

CHILDREN'S ABILITY TO RECOGNIZE IMPLICIT AND EXPLICIT REASONING OF STORY BOOK CHARACTERS

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Abstract

This research study looked at children's ability to recognize implicit and explicit reasoning as presented in Sufi story books. Sufi tales are specific teaching stories that focus on the wisdom that is presented in their message. Participants were 205 children in Kindergarten to fifth grade at an elementary school in North-East of United States. Children were individually tested by asking them to listen to a randomly assigned Sufi tale read from a picture book. Then they were asked questions inquiring about their ability to recognize information from the story book. There were four different Sufi story books used in the assessment of children. Information presented in the story books and corresponding questions were categorized as implicit or explicit. Data analysis was conducted by grade level, gender, and story book. Book type was considered as a covariate in the comparison between gender, and grade levels. Results show that there is a difference in grade level among children's ability to understand explicit versus implicit information. Our results support Piaget's theory of cognitive development in stages by age range, that would correspond in our study to the different grade levels. There was no gender difference among children in different grade levels. Results inform classroom teaching, especially with the purpose to teach reasoning and critical thinking in children with the use of culturally diverse teaching materials.

Keywords: cognitive development; implicit and explicit reasoning; critical thinking

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Development of reasoning in children

Young children are bombarded with information from numerous sources, and they are believed to be credulous and easy to fool because they have a concrete factual reasoning and lack critical thinking. As children grow older there are age differences in the way they are able to reason and critically evaluate the information they receive based on logical inconsistencies.

Developmental research (Mascaro & Sperber, 2009) shows that by six years of age a child is able to infer correct answers from explicit (overt) information, as opposed to implicit (hidden) information. Children around seven years of age start to understand the value and importance of reasoning. Eight-year-olds show evidence of more advanced reasoning as long as the information is explicit (Mills & Grant, 2009; Mills & Keil, 2008). As children grow, by age of 10 or 11 they become more capable to correctly reason, and improve their ability to understand, evaluate and predict a consequence derived from explicit, partial, or implicit information (Mills, 2013; Tullos & Wooley, 2009). Another developmental change was found by Chalik, Rivera and Rhodes (2014) in what regards children's understanding of causal mechanisms of thinking that enables them to predict behavior on the basis of individual emotions.

Research on children's comprehension (Morris, 2000; Moshman, 1990; Perovic & Radenovic, 2011) shows that children perform well when presented with tasks that require simple logical inferences. However, it is shown that there is a developmental gradual transition in the ability to make logical and illogical inferences, as well as explicit inferences, with a full development of understanding of explicit and implicit logical inferences in early adolescence (English, 1993; Grant & Mills, 2011; Markovits, Schleifer, & Fortier, 1989; Moshman, 1990). Fabricius and colleagues (Fabricius & Imbens-Bailey, 2000; Fabricius & Khali, 2003; Fabricius, Boyes, Weimer, & Carroll, 2010) studying children's understanding of people's beliefs, found that children will reason about people's understanding based on perceptual accessibility. Research shows that children are capable of making inferences based on visual information (Aust, Range, Steurer, & Hubers, 2008; Call & Carpenter, 2001; Hill, Collier-Baker, & Suddendorf, 2012). As children reach around seven years of age they begin to show awareness that what we know is dependent on how we interpret reality, and that we can form mental representations of the

world, which is precursor of critical thinking (Kuhn, Cheney, & Weinstock, 2000; Kuhn, 2005; Kuhn & Crowell, 2011). Morris (2000) found that between age of 8 to 13 there is a developmentally increase in the ability to explicitly recognize the difference between logical and nonlogical forms of information, and an increase ability to monitor the introduction of personal knowledge.

Listening comprehension and reasoning

Children's reasoning abilities develops through listening comprehension. Literature on comprehension strategy suggests that text accompanied by pictures is more effective for reading comprehension (Carney & Levin, 2002; Marley & Szabo, 2010; Sadoski & Paivio, 2001; Salmon, Yao, Berntsen, & Pipe, 2007; Szabo & Marley, 2008). Of particular interest is a listening comprehension study conducted by Greenhoot and Semb (2008), where children listened to stories accompanied by relevant or irrelevant pictures. The results showed that there was an improvement when relevant pictures were presented along with verbal stories and also there was an age-related developmental transition when text was accompanied by pictures.

Many researchers suggest that reading comprehension and fluency are improved when students are provided with a model of fluent reading (Cole & Lionetti, 2004; Hawkins, Musti-Rao, Hale, McGuire, & Hailley, 2010; Marley & Szabo, 2011; Skinner, Cooper, & Cole, 1997). There are multiple terms used to name the modeling of fluent reading, such as listening previewing (Rose, 1984a, 1984b), echo reading (Homan, Klesius, & Hite, 1993), listening-while-reading (Raskinski, 1990), and reading aloud (Kuhn, 2005). These are instructional models where students are taught to read while the teacher, or another more skilled peer, reads fluently the passage; they are also referred in the literature as listening only (LO) instructional methods. Hawkins et al. (2010) show the effectiveness of fluent reading models. Their research shows that listening to a text being read out loud resulted in higher comprehension of the meaning of the text, compared to when students themselves were reading the text. Results from this research show that when students come in the classroom with different reading abilities, and are provided with fluent reading models, less cognitive energy was needed for decoding because cognitive resources were used for understanding the meaning of what was read.

Begeny, Krouse, Ross, and Mitchell (2009), show that listening strategies are more effective for addressing educational purposes related to

teaching comprehension, building vocabulary, and helping students obtain the meaning of presented information from a text. In their study two listening comprehension strategies (student repeated reading, and listening passage preview) were equally effective. Their results support similar results from Rosenhouse et al. (1997), and show that listening strategies are just as effective as repeated reading in what concerns retention of information from the passage read.

It is demonstrated that listening comprehension is a precursor for reading comprehension (Diakidoy, Stylianou, Karefillidou, & Papagerogiou, 2005), and it is a function of age, the relation between listening and reading comprehension becoming stronger as children mastered reading. While Cain and Oakhill (2007) stressed the need to study developmental differences in text comprehension, Florit, Roch, Atoe, and Levorato (2009) stress the role of memory in listening comprehension, and show that performance on listening comprehension tasks predicted reading comprehension. They also point out a significant age effect on listening comprehension, which indicates a qualitative and quantitative development in text comprehension that increased with children's age. Huang and Snedeker (2009) point out that as children become linguistically competent, they also become able to make inferences of the meaning from the literal text they hear.

Research literature shows that children's comprehension, reasoning, and critical thinking is developmental. Educators study which listening or reading comprehension teaching method would best help children improve their reasoning and develop their critical thinking. In this study we set out to observe developmental differences in children's critical thinking about story lines. Comprehension of story line and ability to point out existent misunderstandings in characters' thinking (explicit information) from the story text would demonstrate children's ability to think critically. We hypothesize that, according to the cognitive constructivist theory (Piaget, 1964; Cain & Oakhill, 2007; Florit et al., 2009), the developmental stage of children will impact their listening comprehension performance, and their ability to think about inferential content (implicit information) in a listening task. We claim that we can see better children's reasoning when children transfer their comprehension and reasoning abilities to analyze story lines from another culture, with purposes that are different from most children's books written in the western tradition. We set in this study to use multicultural literature, with

unfamiliar story lines. This can challenge children’s knowledge and assumptions, and thus might be more evident to see the way they use reasoning and critical thinking. Observing children applying their reasoning to new story lines (unfamiliar to them) could help us measure with a bit more accuracy their reasoning and critical thinking abilities. We expect that ambiguity level (implicit information) will negatively impact performance in listening comprehension. Based on developmental theory and with support from research on listening comprehension we pose two questions:

RQ1: Is there a grade level difference among elementary school aged children in recognizing and analyzing the thinking of story book characters?

RQ2: Is there a grade level difference in elementary school aged children’s thinking about factual information when identifying and analyzing the explicit and implicit reasoning of story book characters?

Method

Participants

Participants were students in a suburban public elementary school in the Northeast of the United States. Participants’ race distribution is representative of the school racial composition, with mostly Caucasian (77%), followed by Hispanic (11%), Asian (7%), and African American (4%). In this school, nine percent of students were eligible for free lunch, two percent with reduced lunch, and seven percent with limited English proficiency. Table 1 shows some of the demographic data of our participants. A total of 224 students returned their parental consent form to participate in the study, 11 students either were sick in the testing day, absent, or moved to another school, and eight students were holders of IEP (Individualized Education Program) for special needs; these were later dropped from data analysis to not skew the results. Data analysis was conducted on 205 participants who were tested individually by three experimenters.

Table 1. Participants demographic data

Grade	Age range	Girls	Boys	Total in study	Total in school
Kindergarten	5-6	11	18	29	56
1 st grade	6-7	20	14	34	69
2 nd grade	7-8	18	22	40	83
3 rd grade	8-9	16	13	29	76

Table 1. Participants demographic data - *continued*

Grade	Age range	Girls	Boys	Total in study	Total in school
4 th grade	9-10	17	16	33	70
5 th grade	10-11	23	17	40	71
Total	5-11	105	100	205	425

Instruments

Testing materials were four Sufi tales written for Western children. The Sufi were originally a people from the Near East, Middle East, and Central America who sought to discover truth in their quest for enlightenment. Many of their carefully crafted stories were meant to develop reasoning and critical thinking, while obtaining enlightenment. The stories would do this by surprising or even perplexing their listeners or readers, thereby stimulating their thinking; this in turn, would aid them in discovering the truth, thus helping them achieve enlightenment. In each tale a character or a group of characters thinking has gone or does go awry; thus, they each raise their own perplexing question as to why the character(s) thought as they did. Table 2 presents the books and their focal perplexing question.

Table 2. Sufi tales books

Title	Author(s)	Perplexing Question
Book 1 <i>The Clever Boy and the Terrible, Dangerous Animal</i>	Shah (2000a)	Why would villagers be terrified of a fruit?
Book 2 <i>The Silly Chicken</i>	Shah (2000b)	How does a chicken frighten a group of townspeople to the point where they want to escape from the earth?
Book 3 <i>The Old Woman and the Eagle</i>	Shah (2002)	Why would an old woman insist an eagle is a pigeon?
Book 4 <i>In the Dark</i>	Wolf, Rao, and Ramanathan (2002)	How could five men (in the same situation and confronted with the same object) arrive at five widely different and incorrect identifications of that object?

Book readability was determined using Lexile text measures (*see* Table 3). These measures are calculated using word frequency and sentence length. Readability was computed using Scholastic Reading Inventory (SRI) Lexile scores for grade level performance (Scholastic Inc., 2007). Lexile scores have a 200 point range for the first and second grades (Gr 1 range 100-299; Gr 2 range 300-499), while for the third through fifth grades the Lexile scores have a 100 point range (Gr 3 range 500-599; Gr 4 range 600-699; Gr 5 range 700-799).

The Lexile measures do not incorporate a number of factors that influence the ease of reading, for instance, content complexity, reader motivation, and book design. Picture books are designed to include illustrations that are just as important to the reader or listener as the written text. Pictures and text both contribute to the telling of the story. Three of the four Sufi tales (*see* Table 3) have illustrations that strongly support the story line. The fourth book has abstract, irrelevant illustrations (mostly blots of black color that do not represent evident objects or pictures).

Table 3. Sufi books: lexile measure, picture support and number of participants

Title	Lexile Measure	Mean Sentence Length	Mean Word Frequency	Word Count	Picture Support	Students Tested
Book 1 <i>The Clever Boy and the Terrible, Dangerous Animal</i>	690L	11.67	3.78	677	Strong	54
Book 2 <i>The Silly Chicken</i>	690L	12.80	3.95	781	Strong	53
Book 3 <i>The Old Woman and the Eagle</i>	790L	12.52	3.66	626	Strong	48
Book 4 <i>In the Dark</i>	430L	7.78	3.68	428	Abstract	50

To assess children’s critical thinking through the ability to identify and analyze the story character’s thinking, for each book we developed nine comprehension questions (questions were numbered 1 to 8, with two parts for question 7: 7a and 7b). The questions were developed based on a revised version of Paul and Elder (2005) definition of critical thinking and eight of its dimensions which they call “The Elements of Thought.” Including analytic, evaluative, and creative processes, they define critical thinking as “*the art of thinking about*

thinking in such a way as to: 1) identify its strengths and weaknesses, and 2) recast it in improved form (where necessary)'' (Paul & Elder, 2005, p. 23). Each of our thinking elements and its description can be seen in Table 4.

Table 4. Thinking elements and their description

Q	Element	Description
1	The Goal	The goal that the character is trying to accomplish by his or her action(s)
2	The Question	The question that the character asks in order to achieve his or her goal
3	The Point of View	The way the character is looking at something that is very important to the story
4	The Unquestioned Assumption	A general belief whose truth the character takes for granted
5	The Information	The facts, evidence or experiences that the character uses while trying to figure out what is most important for him or her to know
6	The Inference	The thinking process that a character uses to arrive at a result he or she considers to be a truth
7	The Guide to Thinking	7a) The ideas or principles of thinking that the character should use to achieve his or her <i>proper</i> goal; and 7b) the <i>reasoning</i> about that thinking
8	The Consequence	The immediate result caused by the main problem in the character's thinking

Each Sufi tale had a specific set of nine questions (for an example of a specific set of questions developed for a particular tale *see* Appendix A). Once the questions were formulated we agreed upon the correct, partial correct, and the incorrect responses to each of the questions on all four stories. Questions were also categorized (*see* Table 5) in explicit (if the response could be drawn directly from the text), and implicit (if the response needed reasoning or critical thinking and was not presented direct in the text). There were particular questions that were of the same type across all four books. Specifically, questions 2, 6, 7b were all implicit, and 7a was explicit across all of the four books.

Table 5. Type of question by book with number of explicit vs implicit questions

Book	#Q		Q1	Q2	Q3	Q4	Q5	Q6	Q7a	Q7b	Q8
	Expl	Impl									
<i>Clever boy</i>	2	7	Impl	Impl	Expl	Impl	Impl	Impl	Expl	Impl	Impl
<i>Silly Chicken</i>	4	5	Expl	Impl	Impl	Impl	Expl	Impl	Expl	Impl	Expl

Table 5. Type of question by book with number of explicit vs implicit questions - *continued*

Book	#Expl Q	#Impl Q	Q1	Q2	Q3	Q4	Q5	Q6	Q7a	Q7b	Q8
<i>Old Woman</i>	5	4	Expl	Impl	Expl	Expl	Expl	Impl	Expl	Impl	Impl
<i>In the Dark</i>	3	6	Expl	Impl	Impl	Impl	Expl	Impl	Expl	Impl	Impl

Procedures

The study was approved by institutional review board and conducted in accordance with ethical guidelines for research with children. Participants had parental approval and were not provided with rewards. All participants were assigned a numeric code that represented their grade level, and an individual order number that could be paired with their age, gender, and book they were tested with. There were three experimenters who were the readers (the two authors and one paid assistant, all female), each had a copy of the original Sufi tales books, four cards with the numbered books, and the same list of questions by each book. To insure random assignment of grade level each book was randomly assigned an order number. Then books were randomly chosen to be read to the participants. All three experimenters practiced with reading out loud the books to insure there is no difference in the reading style and exact procedures.

Students were tested individually, out of the classroom, in a quiet place. The reader was reading each page showing the page to the student to be able to see the text as well as the pictures in the story book. Each story had a culminating point where the reader stopped and asked one by one the first eight questions (1 to 7b), while the reader recorded word by word what the child was responding to each question. Then the experimenter continued to read the story using the same method. When the story reached end the reader asked the last question. Each response to questions was recorded verbatim by the reader (word by word). Later all documents were typed with the respective numeric codes. Scoring of each participant's response was blind, and scores were assigned based on the complexity of each response. If the response was incorrect, not appropriate, or nonexistent then it received a score of zero (0), if the response was partially correct a score of 0.5 points was assigned, if the response was correct it received a score of one (1). Total scores for each student

were computed by adding up scores obtained on each question (minimum 0 when none of questions were responded, and maximum score 9 points).

The same three experimenters were raters. In order to increase reliability of scoring all three raters scored first individually 20 protocols and then discussed each score and agreed upon the appropriateness of responses. A second batch of ten protocols was scored by all three raters and discussed to reach agreement. The second time around inter-rater reliability was much higher (.87). Then two raters (one author and the paid assistant) scored all protocols, and the third rater (the other author) scored one third of protocols. Each rater entered the scores in an excel sheet. The inter-rater reliability between the two raters scoring all protocols was higher (.92) than between all three raters (.88).

Results

Data analysis used an ANCOVA analysis by gender and grade, with book as covariate. Results by gender did not show statistically significant differences, however there were statistically significant differences in what regards grade level ($F=10.59$; $df=28$; $p<.0001$). Post hoc comparisons by grade level show a statistically significant difference between children's responses in Kindergarten, and those in first, and second grade, while those in 3rd and 4th grade do not show a statistically significant difference in scores. There is a statistically significant difference between scores from second and third grade students as compared to fifth grade students (*see Appendix B*).

Comparing total scores by book, the highest scores overall across all grade levels were obtained on the *Old Woman* story (being the easiest), followed in order by *Silly Chicken*, *Clever Boy*, and the lowest scores were obtained for *In the Dark* story (being the most difficult). Interestingly, different grade levels present different order of book difficulty (*see Table 6*, presenting the books in order from easy/highest scores overall, to difficult/lowest scores overall by grade level).

Table 6. Ordered easiness of book by grade

Grade level	Participants	Order of books from easy to difficult
K	29	Old Woman, Silly Chicken, Clever Boy, Dark
1 st grade	34	Silly Chicken, Old Woman, Clever Boy, Dark
2 nd grade	40	Old Woman, Silly Chicken, Clever Boy, Dark
3 rd grade	29	Old Woman, Clever Boy, Dark, Silly Chicken
4 th grade	33	Old Woman, Dark, Clever Boy, Silly Chicken
5 th grade	40	Old Woman, Silly Chicken, Clever Boy, Dark

A second analysis was conducted to take into account differences by type of question for each book. Each of the nine questions of each book was categorized based on the evidence that was required in the response. A question was categorized as explicit if in responding the child could draw information directly from the text which was read in the story. If in responding the child had to draw implied information, which was not directly written in the story text, the question was categorized as implicit. Based on the research literature it was expected that older children would be able to respond better to both explicit and implicit questions. Results show that there is a statistically significant difference in the level of responses by book and by type of question; the more difficult the story, a higher number of questions (both explicit and implicit) showed statistically significant difference in responses (*see* Table 7).

Table 7. Results by book and type of question and significance by grade

Book by order	# S tested	# Q sig	Significance (*) by question number and type								
			1	2	3	4	5	6	7a	7b	8
(I) Old woman	48	3q	expl*	impl	expl	expl*	expl	impl	expl	impl	impl*
(II) Silly chicken	53	4q	expl*	impl*	impl*	impl	expl	impl	expl	impl	expl*
(III) Clever Boy	54	6q	impl*	impl	expl	impl*	impl	impl*	expl*	impl*	impl*
(IV) In the dark	50	9q	expl*	impl*	impl*	impl*	expl*	impl*	expl*	impl*	impl*

Note: * significant difference by grade at $p < 0.05$

Our results are interesting in that for each book results show that both (explicit and implicit) questions were responded differently by students in the different grade level (*see* Appendix C and D). The results support the idea that as the text had more implicit information for children to draw from (*see* Table 5 for number of explicit vs implicit question by book), the results show that children's responses were statistically significant different (*see* Table 7 for significance results; see depiction of statistical significant differences by grade level in Appendix C and D).

Discussions

Results show that considering gender there is no statistically significant difference in the way girls and boys thought about and responded across all grade levels. This means that at elementary level girls and boys show similar thinking skills in story comprehension and evidence of their reasoning. Our

results support the literature on gender and academic achievement, which claims that gender-based differences in academic achievement and logical thinking (used especially in STEM academic content), show differences only starting from middle school (Osterhaus & Koerber, 2017).

From comparisons across grade level the results support the literature on cognitive development (Grant & Mills, 2011). As children enter formal education in first grade they develop a more systematic thinking and use better logical thinking than children in kindergarten. Our results show a statistically significant difference occurring between responses from children in third grade and all others in lower grade levels (*see* depiction of differences by grade level in Appendix B). Again, the results support the claims from cognitive development literature (Hill, Collier-Baker, & Suddendorf, 2012; Piaget, 1964; Tullos & Wooley, 2009) that around nine years of age children start to develop formal operation thinking, and their if-then analysis as part of logical and critical thinking, develops as well.

When looking at the results by book, it was noticed that overall book difficulty across all age and grade levels was somewhat aligned to the Lexile scores, and also to the level of explicit versus implicit information in the story. The overall order from easiest to most difficult was the following: *Old Woman*, *Silly Chicken*, *Clever Boy*, and *In the Dark*. Despite that two of our books (*Clever Boy* and *Silly Chicken*) had the same Lexile scores (readability coefficients), these particular books are picture books where the children can also see the story line, not only hear it. These pictures allow the listener to activate background knowledge, and draw connections. Pictures are important helpers in story comprehension, and they can add (if the pictures are explicit) or can hinder story comprehension (if pictures are abstract). For example, in *The old woman and the eagle* the children can see the picture of an eagle early on, and they know from common knowledge that an eagle is not a pigeon (which is the main argument in this Sufi tale). While in the story *In the Dark* children are not given enough pictorial information to recognize the problem early on (there are abstract blots of black color), and only at the very end there is a picture of the elephant (which finally discloses the intrigue of this Sufi tale). Children had to synthesize the information in one of the books (*In the Dark*) based on implicit information, without much help from the abstract pictures in the book, while in the other three, they had to analyze the information and had the help from the pictures.

This level of explicit information (either from the story line or additional information from the pictures), compared to the implicit information (which is not depicted in the pictures and not written in the text), had an effect on how the children understood the thinking process of the characters from the Sufi tale. Literature considering implicit and explicit information processing in children shows that children use the support of images (pictures in a book), or actions (manipulatives to play out a story plot in a book) to help in their comprehension (Aust, Range, Steurer, & Huber, 2008; Diakidoy, Stylianou, Karefillidou, & Papagerogiou, 2005; Marley & Szabo, 2010; Marley & Szabo, 2011; Szabo & Marley, 2008). Our results show that children's ability to reason about another person's thinking is also based on developmental factors. Walker, Wartenberg, and Winner (2013) examined the influence of teaching argumentation in 7-8 years old children and found that when children construct their own arguments it facilitated also their reasoning. As children enter second grade level they already are able to better reason using explicit information as compared to first grade and kindergarten level children (*see* depiction of differences in Appendix C).

Between age nine and ten (usually grades 3rd and 4th in elementary school), children start also to understand better implicit information (*see* depiction in Appendix D). Our results support the evidence based on cognitive development, knowing that by fifth grade in elementary school, students develop a better logical, abstract, and critical thinking because they are required to use analysis and more structured thinking in the curriculum, and they are expected to perform at a higher thinking level. In accordance, our results present a statistically significant difference in responses based on implicit information from 5th grade students, as compared to 3rd grade and lower grades level students, with 4th grade as a transition level (*see* depiction of differences in Appendix D). Overall, as children reach fifth grade their curriculum implies the use of higher order thinking and reasoning, which in turn helps children develop their critical thinking, which is supported also by our results for both, reasoning based on explicit and implicit information (*see* Appendix C and D).

Educational implications

Results from this study are important for elementary educators because they inform classroom teaching especially using listening comprehension teaching methods to develop children's reasoning skills. Teachers usually base

their teaching methods on children's cognitive development. However, they should be careful when they chose readings, and analysis of text that is loaded with explicit and implicit information. Especially with the purpose to teach reasoning in children, teachers should use more explicit information for younger students (kindergarten and first grade), while as children develop teachers can introduce text analysis that has more implicit information. We claim, based on results from this study, that with the purposes to help children develop reasoning and critical thinking, teachers could also use culturally diverse teaching materials. Teaching with multicultural books that include different story lines that are meant to perplex children might help in the development of their reasoning and critical thinking since it gives a layer of unusual and even abstract flavor. We argue here that using Sufi tales in the classroom is a good venue for teaching children to think critically.

Limitations

Our research was conducted in one single school and we had self-selection of participants, given that only those participated who received parent consent. It is possible that self-selected parents agreed and were confident to have their children be tested on listening comprehension tasks. Experimenters and raters were the authors, with one supplemental paid rater. We do not claim that reasoning skills can be only measured and taught with Sufi tales, we only present our results that these tales are a good method to develop listening comprehension and in the same time reasoning skills. We are aware that the four books were not identical in what concerns readability coefficient, length, and easiness of understanding the implicit message (e.g., *In the dark* was a more difficult text to reason on), however they all were comparable and of the same genre.

Conclusions

Elementary aged children are able to understand the implicit content of a text and are able to use reasoning based on critical thinking to understand the text. Texts that require reasoning should be used in elementary classroom to teach and develop critical thinking skills in children. There is a need to teach children how to think and develop good critical thinking skills from early age. Our research has practical educational implications that support the usefulness

of pairing content-based instruction with instructional practices that require students to use metacognition and analyze the content they learn about. Elementary education students should be asked and required to respond reasoning questions, and think about their own thinking (use of metacognition). A good practice is to require students to bring arguments when they analyze the characters' thinking in a story, and in turn this will promote not only the development of metacognition, but also help students develop inquiry skills, and in consequence critical thinking. More research is needed to explain how exactly can Sufi tales be used to teach critical thinking and reasoning skills to elementary education children.

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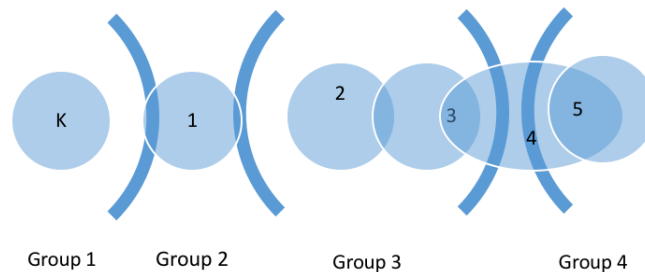
Appendix A

Example of Questions and their Type for one Sufi Tale Book

Question: Book 1- Watermelon	Type of Question
1. In the beginning, when the villagers see the unknown object, what is their goal?	Implicit
2. At the beginning, what do the villagers ask themselves?	Implicit
3. What do the villagers think the unknown object is?	Explicit
4. Why do the villagers believe that the unknown object is dangerous?	Implicit
5. What information do the villagers use to identify the unknown object?	Implicit
6. Explain how the villagers are thinking when they call the unknown object a <i>terrible dangerous animal</i>	Implicit
7a. What happened when the villagers first saw the watermelon?	Explicit
7b. What does this tell you about the villagers thinking?	Implicit
8. How should the villagers have thought about the unknown object from the beginning?	Implicit

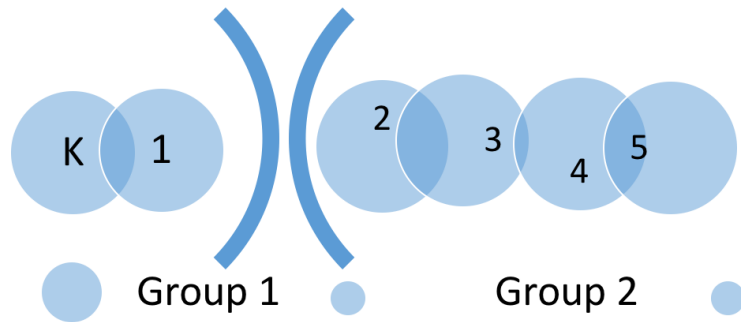
Appendix B

Grade Level Differences



Appendix C

Results Based on Explicit Text Information



Appendix D

Results Based on Implicit Text Information

