001$, which was consistent with the various dimensions being on different scales. Significant effects were also found for the between-subjects variables of grade, $F(1, 143) = 32.48$, $p < .001$ and gender, $F(1, 143) = 8.42$, $p = .004$, where fifth graders outperformed third graders, and females outperformed males. Because the overall F-Test yielded a significant difference based on audience, individual ANOVAs were then conducted to determine if the audience distinction held for all 8 variables tested in the overall F-test.

Individual ANOVAs. A mixed analysis of variance (ANOVA) on the dependent variable of overall persuasiveness with audience (2: adult, child) as a within-subjects factor and grade (2: 3rd, 5th) and gender (2: female, male) as between-subjects factors was conducted to assess whether children would write more persuasively to a fellow child than an adult. As predicted, overall persuasiveness was higher when participants wrote to a fellow child ($M = 3.99$, $SD = .86$) compared to an adult ($M = 3.71$, $SD = 1.05$), $F(1, 143) = 11.49$, $p = .001$. Fifth graders wrote more persuasive letters than third graders, $F(1, 143) = 37.44$, $p < .001$, and females wrote more persuasively than males, $F(1, 143) = 9.97$, $p = .002$. Means and standard deviations by grade and gender for all audience awareness variables can be found in Tables 3 and 4 respectively. Inferential statistics for individual ANOVAs are available in Tables 5 (audience effects), 6 (grade effects), and 7 (gender effects).

Identical ANOVAs were conducted on the other seven audience awareness dependent variables. Quality was significantly higher in the argument written to a child than an adult for reason/evidence quality (Adult $M = 3.89$, $SD = .96$; Child $M = 4.10$, $SD = .86$; $F(1, 143) = 6.76$,

$p = .010$), audience awareness in evidence (Adult $M = 3.89$, $SD = 1.02$; Child $M = 4.28$, $SD = .89$; $F(1, 143) = 17.69$, $p < .001$), counterargument response quality (Adult $M = 3.74$, $SD = 1.36$; Child $M = 4.03$, $SD = 1.10$; $F(1, 143) = 5.36$, $p = .022$), highest observed audience awareness in the argument (Adult $M = 5.71$, $SD = .74$; Child $M = 6.02$, $SD = .67$; $F(1, 143) = 15.77$, $p < .001$), overall audience awareness (Adult $M = 2.80$, $SD = .77$; Child $M = 3.10$, $SD = .77$; $F(1, 143) = 14.78$, $p < .001$), and number of counterarguments mentioned (Adult $M = .14$, $SD = .42$; Child $M = .27$, $SD = .49$; $F(1, 143) = 6.21$, $p = .014$). This difference approached significance for the number of counterargument responses attempted (Adult $M = 1.52$, $SD = .87$; Child $M = 1.71$, $SD = .80$, $F(1, 143) = 3.81$, $p = .053$).

Fifth graders outperformed third graders on six of the seven variables: reason/evidence quality, $F(1, 143) = 37.20$, $p < .001$, audience awareness in evidence, $F(1, 143) = 32.55$, $p < .001$, counterargument response quality, $F(1, 143) = 16.31$, $p < .001$, highest observed audience awareness in the argument, $F(1, 143) = 22.29$, $p < .001$, overall audience awareness, $F(1, 143) = 23.60$, $p < .001$, and number of counterargument responses attempted, $F(1, 143) = 17.31$, $p < .001$. There was no difference in the number of counterarguments mentioned by grade, $F(1, 143) = .43$, $p = .51$.

The next research question related to whether fifth graders would not only demonstrate higher audience awareness than third graders in general, but also begin to elevate the quality of writing to the adult audience to being closer to the level they can reach when writing to a fellow child. This would have been demonstrated by a smaller gap between the quality of arguments written to an adult vs. child in the fifth compared to third grade. However, no interactions between audience and grade were found (see Table 5), showing that the persuasiveness of

writing suffered for the dissimilar audience compared to the similar audience to a very similar degree for third- and fifth-graders.

Females outperformed males on the four variables that were not focused on counter-argumentation, namely reason/evidence quality, $F(1, 143) = 7.26$, $p = .008$, audience awareness in evidence, $F(1, 143) = 11.66$, $p = .001$, highest observed audience awareness in the argument, $F(1, 143) = 11.68$, $p = .001$, and overall audience awareness, $F(1, 143) = 6.73$, $p = .010$. There were no gender differences for the number of counterarguments mentioned, $F(1, 143) = 2.23$, $p = .138$, the number of counterargument responses attempted, $F(1, 143) = 1.00$, $p = .320$, and counterargument response quality, $F(1, 143) = 2.06$, $p = .153$. There were also no significant interactions between gender and audience. As such, girls demonstrated higher audience awareness than boys on some features, but did not demonstrate an improved ability to elevate their arguments to the adult audience to the same level attained when writing to the child audience.

Overall, aligned with the hypothesis and the overall F-test, participants demonstrated better argumentative writing ability when writing to a fellow child than an adult for the majority of the eight audience awareness variables. Additionally, audience awareness was higher for fifth graders compared to third graders. For variables not directly assessing counter-argumentation, females outperformed males in demonstrated audience awareness. Even though overall audience awareness was greater in the fifth than third grade, there were no interactions between audience and grade, so fifth graders had not begun to close the gap between the persuasiveness of their writing aimed at a similar vs. dissimilar audience.

Audience, Grade, and Gender Differences in Non-Audience Awareness Variables

Factor Analysis. A factor analysis (principal components) was conducted on the variables unrelated to audience awareness to verify that variables did not cluster based on audience as they did for the audience awareness variables. In the rotated component matrix, the first factor included nine variables with positive factor loadings: adult and child word count, adult and child elaborations, adult and child number of reasons, adult and child number of effective appeals, and the number of claim mentions in the argument written to an adult. The remaining factors appeared to be artifacts, and involved clusters of claim-related variables such as claim clarity, and whether or not there was a claim at the beginning of the argument. As such, the variables did not cluster based on audience factors, but rather other properties of the variables themselves.

Overall F-Tests. A mixed analysis of variance was conducted with the within-subjects factor of audience (2: adult, child) and the between-subjects factors of grade (2: 3rd, 5th) and gender (2: female, male) on the 12 variables that were theoretically unrelated to audience awareness (word count, elaborations, claim clarity, organization, number of reasons, number of partially successful persuasive strategies, number of successful persuasive strategies, number of sources, number of claim mentions, whether or not there was claim near the beginning of the argument, whether or not there was an introduction beyond the claim, and whether or not there was a conclusion) to determine if there was a significant difference in these features of arguments written to a child vs. adult. The same child wrote both arguments on similar topics, so the prediction was that there would be no differences in the arguments written to an adult vs. child audience on variables that were not directly related to audience awareness.

Results were consistent with the hypothesis, and there was no significant difference when writing to an adult vs. child on the 12 non-audience awareness variables, $F(1, 143) = 1.30$, $p =$

.256. Significant effects were found for the between-subjects variables of grade, $F(1, 143) = 21.54$, $p < .001$ and gender, $F(1, 143) = 16.27$, $p < .001$, with fifth graders outperforming third graders and females outperforming males.

A second mixed analysis of variance was conducted on 2 variables (the number of off-topic statements and the number of unnecessary repetitions) with the within-subjects factor of audience (2: adult, child) and the between-subjects factors of grade (2: 3rd, 5th) and gender (2: female, male). A separate analysis was conducted for these variables as unlike the other 12 variables, higher scores on these two variables represented poorer argument quality. Much like with the other F-test, there was no difference based on the audience being written to, $F(1, 143) = .07$, $p = .794$. Third graders produced more tangents and unnecessary repetitions than fifth graders, $F(1, 143) = 7.88$, $p = .006$, and there were no differences based on gender, $F(1, 143) = 1.16$, $p = .283$.

Individual ANOVAs. Individual mixed analyses of variance (ANOVA) on each of the 14 dependent variables unrelated to audience awareness with audience (2: adult, child) as a within-subjects factor and grade (2: 3rd, 5th) and gender (2: female, male) as between-subjects factors were conducted to ensure a strong but unexpected audience effect was not being masked by the lack of audience differences for other variables, as well as to ascertain which variables drove the observed grade and gender differences. Means and standard deviations for these variables by grade and gender can be found in tables 8 and 9 respectively.

No significant or marginally significant differences were found between arguments written to an adult to a child for any of the 14 dimensions (see table 10). When looking at grade level differences, compared to third graders, fifth graders produced more introductions, $F(1, 143) = 32.38$, $p < .001$, conclusions, $F(1, 143) = 8.42$, $p = .004$, and claim mentions, $F(1, 143) = 9.08$,

$p = .003$. Fifth graders also used more successful persuasive strategies, $F(1, 143) = 17.48$, $p < .001$, had a higher word count, $F(1, 143) = 20.20$, $p < .001$, and were more elaborated, $F(1, 143) = 16.39$, $p < .001$ than third graders. They were more organized, $F(1, 143) = 7.96$, $p = .005$, used more reasons, $F(1, 143) = 14.33$, $p < .001$, and included significantly fewer unnecessary repetitions, $F(1, 143) = 5.50$, $p = .020$ than third graders. There were no grade level differences for having a claim near the beginning of an argument, claim clarity, the number of partially successful persuasive strategies, the number of sources cited, or the number of tangents (see table 11).

Gender differences emerged for four variables, whereby females used more successful persuasive strategies, $F(1, 143) = 5.38$, $p = .022$, used more partially successful persuasive strategies, $F(1, 143) = 8.07$, $p = .005$, produced longer arguments (word count), $F(1, 143) = 15.85$, $p < .001$, and included more reasons, $F(1, 143) = 9.01$, $p = .003$ than males (see table 12).

Overall, as predicted, both the factor analysis and the analyses of variance revealed that audience did not affect argumentative writing variables that were unrelated to audience awareness.

Knowledge of Argumentation

Grade Level Differences. The final analyses were conducted to understand how knowledge of fundamental features of argumentation (evidence, warrants, counterarguments) develops between the third and fifth grade. I first conducted independent samples *t*-tests with grade (2: 3rd, 5th) as the between-subjects grouping variable, and the dependent variables of 1) accuracy on four questions that did not assess audience awareness, 2) accuracy on four questions that assessed audience awareness, and 3) sum score of the number of questions for which

children provided an explanation of their answer that indicated an explicit understanding of audience awareness for the 4 audience awareness questions.

There was no significant grade difference on the accuracy of audience awareness questions, $t(141) = .875$, $p = .383$ or non-audience awareness questions $t(127) = 1.95$, $p = .053$, though the latter approached significance. Accuracy was high for both these variables at both grade levels. For instance, out of a maximum score of 4, third graders had a mean performance of 3.44 ($SD = .64$) on non-audience awareness questions, and a mean score of 3.58 ($SD = .64$) on audience awareness questions (See Figure 2). For audience awareness in explanations, however, performance was much lower than the accuracy scores, and fifth graders ($M = 1.63$, $SD = 1.35$) performed significantly better than third graders ($M = 1.09$, $SD = 1.36$), $t(141) = 2.36$, $p = .020$.

Prediction to Persuasiveness of Produced Arguments. In order to determine whether the assessment of knowledge of argumentation predicted the quality of arguments produced by participants, linear regressions were conducted with the outcome variables of overall persuasiveness when writing to a child and adult audience. The predictors entered into the model were the three knowledge variables, writing fluency word count (from the 3-minute fluency assessment), WIAT-III oral word fluency (standardized score), self-rating of liking of writing, self-rating of writing self-concept, gender, and grade. Means and standard deviations by grade and gender are available in Tables 13 and 14 respectively, and correlations between the predictors can be found in Table 15. Both linear and stepwise regressions were conducted on the outcome variables to determine consistency of the results with different computational procedures. Adjusted R^2s are reported below.

The linear regression on overall persuasiveness when writing to a child audience produced $R^2 = .34$, $F(8, 118) = 9.45$, $p < .001$ with three significant predictors: writing fluency, β

=.315, $p < .001$, grade, β =.242, $p = .003$, and audience awareness in explanations on the Knowledge of argumentation task, β =.234, $p = .005$. Oral word fluency, gender, liking of writing, and knowledge accuracy scores were not significant predictors in the model. A forward stepwise regression with the same predictors was also conducted on overall persuasiveness when writing to a child audience. Much like with the standard linear regression, the stepwise procedure yielded a solution with the same 3 variables in the model: writing fluency, audience awareness in explanations, and grade, $R^2 = .35$, $F(3, 123) = 23.49$, $p < .001$.

A linear regression was then conducted on overall persuasiveness when writing to an adult audience. This regression produced a model, $R^2 = .27$, $F(8, 118) = 7.07$, $p < .001$ with three significant predictors: writing fluency, β =.35, $p < .001$, grade, β =.19, $p = .026$, and audience awareness in explanations on the knowledge of argumentation task, β =.18, $p = .039$. Oral word fluency, gender, liking of writing, and knowledge accuracy scores were not significant predictors in the model. The forward stepwise regression on overall persuasiveness when writing to an adult audience yielded analogous results with 3 variables in the model: writing fluency, audience awareness in explanations, and grade, $R^2 = .29$, $F(3, 123) = 18.15$, $p < .001$.

In sum, though knowledge accuracy measures had low utility in predicting persuasiveness in produced arguments, the knowledge variable of audience awareness explicitly demonstrated in explanations consistently predicted overall persuasiveness scores when writing to both the child and adult audience.

Chapter 5

Part I Discussion

Part I of this dissertation focused on how the level of similarity of the audience to the writer impacted the effectiveness of arguments written to that audience. Third- and fifth- grade children composed two persuasive letters, one directed to an adult (a dissimilar audience) and another to a fellow child (a similar audience). I predicted that children would have difficulties with features related to tailoring their argument to their audience (audience awareness) when writing to an adult compared to a fellow child, but that audience would not affect other aspects of writing that were relatively distinct from audience awareness.

Results indicated that as hypothesized, children from both grades demonstrated higher audience awareness when writing to a fellow child compared to an adult. This was reflected in numerous measures of audience awareness, some specific to selecting and discussing evidence in a manner that was appropriate to the audience, and others more focused on counterargumentation, or responding to reasons provided by the audience in favor of the opposite side of the argument.

The second component of my primary hypothesis was that children should *specifically* have difficulty with audience awareness, such that the elements of writing and content generation that are not directly related to the specific audience should be equivalent between the arguments produced by the same child. This was particularly expected given the similarity of the two

prompts children responded to, the counterbalanced study design, and the finding that prompt and condition order did not significantly impact argument persuasiveness.

As predicted, the two arguments children wrote did not significantly differ on variables that were relatively unrelated to audience awareness. Some of these non-audience awareness variables included organizational features (overall organization, presence of claims, introductions, conclusions), argument length (level of elaboration and word count), and the number of unique reasons provided (regardless of whether they were appropriate for the audience or not). Children were therefore able to generate reasons to support their claim and elaborate on them fairly equivalently for both audiences.

This suggested that when writing to a dissimilar audience (based on age), children were able to develop content in a similar manner as when writing to a fellow child. However, they were often less successful with taking the additional step of adapting their thoughts geared to their own experiences to those of someone in a context that overlapped less with their own. As such, the persuasiveness of children's arguments written to adults suffered not due to lack of content, but rather due to insufficient adaptation of the content to the dissimilar audience. Interestingly, the one audience awareness variable that failed to reach statistical significance was the number of counterargument responses attempted, regardless of whether the response was convincing or appropriate for the audience. In contrast, there was a significant difference in the quality of their counterargument responses based on audience. As such, much like with the number of reasons, children attempted to respond to counterarguments put forth by both audiences, but did so more effectively when writing to a fellow child.

Wollman-Bonilla (2011) demonstrated that even first graders could write letters to their parents that contained some elaborations needed for their parents to understand the context they

were in, and Frank (1992) showed that children recognized the need to alter advertisements in strategic ways when the audience the advertisement was targeting changed. In much the same way, the present dissertation found that elementary-aged children are capable of demonstrating audience awareness in their writing to both an adult and a fellow child. Though many children in my sample showed evidence of trying to respond to the specific circumstances of the adult audience, Nilsen and Fecicia (2011) discussed the difficulty in transitioning from recognizing another mental state to being able to effectively use that information to guide the communication. This was potentially an issue faced by the children in this study, where they recognized the viewpoint of the adult audience, but were less effective in using that information successfully than with the child audience.

Grade Differences

In addition to investigating the role of audience, I explored which aspects of argumentative writing were better developed in fifth graders compared to third graders. There were many grade level differences observed for non-audience awareness variables. Fifth graders were better organized than third graders, included more introductions and conclusions, provided more reasons and elaborations, and used more persuasive strategies successfully. Basic features such as mentioning the claim and stating this claim clearly did not differ by grade because the vast majority (> 85%) of students at both grade levels were successfully executing the skill.

Fifth graders also surpassed third graders in a number of audience awareness features. Fifth graders demonstrated higher audience awareness on seven of the eight assessments, suggesting that fifth graders were more attentive to the audience than third graders in general by attempting better responses to more counterarguments and including stronger reasons. As such, attention to the audience in general was greater for fifth than third graders, aligned with the

findings from past work that show improvements in argumentative writing over time (e.g., Knudson, 1992).

The next grade-based investigation related to whether fifth graders would not only demonstrate greater attention to the audience overall, but also begin to overcome some of the difficulties with writing to a dissimilar audience and close the gap between the persuasiveness of arguments written to a child and an adult. There were no interactions between audience (adult and child) and grade, however, suggesting that the persuasiveness of the writing of both third and fifth graders was affected by the audience to a similar degree.

In sum, compared to third graders, fifth graders demonstrated greater argumentative writing ability in both audience awareness and other features. Fifth graders were not better than third graders at bridging the gap between the audience awareness demonstrated in writing to the two audiences, however, suggesting that at both grades, children are equivalently unable to elevate the persuasiveness of their writing to an adult audience to the level they can attain when writing to a fellow child.

Gender Differences

Gender differences have been observed in the prior literature on children's writing, where females often outperform males (Lee, 2013). Females have also been found to demonstrate higher theory of mind abilities that relate to persuasive skill (Lonigro et al., 2017). I therefore predicted that females would likely outperform males on numerous writing features, but particularly on audience awareness. In terms of audience awareness variables, females performed better than males on the five of the eight audience awareness variables that corresponded to overall persuasiveness, reasons, and evidence. There were no gender differences on the three variables related to counterargumentation. No gender differences were found for organizational

features (e.g., overall organization, introduction presence, conclusion presence), but females produced arguments with higher word counts and more reasons, and used more successful persuasive strategies than males. Overall, aligned with prior work, girls wrote more effective arguments than boys, though both girls and boys were similar on some features such as counterargumentation and organization. Girls did not, however, surpass boys in their ability to elevate the quality of their arguments to the adult audience to the same level they attained when writing to a fellow child.

Children's Knowledge of Argumentation

The final aspect of Part I involved assessing how children's knowledge of argumentation develops between the third and fifth grade, and whether my assessment of knowledge of argumentation could predict the persuasiveness of arguments produced by children. Children answered eight forced choice questions and selected one of two answers to indicate what the most appropriate response would be in the scenario. For example, children were asked to select what was more appropriate for the child in the scenario to say when she wanted to convince her mother that parents should help children with their homework: that children do better in school when they understand their homework properly, or that it takes too long to do homework by yourself.

Though the latter response may be more aligned with a child's perspective, the former served as a better choice due to the audience being communicated with. I found that both third and fifth graders had very high accuracy on both the four audience awareness questions and the four non-audience awareness questions. In fact, out of a total of eight questions, even third graders answered an average of over seven correctly. Unsurprisingly, the ceiling effects resulted in there being no significant difference between third and fifth graders in their accuracy on this

task. This suggested that overall, even at the third grade, children have a strong intuitive understanding that some reasons and explanations may be more appropriate for a particular audience than others.

However, children's ability to explicitly recognize that it was the characteristics of the audience and their likely perspectives on the issues that played a large role in the decision-making surrounding answer selection was much less advanced than the intuitive understanding. Out of the four audience awareness question explanations, third graders only provided explanations related to audience awareness an average of 1.09 times, and this significantly increased to only 1.63 times for fifth graders. As such, though fifth graders (compared to third graders) were more advanced in making this explicit connection between audience goals and information that would be convincing to the audience, they still had an incomplete understanding, and many children still failed to demonstrate this explicit appreciation.

Prior research by Leitao (2003) on argumentative knowledge took a very different approach from the present investigation, and asked children to select what to put in an argument from a list of potential reasons in favor of both sides of the provided argument. They found that children did select reasons in favor of the opposing claim for their arguments, even when there was no potential to provide a response. They concluded that children tended to struggle with the complexities of counterargumentation.

This dissertation found that children had a good intuitive understanding of complex argumentative features such as the importance of attending to the goals of the audience, but often failed to explicitly recognize that that was what they were doing. Much like in the Leitao (2003) study, many justifications for answer selection (even for the correct answer) related to the truthfulness of the responses rather than their relations to the audience perspective.

A further extension of this work from prior literature was to see if this knowledge of argumentation could predict the persuasiveness of the arguments written by the children. Results showed that out of all the predictors (grade, gender, writing fluency, oral word fluency, liking of writing, writing self efficacy, knowledge of argumentation accuracy and explanation scores), only three significantly predicted the overall persuasiveness of both the arguments written to an adult and to a child: grade, writing fluency, and audience awareness demonstrated in explanations. As such, it was not an intuitive understanding, but rather an explicit appreciation of the role of the audience in selecting appropriate responses that predicted children's ability to compose more persuasive arguments themselves.

Limitations

Part I of this study greatly contributed to our understanding of audience awareness in the writing of upper elementary-aged children. There were nonetheless some limitations to the study. First, the prompts used in this study were quite different from those students typically encountered in school. Most persuasive writing at the elementary school level takes the form of children expressing their opinion on an issue of relevance, and discussing reasons to support that opinion. The prompts used in this study were elaborated letters that described multiple reasons for the opposing viewpoint the child could then respond to. As such, the explicit opportunities for counterargumentation were greater in the present study than many of their classroom prompts.

Additionally, the students in our sample were accustomed to a writer's workshop approach to writing instruction that was encouraged by their school districts, in which children complete a writing project over a 6-week period, with many opportunities to plan, draft, and revise work over time. The present study required students to complete their arguments during a

single 30-minute session in their classroom. Another limitation was that the coding systems were designed to capture the range of performance demonstrable by children rather than objectively perfect performance. For example, the highest score on counterargument response quality only required a good response to two counterarguments even though three reasons for the opposing viewpoint were provided in the prompt. As such, high scores may not indicate the level of performance that would be expected by an adult writer, but rather by a highly competent child writer.

Finally, in order to maximize the potential that writing skills were advanced enough in my sample to allow for distinctions between audiences to be systematically observable in the data, the sample was limited to a sample from very high performing (top 10 %) schools in the state. As such, the results cannot be generalized to samples with different demographic characteristics. Additionally, the only dimension of audience similarity that was varied in this dissertation was age, so the conclusions drawn from this study may not be generalizable to other possible distinctions between audiences. In spite of the limitations of the study, this investigation provided critical insight into the argumentative and audience awareness skills of children.

Conclusion and Implications

Overall, this study suggested that children in the third and fifth grades at high performing schools in the United States are able to show a decent level of audience awareness in their writing, and that the overall audience awareness in their produced writing as well as the explicit understanding of the role of the audience in selecting content for arguments was greater in the fifth than third grades. However, even though attention to the audience was greater as a whole for fifth graders, both fifth and third graders have a very similar level of difficulty with writing to an adult compared to a fellow child. As such, the ability to bridge the gap in the persuasiveness

of writing based on audience similarity did not seem any better for older children with more writing experience.

Midgette, Haria, and MacArthur (2008) suggested that audience awareness develops through the experiences children have with revising work, which gives them the opportunity to recognize where written work is unclear and likely needs further detail or elaboration. The present study did find an increased understanding and awareness of the audience at the higher grade level that had two additional years of writing and revising experience. As such, our findings were consistent with the idea that revising may help children recognize the need for clarity and elaboration for an audience that does not have the privileged knowledge state of the writer.

The results of this dissertation also showed, however that the experiences children have in elementary school may not be helping them understand how to elevate the quality of their arguments when writing to dissimilar audiences to the level they can reach when writing to someone very similar to them. This is a critically important ability for children to develop, as under most circumstances they encounter, from authentic writing tasks to members of the community to statewide writing assessments, they are writing to adults who differ quite substantially from them.

The present research suggests that children are capable of producing more persuasive writing than they likely demonstrate when writing to a dissimilar audience based on age. They therefore likely need additional support in understanding the explicit role of the perspectives of an audience that differs from them in determining the content that should go into an argument. The only distinguishing feature of arguments written by the same child was audience awareness. As such, the ability to successfully adjust content that is generated from the child's perspective to

match the perspective of an audience that is different from the child is a distinct and essential skill that needs to be taught to children in order for them to improve the persuasiveness of their writing.

Part II

Children's Oral and Written Argumentation

Chapter 6

Introduction to Part II

How does the way we communicate impact the effectiveness of our communication? As discussed in the general introduction and Part I, argumentation is a challenging genre for both children and adults to master. Oral language has an earlier developmental trajectory than written language, however, so understanding how the genre of argumentation is exhibited in both modes of communication can illuminate the challenges and affordances of communication during the late elementary school years as well as whether argumentation and audience awareness can be more effective in one mode of communication than the other.

In this Chapter, I outline theory and research on the development of spoken argumentation, the component skills of writing, theories related to writing and cognitive load, and the similarities and differences between written and spoken communication.

Spoken Argumentation in Elementary School

Argumentation in spoken form has been investigated during the elementary school years. Anderson et al. (1997) analyzed the classroom arguments produced in small groups of fourth graders when discussing stories designed to generate arguments. Researchers found that students often produced arguments lacking in clarity. For example, some children failed to provide conclusions, and many lacked warrants, reducing the logical connectedness of the arguments.

However, these vague elements and connections were often easily inferred by their classmates based on the context of the story they were discussing.

Students also rarely mentioned general rather than context-specific principals in their spoken argumentation. The instances in which they did so indicated an understanding that such a principal may be helpful. For example, children would utilize warrants in cases where the implied warrant from the context was confusing, or if the warrant was a source of contention in the discussion. As such, fourth grade students were able to produce reasonably effective, but far from complete, naturally occurring verbal arguments under specific contextual circumstances.

Moving from natural conversation to speaking without a communicative conversation partner, Delia, Kline, and Burleson (1979) investigated the verbal persuasion skills of Kindergarten through twelfth graders by assessing their responses to two role-play tasks. Students imagined that they were trying to convince their parent to let them have an overnight birthday party, and to convince a stranger to adopt a puppy found by the student. After children completed their spoken productions, they were told that their request was refused, and were asked to provide possible reasons for why that might have been.

Results indicated that students produced more sophisticated persuasive strategies with age, and that they utilized better persuasive strategies when persuading a stranger (in the puppy scenario) compared to a known adult (in the overnight party scenario). When investigating the number of potential reasons for the audience refusing their position, Delia, Kline, and Burleson (1979) found that students discussed more reasons as grade level increased. They were also able to develop more reasons for refusal when persuading the stranger compared to the known adult. This suggests that verbal persuasion skills are still developing throughout K-12 schooling, and

that children may recognize that communicating with individuals they do not know requires additional effort compared to individuals they know.

In sum, it seems that verbal persuasion is a developing skill in grade school, and consequently requires substantial effort on the part of the child to implement successfully. We now shift our focus to the component skills of writing to demonstrate that much like argumentation, the basic writing skills of children require substantial effort to execute.

The Component Skills of Early Writing Mechanics and Quality

Writing is an effortful task for young children that requires the mastery of many component skills to implement successfully. Some of these components involve lower-level skills related to physical/motor coordination as well as familiarity with the visual representation of letters (Berninger et al., 1992). These lower-level skills may be particularly influential and constraining on the writing process for beginning writers. Berninger et al. (1992) studied the role of lower-level skills on the spelling, handwriting, and written composition quality of first through third graders. Some of these low-level skills were specific to the process of writing itself, and relatively distinct from oral language processes.

These writing-specific skills included orthographic coding at the word and letter levels, automaticity of alphabet writing, physical/motor skills related to finger movements and dexterity, as well as non-orthographic visual-motor integration (geometric shapes). The writing criteria of written composition length (number of words and clauses) as well as handwriting were related to orthographic coding ability, alphabet writing automaticity, and finger movement ability. Spelling was related to orthographic coding, alphabet writing automaticity, and non-orthographic visual-motor integration accuracy.

Hooper et al. (2011) similarly found that for first and second grade students, motor skills and orthographic skills predicted performance on tasks assessing the mechanics of writing in terms of writing fluency and spelling. These findings suggest that the physical act of writing involves numerous low-level skills that students in the early grades are still developing, and that these low-level skills constrain their ability to physically write text.

Though writing has numerous physical/motor skills associated with it, verbal skills also factor into children's ability to write text. Berninger et al. (1992) found that verbal skills, such as verbal IQ, were related to the quality of written narrative and expository compositions as rated by experienced elementary school teachers, but not to the length or number of clauses produced in writing. In this manner, basic, writing-specific skills appeared highly influential to the production of writing in terms of quantity, but the quality of writing was predicted by higher-level general verbal skills as measured by Verbal IQ.

Berninger et al. (1992) did not assess how lower-level writing-specific component skills related to writing quality in the early grades, but did do so when looking at intermediate writers in grades four through six (Berninger et al., 1994). Even at the intermediate writing level, narrative and expository writing quality was predicted by both writing-specific motor and orthographic skills (perceptual speed of alphanumeric symbol matching and automaticity of alphabet writing), and higher-level verbal skills (the listening-generation component of working memory and verbal IQ).

Overall, these findings suggest that young children need to master the orthographic and physical/motor skills related to the transcription process in writing that are independent of oral language in order to successfully execute writing tasks at the mechanical (e.g., spelling and handwriting) and substantive (quality) level. In addition, these mechanical writing skills appear

to predict writing quality, suggesting that mechanical writing skills may constrain writing quality much like lower-level motor and orthographic skills (Graham et al., 1997; Graham & Harris, 2000; Kim et al., 2013; Niedo, Abbott, & Berninger, 2014). Difficulty with these processes, as is common in early writers, may hinder the ability of children to communicate effectively through writing (Berninger et al., 1992).

Because writing requires children to coordinate multiple skills, limitations in executive functioning skills such as attention, self-regulation, and working memory provide an additional source of difficulty (e.g., Kent et al., 2014; Hooper et al., 2011). The limited executive functioning resources of children coupled with their still developing mastery of the component skills of writing might limit their ability to compose quality text. This may be even further exacerbated when writing in a challenging genre, such as argumentative writing.

In sum, research has shown that writing mechanics and quality are affected by numerous physical/motor and orthographic factors, making the physical act of writing a challenging task. The next section reviews a cognitive process model of writing that elaborates on the cognitive, contextual, and process components of writing that work in conjunction with the component skills already discussed.

Cognitive Process Models of Writing Development

Flower and Hayes (1981) outlined a theory describing the process of how writing occurs and the central influences on its progress. The cognitive process theory built upon the "stage-based' understanding of writing, where three distinct, chronological stages of pre-writing (thinking about what to write), writing, and re-writing (revising what was written) were postulated to occur. Rather than viewing components of the writing process as occurring in chronological stages, Flower and Hayes (1981) described all aspects of writing as occurring at

any time during the writing process, often even simultaneously. For example, individuals could both write and revise what they were writing concurrently, before the entire text was generated.

Ultimately, the central components of the theory included the writing processes of planning, translating (mental representations into text), and reviewing, and additionally described features of the task environment and the writer's long-term memory as being critical to the implementation of written work.

Two components of the task environment were theorized to be important—the rhetorical problem and the text written so far. With regards to the former (the rhetorical problem), they found that writers often simplify the writing tasks presented to them into what they consider to be the most central, essential elements.

This is useful for limiting the working memory load of holding multiple task demands in memory simultaneously, but can also result in sub-par writing performance if the writer makes incorrect assumptions about the features of the task to utilize in their own representations of the task. As stated by Flower and Hayes (1981), pp 369, "people only solve problems they define for themselves", so incorrect or inadequate self-definitions of the writing task are likely to affect the quality and relevance of the produced writing. In this manner, the more complex the task, and the more elements that the task requires a representation of, the less likely all elements of the task will be successfully represented.

The second element of the task environment is the text already generated during the writing process. When writers make choices about the topic of their essay, the text they produce begins to limit the options of what can come next. As the text gets longer and more complex, the requirements imposed by the already written text become greater, and therefore require more cognitive resources, such as attention, to adjust to. Insufficient adjustments and attention to

previously written text could lead to a lack of coherence or internal consistency in a written composition.

As such, the task environment limits writing both at the beginning of the writing task when the task is re-defined in a simplified manner by the writer, and by the text that is later generated. Though the former attempts to lower the cognitive load of the writing task, the latter draws upon the cognitive resources of the writer continuously. The next element that Flower and Hayes (1981) described as drawing upon the limited cognitive resources of the writer was the writer's long-term memory.

The writer's long-term memory includes all the knowledge about the task at hand, including the simplified self-definition of the writing task, the plans for implementing the task, and the previously acquired knowledge about the topic. In order for long-term memory to help a writer successfully execute the writing task, the writer needs to access relevant information from long-term memory as well as update and restructure that information to become consistent with the demands of the specific writing task. Since knowledge may have been acquired under very different conditions from the writing task, successfully retrieving and adjusting information can be a heavy strain on cognitive resources.

These various components all draw upon the same limited cognitive resources of the writer, and can interact to create conflict between the various elements that results in an additional workload. For example, a writer might have a personal opinion on a matter that is easily retrieved from long-term memory, but this opinion may differ from what they wish to present to the audience they are writing to. Resolving this conflict and suppressing the knowledge that is incongruent with the task definitions and plans for writing takes up an additional cognitive workload. Similarly, an inadequate initial representation of the audience in a

writer's task definition may prevent the writer from even recognizing such a conflict, thereby limiting the effectiveness of the writing produced.

The final element of the theory involved the three writing processes that occurred throughout the execution of a writing task—planning, translating, and revising. Planning involves generating ideas that can be used in the written production, organizing these ideas into a suitable structure for the task at hand, and setting goals for the writing. The process of translating involves converting the mental representation of the ideas one wishes to convey into written form. Finally, the stage of reviewing involves evaluating produced text for quality and relevance, and then revising this text to improve the written composition. In order to successfully review writing, writers need to devote attention to the writing already produced, and monitor its content and quality. In this manner, these three processes occur alongside the task environment and long-term memory to produce a substantial cognitive workload, even for a relatively simple writing task.

Applying the Process Model to Writing Development. The theory proposed by Flower and Hayes (1981) proved highly useful in the understanding of the writing process, and was later further elaborated by Berninger, Fuller, and Whitaker (1996) and others to emphasize the developmental elements of the writing process more specifically. For example, the model by Flower and Hayes (1981) described a single process of translating, which involved converting thought into a written production. Berninger et al. (1992) further developed this component of the model by describing how translation may include two separable components, one involving the expression of ideas as language (text generation), and the second involving converting oral language into an orthographic, textual representation of language (transcription). Berninger et al. (1992) found that these two processes were distinct largely due to variations in developmental

ability at the same time, where many early writers were more successful at text generation than transcription.

A second component added to the model related to individual differences between writers and the connection between oral and written language systems. Differences in the oral language system tend to be related to differences in the written language system (e.g., Abbot & Berninger, 1993). Though there may be some association between oral and written language systems, different levels of written language (word, sentence, and paragraph) within an individual seem to be only minimally associated with each other (e.g., Benton and Kiewra, 1986). These differences between levels of writing produced by the same individual apply across the developmental span of writing acquisition and expertise (Berninger, Fuller, & Whitaker, 1996).

In addition to intraindividual differences, Berninger, Fuller, and Whitaker (1996) discussed how planning and revising occur at any time in the writing process, as described by Flower and Hayes (1981), but further extended this concept. Some planning and revising takes place independently of the translating process, such as planning before writing, or revising after an entire composition has been written. Other instances of planning and revising occur alongside translation processes, and these on-line processes tend to focus on smaller portions of the text being actively produced rather than the text as a whole. Developmentally, on-line planning and off-line revising seem to develop earlier than off-line planning and on-line revising.

More generally, Berninger, Fuller, and Whitaker (1996) described how the writing process components of planning, translating, and revising improve over time at different rates. During the early stages of writing (elementary school), translating develops before planning and revising, where students are first able to become proficient at converting language to text (transcribing), and then at generating ideas in language (Berninger & Swanson, 1994). As the

transcription component becomes more automatized, students are able to invest more into generating ideas, planning, and revising. At intermediate stages of writing, all three processes gradually improve, but are more constrained by individual differences in factors such as working memory capacity. In this manner, working memory was added to the model of the writing process, whereby individual differences in working memory predict more variance in writing as age increases.

As a whole, Berninger, Fuller, and Whitaker (1996) outlined some of the numerous ways the writing process could be further elaborated to take early writing into account, and demonstrated how different components of writing develop at different rates as well as how different writing features and processes can vary both between and within an individual at different stages of writing development.

The Development of Argumentative Writing Ability

Argumentative writing combines the demands of writing and argumentation, producing a challenging task that is critical to investigate during the early years of schooling.

Argumentative writing quality has been investigated in numerous ways, including measures of syntactic complexity, cohesion, and the quality of composition elements as described by Toulmin (1958). With regards to more linguistic measures such as syntactic complexity (e.g., having more clauses per T-unit, or the shortest allowable grammatical component of a sentence), research suggests that argumentative essays become more syntactically complex with age, though there is some variation based on study, whereby some studies find no age differences in syntactic complexity (Beers & Nagy, 2011).

Of greater relevance to the proposed study, McCann (1989) investigated the argumentative writing of sixth, ninth, and twelfth grade students on features related to Toulmin's

model. He found that in some aspects of writing, such as the use of supporting evidence or data, there were few differences between grades. However, on certain more complex features of argumentation, such as the production of qualifications, warrants, and rebuttals, sixth grade students performed below ninth grade students.

Similarly, when investigating the argumentative writing of sixth, eighth, and tenth grade students along with professional writers, Crammond (1998) found that almost all students in their sample were capable of producing at least one claim, one piece of evidence, a constraint, and an appropriately structured claim-data link in their essay. Though there were small differences in the number of pieces of evidence provided by students (with more evidence being provided at higher grade levels), this difference failed to reach statistical significance. Adult professional writers, however, produced more evidence than all student groups.

Similarly, there were no differences in the total number of elaborations students provided based on grade level. The specific types of elaborations used did vary by grade level, however, where providing reservations on claims was more common in the sixth grade, and by the tenth grade, this type of elaboration was largely replaced by countered rebuttals. In line with this, the use of warrants and countered rebuttals increased with grade level. Additionally, tenth grade students were able to utilize longer sub-arguments in their essays than the lower grade levels. Overall, the adult professional writers used many warrants and countered rebuttals, and student use of these same complex argumentative features increased with grade level (Crammond, 1998).

As such, sixth grade students appeared to have a grasp of the more basic elements of providing a claim and data to support the claim. Knudson (1992) looked at the argumentative writing of a group of fourth grade students in comparison to students at higher grade levels, and found that fourth grade students produced the poorest arguments, according to a rating system

based on the features of argument described by Toulmin (1958). Of note, Knudson (1992) found that a large improvement occurred in the ability to make claims in an argument between the fourth and the sixth grade. This suggests that prior to the sixth grade, students may struggle with both the basic and complex features of argumentation. By the sixth grade, however, students may develop more proficiency with the basic elements of argumentation (claims and data), but continue to struggle with the complex features of argumentation, such as warrants and counter-argumentation.

Cognitive Load and a Capacity Theory of Writing

To this point, I have discussed how spoken argumentation, writing, and written argumentation are all challenges that elementary-aged students face when producing arguments. The process theories of writing described earlier discuss the strain on cognitive resources that the numerous features of the writing process entail. This strain in cognitive resources builds upon an idea outlined by Sweller (1994), where he discussed how individuals have a limited cognitive capacity for implementing executive functions at a given time. Some sources of cognitive load include the task an individual is performing, and others include more intrinsic factors that are related to how much the various tasks requiring cognitive resources interact with one another.

In the case of the various components of writing, sub-elements of planning, translating, and revising occur largely in parallel and greatly affect the outcome and success of other elements. The high interactivity between the elements would suggest that cognitive load would be high when executing a writing task, especially until the point at which some skills become automated. McCutchen (1996) described how a capacity theory, such as cognitive load theory, relates to the development of early writing.

McCutchen (1996) discussed how the planning stages of writing are influenced by capacity limitations in writers of all skill levels. However, in terms of translating processes, developmental considerations were theorized as becoming more salient. In particular, mechanical components of writing such as spelling are challenging for early writers, so capacity theories suggest that as long as the mechanical skills associated with writing are effortful, these factors require considerable processing costs that limit the resources that can be allocated to more substantive aspects of writing. As such, the greater the strain on limited cognitive resources, the more constrained children are likely to be in terms of the quality of the written compositions they produce.

At this point, it is clear that 1) argumentation is challenging for children, 2) writing is a struggle for children, 3) integrating argumentation and writing imposes additional difficulties, and 4) we have limited cognitive capacities that become strained when multiple interactive task components need to draw upon cognitive resources at the same time. In this light, removing at least some of these cognitive demands should lighten the cognitive load of students and potentially improve the quality of output.

The manner in which the present study seeks to lower cognitive load is by having students produce verbal arguments (where writing and the integration of writing and argumentation are not required), and comparing the effectiveness of these arguments to analogous written arguments. If speaking as opposed to writing significantly reduces cognitive load, then we should see differences in the arguments produced by children. In the following section, I outline the similarities and differences between written and spoken communication as well as past research on how spoken and written productions vary in quality.

Comparing Written and Spoken Productions

A Socio-Constructivist Approach. A socio-constructivist view of language, as advocated by developmental psychologists such as Piaget and Vygotsky, sees language as a socially constructed and purposeful endeavor. The social nature of language, oral or written, in this perspective, involves an inherent focus on how language will be perceived when read or listened to. Vygotsky placed a very high importance on social processes in advancing development, as he viewed learning as preceding development. Learning, according to Vygotsky, occurred through social interactions with a more capable individual. Similarly, social forces were strongly implicated in development by Piaget, who believed that resolving cognitive conflict from arguments with peers was an important mechanism through which children learned about language and the world.

A socio-constructivist view allows for oral and written language to be considered within the same perspective, tied together by their communicative function. Though a socio-constructivist perspective does not suggest that different modes of communication are identical, some researchers believe that both writing and speaking are inherently communicative acts that are conversational in aim and scope. The main difference between the two forms of communication, according to this view, involves shifting from an explicit conversational scenario in the spoken medium to an implicit, written one. However, there has been considerable debate in the scientific community about how related the two modes of communication are (Sperling, 1996).

Writing and speaking appear to differ at the syntactic level (Halliday, 1987), with writing often employing more sophisticated syntactic structures than speaking. Differences in style and register also become apparent at higher levels of writing proficiency (Sperling, 1996). In some

cases, researchers have even argued that speaking can interfere with writing proficiency if students employ syntactic devices typical of speech rather than writing during written composition (Flower, 1979). Overall, this stance highlights potential differences between writing and speaking privileging the ease of speaking.

A developmental theory on associations between speaking and writing. A developmental theory on how writing and speaking are connected posits that writing and speaking should start off distinct, then converge to being almost identical as basic writing skills improve, and soon after diverge again as children learn the distinct conventions of writing (Kroll, 1981). Finally, writing and speaking become more systematically integrated to optimize communication in both modes. This view was built of research by Kroll (1981) on the ability of children to provide written and spoken instructions on how to play a game, that showed the theorized nonlinear connections between written and spoken communication with developing writing proficiency. Implicit in this view is the idea that the working memory load related to translation processes in writing tax the cognitive resources of the beginning writer, thereby resulting in superior verbal communication. Additional research attempting to better elucidate this link has similarly investigated writing and speaking in childhood.

Overall, much of this work discussed so far suggests that the quality of arguments may be higher in the spoken than in the written medium. Even at the high school level, Felton & Herko (2004) discuss how students demonstrate higher audience awareness when engaging in oral debate than written argumentation. The structural differences between writing and speaking may therefore suggest that students in the elementary grades might produce longer, more elaborated arguments when speaking than when writing. The ease of spoken compared to written communication may additionally allow for more cognitive resources to be devoted to complex

features of argumentation such as demonstrating audience awareness. In this light, children may demonstrate higher audience awareness in the spoken than written medium.

The affordances of writing. In some ways, however, speaking can hold challenges that are overcome in the written medium. Speaking in a coherent manner involves having a good preliminary temporal organizational structure available at the start of speaking, or the result tends to be a stream of speech with frequent pauses and points of incoherence (Scardamalia, Bereiter, & Goelman, 1982). In this manner, the on-line nature of spoken communication requires a good preliminary representation of communicative content as working memory moves very quickly from one communicated idea to the next. As discussed by Elbow (2012), "[Speech] is a medium that traps us in the now and sweeps us implacably forward. We can't experience the past or the future—only thoughts or conceptions of past or future." Written communication, on the other hand, has the capacity to be more deliberate, and can be re-experienced and adjusted even after it has been produced.

Overall, writing has the capacity to be more syntactically complex than speech, more clear and explicit, more organized, and more off-line (Elbow, 2012). The off-line nature of writing allows the writer to notice problems with their argument, be they missing logical links or an inappropriate reason or elaboration for the audience at hand. Writing is also a more distant process, making it less personal and less reliant on shared context to be understandable (Elbow, 2012). In this way, the differences between writing and speaking place more difficulty in coherent communication on the spoken rather than the written medium.

In this light, at the most basic level, written communication is likely to be better organized than spoken communication. The less personal and contextually-bound nature of written communication, in contrast, poses a contradictory prediction on modality differences in

audience awareness to what the prior section on spoken communication suggested. Being more distant and decontextualized may allow children the time to step back from their own perspectives and attend to the perspective of the audience that differs from their own. A more personal medium such as oral communication may make this distancing process more difficult.

Research on written vs. spoken productions. Though Kroll (1981) found that elementary-aged children were likely to be superior at speaking compared to writing, additional research has found largely inconsistent results. When studying the written and spoken definitions 9-year-old children gave for words, Marinellie (2009) found that written productions resulted in the production of more categorical terms related to the word being defined, as compared to spoken productions. As such, this study suggested that early writers may already have written communication that exceeds spoken communication quality.

However, numerous other studies have found the opposite pattern, where oral communication was more effective than written. Graham (1990) assessed the written and spoken persuasive compositions of fourth and sixth grade students with learning disabilities. Students composed responses to three prompts, one in each of three conditions: written, regular dictation, and slow dictation. The slow dictation condition served to equate the speed of verbal production with written production by having students wait for an experimenter to transcribe what they said before continuing with their verbal response. Overall, results indicated that sixth grade student compositions were of higher quality than fourth grade student compositions, and that the dictation condition resulted in higher quality compositions than the written condition at both ages. This suggests that for students with learning disabilities, speaking may result in higher quality productions than written communication.

Bourdin & Fayol (1994) believed that holistic scoring rubrics on writing quality were not capable of capturing differences based on mode of communication in a typically-developing student population. They therefore employed a serial recall task in which French second graders, fourth graders, and college students listened to a list of words and were then asked to recall the words in both the oral and written modes. In this study, more words were recalled with age, and more words were recalled in the spoken than the written medium for second and fourth grade children, while adults displayed similar performance in both modes. Grabowski (2010) replicated the findings of Bourdin & Fayol (1996) in a sample of German second and fourth grade students. He found the same pattern of results using the same task, where fourth graders outperformed second graders, and the spoken medium resulted in greater recall than the written medium.

Still other studies have found no differences between written and spoken productions. Hidi and Hildyard (1983) assigned third and fifth grade students to produce either an oral or written response to a persuasive prompt. Results indicated that both oral and written arguments were equivalent in semantic cohesion, though spoken responses tended to be longer.

Scardamalia, Bereiter, and Goelman (1982) looked at the produced opinion essays of fourth and sixth graders in three conditions: writing, normal dictation, and slow dictation. They also looked at composition quality based on the composition initially produced by children, and an extended composition derived after children were prompted multiple times to add more to their composition (e.g., "Do you think you could write/say 10 more sentences about this? [if negative response] What about 5 more? [if negative response] Then try just 2 more sentences.", p192).

Results indicated that for the initial productions, no significant differences were found between writing and speaking, but there was a trend in the direction of speaking exceeding

writing quality. However, when comparing the prompted productions, rated writing quality improved whereas speaking quality reduced in quality, resulting in a significant difference where writing was superior to speaking. A potential explanation offered by Scardamalia, Beretier, and Goelman (1982) was that prompted spoken responses tended to reduce the length of cohesively structured sections of the argument, while they did the opposite in written communication. As such, adding information to a composition after production appears easier in writing in which writers still have a complete representation of the already produced argument and can elaborate on the argument at relevant points. Once spoken communication has been produced, only gist level representations remain, and it is impossible to integrate any new information within an already produced verbal discourse.

Overall, this research suggests that in argumentative genre research on the written and spoken arguments produced by typically developing populations, there are few observable differences between the effectiveness of arguments. Certain circumstances may result in different results however, such as the genre being studied (Kroll (1981) found spoken procedural compositions surpassed written ones until the 8th grade), the population being studied (Graham (1990) found that spoken productions were of better quality than written ones for students with learning disabilities) or the type of task used (Bourdin & Fayol (1996) and others found that word listing tasks resulted in higher performance in the spoken than written medium).

Overall, the research and theoretical predictions for how spoken and written arguments might differ is fairly inconsistent. Part II of this dissertation therefore focuses on comparing spoken and written argumentation in third and fifth grade students. I investigate how length-related features (word count, level of elaboration), complex organization features (overall organization, presence of introductions beyond a claim, and presence of conclusions), negative

features of arguments (tangents and unnecessary repetitions), audience awareness variables, and other writing features vary as a result of mode of communication. This will help elucidate the ways in which mode of communication impacts different aspects of argumentation in a typically developing sample.

The Present Study

Part II of this dissertation aims to add to the sparse and inconsistent literature on the relative efficacy of written and spoken argumentation. Third- and fifth-grade students produced a written and a spoken argument on the same topic. Their written and spoken arguments were then compared on dimensions that were likely to differ based on the varying structures and affordances of the modes of communication: organization features (overall organization, presence of introductions beyond a claim, and presence of conclusions), length (word count, level of elaboration), and negative communicative features (tangents and unnecessary repetitions). Based on the nature of the two modes of communication previously discussed, I predicted that spoken arguments would be longer and contain more negative communicative features than written arguments. In contrast, I hypothesized that written arguments would be better organized than spoken ones.

The next research question related to variables that have more inconsistent predictions based on prior theory and research: How does audience awareness differ based on mode of communication? The answer to this question would likely reflect the balance between 1) the relative ease of speaking that might allow more cognitive resources to be allocated to audience awareness and 2) the on-line, personal and contextualized nature of spoken communication that may make it more challenging to inhibit verbalizing information of importance to the child that is inappropriate for the audience. My study provided children with greater context in their

writing prompts than the past research, which may heighten the salience of the audience and their ability to demonstrate audience awareness and counterargumentation skills. I therefore predicted that children would produce arguments exhibiting higher audience awareness when speaking than when writing.

The hypothesized differences between writing and speaking are directly related to the fluency of productions in each medium. I therefore conducted follow-up analyses on significant results to ascertain whether the discrepancy between writing fluency and oral word fluency could account for the observed differences by mode of communication.

I additionally investigate whether producing an argument second might result in higher performance than the first time in was produced, as well as how the order of produced arguments affects the types of revisions to writing children make. Finally, much like in Part I, I examined whether the audience awareness demonstrated in the knowledge of argumentation task could predict persuasiveness on a very different writing prompt than Part I.

Chapter 7

Part II Method

Study Design

Students participated in one individual session with an experimenter during which they responded to an argumentative prompt both orally and in writing. Students received one of two prompts, and each child responded to the same prompt both verbally and in writing. After both arguments were produced, children were given the chance to revise their writing. The order of writing and speaking during the sessions was counterbalanced across participants. Prior to producing writing, children were assessed using the WIAT-III Oral Word Fluency Assessment to obtain a control measure of their speaking ability. A measure of writing fluency was obtained during the whole class sessions described in Part I. The overall design included grade (3rd vs. 5th), gender, and condition order as between-subjects factors, while mode of communication was a within-subjects factor. For some analyses, covariates of writing fluency and oral word fluency were also included.

Participants

The sample consisted of the same 157 students (84 females) who participated in Part I. 71 students (37 females) were in the 3rd grade, and 86 students (47 females) were in the 5th grade. All students participated in the study during a 6-week period in the Spring. Students were recruited from eight classrooms (four per grade level) from three high performing schools. All schools ranked in the top 10% of Michigan schools based on the top-to-bottom statewide ranking

provided by the Michigan Department of Education, and all schools had at least 70% of students score as proficient on state assessments of English Language Arts.

In total, 153 students (81 females) completed the in-person protocol for collecting written and oral arguments. Two students failed to complete the in-person protocol due to being too shy to produce an oral argument, and one student failed to complete the protocol due to behavioral issues. One student had unusable data due to illegible handwriting.

I obtained approval for this study from the Institutional Review Board (IRB) at the University of Michigan prior to recruitment. Permission from principals, district superintendents, and teachers were also obtained prior to the study according to the protocols of the relevant school districts. Written parent consent and verbal child assent was obtained prior to running the study.

Procedure

To participate in the individual sessions, students were pulled from the classroom and taken to an available room in their school during the school day. After giving their assent to participate, students completed the WIAT-III Oral Word Fluency Task in which they were asked to orally name as many animals and colors as they could in one minute each. This was followed by a basic mechanical writing fluency assessment in which students wrote as many lower case letters of the alphabet as they could in 15 seconds.

Once these assessments were complete, the experimenters segued into the main task by explaining that they were helping someone collect children's ideas on an issue. Experimenters played the video prompt for the child, and then asked students two questions to ensure they understood the task— "Who are you going to be writing and speaking to?" and "What do you need to convince [name of prompter] to do?" The student was shown the video prompt a second

time if they answered one or both of the questions incorrectly. Once children fully comprehended the task, they were given a written transcript of the video prompt to refer to, and were given 3 minutes to plan their response. They were provided with a pencil and paper, and were instructed that they could write things down, but that they would not be able to refer to anything they wrote later on (See Appendix G for complete individual session script).

After planning, students were asked to respond to the prompt both verbally and in writing. The order of writing and speaking was counterbalanced across participants. The individual session was videotaped, but in order to decrease the salience of the camera, the researcher also used an audio recorder to record the participant's spoken response. Students were given 15 minutes to write their response, and no time limit was placed on their spoken response. If students completed their written response in less than 10 minutes, the experimenter informed them that they still had time left to add more if they wanted. All children completed the task within the allotted time without issue.

After participants competed both the written and spoken response, the experimenter scanned the writing with their phone, asked the participant to read what they wrote aloud, and then gave them 5 minutes to revise their writing. Participants then answered 8 multiple-choice questions about their liking of and self-concept related to writing and speaking. The full procedure lasted 30-40 minutes. See Figure 3 for a flow chart of the in-person writing/speaking session procedure.

Materials and Measures

Individual Session Prompts. Participating children responded to one of two individual session prompts that were very structurally similar but varied by topic. Both topics were designed to be salient issues to children, and were piloted prior to data collection to ensure they

were understandable and relevant to children. Both prompts were presented in video form to aid in comprehension. In the video, a serious, formally dressed adult male discussed an issue relevant to children, about either eliminating recess or field trips (see Appendix H) from elementary schools. This was likely to be in opposition to the opinions of the study participants. The prompter mentioned that he was making an official recommendation to school districts, and wanted to hear the opinions and reasons of students on the issue before making his final recommendation. He then instructed the students to provide a written and spoken response discussing their opinion and reasons for keeping recess or field trips.

Both prompts included explicitly stated reasons for the opposing opinion in order to make potential counterarguments particularly salient to the children. According to the Common Core State Standards (2010), students are not expected to produce counterarguments and rebuttals during elementary school, so providing an explicit opposing reason to a student's argument in the prompt may make it possible for students to write a rebuttal in spite of minimal experience with this practice.

Knowledge of Argumentation Task. This task (see Appendix D), previously discussed in Part I, comprised eight questions that each asked students to select the better of two options in a given scenario. The eight questions covered student understandings of evidence, warrants, and counterargument quality. Four of the questions were unrelated to audience awareness, and response options varied in terms of whether or not they supported the claim being made.

The other four questions included an assessment of audience awareness. For these four questions, the incorrect response was more relevant to children whereas the correct response was more relevant to the audience. Selecting the correct answer therefore required participants to favor the other-oriented reason over the self-oriented reason, thereby demonstrating audience

awareness. In addition to indicating their answer choice, participants wrote an explanation of why they selected their answer for each question to assess their explicit understanding of how the audience relates to the type of evidence provided in the scenarios.

Scoring and Coding of Knowledge of Argumentation Task. Two accuracy scores were computed from this data, one for audience awareness accuracy (range: 0-4), and one for non-audience awareness accuracy (range: 0-4). In order to assess whether children had an explicit, conscious understanding of the role of the audience in selecting their answer on the four audience awareness questions, children's written explanations of their answer choice were coded for whether or not they indicated an understanding of the role of the audience.

These codes were added to compute a separate score for audience awareness in explanations, which ranged from 0-4. Interrater reliability (Cohen's Kappa) ranged from 0.85 to 1.00 for explanations given for each of the four audience awareness questions.

Writing Fluency Assessment. A baseline assessment of writing fluency was conducted in which children were asked to spend one minute planning and three minutes writing all about their school. The number of words written in this three-minute period served as the score on writing fluency. Word counts on three-minute writing assessments have been found to be valid indicators of writing fluency (McMaster & Espin, 2007).

Oral Word Fluency Assessment. An oral word fluency assessment was conducted to assess oral word generation fluency. The oral word fluency subtest of the Wechsler Individual Achievement Test – Third Edition (WIAT-III) was administered and scored according to the WIAT-III protocols. This task involved participants orally listing as many animals and colors as they could in one minute per category. Standardized scores by grade at the Spring were used in analyses.

Liking and Self Concept Questionnaire. Participants completed a short questionnaire that asked them to rate how much they liked writing (scale of 1-5), how much they liked talking (scale of 1-5), as well as how much they liked the writing and talking they did during the specific session. They were then asked four questions total on how good they believed they were at writing and talking (2 questions for each mode; scale of 1-4 each). The raw scores on liking of writing and talking, task-specific writing and talking, and additive scores of the two self-concept questions for writing and talking were used in analyses. This questionnaire was administered at the end of the individual session. Due to time constraints only a small number of questions could be presented to participants, which prevented the use of longer established measures such as the Writer Self-Perception Scale, a 38-item questionnaire (Bottomley, D., Henk, W., & Melnick, S., 1997). However the questions used for this dissertation shared similar content and form as the aforementioned scale.

Data Preparation

All oral arguments were transcribed prior to coding. Artifacts of speech that artificially inflate word count such as false starts, filler words, or successive repetitions of the same word or phrase were also deleted prior to coding. Punctuation was added to transcripts at appropriate points to aid in comprehension. All written arguments were similarly typed and corrected for spelling, grammar, and punctuation. This was done to ensure that handwriting and errors in mechanics would not impact the coding of content, as prior research has suggested that such factors can play a role in quality ratings (Rafoth & Rubin, 1984). Typed, corrected versions of both oral and original written arguments (before revision) were then coded on the following features. The same rubrics were used in Part I and Part II, but the features are described again below.

Data Coding and Scoring

Identical coding systems were used for Parts I and II of the dissertation. Details on the development of coding systems can be found in Chapter 3. Descriptions of the coding systems used in Part II are described below.

Count-based Scoring. Writing was coded for the presence of common features of argumentation as described by Toulmin (1958) as well as features of importance to the curriculum (Common Core Initiative, 2010). The features coded for were: 1) the presence of a claim, 2) the presence of an introduction beyond the claim, 3) the presence of a conclusion, 4) the total number of claim mentions in the argument, 5) the number of different reasons in support of the claim provided, 6) the number of counterarguments mentioned, 7) the number of counterarguments responded to, 8) the number of off-topic statements, 9) the number of unnecessary repetitions, 10) whether or not the argument contained an explicit source, and 11) total word count. Interrater reliability (Cohen's Kappa) was calculated based on 20 randomly selected arguments per prompt (40 total), and all variables attained high reliabilities (Kappa > .8). Reliability for each variable by prompt is available in Table 17.

Qualitative 6-point Analytic Scoring. Arguments were independently rated on overall persuasiveness and the following analytic features that were adapted from the 6+1 traits writing model (Culham, 2005) as well as an argumentative writing evaluation scheme developed for middle school students (Yeh, 1998), but altered substantially to capture variance in quality writing evidenced by third and fifth grade participants. The final 6 analytic features based on this model were: 1) overall persuasiveness, 2) claim clarity, 3) evidence/reason quality, 4) the level of audience awareness displayed in the evidence/reasons, 5) counterargument response quality, and 6) organization. Each feature was rated on a scale of 1-6 (see Appendix E for coding

criteria). Inter-rater reliability (Cohen's Kappa) was > .8 for all scored categories (see Table 17). Identical rubrics were used in Parts I and II, so further details on the rubrics can also be found in Chapter 3.

Elaborations Scoring. All arguments were scored on a scale of 1-4 to determine the level of elaboration present in the argument. At level 1, arguments listed reasons without any elaboration, and at level 4, multiple reasons were well-explained and elaborated. Interrater reliability was $\kappa = .93$ for the field trip prompt, and $\kappa = .91$ for the recess prompt.

Persuasive Strategies Scoring. Written arguments were also coded separately on the use and effectiveness of persuasive strategies to convince the audience. Appeals were developed based on discussions of features of persuasive writing in Duke et al. (2012). Six appeals were scored on a scale of 0-2, where 0 indicated that the appeal was absent, 1 indicated an attempt at the appeal that was only partially successful, and a 2 indicated the successful use of the appeal.

The six appeals were: 1) appeals to the author's knowledge or credibility (e.g., by stating that the author has a lot of experience with the situation of the audience), 2) appeals to the goals or desires of the audience (e.g., by discussing how changing their mind will be more beneficial for the desired outcomes of the audience), 3) the use of persuasive reasons for a claim (reasons that would be valid in the view of the audience only, but do not explicitly relate to audience goals) 4) the use of emotional appeals to the audience (e.g., by emphasizing the emotional distress the removing recess/field trips would produce), 5) the use of rhetorical questions (e.g., Don't you think so?), and 6) the use of empathy (e.g., by discussing that they understand the position of the audience). Inter-rater reliability (Cohen's Kappa) was >.8 for all appeals (See Table 17 for reliabilities for individual variables). The final variables used in analyses were the

number of successful persuasive strategies (score of 2) used and the number of partially successful strategies used (score of 1).

Revision Scoring for Individual Writing/Speaking Session. The initial and revised writing that children produced were compared to determine the number of mechanical (handwriting, spelling, grammar, punctuation) and substantive (adding a reason, elaboration, example, introduction, or conclusion) revisions children made to their writing. A third category, small content revisions, was created to account for revisions that did not specifically address mechanical issues, but were not extensive enough to be classified as substantive. Children wrote their initial arguments in pencil and revised in pen, so all changes made during the revision phase were identified and coded as fitting in one of three categories. The categories of primary interest in this study were the number of mechanical and substantive revisions made to the written argument.

Overview of Analyses. In order to ascertain mode of communication effects on variables predicted to differ, I conducted multivariate analyses of variance on three groups of variables: complex organizational features expected to be higher for writing, length and negative writing features expected to be higher for speaking, and audience awareness variables expected to be higher for speaking. I then performed univariate analyses of variance first without covariates and then including the time varying covariates of writing fluency for written arguments, and oral word fluency for spoken arguments to determine if the discrepancy between writing and oral word fluency could account for the observed differences between written and spoken arguments.

I then conducted a multivariate analysis of variance with all the variables predicted not to differ by mode of communication. This was followed by univariate analyses of variance on

variables for which the overall F-test did not attain significance for the within-subjects factor of mode of communication. A flow chart of the aforementioned analyses can be found in Figure 4.

Analyses were then conducted to assess whether order of production influenced any of the variables, including the number and type of revisions made to the written argument. Finally, similar linear and stepwise regressions to Part I were conducted to determine whether knowledge of argumentation could predict persuasiveness of the arguments produced during this portion of the study. In the next chapter, I discuss the analyses in greater detail before reporting the results.

Chapter 8

Part II Results

Statistical Analysis

Mode of Communication Effects. Four mixed multivariate analyses of variance were conducted with the within-subjects factor of mode of communication (2: writing, speaking) and the between-subjects factors of grade (2: 3rd, 5th) and gender (2: female, male) on the variable groups of: 1) complex organizational features expected to be higher for writing (organization, introduction, conclusion), 2) length and negative writing features, which was expected to be higher for speaking (word count, level of elaboration, unnecessary repetitions and off-topic statements), 3) audience awareness variables expected to be higher for speaking (number of counterarguments, number of counterargument responses, counterargument response quality, overall persuasiveness, reason/evidence quality, and audience awareness in reasons/evidence), and 4) the remaining features for which no differences based on mode of communication were expected (claim presence, claim clarity, number of successful persuasive strategies, number of partially successful persuasive strategies, number of reasons, number of claim mentions, and number of sources cited).

Follow-up analyses of variance were then conducted on each variable with the within-subjects factor of mode of communication (2: writing, speaking) and the between-subjects factors of grade (2: 3rd, 5th) and gender (2: female, male) in order to determine the strength and direction of expected differences, and whether or not unexpected differences were observed in the data.

Effects of Time-Varying Covariates for Writing and Speaking. In order to determine if continuous controls could account for the differences between writing and speaking that were observed, multivariate analyses of variance were conducted on the variables that significantly differed based on mode of communication in accordance with the predictions. The analyses of variance were conducted with the within-subjects factor of mode of communication (2: writing, speaking), the between-subjects factors of grade (2: 3rd, 5th) and gender (2: female, male), and the time-varying covariates of writing fluency word count for the written control, and oral word fluency for the spoken control.

This analysis assessed whether the observed difference in writing and speaking scores could be accounted for by the discrepancy between writing fluency and oral word fluency. Time-varying covariates are designed to assess the influence of factors that are unstable across different measurements, particularly in cases where the differences in these factors likely relate to the outcomes of interest. In the present study the two time points are considered the two produced arguments, while the corresponding fluencies are considered the unstable characteristic (a characteristic that is not necessarily equal for both modes of communication) that may influence the difference between the arguments. If a difference remains significant once the time-varying covariates are added, it indicates that the group difference is not fully explained by the difference between the covariates, and therefore is based on another factor that distinguishes the groups being compared.

Similar analyses were then conducted using self-report covariates of liking of writing and speaking, liking of writing and speaking during the specific task, and writing and speaking self-concept to determine if any of the self-report variables could alternatively account for the observed differences between written and spoken communication.

Order Effects on Writing and Speaking Variables. In order to determine if having previously produced an argument in a different mode of communication facilitated the production of the second argument, a multivariate analysis of variance was conducted with grade and order of production as between-subjects factors, and all 20 coded variables per mode of communication as the dependent variables. In this manner, I could assess whether there were significant differences in the quality of written and spoken arguments based on whether they were produced first or second.

Order Effects on Number of Revisions to Writing. The impact of condition order was investigated on the number of mechanical and substantive revisions made by participants with type of revision (2: mechanical, substantive) as a within-subjects factor and grade, (2: third, fifth), gender (2: female, male), and condition order (2: speaking first, writing first) as between-subjects factors.

Knowledge of Argumentation. To determine whether knowledge of argumentation serves as a significant predictor of the persuasiveness of produced arguments in Part II of the dissertation, linear regressions were conducted on non-audience awareness question accuracy, audience awareness accuracy, audience awareness in children's written explanations, and the other control variables that were not argument-specific (writing fluency, oral word fluency, grade, gender, and self-ratings on writing and speaking liking, task-specific liking, and self-concept). Two regressions were computed with these predictors, one with the dependent variable of the coded overall persuasiveness of the written argument, and the other with the dependent variable of the overall persuasiveness of the spoken argument. A second set of regressions with the same predictors and outcomes were also conducted using the forward stepwise procedure to determine if predictive utility was stable across different statistical computations.

The results of these analyses are presented below.

Predicted Mode of Communication Differences

Three overall F-tests were conducted to determine whether three groups of variables differed by mode of communication as predicted. The variable groups were: organizational features expected to be higher for writing (3 variables), length and negative communication features expected to be higher for speaking (4 variables), and audience awareness variables predicted to be higher for speaking (6 variables).

Group 1: Organizational Features. A mixed analysis of variance was conducted with the within-subjects factor of mode of communication (2: written, spoken) and the between-subjects factors of grade (2: 3rd, 5th) and gender (2: female, male) on the 3 variables predicted to be better in written than spoken productions (organization, introduction presence, conclusion presence) to determine if there was a significant difference between spoken and written arguments on the same topic for these variables.

As hypothesized, a significant effect of the within-subjects factor of mode of communication was found, $F(1, 149) = 48.47$, $p < .001$, with writing being better organized than speaking. There was a significant interaction between mode of communication and grade, $F(1, 149) = 5.62$, $p = .019$, where the benefit of writing over speaking was greater for fifth graders than third graders. There was also a significant main effect of grade, $F(1, 149) = 13.40$, $p < .001$, but no difference based on gender, $F(1, 149) = .05$, $p = .679$.

Group 2: Length and Negative Communication Features. A mixed analysis of variance was conducted with the within-subjects factor of mode of communication (2: written, spoken) and the between-subjects factors of grade (2: 3rd, 5th) and gender (2: female, male) on

the four variables expected to be higher for speaking (word count, level of elaboration, number of unnecessary repetitions, number of off-topic statements).

As hypothesized, a significant main effect of the within-subjects factor of mode of communication was found, $F(1, 149) = 15.64$, $p < .001$, with higher scores for speaking than writing. There was a significant interaction between mode of communication and gender, $F(1, 149) = 5.50$, $p = .020$, such that the difference between speaking and writing was greater for males than females. There was also a significant main effect of grade, $F(1, 149) = 32.13$, $p < .001$, but no main effect of gender, $F(1, 149) = .01$, $p = .759$.

Group 3: Audience Awareness Features. A mixed analysis of variance was conducted with the within-subjects factor of mode of communication (2: written, spoken) and the between-subjects factors of grade (2: 3rd, 5th) and gender (2: female, male) on the six variables related to audience awareness. I predicted that audience awareness would be higher for speaking.

The difference between writing and speaking approached significance, $F(1, 149) = 2.88$, $p = .092$ in the predicted direction, and there was a significant main effect of grade, $F(1, 149) = 39.23$, $p < .001$. Due to the mode of communication effect not reaching statistical significance, the hypothesis that audience awareness would be greater in spoken than written arguments was not supported.

Because the overall F-Test yielded a significant difference based on mode of communication for the first two groups, individual ANOVAs were then conducted on each of the variables from those groups to determine if the mode of communication distinction held for all variables tested in the overall F-tests. Means and standard deviations by grade and gender for all seven variables in groups one and two can be found in Tables 18 and 19 respectively.

Individual ANOVAs. Tables 20, 21, 22, and 23 show the inferential statistics for mode of communication, grade, gender, and condition order effects respectively for the seven variables from Groups one and two. A mixed analysis of variance (ANOVA) on the dependent variable of organization with mode of communication (2: writing, speaking) as a within-subjects factor and grade (2: 3rd, 5th), gender (2: female, male), and condition order (2: speaking first, writing first) as between-subjects factors was conducted to assess whether children would be more organized in their writing than their speaking. As predicted, organization was higher when participants wrote their argument (M = 4.81, SD = .96) compared to when they produced a spoken argument (M = 4.37, SD = .91), $F(1, 146) = 24.30$, $p < .001$. Fifth graders were more organized than third graders, $F(1, 146) = 5.18$, $p = .024$, and there were no differences based on gender, $F(1, 146) = .001$, $p = .981$.

Identical ANOVAs were conducted on the other two dependent variables in group 1 (organizational features) that were predicted to differ based on mode of communication. As hypothesized, children were more likely to include introductions when writing (M = .40, SD = .49) than when speaking (M = .20, SD = .40), $F(1, 146) = 14.62$, $p < .001$, and conclusions were similarly more common in the written (M = .78, SD = .42) than spoken (M = .49, SD = .50) arguments, $F(1, 146) = 42.50$, $p < .001$. There was a significant main effect of grade, where fifth graders were more likely than third graders to use a conclusion, $F(1, 146) = 6.20$, $p = .014$, and an introduction, $F(1, 146) = 18.43$, $p = .007$.

There was an interaction between mode of communication and grade for conclusions, $F(1, 146) = 8.17$, $p = .005$, such that there was very little difference in presence of conclusions between third (M = .47, SD = .50) and fifth (M = .51, SD = .50) graders in the spoken arguments, but fifth graders (M = .90, SD = .30) produced conclusions substantially more often than third

graders (M = .63, SD = .49) in their writing. A similar interaction between mode of communication and grade existed for introductions, $F(1, 146) = 13.00$, $p < .001$. Third graders had a low and similar presence of introductions across mode of communication (Speaking M = .17, SD = .38, Writing M = .19, SD = .39), and fifth graders had a similar proportion of introductions to third graders when speaking (M = .23, SD = .42), but a substantially higher number when writing (M = .58, SD = .50).

Identical analyses of variance were conducted on the variables in group 2, which revealed that spoken arguments (M = 3.21, SD = .90) were significantly more elaborated than written ones (M = 2.89, SD = .91), $F(1, 146) = 14.08$, $p < .001$, and similarly had a higher word count (M = 141.25, SD = 89.53) compared to written arguments (M = 115.60, SD = 59.98), $F(1, 146) = 14.31$, $p < .001$. There was a significant main effect of grade, where fifth graders outperformed third graders on the level of elaborations, $F(1, 146) = 22.60$, $p < .001$ and word count, $F(1, 146) = 32.04$, $p < .001$. There was also a significant interaction between mode of communication and gender, $F(1, 146) = 4.93$, $p = .028$. The interaction revealed that the difference in word count between speaking and writing was particularly pronounced for males.

As predicted, unnecessary repetitions were more common in spoken (M = .13, SD = .44) than written (M = .03, SD = .20) arguments, $F(1, 146) = 7.46$, $p = .007$, and off-topic statements were similarly more frequent when speaking (M = .34, SD = 1.38) than when writing (M = .07, SD = .30), $F(1, 146) = 7.23$, $p = .008$.

Overall, aligned with the hypotheses and the overall F-tests, participants produced longer, more elaborated arguments when speaking than when writing. At the same time, their spoken arguments contained more off-topic statements and unnecessary repetitions than their written ones. Written arguments were more organized and more likely to include an introduction and

conclusion than spoken ones. There were few direct gender differences, but males tended to have a greater discrepancy between their written and spoken argument lengths than females. Fifth graders produced longer arguments with more elaborations than third graders, and were also more likely to include introductions and conclusions than third graders.

I next examined whether the differences observed between written and spoken arguments could be explained by adding time-varying covariates specific to each mode of communication.

Do covariates account for the Mode of Communication differences?

Organization. Written arguments were found to be more organized than spoken ones, $F(1, 146) = 24.30$, $p < .001$ when no covariates were included. The analysis was then run including the time-varying covariates of writing fluency (word count on 3-minute fluency task) for writing and WIAT-III oral word fluency for speaking to determine if the original difference observed could be accounted for by the discrepancy between children's writing and speaking fluency. Once time-varying covariates were added, there was no longer any difference between the written and spoken arguments, $F(1, 145) = .70$, $p = .405$. As such, the difference in organization between written and spoken arguments was explained by the discrepancy between their writing and oral word fluency.

The significant difference between writing and speaking remained when the time-varying covariates of liking of writing and speaking, $F(1, 145) = 21.13$, $p < .001$, liking the specific writing and speaking done during the study session, $F(1, 145) = 23.84$, $p < .001$, or writing and speaking self-concept, $F(1, 145) = 20.42$, $p < .001$ were used. This suggested that the discrepancies between liking and self-concept for writing vs. speaking could not account for the observed mode of communication difference in organization.

Presence of an Introduction and Conclusion. Written arguments were more likely to contain introductions, $F(1, 146) = 14.62$, $p < .001$ and conclusions, $F(1, 146) = 42.50$, $p < .001$ than spoken arguments when no covariates were included. There were also significant interactions between mode of communication and grade for both variables. The analyses were then run including the time-varying covariates of writing fluency for writing and WIAT-III oral word fluency for speaking to determine if the original difference observed could be accounted for by the discrepancy between their writing and speaking fluency.

Once time-varying covariates were added, the difference between the written and spoken arguments remained significant for the presence of introductions, $F(1, 145) = 9.30$, $p = .003$, and went from highly significant to marginally significant for the presence of conclusions, $F(1, 145) = 3.32$, $p = .071$. The interactions between mode of communication and grade remained significant for both introductions, $F(1, 145) = 8.86$, $p = .003$ and conclusions, $F(1, 145) = 7.88$, $p = .006$. When conducting the analyses with the time-varying covariates of writing and speaking liking, task-specific liking, and self-concept, the significance of the main effect of mode of communication and the interaction between mode of communication and grade still remained significant.

Overall, this suggests that none of the time-varying covariates were able to account for the main effect of mode of communication on introductions, nor were they able to account for the interactions between mode of communication and grade for both introductions and conclusions. As such, many of the mode of communication differences for introductions and conclusions were due to differences between writing and speaking that were relatively unrelated to varying scores in liking, self efficacy, and fluency.

Unnecessary Repetitions and Off-Topic Statements. Spoken arguments contained more unnecessary repetitions, $F(1, 146) = 7.46$, $p < .001$ and more off-topic statements, $F(1, 146) = 7.23$, $p = .008$ than written arguments without covariates in the model. The analyses were then run including the time-varying covariates of writing fluency for writing and WIAT-III oral word fluency for speaking to determine if the original difference observed could be accounted for by the discrepancy between their writing and speaking fluency. Once time-varying covariates were added, there was no longer any difference between the written and spoken arguments for unnecessary repetitions, $F(1, 145) = 2.30$, $p = .131$ and off-topic statements, $F(1, 145) = .06$, $p = .810$. This showed that the difference in unnecessary repetitions and off-topic statements between written and spoken arguments was explained by the discrepancy between their writing and oral fluency.

When conducting the analyses on unnecessary repetitions and off-topic statements with the time-varying covariates of writing and speaking liking, task-specific liking, and self-concept, the main effect of mode of communication remained significant. As such, the discrepancies between liking and self-concept for writing vs. speaking could not account for the observed mode of communication difference in unnecessary repetitions and off-topic statements.

Level of Elaborations and Word Count. Spoken arguments had a higher level of elaboration, $F(1, 146) = 14.08$, $p < .001$ and word count, $F(1, 146) = 14.31$, $p < .001$ than written ones when no covariates were included. The analyses were then run including the time-varying covariates of writing fluency for writing and WIAT-III oral word fluency for speaking to determine if the original difference observed could be accounted for by the discrepancy between their writing and speaking fluency. Once time-varying covariates were added, there was no longer any difference between the written and spoken arguments for level of elaborations, $F(1,$

145) = .26, p = .612 or word count, $F(1, 145) = .02$, p = .889. The interaction between gender and word count remained significant, however, $F(1, 145) = 4.97$, p = .027. As such, the difference in level of elaboration and number of words produced between written and spoken arguments was explained by the discrepancy between their writing and oral fluency. The interaction between gender and mode of communication was not accounted for by this discrepancy in fluency.

The significant difference between writing and speaking for level of elaboration was not eliminated when the time-varying covariates of liking of writing and speaking, $F(1, 145) = 14.59$, $p < .001$, liking the specific writing and speaking done during the study session, $F(1, 145) = 14.50$, $p < .001$, or writing and speaking self-concept, $F(1, 145) = 10.72$, p = .001 were used. The same was true for word count for all three covariates. The interaction between mode of communication and gender for word count was partly accounted for by the discrepancy between liking talking and liking writing, where the effect when from being significant to marginally significant, $F(1, 145) = 3.64$, p = .058. This suggested that the writing vs. speaking discrepancies for liking and self-concept for could not account for the observed mode of communication difference in level of elaboration or word count, but partly explained the heightened impact of mode of communication on the word counts of males vs. females.

Mode of Communication Effects for Predicted Similarities

Overall F-Test. A mixed multivariate analysis of variance was conducted with the within-subjects factor of mode of communication (2: written, spoken) and the between-subjects factors of grade (2: 3rd, 5th) and gender (2: female, male) on the seven variables that were predicted to be similar based on mode of communication (claim clarity, number of successful persuasive strategies, number of partially successful persuasive strategies, number of reasons,

number of sources, presence of a claim near the beginning of the argument, and number of claim mentions throughout the argument) to determine if there was a significant difference between spoken and written arguments on the same topic for these variables.

As predicted, there was no significant difference based on mode of communication for these seven variables, $F(1, 149) = .09$, $p = .763$. There was a significant effect of grade, $F(1, 149) = 25.58$, $p < .001$, but no difference based on gender, $F(1, 149) = .95$, $p = .331$. Individual ANOVAs were then conducted on all seven variables tested in the overall F-test, as well as the six variables tested in the audience awareness group to determine which variables had a significant grade effect. Means and standard deviations by grade and gender on predicted similar and audience awareness variables can be found in Tables 24 and 25.

Individual ANOVAs for Audience Awareness and Predicted Similarities. When follow-up ANOVAs were conducted on individual variables to determine which variables had significant grade level effects, it was found that none of the six audience awareness variables had mode of communication effects that reached statistical significance, but one variable (overall persuasiveness) approached significance, $F(1, 146) = 3.07$, $p = .082$, with speaking ($M = 3.58$, $SD = .90$) being higher than writing ($M = 3.47$, $SD = .97$). Of the seven expected similarity variables, one variable (number of partially successful persuasive strategies) had a significant mode of communication difference, $F(1, 146) = 4.87$, $p = .029$ where there were more partially successful strategies used when writing ($M = 1.50$, $SD = .87$) than when speaking ($M = 1.30$, $SD = .91$). Another variable (total number of claim mentions in the argument) had a marginally significant effect, $F(1, 146) = 3.41$, $p = .067$, with there being marginally more claim mentions in writing than speaking.

The only significant interactions between mode of communication and a between-subjects factor (gender, grade, condition order) for any of the audience awareness and expected similarity variables were the interactions between the total number of claim mentions in the argument and grade, $F(1, 146) = 7.23$, $p = .008$, and the total number of claim mentions in the argument and gender, $F(1, 146) = 12.49$, $p = .001$. The former interaction suggested that fifth graders stated the claim more times when writing than when speaking, but there was no difference for third graders based on mode of communication. The interaction with gender suggested that males said the claim a similar number of times when writing and speaking, but females stated the claim more frequently when writing than when speaking.

Fifth graders performed better than third graders on overall persuasiveness, $F(1, 146) = 44.76$, $p < .001$, reason/evidence quality, $F(1, 146) = 42.30$, $p < .001$, audience awareness demonstrated in evidence, $F(1, 146) = 25.80$, $p < .001$, counterargument response quality, $F(1, 146) = 21.98$, $p < .001$, the number of successful persuasive strategies used, $F(1, 146) = 25.93$, $p < .001$, number of reasons, $F(1, 146) = 17.25$, $p < .001$, number of counterarguments mentioned, $F(1, 146) = 22.83$, $p < .001$, number of counterargument responses attempted, $F(1, 146) = 11.81$, $p = .001$, and number of claim mentions, $F(1, 146) = 10.00$, $p = .002$. There were no significant gender differences. Inferential statistics on the main effects for mode of communication, grade, and gender can be found in Tables 26, 27, and 28 respectively.

Overall, there were no significant differences in audience awareness variables (overall persuasiveness, reason/evidence quality, audience awareness in evidence/reasons, counterargument response quality, number of counterarguments mentioned, number of counterargument responses attempted), the number of reasons provided, or basic structural variables (including a claim, claim clarity) based on mode of communication. Fifth graders

performed better than third graders on the six audience awareness variables, the number of successful persuasive strategies used, the number of reasons provided, and the number of claim mentions throughout the argument, but there were few differences based on basic structural variables (including a claim, claim clarity).

Order Effects. The next analysis was conducted to determine if there were benefits to producing an argument second, due to having had the chance to practice the argument in a different mode of communication. An analysis of variance with all 20 dependent variables and the independent variables of order of production, grade, and gender was conducted to assess if there were any differences between arguments produced first and second.

The overall multivariate F-test revealed that there were no differences based on order, $F(1, 106) = 1.12$, $p = .316$. There were also no significant interactions of order with grade, $F(1, 146) = .96$, $p = .543$ or gender, $F(1, 106) = .94$, $p = .572$. As such, it appeared that there were no facilitative or detrimental effects of producing an argument first or second.

Order Effects on Revisions. Even though order of writing and speaking did not affect the quality of the original written or spoken productions, we sought to determine whether the number and type of revisions made to writing would vary as a result of condition order. We predicted that providing the spoken argument after the written one might be more conducive to making substantive revisions, as the child would have been able to think about the topic further after writing. In contrast, we predicted that when writing occurred after speaking, more mechanical revisions would be made in lieu of substantive revisions as children did not have the opportunity to further think about the argument by verbalizing it before making revisions.

An analysis of variance was conducted with a within-subjects factor of revision type (2: mechanical, substantive) and the between-subjects factors of condition order, gender, and grade.

As predicted, there was a significant interaction between revision type and order, $F(1, 145) = 4.14$, $p = .044$, where more mechanical revisions were produced when the original writing occurred after speaking, and more substantive revisions were done when the original writing occurred before speaking (See Figure 5). There were also far more mechanical revisions ($M = 4.33$, $SD = 4.33$) made than substantive ones ($M = .69$, $SD = 1.00$) regardless of order, $F(1, 145) = 89.36$, $p < .001$. There were no interactions between condition order and grade or gender, nor were their any main effects of grade or gender on the number of mechanical and substantive revisions.

Predictive Utility of Knowledge of Argumentation. Much like in Part I, we conducted linear and forward stepwise regressions on overall persuasiveness with the predictors of writing fluency, oral word fluency, grade, gender, liking of writing or speaking, liking of task-specific writing or speaking, writing or speaking self-concept, accuracy of non-audience awareness questions, accuracy of audience awareness questions, and number of explanations of answers on audience awareness questions that explicitly reflected audience awareness. Correlations between these predictors and overall persuasiveness can be found in Table 29. In this way, we could determine if knowledge of argumentation could be predictive in a very different writing situation from Part I.

The linear regression predicting overall persuasiveness in the written argument produced $R^2 = .35$, $F(10, 122) = 8.06$, $p < .001$ with four significant predictors: writing fluency, $\beta = .25$, $p = .002$, grade, $\beta = .26$, $p = .001$, oral word fluency, $\beta = .18$, $p = .017$ and audience awareness in explanations on the Knowledge of argumentation task, $\beta = .18$, $p = .031$. Gender, liking of writing, and knowledge accuracy scores were not significant predictors in the model (see Table 30). A forward stepwise regression was also conducted on overall persuasiveness when writing

to a child audience with the same predictors. Much like with the linear regression, the stepwise procedure yielded a solution with the same four variables in the model: grade, audience awareness in explanations, writing fluency, and oral word fluency, $R^2 = .33$, $F(4, 128) = 17.35$, $p < .001$.

A linear regression was then conducted on the overall persuasiveness score for the spoken argument. Only two variables reached significance in this analysis—oral word fluency, $\beta = .16$, $p = .037$, and grade, $\beta = .41$, $p < .001$, $R^2 = .29$, $F(10, 122) = 6.47$, $p < .001$. A forward stepwise regression was then conducted with the same predictor and outcome variables. This procedure yielded a different result from the linear regression, with the three significant predictors of grade, audience awareness in explanations, and liking of speaking, $R^2 = .29$, $F(3, 129) = 18.69$, $p < .001$.

Overall, the knowledge of argumentation score of audience awareness in explanations significantly predicted overall persuasiveness in both the written arguments in Part I as well as the written argument in Part II. The overall persuasiveness of the spoken argument in Part II was predicted by audience awareness in explanations during the forward stepwise regression, but not the linear regression. As such, the predictor of audience awareness in explanations appears to robustly predict persuasiveness in arguments across different types of prompts in writing, but further investigations need to be conducted to determine if the same can be said for spoken arguments.

Chapter 9

Part II Discussion

Part II of the dissertation aimed to understand how the way children communicate impacts the quality of their arguments. I predicted that three primary aspects of produced arguments would be impacted by the way children communicated – complex organization, length, and audience awareness. In line with my hypothesis, results from this dissertation indicated that children had better overall organization and more frequently included the organizational features of introductions and conclusions when writing compared to speaking. This was consistent with prior research that suggested that the off-line nature of written communication makes it easier to organize compared to spoken communication (Scardamalia, Bereiter, & Goelman, 1982; Elbow, 2012).

In contrast to organization that was superior in the written medium, I predicted the spoken argument would be longer than the written one both in terms of word count and level of elaboration. Prior research comparing children's written and spoken arguments (Hidi & Hildyard, 1983; Scardamalia, Bereiter, & Goelman, 1982) consistently found that speaking often produced a higher word count, likely due to the relative ease of speaking compared to writing. In line with my hypothesis and prior work, children in the present study produced longer arguments that contained a higher level of elaboration when speaking than when writing arguments on the same topic.

The final area I predicted to differ based on mode of communication was audience awareness. Scardamalia, Bereiter, and Goelman (1982) found that spoken arguments had a marginally greater overall quality than written ones, but that this difference did not reach statistical significance. Even though quality was not specifically determined based on audience awareness in this prior study, other work has suggested that audience awareness is an effective predictor of the quality of arguments (O'Keefe, 1999). As such, I predicted that the relative ease of spoken compared to written communication for children still learning to write would better enable them to invest in the complex feature of audience awareness.

My findings were very similar to those of Scardamalia, Bereiter, and Goelman (1982), and I found that spoken arguments were only marginally more persuasive than written ones. My hypothesis was therefore not supported. Elbow (2012) discussed that the spoken medium tends to be more personal than the written one, which may have reduced the benefits that the ease of spoken communication may have afforded to audience awareness. The act of on-line speaking gives little time for reflection and pause when producing information, and the heightened pace of production compared to writing makes likely makes it more difficult to suppress personal motivations behind a claim that may not be convincing to an audience.

In the present dissertation, children produced arguments on topics for which their personal reasons for their claim were likely to be a very poor fit for their audience. Children were trying to convince a serious, stoic adult audience who explicitly stated that school was for learning, and not for fun, that field trips and recess should not be eliminated. The personal nature of the topic, the more personal nature of the spoken medium, and the particularly poor fit between personal reasons and those that would be effective for the audience may have therefore made a difference in audience awareness between writing and speaking less likely. As such,

even though children could provide longer, more elaborated responses when speaking, this did not fully translate into the persuasiveness of their responses.

The Role of Writing and Oral Word Fluency

I next examined whether the differences in organization and length observed between writing and speaking could be explained by the discrepancy between writing and oral word fluency. Results indicated that the difference between writing and speaking for overall organization, presence of conclusions, unnecessary repetitions, off-topic statements, word count, or level of elaboration could be explained by discrepancies between writing and oral word fluency. However, writing and oral word fluency differences did not explain differences in the presence of introductions beyond the claim between written and spoken arguments.

Additionally, when self-ratings of liking of writing and speaking or writing and speaking self-concept were used as covariates instead of writing and oral word fluency, they generally did not explain the differences between written and spoken arguments. As such, the differences were largely due to individual differences in written vs. oral word fluency, and not to participant impressions of how much they liked or how good they were at writing and speaking.

The higher prevalence of introductions in writing than speaking was not explained by any of the covariates. Thus, it is possible that including an introduction beyond a claim is something that is more dependent on whether it is a skill that has been specifically taught to children in the specific mode of communication. Since students in school participate in formal speaking activities far less frequently than writing activities, they may have more of an awareness of and practice with producing introductions in writing.

Further supporting this interpretation, the interactions between grade and mode of communication for the presence of introductions and conclusions were not accounted for by any

of the covariates. Both third and fifth graders often failed to include introductions and conclusions when speaking, but fifth graders in particular produced introductions and conclusions in their writing that did not exist in their spoken argument. It is therefore possible that a heightened emphasis on more elaborate introductions in writing in the fifth grade was related to this increase in the presence of introductions exclusively for writing at that grade level, though causality cannot be determined from the present data.

Much like with the interactions for the presence of introductions and conclusions with grade, including writing and oral word fluency in the model did not eliminate the interaction between word count and gender. The benefit to word count of speaking over writing was still substantially greater for boys. Interestingly, this interaction was somewhat accounted for by self-ratings on the liking of writing and speaking. As such, boys appeared to like talking more than writing, a difference that was greater for them than for girls, which partly explained their relatively greater difference in length of written and spoken productions.

Grade Differences

In addition to the interactions between grade and the presence of introductions/conclusions discussed previously, fifth graders outperformed third graders as a whole on a number of features. Fifth graders were better organized, were more likely to use introductions and conclusions, produced longer, more elaborated arguments, included a greater number of reasons, used more successful persuasive strategies, and demonstrated higher audience awareness than third graders. Basic features such as including a claim and claim clarity did not differ by grade due to most children being successful with this skill even in the third grade. Thus, much like in Part I, children in the fifth grade wrote higher quality arguments than third graders across numerous dimensions.

Gender Differences

Arguments in Part II showed very few gender differences as a whole, which differs from findings in Part I and prior research (Lee, 2013) that has found that females generally outperform males. The main observed difference in relation to gender in Part II of this dissertation was that length of boys' arguments benefited more by speaking than writing compared to girls' arguments—a difference that could be partly explained by the discrepancy between self-ratings of liking speaking and writing. As such, compared to girls, boys liked speaking more than writing, and consequently produced longer spoken compared to written arguments.

A potential explanation for why there were no overall gender differences may be related to the different context of Part II compared to Part I. Part I writing assessments were conducted in the classroom and run by the teachers. The written and spoken arguments for Part II were conducted in a one-on-one session with an experimenter. This may have been more motivating for boys than working in their regular classroom. Additionally, boys were particularly negative in their views of liking writing (but not speaking) compared to girls (see correlations in Table 29), which may have contributed to fewer gender differences in Part II in which children produced both spoken and written arguments as opposed to just written ones.

Order Effects on Arguments and Revisions

Children produced two arguments in a row on the same topic in the present study. It was therefore possible that practice effects may have benefited the second argument produced, regardless of mode of communication. The results, however, suggested that this was not the case, and there were few differences in the quality of written and spoken arguments depending on whether they were produced first or second. In this manner, practicing an argument in a different mode of communication a single time appeared neither facilitative nor detrimental for the next

argument produced. Prior research has suggested that oral discussions on the argument topic can improve the quality of written arguments over time (Reznitskaya et al., 2011; Chen, Hand & Park, 2016), but this does not appear to be the case when a single, non-collaborative oral argument was produced.

Chen, Hand, and Park (2016) also found that children transferred their skills from oral arguments with other children to their written ones when they revised their writing. Even though the present study did not involve a collaborative discussion, I investigated how the order of argument production impacted the type of revisions children made to their writing. The study protocol had children produce both their oral and written argument, and then spend five minutes revising their writing.

Producing an argument orally prior to writing a written one from scratch did not benefit the original written argument in the present dissertation, but it was possible, in accordance with findings from Chen, Hand, and Park (2016), that children would make more substantive revisions to their written argument when they were able to provide an oral version of the argument *after* they wrote their original argument. This may have given them the opportunity to think about their argument in a slightly different way, and then apply any new ideas or elaborations to their writing during the revision stage. In contrast, during the condition where speaking occurred before original writing, I predicted that because children would not have the chance to talk about the topic after writing it, they would likely spend their revision period making mechanical revisions related to correcting spelling, grammar, punctuation, or poor handwriting.

As predicted, the results of the present study showed that when children had the opportunity to verbalize their argument after producing an original writing piece, they later made

more substantive, content-related revisions to their written argument. The opposite pattern was observed for the other condition order, where more mechanical than substantive revisions were made by children. There were also no differences in the number and type of revisions made by grade and gender, suggesting that all children revised to a similar degree when given only a short revision period.

As such, even though producing an oral argument in the present study was not a collaborative process, it nonetheless increased the likelihood that children would make substantive revisions to their writing when it occurred after the initial draft was written. Overall, this suggests that talking about an argument (even in a non-interactive setting) may be beneficial during the revising, but not the planning stages of written argumentation.

Knowledge of Argumentation

The final goal of Part II of the dissertation was to determine if the knowledge of argumentation task could successfully predict the persuasiveness of arguments of a different type from Part I. Part II utilized very different topics and involved a more formal setting, providing sufficient variation in the writing task environment to test the consistency of the knowledge of argumentation task's ability to predict to persuasiveness.

When the written argument was assessed, the audience awareness demonstrated in the explanations for answers once again remained a significant predictor of overall persuasiveness regardless of statistical procedure used along with grade, writing fluency, and oral word fluency. For the overall persuasiveness of the spoken argument, however, the linear regression procedure resulted in only two significant predictors- grade and oral word fluency. When a stepwise regression was conducted, grade, audience awareness in explanations, and liking of speaking were identified as significant contributors.

As such, it appears that having an explicit (not just intuitive) understanding of audience awareness as measured by the knowledge of argumentation task was a robust predictor of argument persuasiveness across different written arguments. Oral arguments, however, seemed slightly more difficult to predict, with different statistical procedures yielding different results. Elbow (2012) discussed how oral language is more personal, and less deliberate than written communication. It is therefore possible that an explicit understanding of audience awareness is not as robustly linked to spoken communication because children have less time to be deliberate and reflective about what they are saying as they are saying it compared to writing. Since only one sample of spoken communication was collected in this study, further research would be needed to ascertain if this is the case.

Limitations

Part II made valuable contributions to our understanding of children's oral and written argumentation, but had a number of limitations. In addition to the limitations discussed in Part I, a more comprehensive oral language fluency assessment may have benefited interpretation of the findings of the study. Writing fluency was correlated with persuasiveness in writing, but oral word fluency that was measured in this study was not directly correlated with spoken argument persuasiveness.

Another limitation of the present study was that the setting for providing a spoken argument was fairly artificial. Children appeared to have experience with writing under different conditions, but often indicated that the situation of speaking into an audio recorder to an absent audience was an unfamiliar experience. Some children were thus shy or inhibited in their speaking due to the setting, which may have lowered the quality of their spoken arguments.

Additionally, one of the affordances of speaking is the ability to verbalize thoughts as they occur to you, but due to the planning phase, children did not have the chance to spontaneously discuss the first thoughts that occurred to them. As such, their arguments may have been different if they had been provided immediately after viewing the prompt without planning.

In spite of these limitations, Part II of this dissertation provided valuable insight into children's argumentation and potential strategies for improving the quality of written work.

Conclusions and Implications

Overall, Part II of the dissertation investigated the written and spoken argumentation of third and fifth graders. Children produced longer, more elaborated spoken arguments, while their written arguments tended to be better organized. Boys in particular were more inclined to produce longer arguments when talking than when writing, at least partly due to their dislike of writing in comparison to girls. However, even though the participants in Part I and Part II were the same, there were no overall gender differences in argument quality on any assessed dimensions in Part II (there were numerous gender differences in Part I). As such, providing children with the opportunity to talk about their argument appeared to lower the discrepancy of argument quality based on gender.

Additionally, producing a spoken argument before the first draft of a written one did not benefit the quality of the written work. In the same vein, being able to write down an argument before delivering a spoken argument on the same topic did not appear to facilitate spoken argument quality. However, children were given the opportunity to revise their written work after both the oral and written arguments were complete, and I found that children were more likely to make substantive revisions to the content of the argument (adding a reason, elaboration,

introduction, or conclusion) when they provided their spoken argument *after* their original written one, but before the revision phase.

It therefore seems that talking about an argument was not an effective planning strategy prior to producing any writing, but was a good way to elaborate on thoughts after a draft of writing was already produced, which in turn facilitated substantive revising. As such, the present study results suggest that a potential way to help children improve the substantive nature of their revisions would be to have them talk about their argument out loud after finishing their first draft a practice that may be effective even when a conversation partner is not available. Additionally, providing children, and particularly boys, the opportunity to talk about their writing may help their arguments become more similar to the quality of girls' arguments.

Chapter 10

General Discussion

This dissertation made a substantial contribution to our understanding of children's audience awareness and argumentative abilities in upper elementary school. Argumentation is in the unique position of being very natural and easy for children develop—with even preschool-aged children producing verbal arguments to resolve conflict (e.g., Howe & McWilliam, 2001; Orsolini, 1993), and yet surprisingly difficult for children and adults alike to execute in a sophisticated manner that favors the perspective of the audience over the self (e.g., Felton & Herko, 2004; Trimble, 1975). The present dissertation sought to uncover some of the elements of arguments, both related and unrelated to the audience, that third and fifth grade children could produce orally and in writing.

There is a lack of emphasis on complex features of argumentation such as responding to counterarguments during elementary school (Common Core Initiative, 2010). However, the prompts used in this dissertation explicitly included reasons for opposing viewpoint that children were free to address, and by and large, children in the present study did in fact attempt to do so. Across the three written arguments children produced, only one child failed to respond to any counterarguments in any produced argument, and the majority of children responded to two or more counterarguments. As such, children likely do have the capacity to learn complex aspects of argumentation from an early age to benefit the quality of their writing.

Part I of the dissertation investigated the development of audience awareness between the third and the fifth grades. I studied whether older children, in comparison to younger ones, would

demonstrate 1) increased attention to the audience in their persuasive writing in general, and 2) an increase in the ability to raise the persuasiveness of arguments written to a dissimilar audience (an adult) closer to the level they can reach when writing to someone more similar (a fellow child). I found that there were clear and consistent developments improvements in the former skill between the two grade levels, but that the latter remained unchanged. As such, children appeared to gain a general awareness that they should pay attention to the person they are writing to between the third and fifth grades, but children at both grade levels had a similar level of difficulty with being just as persuasive when writing to someone different from them as they were when writing to someone much more like them.

Part II focused on studying the role of how we produce an argument (orally vs. in writing) in determining argument quality. I also investigated how the timing of writing and speaking in relation to each other might impact the quality of children's compositions and the types of revisions they make to their writing. Results showed that audience awareness was quite similar regardless of how the argument was communicated, but that the written medium favored better organization while the spoken medium facilitated longer, more elaborated arguments.

I also found that neither children's writing nor speaking benefited from having produced an argument on the same topic immediately prior in the contrasting mode of communication. As such, one prior argument production was insufficient to improve the quality of the second argument produced. However, the order that arguments were produced in did impact the type of revision that was favored when revising original written compositions. When the spoken argument was produced after the written one (but before the revisions), children tended to make more substantive revisions to their writing (adding ideas, introductions, conclusions). When the spoken argument was produced before the original written argument, however, children favored

mechanical revisions related to spelling, grammar, punctuation, or handwriting over more substantive ones.

In this manner, saying an argument out loud was able to support children in making substantive revisions, but not in writing a better argument initially. This suggests that after children have completed an initial written draft, being able to verbalize the argument out loud could be a useful instructional strategy for promoting substantive revisions to the draft. The present dissertation suggests that this practice could be beneficial even in a context where no conversational partner is available and there is no potential for feedback.

Finally, across both parts of the dissertation, I investigated the development and predictive utility of children's knowledge of argumentation. I found that children had a strong intuitive understanding of the basic features of arguments as well as audience awareness through the high accuracy of their answer selection. They were much lower in their explicit awareness of the role of the audience in determining the content of arguments, however. This explicit awareness was higher for fifth than third graders, and was able to predict the persuasiveness of all three written arguments children produced. As such, moving an appreciation of the audience from an intuitive to an explicit understanding is likely a useful endeavor for educators.

Overall, there was a strong and consistent developmental picture for argumentative skills, where across different prompts, audiences, and modes of communication, fifth graders were more advanced in numerous features of argumentation, from audience awareness to organization. The role of gender in the quality of arguments appeared more context-dependent, as the same children showed different patterns in different parts of the dissertation. During the whole-class sessions in Part I, females tended to outperform males on a number of features in line with prior research (Lee, 2013). There were no overall gender differences in Part II of the study, however,

during which children composed spoken and written arguments in a one-on-one setting with a researcher. As such, gender differences are likely dependent on the context of writing, and it is possible that individual attention or the ability to talk about a topic being written about may allow boys to write as effectively as girls. Additionally, the prompts used in Parts I and II differed substantially. Part I prompts involved students writing informal letters on moral issues, whereas Part II was a more formal, consequential task where students needed to convince an official adult to keep recess or field trips in school. As such, gender differences may also be content-dependent, with boys and girls performing more equivalently on the style of prompt used in Part II.

Some potential avenues for future research include further investigating the perspective-taking abilities of children by asking them to evaluate arguments written to different audiences both from their own perspective and from the perspective of an intended audience that differs from them. Further research can also investigate how spontaneous verbal arguments produced in both interactive and non-interactive settings may differ from the more planned oral and written arguments produced in this dissertation study.

In conclusion, the study of children's argumentation is a growing field that holds much promise for our understanding of the way children learn and think about other people. This dissertation provided an in-depth investigation into how the mode of communication and the audience being communicated with impacts the quality of the arguments children produces. The findings have strong implications for our understanding of the cognitive capabilities of children as well as potential instructional practices and foci that may benefit the argumentative writing abilities of children.

Tables

Table 1

Inter-rater Reliability (Cohen's Kappa) for Coded Variables

		Cheating Prompt		Lying Prompt	
Notes	Variable	N	Cohen's Kappa	N	Cohen's Kappa
	Claim (0-1)	20	1.00	20	1.00
	Introduction (0-1)	20	1.00	20	1.00
	Conclusion (0-1)	20	1.00	20	.86
	# Claim Mentions	20	.92	20	.93
	# Sources Cited	20	1.00	20	1.00
	# Reasons Provided	20	.94	20	.94
	# Unnecessary Repetitions	20	1.00	20	1.00
	# Off-topic Statements	20	1.00	20	1.00
Persuasive Strategies (0=absent; 1=partially successful; 2=successful)	Author Knowledge	20	1.00	20	.85
	Audience Goals	20	1.00	20	1.00
	Persuasive Reasons	20	1.00	20	1.00
	Emotion	20	1.00	20	1.00
	Rhetorical Questions	20	1.00	20	1.00
	Empathy	20	.92	20	.91
	Claim Clarity (1-6)	20	1.00	20	.87
	Organization (1-6)	20	.83	20	.81
	Elaborations in Writing (1-4)	20	.86	20	.92
	Overall Persuasiveness (1-6)	20	.93	20	.81
	Evidence Quality (1-6)	20	.86	20	.87
	Audience Awareness in Evidence (1-6)	20	.92	20	.86
	Counterargument Response Quality (1-6)	20	.83	20	.81
	# Counterarguments Listed	20	1.00	20	1.00
	# Counterargument Responses	20	.88	20	1.00
	Highest Audience Awareness	20	.88	20	.92
	Overall Audience Awareness	20	1.00	20	.87

Table 2

Correlations between Audience Awareness Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. # Counterarguments- Adult	--															
2. # counterargument Responses - Adult	.18*	--														
3. Overall Persuasiveness - Adult	.14	.68***	--													
4. Reason/Evidence Quality - Adult	.12	.64***	.88***	--												
5. Audience Awareness - Reasons - Adult	.15	.66***	.86***	.83***	--											
6. Counterarg Response Quality- Adult	.15	.81***	.78***	.75***	.77***	--										
7. Highest Audience Awareness - Adult	.13	.49***	.68***	.61***	.69***	.58***	--									
8. Overall Audience Awareness- Adult	.02	.49***	.70***	.69***	.69***	.61***	.76***	--								
9. # Counterarguments- Child	.05	.15	.10	.09	.11	.19*	.01	.07	--							
10. # counterargument Responses - Child	-.06	.15	.23**	.23**	.29***	.24**	.19*	.27**	.12	--						
11. Overall Persuasiveness - Child	.08	.37***	.46***	.45***	.43***	.35***	.22**	.30***	.12	.47***	--					
12. Reason/Evidence Quality - Child	.06	.38***	.41***	.43***	.41***	.31***	.22**	.29***	-.02	.45***	.85***	--				
13. Audience Awareness- Reasons - Child	.05	.39***	.37***	.34***	.33***	.36***	.18*	.28**	.16	.50***	.79***	.73***	--			
14. Counterarg Response Quality- Child	.01	.26**	.26**	.28**	.26**	.29***	.12	.24**	.08	.68***	.69***	.68***	.70***	--		
15. Highest Audience Awareness - Child	.06	.35***	.35***	.38***	.35***	.34***	.15	.22**	.11	.32***	.64***	.62***	.56***	.55***	--	
16. Overall Audience Awareness- Child	.02	.43***	.42***	.47***	.42***	.44***	.18*	.33***	.09	.32***	.66***	.64***	.54***	.58***	.78***	--

*<.05, **<.01, ***<.001

Table 3

Means and Standard Deviations of Audience Awareness Variables by Grade

Dependent Variable	Third Grade				Fifth Grade			
	Child Audience		Adult Audience		Child Audience		Adult Audience	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Overall Persuasiveness (1-6)	3.60	.87	3.32	.98	4.33	.69	4.05	.99
Evidence Quality (1-6)	3.75	.84	3.50	.84	4.41	.76	4.23	.93
Audience Awareness in Evidence (1-6)	3.97	.99	3.50	1.03	4.54	.69	4.23	.89
Counterargument Response Quality (1-6)	3.71	1.20	3.38	1.32	4.30	.94	4.05	1.32
Highest Audience Awareness (1-8)	5.81	.76	5.51	.78	6.20	.52	5.89	.66
Overall Audience Awareness (1-5)	2.82	.77	2.57	.68	3.33	.69	3.00	.80
# Counterarguments Listed	.31	.53	.15	.43	.24	.46	.13	.40
# Counterargument Responses	1.46	.84	1.32	.85	1.92	.71	1.70	.85

Table 4

Means and Standard Deviations of Audience Awareness Variables by Gender

Dependent Variable	Female				Male			
	Child Audience		Adult Audience		Child Audience		Adult Audience	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Overall Persuasiveness (1-6)	4.18	.76	3.88	1.02	3.78	.92	3.52	1.05
Evidence Quality (1-6)	4.26	.81	4.01	.96	3.91	.88	3.75	.94
Audience Awareness in Evidence (1-6)	4.49	.80	4.04	1.01	4.03	.94	3.72	1.01
Counterargument Response Quality (1-6)	4.15	1.07	3.83	1.47	3.88	1.36	3.64	1.20
Highest Audience Awareness (1-8)	6.15	.71	5.84	.67	5.87	.58	5.57	.80
Overall Audience Awareness (1-5)	3.23	.84	2.90	.74	2.94	.65	2.69	.80
# Counterarguments Listed	.35	.51	.13	.40	.18	.46	.15	.44
# Counterargument Responses	1.76	.78	1.56	.93	1.64	.81	1.48	.80

Table 5

Audience Main Effects and Interactions for Audience Awareness Variables

Dependent Variables	Contrast	Adult vs. Child Audience Main Effects and Interactions					
		F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
Overall Persuasiveness	Audience	11.49	1/143	.001	5.50	68.39	.48
	Audience*Grade	.07	1/143	.795	.03		
	Audience*Gender	.26	1/143	.611	.13		
Reason/Evidence Quality	Audience	6.76	1/143	.010	3.16	66.81	.47
	Audience*Grade	.07	1/143	.794	.03		
	Audience*Gender	.49	1/143	.487	.23		
Audience Awareness in Reasons/Evidence	Audience	17.69	1/143	< .001	10.83	87.50	.61
	Audience*Grade	.45	1/143	.502	.28		
	Audience*Gender	.78	1/143	.378	.48		
Counterargument Response Quality	Audience	5.36	1/143	.022	5.80	154.72	1.08
	Audience*Grade	.01	1/143	.923	.01		
	Audience*Gender	.27	1/143	.608	.29		
Highest Audience Awareness	Audience	15.77	1/143	< .001	6.70	60.77	.43
	Audience*Grade	.07	1/143	.788	.03		
	Audience*Gender	.04	1/143	.845	.02		
Overall Audience Awareness	Audience	14.78	1/143	< .001	5.92	57.31	.40
	Audience*Grade	.42	1/143	.518	.17		
	Audience*Gender	.33	1/143	.564	.13		
# Counterarguments Mentioned	Audience	6.21	1/143	.014	1.21	27.74	.19
	Audience*Grade	.15	1/143	.703	.03		
	Audience*Gender	3.82	1/143	.052	.74		
# Counterargument Responses	Audience	3.81	1/143	.053	2.30	86.16	.60
	Audience*Grade	.38	1/143	.538	.23		
	Audience*Gender	.08	1/143	.783	.05		

Table 6

Grade-Level Main Effects for Audience Awareness Variables

Dependent Variables	Main Effects for Grade Level (3rd vs. 5th)					
	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
Overall Persuasiveness	37.44	1/143	< .001	38.04	145.28	1.02
Reason/Evidence Quality	37.20	1/143	< .001	33.77	129.84	.91
Audience Awareness in Reasons/Evidence	32.55	1/143	< .001	30.81	135.36	.95
Counterargument Response Quality	16.31	1/143	< .001	28.86	253.00	1.77
Highest Audience Awareness	22.29	1/143	< .001	10.43	66.93	.47
Overall Audience Awareness	23.60	1/143	< .001	15.73	95.34	.67
# Counterarguments Mentioned	.47	1/143	.514	.091	30.48	.21
# Counterargument Responses	17.31	1/143	< .001	12.62	104.29	.73

Table 7

Gender Main Effects for Audience Awareness Variables

Dependent Variables	Main Effects for Gender					
	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
Overall Persuasiveness	9.97	1/143	.002	10.12	145.28	1.02
Reason/Evidence Quality	7.26	1/143	.008	6.59	129.84	.91
Audience Awareness in Reasons/Evidence	11.66	1/143	.001	11.04	135.36	.95
Counterargument Response Quality	2.06	1/143	.153	3.65	253.00	1.77
Highest Audience Awareness	11.68	1/143	.001	5.47	66.93	.47
Overall Audience Awareness	6.73	1/143	.010	4.49	95.34	.67
# Counterarguments Mentioned	2.23	1/143	.138	.47	30.48	.21
# Counterargument Responses	1.00	1/143	.320	.73	104.29	.73

Table 8

Means and Standard Deviations of Non-Audience Awareness Variables by Grade

Dependent Variable	Third Grade				Fifth Grade			
	Child Audience		Adult Audience		Child Audience		Adult Audience	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Claim (0-1)	.82	.38	.88	.33	.89	.32	.91	.29
Introduction (0-1)	.29	.46	.29	.46	.66	.48	.66	.48
Conclusion (0-1)	.74	.44	.74	.44	.90	.30	.87	.33
# Claim Mentions	2.09	1.39	1.85	1.15	2.53	1.29	2.44	1.22
# Sources Cited	.07	.26	.01	.12	.03	.16	.04	.19
# Reasons Provided	2.87	1.26	2.72	1.35	3.61	1.41	3.33	1.35
# Unnecessary Repetitions	.15	.47	.10	.35	.04	.19	.01	.11
# Off-topic Statements	.13	.42	.18	.57	.05	.22	.05	.22
# Unsuccessful Persuasive Strategies	1.25	.98	1.13	.95	1.03	1.01	1.01	.88
# Successful Persuasive Strategies	.97	.86	.82	.83	1.47	.88	1.34	.97
Claim Clarity (1-6)	4.44	1.18	4.53	1.11	4.56	1.07	4.75	.90
Organization (1-6)	4.32	1.07	4.31	1.04	4.76	.90	4.67	1.02
Elaborations in Writing (1-4)	2.53	1.04	2.47	.97	3.08	.87	3.01	.95
Word Count	110.50	59.39	107.51	62.58	153.61	62.60	150.16	69.24

Table 9

Means and Standard Deviations of Non-Audience Awareness Variables by Gender

Dependent Variable	Female				Male			
	Child Audience		Adult Audience		Child Audience		Adult Audience	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Claim (0-1)	.88	.33	.90	.30	.84	.37	.90	.31
Introduction (0-1)	.54	.50	.51	.50	.43	.50	.46	.50
Conclusion (0-1)	.86	.35	.85	.34	.78	.42	.76	.43
# Claim Mentions	2.50	1.46	2.30	1.28	2.12	1.19	2.01	1.36
# Sources Cited	.06	.24	.05	.22	.03	.17	.00	.00
# Reasons Provided	3.55	1.46	3.25	1.32	2.93	1.22	2.81	1.42
# Unnecessary Repetitions	.11	.42	.08	.31	.06	.24	.03	.17
# Off-topic Statements	.10	.34	.11	.32	.07	.32	.10	.53
# Unsuccessful Persuasive Strategies	1.26	1.09	1.20	.96	.97	.87	.91	.83
# Successful Persuasive Strategies	1.40	.98	1.20	.97	1.04	.77	.99	.90
Claim Clarity (1-6)	4.60	1.10	4.74	.90	4.39	1.14	4.54	1.12
Organization (1-6)	4.54	1.02	4.48	.99	4.58	.99	4.54	1.11
Elaborations in Writing (1-4)	2.91	1.00	2.88	1.05	2.72	.98	2.63	.92
Word Count	149.73	68.65	149.01	75.56	114.49	53.99	108.25	53.82

Table 10

Main Effects of Audience for Non-Audience Awareness Variables

	Adult vs. Child Audience Main Effects					
Dependent Variables	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
Word Count (# words)	1.07	1/143	.302	851.04	113532.48	793.93
Level of Elaboration (1-4)	.52	1/143	.47	.28	76.70	.54
Claim Clarity (1-6)	1.56	1/143	.213	1.40	128.33	.90
Organization (1-6)	.27	1/143	.607	.19	102.49	.72
Claim Presence (0-1)	1.68	1/143	.197	.14	11.82	.08
Introduction Presence (0-1)	.003	1/143	.955	.00	18.95	.13
Conclusion Presence (0-1)	.12	1/143	.729	.01	14.76	.10
# Reasons	2.59	1/143	.110	3.07	169.50	1.19
# Partially Successful Persuasive Strategies	.38	1/143	.538	.32	118.41	.83
# Successful Persuasive Strategies	2.24	1/143	.136	1.22	77.79	.54
# Sources Cited	1.10	1/143	.297	.04	5.37	.04
# Claim Mentions	1.75	1/143	.188	1.79	146.39	1.02
# off-topic statements	.43	1/143	.513	.04	12.40	.09
# unnecessary repetitions	1.30	1/143	.257	.09	9.32	.07

Table 11

Grade-Level Main Effects for Non-Audience Awareness Variables

Dependent Variables	Main Effects for Grade Level (3rd vs. 5th)					
	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
Claim (0-1)	1.02	1/143	.314	.14	19.36	.14
Introduction (0-1)	32.38	1/143	< .001	9.96	43.96	.31
Conclusion (0-1)	8.42	1/143	.004	1.58	26.76	.19
# Claim Mentions	9.08	1/143	.003	19.53	307.73	2.15
# Sources Cited	.42	1/143	.519	.014	4.93	.03
# Reasons Provided	14.33	1/143	< .001	33.25	331.69	2.32
# Unnecessary Repetitions	5.50	1/143	.020	.65	16.86	.12
# Off-topic Statements	3.54	1/143	.062	.71	28.61	.20
# Unsuccessful Persuasive Strategies	1.58	1/143	.212	1.43	129.92	.91
# Successful Persuasive Strategies	17.72	1/143	< .001	17.48	141.01	.99
Claim Clarity (1-6)	1.43	1/143	.234	1.96	196.19	1.37
Organization (1-6)	7.96	1/143	.005	10.37	186.31	1.30
Elaborations in Writing (1-4)	16.39	1/143	< .001	21.01	183.25	1.28
Word Count	20.20	1/143	< .001	135109.48	956378.72	6687.96

Table 12

Gender Main Effects for Non-Audience Awareness Variables

Dependent Variables	Main Effects for Gender					
	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
Claim (0-1)	.22	1/143	.643	.03	19.36	.14
Introduction (0-1)	1.61	1/143	.207	1.61	43.96	.31
Conclusion (0-1)	2.78	1/143	.097	.52	26.76	.19
# Claim Mentions	3.78	1/143	.054	8.12	307.73	2.15
# Sources Cited	3.36	1/143	.069	.12	4.93	.03
# Reasons Provided	9.01	1/143	.003	20.89	331.69	2.32
# Unnecessary Repetitions	1.75	1/143	.188	.21	16.86	.12
# Off-topic Statements	.16	1/143	.692	.16	28.61	.20
# Unsuccessful Persuasive Strategies	8.07	1/143	.005	7.33	129.92	.91
# Successful Persuasive Strategies	5.38	1/143	.022	5.31	141.01	.99
Claim Clarity (1-6)	2.21	1/143	.140	3.03	196.19	1.37
Organization (1-6)	.28	1/143	.596	.37	186.31	1.30
Elaborations in Writing (1-4)	2.66	1/143	.105	3.41	183.25	1.28
Word Count	15.85	1/143	< .001	106014.10	956378.72	6687.96

Table 13

Means and Standard Deviations of Regression Predictors by Grade Level

Control Variables	Third Grade		Fifth Grade	
	Mean	SD	Mean	SD
3-min Writing Fluency Word Count	41.24	13.29	51.16	13.22
Oral Word Fluency Standardized	105.37	14.76	105.79	15.37
ABC Task	11.59	3.74	16.03	4.73
Argumentative Knowledge 1 Total	7.02	.87	7.35	1.09
Audience Awareness Questions	3.58	.64	3.68	.66
Audience Awareness Explanations	1.09	1.36	1.63	1.35
Writing Self-Concept	5.72	1.43	5.70	1.48
Liking of Writing	3.93	.98	3.85	.94

Table 14

Means and Standard Deviations of Regression Predictors by Gender

Control Variables	Female		Male	
	Mean	SD	Mean	SD
3-min Writing Fluency Word Count	48.41	12.65	44.37	15.49
Oral Word Fluency Standardized	107.95	16.16	102.85	13.22
ABC Task	14.33	5.12	13.55	4.46
Argumentative Knowledge 1 Total	7.25	1.03	7.18	1.01
Audience Awareness Questions	3.59	.67	3.69	.61
Audience Awareness Explanations	1.47	1.43	1.28	1.30
Writing Self-Concept	5.99	1.41	5.39	1.45
Liking of Writing	4.16	.80	3.55	1.02

Table 15

Correlations between Regression Predictors

Variables	1	2	3	4	5	6	7	8	9
1.Writing Fluency	--								
2. Oral Word Fluency	.03	--							
3. Like Writing	.20*	-.08	--						
4. Writing Self Concept	.18*	.10	.43***	--					
5. Gender (F=1; M=2)	-.14	-.17*	-.32***	-.21*	--				
6. Grade	.35***	.01	-.04	-.01	.00	--			
7. Non Aud Aware Accuracy	.20*	.10	.16	.10	-.15	.17	--		
8. Aud Aware Accuracy	.06	.06	.06	.07	.07	.07	.26**	--	
9. Aud Aware Explanations	.25**	.18*	.02	.15	-.07	.20*	.31***	.38***	--

Table 16

Regressions on Overall Persuasiveness when Writing to an Adult and Child

	Overall Persuasiveness-Child			Overall Persuasiveness-Adult		
Variable	*B*	*β*	*t*	*B*	*β*	*t*
Writing Fluency	.02	.31	3.87***	.03	.35	4.05***
Oral Word Fluency	.01	.10	1.30	.01	.12	1.47
Like Writing	.01	.02	.18	.03	.02	.26
Writing Self Concept	.01	.02	.18	.03	.04	.43
Gender (F=1; M=2)	-.20	-.11	-1.46	-.04	-.02	-.22
Grade	.22	.24	3.03**	.20	.19	2.25*
Non Aud Aware Accuracy	-.01	-.01	-.06	.04	.03	.32
Aud Aware Accuracy	.05	.04	.46	-.01	-.01	-.07
Aud Aware Explanations	.15	.23	2.78**	.14	.18	2.01*
Note		R^2 = .34			R^2 = .27	

*<.05, **<.01, ***<.001

Table 17

Reliability of Part II Coded Variables

Notes	Variable	Field Trip Prompt		Recess Prompt	
		N	Cohen's Kappa	N	Cohen's Kappa
	Claim (0-1)	20	1.00	20	1.00
	Introduction (0-1)	20	.88	20	.89
	Conclusion (0-1)	20	1.00	20	.83
	# Claim Mentions	20	.91	20	1.00
	# Sources Cited	20	1.00	20	1.00
	# Reasons Provided	20	.86	20	.86
	# Unnecessary Repetitions	20	1.00	20	1.00
	# Off-topic Statements	20	1.00	20	1.00
Persuasive Strategies (0=absent; 1=partially successful; 2=successful)	Author Knowledge	20	1.00	20	1.00
	Audience Goals	20	.80	20	.85
	Persuasive Reasons	20	.90	20	.80
	Emotion	20	1.00	20	.91
	Rhetorical Questions	20	1.00	20	1.00
	Empathy	20	1.00	20	.86
	Claim Clarity (1-6)	20	1.00	20	1.00
	Organization (1-6)	20	.93	20	.83
	Elaborations in Writing (1-4)	20	.93	20	.91
	Overall Persuasiveness (1-6)	20	1.00	20	.93
	Evidence Quality (1-6)	20	.93	20	1.00
	Audience Awareness in Evidence (1-6)	20	1.00	20	1.00
	Counterargument Response Quality (1-6)	20	.92	20	.93
	# Counterarguments Listed	20	1.00	20	1.00
	# Counterargument Responses	20	.82	20	.84

Table 18

Means and Standard Deviations of Organization, Length, and Negative Feature Variables by Grade Level

Dependent Variable	Third Grade				Fifth Grade			
	Spoken Argument		Written Argument		Spoken Argument		Written Argument	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Organization (1-6)	4.23	.94	4.64	1.02	4.49	.88	4.95	.88
Introduction Presence (0-1)	.17	.38	.19	.39	.23	.42	.58	.50
Conclusion Presence (0-1)	.47	.50	.63	.49	.51	.50	.90	.30
Word Count (# words)	115.14	63.86	84.40	40.02	163.28	101.74	141.92	61.55
Level of Elaboration (1-4)	2.93	.89	2.60	.86	3.45	.85	3.13	.89
# Off-topic Statements	.44	1.78	.03	.17	.25	.92	.10	.37
# Unnecessary Repetitions	.17	.45	.01	.12	.10	.43	.04	.24

Table 19

Means and Standard Deviations of Organization, Length, and Negative Feature Variables by Gender

Dependent Variable	Female				Male			
	Spoken Argument		Written Argument		Spoken Argument		Written Argument	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Organization (1-6)	4.36	.90	4.83	.97	4.39	.93	4.79	.95
Introduction Presence (0-1)	.17	.38	.44	.50	.24	.43	.35	.48
Conclusion Presence (0-1)	.47	.50	.83	.38	.51	.50	.72	.45
Word Count (# words)	134.69	80.99	125.17	64.67	148.64	98.30	104.83	52.60
Level of Elaboration (1-4)	3.11	.94	2.95	.92	3.32	.85	2.82	.91
# Off-topic Statements	.16	.49	.07	.26	.54	1.93	.06	.33
# Unnecessary Repetitions	.10	.34	.02	.16	.17	.53	.03	.24

Table 20

Mode of Communication Main Effects and Interactions for Organization, Length, and Negative Feature Variables

Dependent Variables	Contrast	Writing vs. Speaking Main Effects and Interactions					
		F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
Organization	Communication Mode	24.33	1/146	< .001	14.33	86.07	.59
	Comm*Grade	.04	1/146	.844	.02		
	Comm*Gender	.11	1/146	.737	.07		
	Comm*Condition Order	.20	1/146	.653	.12		
Introduction	Communication Mode	14.62	1/146	< .001	2.32	23.16	.16
	Comm*Grade	13.00	1/146	< .001	2.06		
	Comm*Gender	2.94	1/146	.088	.47		
	Comm*Condition Order	.35	1/146	.554	.06		
Conclusion	Communication Mode	42.50	1/146	< .001	5.52	18.95	.13
	Comm*Grade	8.17	1/146	.005	1.06		
	Comm*Gender	2.94	1/146	.089	.38		
	Comm*Condition Order	.05	1/146	.832	.01		
Word Count	Communication Mode	14.31	1/146	< .001	52290.41	533655.23	3655.17
	Comm*Grade	.31	1/146	.581	1119.66		
	Comm*Gender	4.93	1/146	.028	18020.93		
	Comm*Condition Order	.91	1/146	.341	3331.12		
Level of Elaboration	Communication Mode	14.08	1/146	< .001	8.58	88.93	.61
	Comm*Grade	.001	1/146	.974	.001		
	Comm*Gender	2.96	1/146	.088	1.80		
	Comm*Condition Order	1.15	1/146	.285	.70		
Off-topic Statements	Communication Mode	7.23	1/146	.008	6.41	129.43	.89
	Comm*Grade	1.49	1/146	.225	1.32		
	Comm*Gender	3.56	1/146	.061	3.16		
	Comm*Condition Order	.01	1/146	.944	.004		
Unnecessary Repetitions	Communication Mode	7.46	1/146	.007	.84	16.41	.11
	Comm*Grade	1.43	1/146	.234	.16		
	Comm*Gender	.46	1/146	.499	.05		
	Comm*Condition Order	1.01	1/146	.316	.11		

Table 21

Grade Main Effects for Organization, Length, and Negative Feature Variables

	Main Effects for Grade Level (3rd vs. 5th)					
Dependent Variables	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
Organization (1-6)	5.18	1/146	.024	5.94	167.43	1.15
Introduction Presence (0-1)	18.43	1/146	< .001	3.89	30.79	.21
Conclusion Presence (0-1)	6.20	1/146	.014	1.76	41.52	.28
Word Count (# words)	32.04	1/146	< .001	211729.54	964960.52	6609.32
Level of Elaboration (1-4)	22.60	1/146	< .001	19.91	128.63	.88
# Off-topic Statements	.26	1/146	.611	.29	161.86	1.11
# Unnecessary Repetitions	.31	1/146	.579	.04	17.44	.12

Table 22

Gender Main Effects for Organization, Length, and Negative Feature Variables

	Main Effects for Gender					
Dependent Variables	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
Organization (1-6)	.00	1/146	.981	.00	167.43	1.15
Introduction Presence (0-1)	.09	1/146	.766	.02	30.79	.21
Conclusion Presence (0-1)	.15	1/146	.699	.04	41.52	.28
Word Count (# words)	.07	1/146	.789	475.58	964960.52	6609.32
Level of Elaboration (1-4)	.31	1/146	.577	.28	128.63	.88
# Off-topic Statements	2.32	1/146	.130	2.57	161.86	1.11
# Unnecessary Repetitions	.59	1/146	.446	.07	17.44	.12

Table 23

Condition Order (Write or Speak First) Main Effects for Organization, Length, and Negative Feature Variables

	Main Effects for Condition Order					
Dependent Variables	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
Organization (1-6)	.18	1/146	.674	.20	167.43	1.15
Introduction Presence (0-1)	.44	1/146	.509	.09	30.79	.21
Conclusion Presence (0-1)	.47	1/146	.495	.13	41.52	.28
Word Count (# words)	.82	1/146	.368	5390.23	964960.52	6609.32
Level of Elaboration (1-4)	.41	1/146	.521	.36	128.63	.88
# Off-topic Statements	.02	1/146	.904	.02	161.86	1.11
# Unnecessary Repetitions	.10	1/146	.758	.01	17.44	.12

Table 24

Means and Standard Deviations of Audience Awareness and Expected Similarity Variables by Grade Level

Dependent Variable	Third Grade				Fifth Grade			
	Spoken Argument		Written Argument		Spoken Argument		Written Argument	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
# Counterarguments	.01	.12	.00	.00	.27	.54	.18	.42
# Counterargument Responses	1.06	.72	1.06	.74	1.45	.75	1.42	.74
Overall Persuasiveness (1-6)	3.11	.77	3.04	.79	3.96	.82	3.83	.96
Reason/Evidence Quality (1-6)	3.49	.81	3.37	.73	4.22	.90	4.16	.90
Aud Aware in Evidence (1-6)	3.44	1.02	3.40	.86	4.19	.89	4.05	1.02
Counterargument Response Quality (1-6)	2.90	1.16	2.73	1.05	3.61	1.15	3.58	1.20
# Successful Strategies	.29	.54	.21	.45	.75	.84	.72	.86
# Partially Successful Strategies	1.33	.79	1.46	.76	1.28	1.00	1.53	.95
# Reasons	2.53	1.32	2.53	1.24	3.51	1.64	3.13	1.11
# Sources	.03	.17	.06	.23	.10	.30	.08	.28
# Claim Mentions	1.51	.78	1.46	.74	1.67	.84	2.06	1.13
Claim Presence (0-1)	.91	.28	.89	.32	.95	.22	.94	.24
Claim Clarity (1-6)	4.84	.72	4.60	1.12	4.67	.80	4.89	.81

Table 25

Means and Standard Deviations of Audience Awareness and Expected Similarity Variables by Gender

Dependent Variable	Female				Male			
	Spoken Argument		Written Argument		Spoken Argument		Written Argument	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
# Counterarguments	.11	.35	.07	.26	.19	.49	.13	.37
# Counterargument Responses	1.25	.77	1.32	.76	1.29	.76	1.18	.76
Overall Persuasiveness (1-6)	3.53	.95	3.51	1.05	3.63	.85	3.43	.87
Reason/Evidence Quality (1-6)	3.85	.96	3.85	.99	3.92	.90	3.74	.82
Aud Aware in Evidence (1-6)	3.77	1.00	3.75	1.06	3.94	1.03	3.75	.95
Counterargument Response Quality (1-6)	3.27	1.29	3.28	1.21	3.31	1.11	3.08	1.21
# Successful Strategies	.49	.78	.51	.73	.58	.73	.47	.77
# Partially Successful Strategies	1.37	.91	1.53	.87	1.22	.91	1.46	.87
# Reasons	3.20	1.71	2.93	1.20	2.90	1.40	2.78	1.21
# Sources	.06	.24	.06	.24	.07	.26	.08	.28
# Claim Mentions	1.52	.82	1.98	1.07	1.69	.80	1.57	.90
Claim Presence (0-1)	.91	.28	.91	.28	.96	.20	.92	.28
Claim Clarity (1-6)	4.68	.86	4.84	1.03	4.83	.63	4.67	.90

Table 26

Mode of Communication Main Effects for Audience Awareness and Expected Similarity Variables

	Write vs. Speak Main Effects					
Dependent Variables	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
# Counterarguments	2.51	1/146	.115	.20	11.64	.08
# Counterargument Responses	.08	1/146	.778	.02	34.28	.24
Overall Persuasiveness	3.07	1/146	.082	.90	42.88	.29
Reason/Evidence Quality	1.75	1/146	.188	.68	56.74	.39
Aud Aware in Evidence	1.83	1/146	.179	.78	62.17	.43
Counterargument Response Quality	1.58	1/146	.210	.97	89.05	.61
# Successful Strategies	.71	1/146	.402	.24	48.97	.34
# Partially Successful Strategies	4.87	1/146	.029	3.21	96.03	.66
# Reasons	2.67	1/146	.107	2.54	141.24	.97
# Sources	.31	1/146	.580	.01	2.42	.02
# Claim Mentions	3.41	1/146	.067	1.63	69.74	.48
Claim Presence	.52	1/146	.472	.03	8.22	.06
Claim Clarity	.07	1/146	.790	.04	84.93	.58

Table 27

Grade Main Effects for Audience Awareness and Expected Similarity Variables

	Main Effects for Grade Level					
Dependent Variables	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
# Counterarguments	19.81	1/146	< .001	3.64	26.80	.18
# Counterargument Responses	11.81	1/146	.001	10.09	124.75	.85
Overall Persuasiveness	44.76	1/146	< .001	49.44	161.27	1.11
Reason/Evidence Quality	42.30	1/146	< .001	42.62	147.12	1.01
Aud Aware in Evidence	25.80	1/146	< .001	35.63	201.64	1.38
Counterargument Response Quality	21.98	1/146	< .001	44.62	296.34	2.03
# Successful Strategies	25.93	1/146	< .001	17.66	99.44	.68
# Partially Successful Strategies	.01	1/146	.944	.01	137.20	.94
# Reasons	17.25	1/146	< .001	46.78	396.05	2.71
# Sources	1.77	1/146	.186	.20	16.24	.11
# Claim Mentions	10.00	1/146	.002	10.52	153.59	1.05
Claim Presence	1.68	1/146	.197	.14	12.02	.08
Claim Clarity	.22	1/146	.642	.20	133.35	.91

Table 28

Gender Main Effects for Audience Awareness and Expected Similarity Variables

	Main Effects for Gender					
Dependent Variables	F	df	Sig.	MS_{Effect}	SS_{Error}	MS_{Error}
# Counterarguments	1.79	1/146	.183	.33	26.80	.18
# Counterargument Responses	.06	1/146	.809	.05	124.75	.85
Overall Persuasiveness	.04	1/146	.834	.05	161.27	1.11
Reason/Evidence Quality	.02	1/146	.887	.02	147.12	1.01
Aud Aware in Evidence	.59	1/146	.445	.81	201.64	1.38
Counterargument Response Quality	.11	1/146	.743	.22	296.34	2.03
# Successful Strategies	.04	1/146	.834	.03	99.44	.68
# Partially Successful Strategies	.67	1/146	.413	.63	137.20	.94
# Reasons	1.24	1/146	.267	3.37	396.05	2.71
# Sources	.02	1/146	.891	.00	16.24	.11
# Claim Mentions	.45	1/146	.503	.47	153.59	1.05
Claim Presence	.85	1/146	.358	.07	12.02	.08
Claim Clarity	.00	1/146	.982	.00	133.35	.91

Table 29

Correlations between Overall Persuasiveness and Regression Predictors

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Overall Persuasiveness-Write	--														
2. Overall Persuasiveness-Speak	.66***	--													
3. Writing Fluency	.38***	.25**	--												
4. Oral Word Fluency	.14	.15	.01	--											
5. Like Talking	.17*	.23**	.03	.06	--										
6. Like Task Talking	-.21**	-.10	-.08	-.10	.26**	--									
7. Speaking Self Concept	.11	.08	.04	.06	.41***	.23**	--								
8. Like Writing	-.02	-.02	.16	-.08	-.05	.15	-.14	--							
9. Like Task Writing	-.01	-.03	-.02	-.13	.10	.26**	.10	.37***	--						
10. Writing Self Concept	.08	.00	.10	.11	-.13	.12	.04	.37***	.10	--					
11. Gender (F=1; M=2)	-.04	.05	-.13	-.12	.03	-.03	.01	-.28***	-.13	-.16	--				
12. Grade	.41***	.47***	.35***	-.04	.14	-.24**	-.06	-.10	-.18*	-.06	.00	--			
13. Non Aud Aware Accuracy	.28**	.15	.22*	.05	.01	-.06	-.05	.17	.07	.05	-.08	.14	--		
14. Aud Aware Accuracy	.26**	.21*	.10	.06	.08	.03	.09	.07	-.17*	.07	.03	.09	.27**	--	
15. Aud Aware Explanations	.39***	.28**	.24**	.14	.05	-.14	.06	-.02	-.11	.11	-.05	.18*	.29**	.39***	--

Table 30

Regression for Written and Spoken Overall Persuasiveness

	Overall Persuasiveness-Writing			Overall Persuasiveness-Speaking		
Variable	*B*	*β*	*t*	*B*	*β*	*t*
Writing Fluency	.02	.25	3.23**	.00	.05	.59
Oral Word Fluency	.01	.18	2.41*	.01	.16	2.11*
Like Writing/Speaking	-.14	-.13	-1.52	.14	.15	1.79
Like Task Writing/Speaking	.14	.12	1.53	.03	.03	.33
Writing/Speaking Self Concept	.07	.10	1.31	.01	.01	.12
Gender (F=1; M=2)	.02	.01	.17	.24	.14	1.80
Grade	.26	.26	3.36**	.38	.41	4.89***
Non Aud Aware Accuracy	.15	.10	1.34	.03	.02	.28
Aud Aware Accuracy	.20	.14	1.72	.09	.07	.80
Aud Aware Explanations	.13	.18	2.18*	.09	.14	1.63
Note		R^2 = .35			R^2 = .29	

*<.05, **<.01, ***<.001

Figures

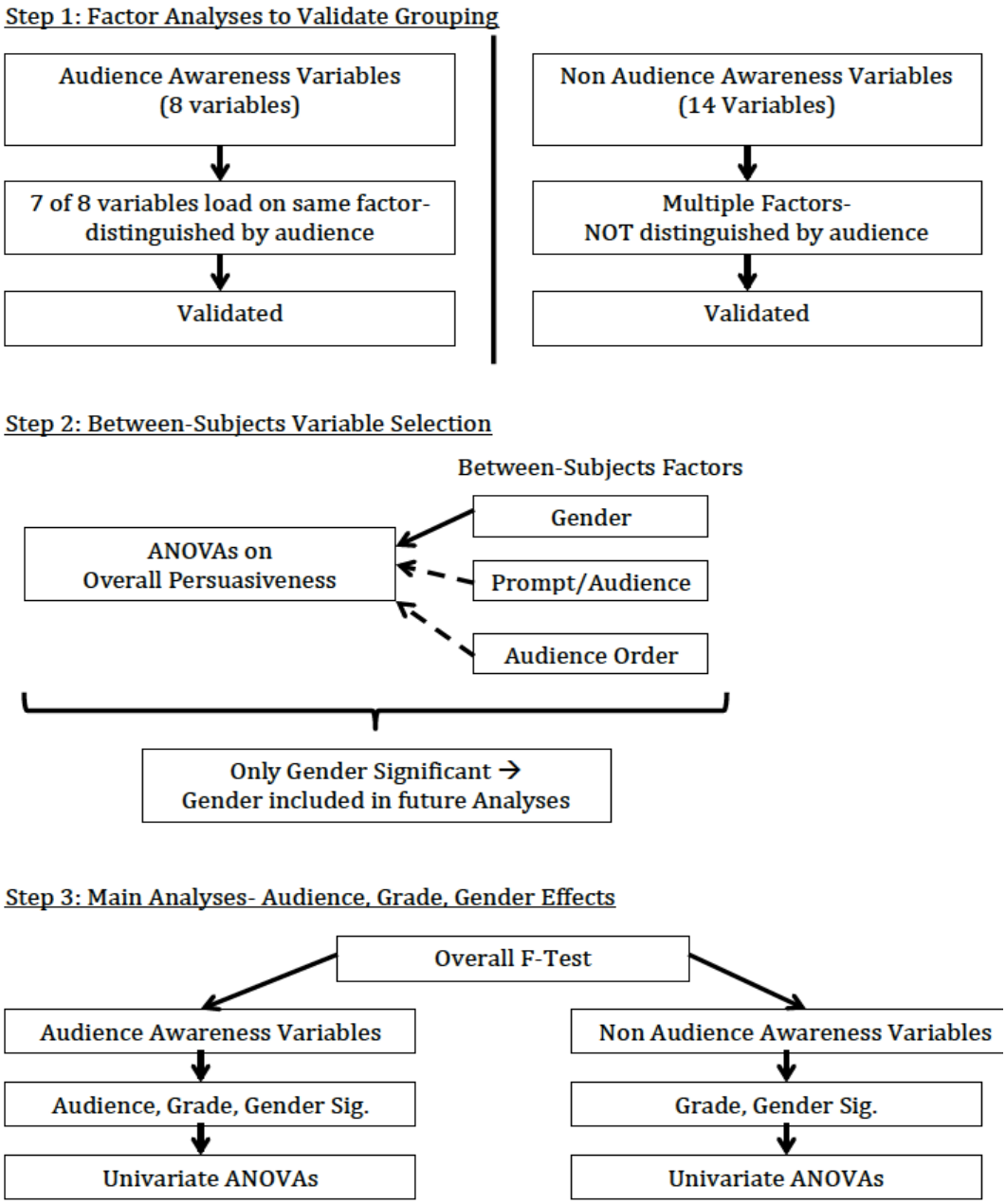

Figure 1. Analysis Flow Chart for Part I.

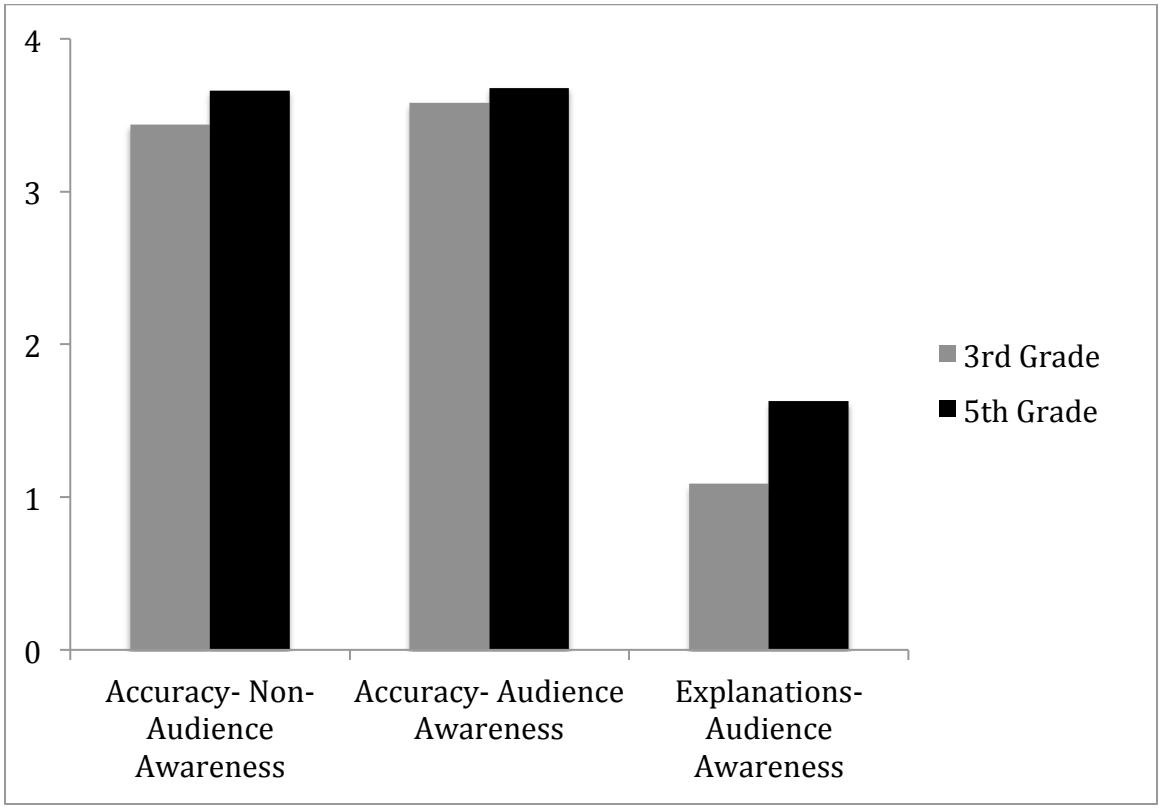

Figure 2. Means of Knowledge of Argumentation Scores for Third and Fifth Graders.

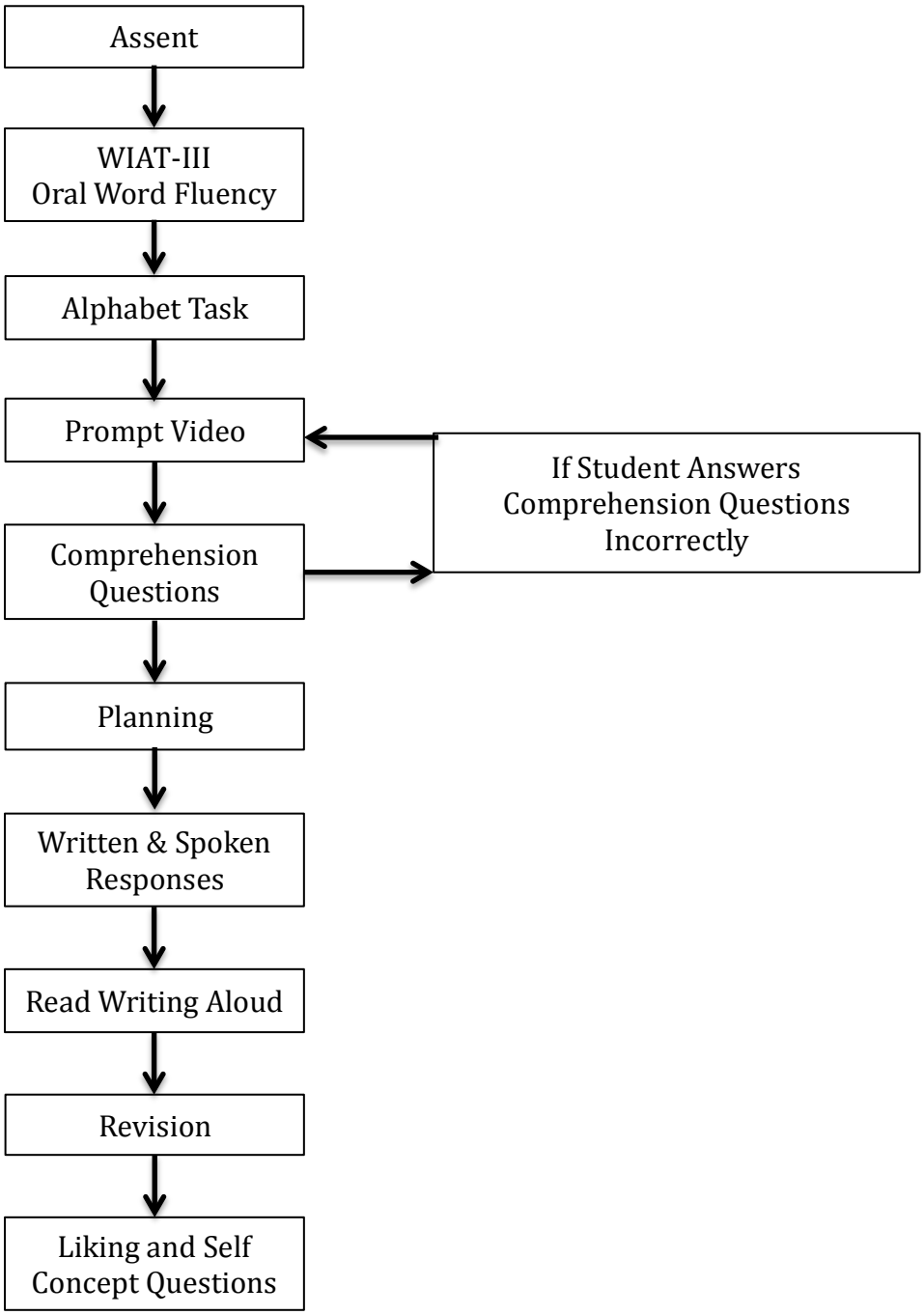

Figure 3. In-Person Writing and Speaking Session Procedure.

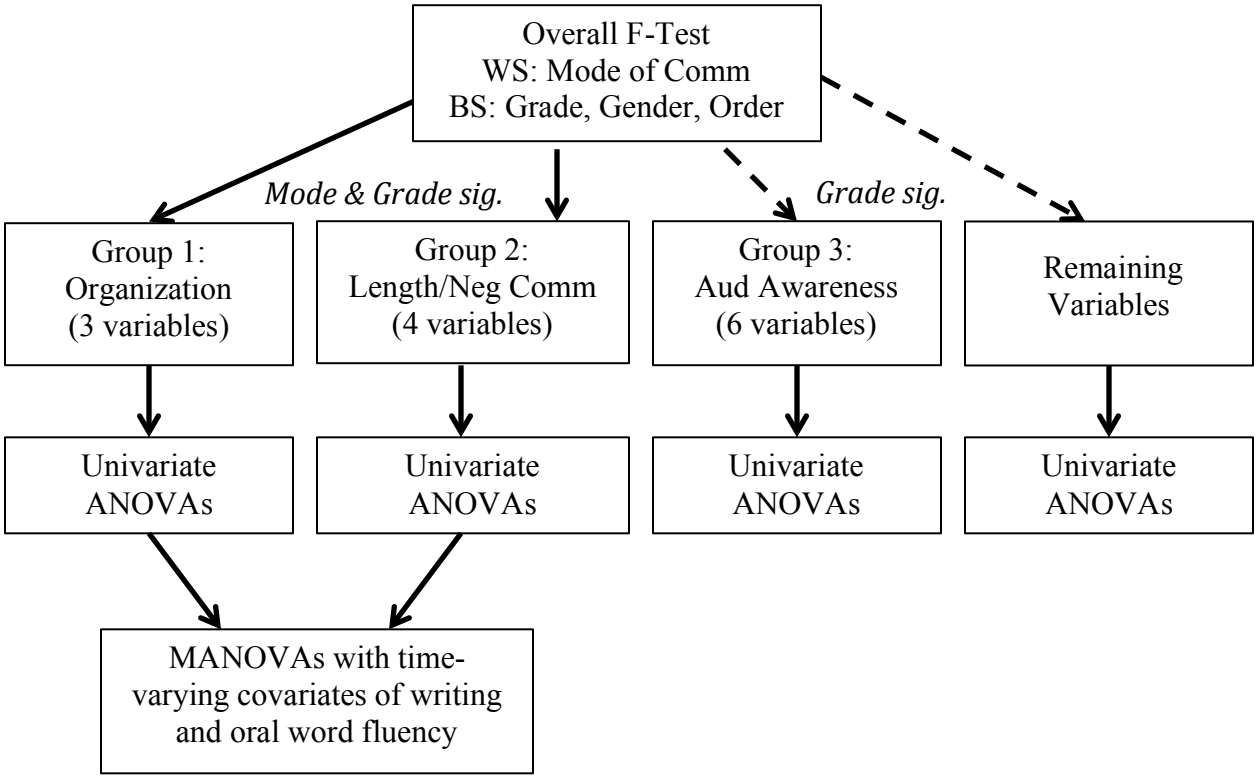

Figure 4. Analysis Flow Chart for Part II.

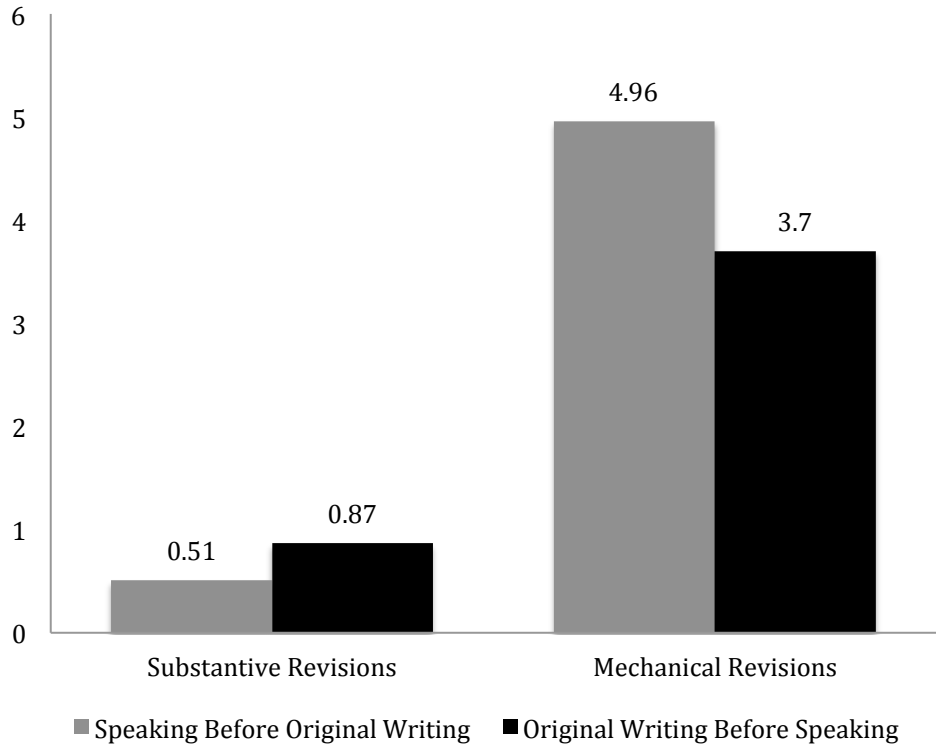

Figure 5. Number of Revisions Made by Type of Revision and Condition Order.

APPENDIX A: Classroom Prompt Administration Protocol

Teacher: "Today we will be writing a letter in response to someone who needs your help. I'm going to give each of you a letter. So to help him, you are each going to write him a letter back. Please start by reading the letter I am handing out. You all have different letters, so make sure you only read and reply to your own. If you are having trouble reading it, raise your hand and someone will come and help you."

→ Distribute letters and writing paper to students

Teacher: "Ok, so now, we need to send him a reply. I would like everyone to take out a pencil and write a letter in response to the person who wrote you one. Remember that you need to do a really good because your help is very important to the person who wrote to you. You can take 30 minutes for this. Try to make the letter as good as you can, so once you are done, read your letter again and make any revisions or changes to improve it.

Any questions?

You can get started. Remember to work alone on this- no talking. Raise your hand if you have any questions."

→ Once some students seem to be finishing, repeat

"You want to make the letter as good as you can, so once you are done, read your letter again and make any revisions or changes to improve it."

Appendix B: 3- Minute Fluency Administration Protocol

1. Say, "Hi! Today, I'm going to have you do a quick writing. I'm going to tell you a topic and I want you to write all about the topic. You will have three minutes to write. If you don't know how to spell a word, just do the best you can to write it."
2. Distribute paper and pencils.
3. Say, "I'm going to read you the topic. Then I want you to take 1 minute to think about it. I'll say stop after one minute. Then you will have 3 minutes to write."
4. Say, "We are going to write <u>all about school</u>. The researcher wants to know all about your school. I want you to take 1 minute to think. Put your pencils on your desks. Start thinking now".
5. Set the timer for one minute. When it rings, say "Ok, we're ready to write. Now you have 3 minutes to write all about school. Remember to just do your best with spelling. Pick up your pencils. Start writing now."
6. When the time rings, say "Please put your pencils down."
7. Collect the paper. Say, "Thank you so much for writing! The researcher can't wait to read your writing."

APPENDIX C: Part I Argument Prompts

ADULT CHEAT PROMPT:

Dear Pen Pal,
My name is Andy Smith. I joined a pen pal group for adults and kids because I need some help with a problem. I hope you can help me.
I finished high school five years ago and now sell things for a company. Last year, the company lost money because someone made mistakes counting money. Now they want to make sure we can all do math.
We're taking a math test in two weeks. If I don't pass, I'll lose my job.
I'm bad at math, and always did badly on math tests back in school. I really want to do well on this test. I want my boss to think I'm smart, and I don't want to lose my job.
My boss says that we need to take the test on our own, but I don't know any math. So how can I pass? That's why I'm thinking about cheating.
A guy who works with me is good at math. If I copy his answers, I can pass the test. My boss won't find out. We can sit in the back of the room so I won't get caught.
I know that I'm not supposed to cheat. But I don't know what else to do. Before I decide, I'm hoping someone can give me the reasons that I should not cheat. Can you convince me not to cheat?
Thank you,
Mr. Andy Smith

CHILD CHEAT PROMPT:

Dear Pen Pal,
I'm Michael from First Springs Elementary School. My teacher asked my class to write a letter to a kid we don't know to ask for help with a problem. I have a really big problem, so I'm writing this letter about it.
I'm not super good at math, and I always do really badly on math tests. My teacher and Mom sometimes yell at me. We have a big test coming up in two weeks. I really want to do well on the test. And I don't want to get in trouble. And I want to make my mom and teacher proud of me.
My teacher says that we need to take the test on our own. No talking or copying. But I don't know the stuff on the test. So how can I do well??? That's why I'm thinking about cheating.
Leo sits next to me and he's really good at math. So if I copy his answers, I can get it right. I think my teacher won't see me. I sit in the back of class. So I won't get caught.
I know that I'm not supposed to cheat. But I don't know what else to do. Before I decide, I'm hoping someone can give me the reasons that I should not cheat. Can you convince me not to cheat?
Thanks,
Michael

ADULT LIE PROMPT:
Dear Pen Pal,
My name is Bill Brown. I joined a pen pal group for adults and kids because I need some help with a problem. I hope you can help me.
I finished high school five years ago. I now work at the mall. Last
Monday, I was working alone until the store closed. I was supposed to lock the door before I left. But I forgot. Then a man tried to steal from the store. Luckily, a security guard caught him.
My boss is starting to wonder how the thief got into the store. He thinks that the door wasn't locked. So he's really angry. He's asking me if I left the door unlocked.
He may fire me if he finds out that it was my fault. I'm a very good worker. My boss was even going to make me head salesperson. Even if he doesn't fire me, he won't make me head salesperson. This is why I'm thinking about lying. I can pretend that I locked the door.
If my boss believes me, I won't get into trouble. I was the only one there, so he won't find out that I lied.
I know that I shouldn't lie, but I don't know what else to do. Before I decide, I'm hoping someone can give me the reasons that I should not lie.
Can you convince me not to lie?
Thank you,
Mr. Bill Brown

CHILD LIE PROMPT:
Dear Pen Pal,
I'm Tim from First Springs Elementary School. My teacher asked my class to write a letter to a kid we don't know to ask for help with a problem. I have a really big problem, so I'm writing this letter about it.
I'm the class leader this month. Sometimes I get extra jobs to do.
Last Monday, my teacher told me to shut the classroom door when we went to assembly. But I forgot. Then a bad kid tried to steal something from the classroom. Then luckily, the janitor caught him.
My teacher is wondering how the other kid got in the room. She thinks that I didn't shut the door. So she's really upset. She asked me if I did it.
I'll get in trouble if I say I did it. I'm a good kid. I'm going to win a class prize (candy!) for being a good leader. Then I won't get the prize. So
I'm thinking about lying. I can pretend that I shut the door.
Then I won't get into trouble. My teacher wasn't looking. She won't know that I lied.
I know that I shouldn't lie. But I don't know what else to do. Before I decide, I'm hoping someone can give me the reasons that I should not lie.
Can you convince me not to lie?
Thanks,
Tim

APPENDIX D: Knowledge of Argumentation Task

Instructions: Below is a list of 8 questions. In each one, a kid needs your help to decide what he or she should say next. Please circle either option A or option B to tell the kids what they should say next. After each question, I'll give you a minute to write down why you picked your answer. So here comes the first one…

***Q1) Ben's parents don't want him to play video games, but Ben wants to.
Ben really wants to convince his parents that they should let him play video games.
Ben says to his parents: "I think that you should let me play video games."

<u>What should Ben say to his parents next?</u>

A) Video games are really fun because they are exciting and fast-paced.
OR
B) Video games teach important skills like fast and correct decision-making.

Now circle what Ben should say next.

Why did you pick that answer?

***Q2) A state official wants to remove all unhealthy foods, like chocolate, cookies, and chips from vending machines, but Kevin wants to keep these foods.
Kevin says to the state official: "I think that we should keep chocolate, cookies, and chips in vending machines."

<u>What should Kevin say next?</u>
A) These foods can make people happier and make them want to study or work harder.
OR
B) These foods tend to taste a lot better than healthy food.

Now circle what Kevin should say next.

Why did you pick that answer?

***Q3) When chatting with her mom about homework, Brittney says:
I think that parents should help kids with their homework because they learn more from it that way.

<u>What should Brittney say next?</u>

A) Kids who understand their homework properly tend to do better in school.

OR

B) It takes too long to do homework alone since teachers assign so much of it.

Now circle what Brittney should say next.

Why did you pick that answer?

Q4) During a class presentation on reducing pollution, Ashley says:
Everyone should take buses more often because it reduces the amount of pollution in the air.

What should Ashley say next?

A) It is easier to take buses since you don't have to pay attention to the roads.
OR
B) Having cleaner air to breathe improves everyone's health.

Now circle what Ashley should say next.

Why did you pick that answer?

Q5) When chatting with her mom about exercise, Jasmine says:
I think that everyone should exercise at least three times a week to improve their health. I know you keep saying that you don't have time to exercise because you work too much.

What should Jasmine say next?
A) If you try, you can work a little less so that you have time to exercise.
OR
B) If you try, you can exercise by taking the stairs instead of the elevator, which you can even do at work.

Now circle what Jasmine should say next.

Why did you pick that answer?

Q6) During a presentation to the school board about how long the school day should be, Amber says:
"I think that the school day should be shorter because children can't pay attention for too long. I understand that the school board thinks that there are too many things that we need to learn in school, and need a longer school day to do this.

What should Amber say next?

A) Children should also learn less in school by taking away some difficult topics that take too long to teach, so that the school days can still be shorter.

OR

B) Children will still be able to learn everything in a shorter day because they will be able to pay more attention and remember more, so teachers will spend less time reminding them of things they forgot.

Now circle what Amber should say next.
Why did you pick that answer?

***Q7) When trying to convince his mom to let him keep watching TV, Greg says: I think parents should let their kids watch lots of television.

<u>What should Greg say next?</u>

A) Scientists have found that children who watch too much television have health problems, like gaining weight.

OR

B) Scientists have found that children learn many important things from watching television, like new ways of thinking and problem solving.

Now circle what Greg should say next.

Why did you pick that answer?

Q8) During a presentation about museums, Dylan says:
Everyone who works in the museum should know many facts about the exhibits.

<u>What should Dylan say next?</u>

A) Museum visitors tend to pick up the written information packets at the door, which gives them all the facts about the exhibits.

OR

B) Museum visitors tend to ask the people who work there lots of questions about the exhibits.

Now circle what Dylan should say next.

Why did you pick that answer?

Note. ***indicates audience awareness questions (Qns. 1, 2, 3, 7)

APPENDIX E: Analytic Scoring Rubrics for Parts I & II

Overall Persuasiveness Rating

1 point: Argument rarely supports the claim due to being too short, unfocused, or confusing,
2 points: Argument is largely unpersuasive though there are elements that support the claim. These elements are not very strong reasons based on the audience perspective and are largely unelaborated. Reasons are not linked to audience goals and beliefs.
3 points: Argument is somewhat persuasive and contains a mixture of unpersuasive elements and persuasive ones for the audience. The persuasive elements are not emphasized more than the unpersuasive ones. The writing quality is not highly persuasive, and no counterarguments are effectively addressed.
4 points: Argument reads somewhat persuasively by having a clear focus on persuasive elements, though some unpersuasive elements to the audience may still exist. Writing reads somewhat persuasively, though not strongly so. Writing should contain at least 2 reasons or counterargument responses, and at least one counterargument should be addressed decently.
5 points: Argument is persuasive and includes elaborated persuasive elements and very few unpersuasive elements Writing reads persuasively and uses some strong, emotive language. Writing contains multiple relevant, decently developed reasons, addresses more than 1 audience goals decently, and is elaborated to some extent. A few issues may still exist (e.g. one average reason or poor example - should not elaborate on anything that the audience wouldn't care about anymore)
6 points: Argument is highly persuasive- all elements are audience-focused and most elements are reasonably elaborated. Writing reads persuasively. No unconvincing reasons are included, and multiple counterarguments are effectively addressed.

Claim Clarity

1 point: No claim can be identified
2 points: Claim not clearly stated at the beginning but can be inferred from the argument.
3 points: The claim is stated incompletely (e.g. I disagree with you) without saying what they are disagreeing with.
4 points: Claim is stated as a response (e.g. I agree/disagree) but is elaborated enough to know what the claim content is, or stated as is if were already obvious, but still mentioned (e.g. These are my reasons why you shouldn't lie.)
5 points: The argument clearly contains a directly stated claim, though it may be stated in a non-persuasive manner.
6 points: The argument clearly contains a directly stated claim that is stated firmly and persuasively by using elaboration or emphasis.

Evidence/Reason Quality

1 point: The reasons appear to contradict the claim, are not relevant to the claim, or no reasons are provided

2 points: 1-2 *unelaborated* reasons are provided that are relevant, but unimportant or unconvincing to the audience, providing only weak justification for the claim. No strong/clear reasons that would be convincing to the audience are provided. Few elaborations, connections, examples.

3 points: 1-2 *unelaborated* reasons are provided that are important and convincing though unelaborated

OR 1-2 *elaborated* reasons provided that are relevant, but unimportant or unconvincing relative to other possible reasons

4 points: 1-2 *somewhat elaborated* reasons that are relevant and reasonably important, but weakly stated (not persuasively stated or lacking elaboration), providing only weak justification for the claim.

OR only 1 reason that is strongly stated.

OR 2 or more good reasons that are not very well elaborated, but elaborated enough to understand the point.

5 points: 2 or more reasons that are relevant to the audience, important, and elaborated. An additional poor reason may also be provided as long as at least 2 reasons are strong.

6 points: 2 or more reasons that are relevant, important, elaborated and strongly stated, and at least 3 good, audience-focused total. No poor reasons provided.

Evidence/Reason Quality- Audience Awareness

1 point: All evidence used, if any, is only focused on the child's viewpoint without consideration for what the adult audience may consider important.

2 points: The evidence seems very child-focused overall though there may be one instance of attempting to link the reason to the audience. Ignores or very poorly addresses issues faced by the audience, and no specific information from the prompt is utilized.

3 points: Some evidence is child-focused while other reasons cater to the audience. Reasons are not written in a way that indicates that the child understands which are child vs. audience focused. Must have at least one audience-directed reason even if it does not relate to an audience goal. Elaborations are not well-suited to the audience or no/few elaborations provided.

4 points: Most evidence caters to the audience, but elaborations/examples assume knowledge the audience may not have, which includes lack of elaborations/definitions. Needs to have at least one instance of discussing information from the prompt. Should NOT have any reasons that contradict information in the prompt or the audience viewpoint.

5 points: Most evidence caters to the audience and is framed in an audience-focused way. Should no longer have evidence too unelaborated to understand. Cannot say anything that is detrimental to the argument in terms of audience goals. Utilized specific prompt information. Minor issues related to audience awareness still exist.

6 points: All evidence caters to the audience, is effectively tied back to the specific goals and circumstances of the audience, and does not assume too much specialized knowledge in the reader

Counterargument Response Rating Scale

1 point: No counterarguments are stated or refuted
2 points: At least 1 counterargument is stated but not refuted. (mention counterargument, but no response given to it)
3 points: At least 1 response to a counterargument provided, but the rebuttal is not very consistent or convincing
4 points: 1 counterargument convincingly refuted.
5 points: A decent attempt at refuting at least 2 counterarguments; or only one is very effectively refuted/responded to.
6 points: 2 or more counterarguments are effectively refuted/responded to

Organization Rating Scale

Sum Score (of 6):
1 point- has an introduction
1 point- has a conclusion
2 points- ideas grouped together effectively (1 point if partially effective)
1 point- avoids representing the same reason as multiple reasons, or multiple reasons as the same
1 point- avoids unnecessary repetition and tangents

APPENDIX F: Highest and Overall Audience Awareness Rubrics

Score	Description
0	No opinion stated or implied, no reasons provided
1	unelaborated request
2	Primarily employing a repeated statement of the request or repeating a single reason
3	Elaboration of the necessity, desirability, or usefulness of not cheating/lying in terms of the persuader's need or the need of someone other than the persuader or audience
4	Appealing to general principals rather than ones specific to the situation
5	Acknowledging and dealing with anticipated counterarguments by refuting them, but without direct links to the consequences for the audience
6	Some efforts to demonstrate relevant consequences for the audience of accepting or rejecting the claim
7	Elaboration of the relevant consequences of accepting/rejecting the claim and direct links to the characteristics of the specific audience
8	Outstanding instance of taking the audience perspective by clearly demonstrating a response where the writer completely took the perspective of the audience

Highest Audience Awareness	The level (0-8) that represented the best element produced anywhere in the argument
Overall Audience Awareness	1- Only lower level strategies used (3 and under) 2- At least one mid-level strategy used (4 or 5) 3- At least one higher level strategy used (6 or 7) 4- At least 2 strategies are at a high level (6 or above), with no more than 1 strategy below level 6 5- 3 strategies at a high level (6 or above) with no strategies level 1-3, and no more than 1 being at level 4 or 5.

APPENDIX G: Part II Individual Session Protocol

Note 4 versions:

1) Speaking First, Recess Prompt
2) Speaking First, Field Trip Prompt
3) Writing First, Recess Prompt
4) Writing First, Field Trip Prompt

Persuasive Writing and Speaking
Individual Session Researcher Protocol
Speaking First

Prep:
Set up work station including camera
Turn on camera when session starts

1) Assent

I am working on a research project about how kids write and speak. I'm going to ask you to do some writing, speaking, and reading. It's okay if you don't want to do something. Just let me know, and we can stop. Your parents already told me that it's okay with them if you take part, but you get to decide, too. Do you want to help me out and do some writing and speaking?

Great! Let's get started!

2) WIAT-III Oral Word Fluency

The first thing we're going to do is something where I'll give you a category, like foods and I'll ask you to name as many things in that category as you can in one minute, like hot dogs or cookies.

Any questions?

Great! Let's get started!

→ Turn on audio recorder, and say "*subject number* (e.g., 502) word task"

Name as many <u>animals</u> as you can in one minute. For example, you can say bear and goat. Now you name some more animals.
Start Now. → Start timer on "Now"
→ Write down words the child says

→ after 60 seconds, say "stop"

Now we'll do one more just like that.
Name as many colors as you can in one minute. For example, you can say red and lavender. Now you name some more colors.
Start Now. → Start timer on "Now"
→ Write down words the child says
→ after 60 seconds, say "stop"

→ Turn off audio recorder

3) abc Task

Now we'll do something different. Here's a piece of paper and pencil. I want you to print the entire alphabet in lower case, small letters as fast as you can without making mistakes.
When I say start, you can start writing the letters. Ready?

→ Say "Start" with timer, and "stop" after exactly 15 seconds

Great job! Now we're moving on to the main reason I'm here today.

4) Instructions + Video Prompt + Comprehension Questions

I'm helping someone collect kids' ideas on an issue. He's made a short video about the issue for you to watch.

Why don't you put these headphones on, and I'll play the video!

→ Play video

Once video complete, ask 2 comprehension questions:

Q1: Ok, so who are you going to be writing and speaking to? (Answer should be John Williams/Timothy Stone OR a descriptive comment such as "the man who is saying to the principal that we shouldn't have recess/field trips". If they say a descriptive comment. Respond "Exactly, that's what **[John Williams/Timothy Stone]** said."

Q2: What do you need to convince **[John Williams/Timothy Stone]** to do? (Answer should be that they need to convince him to keep recess/field trips)

Note: If child answers either question incorrectly, play the video again.

5) Planning Instructions

So, like **[John Williams/Timothy Stone]** said, you're going to make a presentation and write down your opinion and reasons about why kids should still **go on field trips/ have recess during school**.

Now, I'm going to give you 3 minutes to plan what you are going to say and write about.

Here's a reminder of what **[John Williams/Timothy Stone]** said in case you want to refer to it.
→ Give them the transcript paper

After planning, you can first do the spoken presentation on your opinion and reasons, and then write them down.

Any questions? Great!

You can press the spacebar if you want to watch the video again. I'll let you know when your planning time is over, and then **you can make the spoken presentation on your opinion and reasons.**

Here's a pencil and paper in case you want to write something down. You will not be able to refer to anything you write later on though. Ok…so you can start planning now
→ Give 3 minutes to plan (use stopwatch on your phone) – must spend 3 minutes planning
→ If child took notes, collect their notes after planning time is up

Ok, so you can now give **the spoken presentation on your opinion and reasons!**

6) Speaking Instructions

I'll start the audio recorder and you can start talking whenever you're ready!
→ Start audio recorder and say: "*subject number* speaking start" e.g., "511 speaking start"
→ once complete, stop the recorder

→ DO NOT give child their notes during speaking session. They may look at the prompt transcript if they want.

Great job!

→ Turn off audio recorder

7) Writing Instructions

Ok, so now we can move on the next part, where you write down your opinion and reasons.

I'll give you up to 15 minutes to this, but you can just let me know when you're done in case you're finished early. Ok? Great! You can start whenever you're ready.

→ Give child a 5-minute warning "You have 5 minutes left"
→ Give child a 1-minute warning "your time is almost up, so why don't you finish writing your last sentence"

→ If child says they are done in 10 minutes or less, say:
You still have some time left. Do you want to add anything else?
→ If yes, give them up to the original 15 minutes. If no, move on to revision

→ once writing is complete, **take a pdf photo** of what the child wrote.

Great job!

8) Revision

Let's now make sure your writing is as good is at can be. (give child their writing). Can you read what you wrote out loud for me?
→ child reads out loud

Great job!
Now, take 5 minutes to revise or change what you wrote to make it as good as possible for **[John Williams/Timothy Stone]** so that he changes his mind and recommends that kids should still **go on field trips/ have recess**. I'll let you know when your time is up.

→ Child should revise for at least 3 minutes.

9) Liking/Self-Concept Questions

You've done an amazing job so far, and we're almost done now.

The last thing I'll ask you to do is ask you a few questions about how much you like writing and talking.

→ Take out questionnaire and read instructions, question, and response options to student.
→ Say "circle your answer", and then read the next question

Wonderful! We're all done now!

Debrief:
While we're heading back to class, I just wanted to let you know that the opinions of **[John Williams/Timothy Stone]** aren't very common. Lots of people believe that it's really good to **have recess/go on field trips**!

Thanks for all your help! Have fun in class!

APPENDIX H: Individual Session Argument Prompts

Field Trip Prompt:

"My name is John Williams, and I have been asked to provide my opinion on whether or not elementary school students should go on field trips. School boards, principals, and teachers will use my suggestions to determine whether students will still go on field trips during the next school year.

I believe that students should no longer go on field trips during the school day. Instead, they should only spend their time in class.

Field trips just encourage students to expect breaks from schoolwork, and do not help them learn the many things they need to learn in school. For instance, if a student goes on a field trip to the zoo, the student learns nothing. If that student instead remains in class, where the student is taught information and facts about animals, the student learns a lot. This is why I think students should no longer go on field trips.

I'll be giving schools my opinion very soon, but before I do, I would like to listen to the opinions of some of the students this decision will be affecting, which is why I have made this video presentation.

I understand that many students would not agree with my decision, so I am asking that you make me an audio presentation of your opinion and reasons about why you should still go on field trips. In addition to your spoken comments, I would like you to write down your opinion and reasons clearly and neatly. If your arguments are convincing to me, they may influence my final decision about whether students should still go on field trips."

Recess Prompt:

"My name is Timothy Stone, and I have been asked to provide my opinion on whether or not elementary schools should recess for children. School boards and principals will use my suggestions to determine whether schools will still have recess during the next school year.

I believe that elementary schools should no longer have recess at the school. Instead, students should spend their time, other than lunch, in class doing learning activities.

Having recess just encourages students to expect breaks from learning, which does not help them learn the many things they need to learn in school. If students spend their time in class, they can take part in learning activities such as reading fiction stories. When children have recess, they can do anything they want, even things that don't help them learn anything. This is why I think schools should no longer have recess.

I'll be giving schools my opinion very soon, but before I do, I would like to listen to the opinions of some of the students this decision will be affecting, which is why I have made this video presentation.

I understand that many students would not agree with my decision, so I am asking that you make me an audio presentation of your opinion and reasons about why schools should still have recess. In addition to your spoken comments, I would like you to write down your opinion and reasons clearly and neatly. If your arguments are convincing to me, they may influence my final decision about whether schools should still have recess."

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