The interpretation of sarcasm by typically developing children and children with LLD in the school age population

Kristin D. Sheperd

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The interpretation of sarcasm by typically developing children and children with LLD in the school age population

Abstract
The present study was conducted to obtain information about the interpretation of sarcasm by typically developing children and children with language learning disabilities in the school age population. Prior research indicates sarcasm comprehension is a difficult semantic task for typically developing children to acquire, and thus it is likely that children with language learning disabilities, who have been shown to have significant semantic difficulties, are at risk for delayed acquisition of sarcasm comprehension. Participating children took a 24 question multiple-choice sarcasm test. Results demonstrated significant differences in sarcasm comprehension between children with language learning disabilities and their typically developing peers. Additionally, findings revealed a significant association between sarcasm comprehension and age, but no significant association with gender. Both groups of children (LLD vs. typical) deviated from the expected developmental sequence of sarcasm interpretation.

Keywords
Health Sciences, Speech Pathology

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THE INTERPRETATION OF SARCASM BY TYPICALLY DEVELOPING CHILDREN AND CHILDREN WITH LLD IN THE SCHOOL AGE POPULATION

BY

KRISTIN D. SHEPPERD
Bachelor of Science, University of New Hampshire, 2006

THESIS

Submitted to the University of New Hampshire in Partial Fulfillment of the Requirements for the Degree of

Master of Science in Communication Sciences and Disorders

September, 2008
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august 7, 2008

Date
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ABSTRACT

THE INTERPRETATION OF SARCASM BY TYPICALLY DEVELOPING CHILDREN AND CHILDREN WITH LLD IN THE SCHOOL AGE POPULATION

BY

Kristin D. Shepperd

University of New Hampshire, September, 2008

The present study was conducted to obtain information about the interpretation of sarcasm by typically developing children and children with language learning disabilities in the school age population. Prior research indicates sarcasm comprehension is a difficult semantic task for typically developing children to acquire, and thus it is likely that children with language learning disabilities, who have been shown to have significant semantic difficulties, are at risk for delayed acquisition of sarcasm comprehension. Participating children took a 24 question multiple-choice sarcasm test. Results demonstrated significant differences in sarcasm comprehension between children with language learning disabilities and their typically developing peers. Additionally, findings revealed a significant association between sarcasm comprehension and age, but no significant association with gender. Both groups of children (LLD vs. typical) deviated from the expected developmental sequence of sarcasm interpretation.
Sarcasm

Sarcasm is defined as a sharply ironical taunt; a sneering or cutting remark; a form of wit that is marked by the use of sarcastic language and is intended to make its victim the butt of contempt or ridicule (http://dictionary.reference.com/browse/sarcasm). All of these definitions fail to show the complexity of a sarcastic utterance. What is inherent in sarcasm is that there is a mismatch between what is said in the utterance and the intended meaning of the speaker. It is also true that the purpose is to insult, or poke fun at, the victim. Sarcasm is often accompanied by a certain intonation and facial expression, but this is not necessary to make an utterance sarcastic. It is an indirect form of communication that leaves the interpretation of the utterance to the listener. Sarcasm is one subset of the irony category. There are three subcategories in all: hyperbole, which is an exaggerated statement, understatement, which is self explanatory, and sarcasm, which is a statement where the intended meaning is not portrayed by the words used (Winner, 1987).

Given its subtlety, how do children begin to understand sarcasm? Researchers have focused on the following variables when looking at how
children interpret sarcasm: context, intonation, memory constraints, and age. Context cues refer to the fact that what is actually happening does not seem to be reflected accurately in the language used (Ackerman, 1986; Winner, 1986). Intonation cues are often used along with the linguistic message to exaggerate the point (Fisher et. al., 2007). Memory constraints refers to the fact that one must be able to remember the contextual cues long enough to make the connection that what is said is not what is really meant (Winner, 1987). The fourth factor, age, is relevant because sarcasm is a late developing skill (Demorest, Phelps, Meyer, Gardner, & Winner, 1984). Overall, it is not an easy skill for children to develop because of the factors listed.

Ackerman (1986) proposed that children recognize that what is said does not match up with the facts of what is occurring and because of this mismatch they know that the literal meaning is not the intended message. Ackerman (1982) conducted research to determine when the ability to interpret sarcasm emerges, and whether there was a significant difference in comprehension based on the placement of the contextual cues, either preceding or following the utterance, and either adjacent to or separated from the utterance. Ackerman tested first and third graders as well as college students, using an oral reading of a paragraph that was either sarcastic or literal. Two separate studies were done; the first was a series of questions asked after the reading of the paragraph. The second
was comprised of a series of sentences containing a combination of the utterance and context information from the paragraphs. The sentences were read aloud after a 5 minute delay from the paragraph read-aloud. The participants were asked to determine if the sentences were from the original paragraph or not; it was essentially a sentence match-up activity. The purpose of this second study was to determine if there was integration of the utterance information and context in memory, or if the two were stored separately. Ackerman found that the placement of contextual information did have an effect on sarcastic utterance interpretation; participants had the most difficulty when the context was separated and preceding the utterance. Further, third graders and college students correctly interpreted most of the sarcastic utterances, with only a few problems integrating context and literal meaning on certain occasions. First graders could comprehend the sarcastic utterances with the right cues, but had great difficulty integrating the utterance information and the context. This may be the important skill, developing over time, which allows listeners to interpret sarcasm (Ackerman, 1986).

Winner (1986) looked at non-literal meaning as the first step in interpreting sarcasm. She brought Grice's maxims (1957, 1975) into the discussion to help explain sarcasm. Three of the maxims were used: the truth maxim, which says that “declarative utterances are literally true”, the belief maxim, which says that “speakers ordinarily believe the literal
content of what they assert”, and the literalness maxim which says that “there is usually no disjunction between what is said and what is intended as the message.” These maxims are important rules governing conversational discourse but may be violated by certain types of utterances. An example of this is sarcasm. Winner (1986) explains:

Errors violate the truth maxim; lies violate the belief maxim and the truth maxim; and figurative utterances violate all three maxims [truth maxim, belief maxim, literalness maxim] (Gardner & Winner, in press). Utterances that violate the truth maxim are false; those that also violate the belief maxim are intentionally false; and those that violate the literalness maxim as well are intended to convey a message that is different from the literally false statement that is uttered.

According to several studies (Ackerman 1981, 1983, Demorest, Phelps, Meyer, Gardner, & Winner, 1984, Demorest, Silberstein, Gardner & Winner, 1983) children have the hardest time with the violation of the literalness maxim. The truth and belief maxims pose less of a problem than does the literalness maxim. Because of this, children interpret sarcastic utterances as lies, that is, deceptive statements rather than sarcastic ones.

According to Gibbs (1984), all language requires the listener to include information outside of the words used in order to comprehend the utterance. Due to this belief, he suggests that there is not a distinct difference between literal and non-literal language. An example of this need for further examination of language is the phrase “You are going to lose all your money.” The two interpretations offered are that there could be a hole in the person’s pocket, or that a stock investment could
backfire. Determining which of these interpretations is intended requires the listener to use contextual cues and think beyond the words. Winner (1987) does not think that this example is enough to say that there is no difference between literal and non-literal language. She believes that there is still an inherent disjoint between saying something that is intended to be taken at face value and saying something that is intended to have a meaning different from the words used.

Winner (1987) conducted research to determine if children’s difficulty in understanding sarcasm was due to memory or conceptual limits. She made a distinction here between traditional testing of sarcasm comprehension and how she believes it should ideally be tested. An example of traditional testing is seen in the work of Demorest et. al. (1984). They asked questions about a speaker’s thoughts including: whether the utterance is true, whether the speaker believes what he or she said, and if the speaker wants the listener to believe what he or she said. According to Winner, these are rather difficult questions and may not show the true level of understanding of a child. She proposed a different way to assess comprehension: to ask the child to place utterances in labeled groups, such as: mistakes, lies, and teasing.

Winner (1987) also discussed the memory demands on children in comprehending sarcasm. She pointed out that sarcasm taxes the memory more than both errors and lies because in order to comprehend
sarcasm the child must determine that all three maxims (truth maxim, belief maxim, and literalness maxim) have been violated. In order to do this, a child must remember the facts, the speaker's knowledge, and the speaker's intentions for the listener. It is much easier to identify a lie, which only violates two maxims, or an error, which only violates one maxim. These place much less strain on the child's memory. High memory demands are placed on the child expected to interpret a sarcastic utterance; the child must remember much more information to determine whether sarcasm was intended as opposed to lies or deception. Accordingly, Winner argued that the only way we can reliably test sarcasm comprehension is by reducing some of the memory requirements needed in the tests. However, the children in her study did not perform better when flash cards displaying the scene remained visible during questioning. This suggests that previous studies requiring a larger memory were probably reliable tests of children's comprehension.

In a second study Winner (1987) compared different members of the irony family to see which developed first. As discussed previously, there are three subcategories of irony: hyperbole, understatement, and sarcasm. She hypothesized that because sarcasm has a larger discrepancy between what is said and what is meant, it should be easier to grasp than either hyperbole or understatement. The age groups studied were 6, 8, and 10. Her hypothesis was confirmed; sarcasm was
the easiest of the three to understand. Winner suggested that possible reasons for these findings were the intonational cues or facial expressions that often accompany sarcasm, or the fact that sarcasm is more prevalent than hyperbole and understatement in our culture. However, no facial expressions were used in the experiment. Further, it was shown that by the age of 8 intonational cues did not help. This study did not determine whether younger children use intonation as a comprehension strategy. Also, sarcasm is used more than understatement in our society, but hyperbole is used commonly as well, so this explanation is questionable. The final conclusion that can be drawn from this study is that in the irony family, the greater the discrepancy between the words and the intention, the easier the utterance is to understand.

According to Capelli, Nakagawa, and Madden (1990), there are some facts being overlooked that pertain to sarcasm comprehension. First, it has been shown through previous studies that young children have a hard time distinguishing literal meaning and the intended meaning of utterances (Beal & Flaval 1984). This ability is thought to emerge around age 7, but it is not know to be solid at this point. Second, in order to make connections between the context of the situation and the language used, inference making must be within the child's skill base.

Another aspect of sarcasm comprehension that has been the subject of investigation (Wagoner, 1983; Beach, Katz, & Skowrinski, 1996; Blasko &
Hall, 1998; Capelli, Nakagawa & Madden, 1990) is intonation. Wagoner (1983) pointed out that intonation may play a bigger role than others have suggested. She argued that intonation discrimination is a skill that is present in infancy. Babies can tune into intonational differences and even at fairly young ages they can make associations with emotions (Walker-Andrew & Gronlick, 1983). Research (Beach, Katz, & Skowrinski, 1996; Blasko & Hall, 1998) has shown that “sentence comprehension improves when prosodic cues are present and is compromised when they are absent”. Capelli, Nakagawa, and Madden (1990) conducted a study to determine if intonation played a dominant role in the comprehension of sarcasm: do children understand sarcasm based on intonation rather than seeing discrepancies between context and literal meaning? She used third graders, sixth graders, and an adult comparison group in her study. Her findings did in fact support the idea that young children rely more on intonation when first beginning to interpret sarcasm. In the third and sixth grade populations, the children identified sarcasm when sarcastic intonation was used regardless of the context. In the same light, they had a difficult time labeling the instances as sarcasm when the context suggested it but intonation was not altered. Capelli, Nakagawa, and Madden (1990) did acknowledge that when we are looking at the identification of sarcasm based on intonation, the child may understand that it is a sarcastic remark but may miss entirely the fact
that it is a non-literal utterance. The actual level of comprehension is
questionable. She further indicated that though it is possible that children
understand sarcasm initially by using intonation, they must somehow get
to the adult level where they can use both intonation and context to
determine a sarcastic utterance. It is not until they reach this next level
that they understand the difference between literal meaning and
speaker's meaning, and begin to see the purpose for the use of sarcasm
(Capelli, Nakagawa & Madden, 1990).

Furthermore, research on non-verbal aspects of communication,
including intonation, shows that there is a significant gender difference in
the interpretation of such cues (Hall, 1984; Schneideri & Schneider, 1984).
Specifically, research suggests that women are superior at attending to
and interpreting the intended message from nonverbal cues. In addition,
research on typical language acquisition has demonstrated a slight
gender difference in favor of females in the development of language
skills (Galsworthy, Dionne, & Dale, 2000; Plomin & Dale, 2000; Van Hulle,
Goldsmith, & Lemery, 2004). Overall language skills as well as receptive
aspects of non-verbal communication are considered relevant in the
interpretation of sarcasm. As noted above, intonation is thought to aid
more in the identification of sarcasm than the comprehension of the non-
literal nature of the utterance. However, the intonational cues provide
additional information leading to correct interpretation of the utterance.
Overall, there does not seem to be any direct answer as to when children begin to fully understand sarcasm. According to Capelli, Nakagawa, and Madden’s research (1990), we can conclude that children can first begin to identify sarcasm by first grade. The actual comprehension of the mismatch between the literal meaning and intended meaning does not seem to be mastered until at least third grade. In Demorest’s study, 6, 9, and 13 year olds were examined to see when they understand sincere, deceptive, and sarcastic remarks. At the age of 6 children took all remarks as sincere utterances. At the later ages of 9 and 13 they saw the deliberately false remark, but took it as deceptive, so they saw the discrepancy between the utterance and the meaning but did not understand the intention. From these results, Demorest, Meyer, Phelps, Gardner, and Winner (1984) go on to break sarcasm comprehension into three stages of development. In the first stage, students take all remarks as sincere because they “rely on the speaker’s statement as evidence of his belief and purpose.” In the second stage, students are able appreciate the discrepancy between the facts and the speaker’s statement, but they still rely on the statement for determining the speaker’s purpose. So, both sarcasm and lies are taken as deceptive utterances. In the third stage, the student can discriminate between sarcasm and deception because they can see the separation of the speaker’s purpose and the statement. Sarcasm is a
difficult semantic category requiring the integration of many abilities and thus it is a later developing skill. It appears that full comprehension is not achieved until the early adolescent years.

**Language Learning Disabilities**

Given the complexity of sarcasm and its multifaceted make-up, it makes sense to speculate that children with language learning disabilities (LLD) would struggle with its mastery. LLD is the combination of a learning disability and a speech and language impairment. This diagnosis has been problematic because language impairments and learning disorders are often difficult to distinguish. Due to this, a working definition of a language learning disability is: a language disorder with the presence of intelligence within the average range associated with academic difficulty. Most definitions of learning disorders talk about the language impairments seen in the children in this population, and as such, they are really language-learning disorders. The key of any type of learning disability is that there is “a disparity between potential performance and actual performance” (Wallach, 2005). In the preschool population, the term specific language impairment (SLI) is often used. In some sense, it depends on the age of the child which label will be given. Children with language-learning disabilities are often referred to as school aged children with language impairments, which can confound the confusion.
One distinction to be made is this: not all children with learning disabilities are language-impaired; hence the use of the term language-learning disability to clarify.

Characteristics of LLD range in severity, but several language aspects are consistently impacted by the disability. Of concern relative to sarcasm interpretation are pragmatics and semantics. In the area of pragmatics, studies of children with LLD have demonstrated that they find less social acceptance (Vaughn, Elbaum & Boardman, 2001). They are often passive participants, not likely to take the lead or persuade others (Bryan, Donohue, & Pearl, 1981). MacLauchlan and Chapman (1988) found that children with LLD had a greater difference in conversational breakdowns in narration versus conversation. Another area of pragmatics that is affected is the use of conversational repairs (MacLauchlan & Chapman, 1988). Children with LLD tend to offer unclear explanations and have a hard time rewording their utterance when it is requested (Knight-Arrest, 1984). Overall their social communication skills are less effective (MacLauchlan & Chapman, 1988). These pragmatic difficulties are significant to sarcasm comprehension because sarcasm is a social form of communication.

Another area that is often impaired in children with disordered language is the receptive aspects of pitch, stress, and conversational pause (Fisher et. al., 2007). These are important in gaining a true sense of
the meaning of the utterance, and these children may fall behind in developing this skill (Mann, Cowin, & Schoenheimer, 1989.) Research by Fisher et. al., (2007) confirms that children with language impairments may not be able to access prosodic cues as well as their typical peers, and "they may not derive the same support for sentence parsing and comprehension that their normal peers gain from the underlying prosody." This would be an important skill for beginning sarcasm comprehension as intonation is often used as the first clue for identification and early comprehension of sarcasm (Capelli, Nakagawa & Madden, 1990).

Windsor (1999) examined whether semantic inconsistency affected the ability of both typical children and children with a learning disability to judge a sentence’s grammar to be correct or incorrect. She found that both groups had a harder time identifying grammatically correct sentences when the semantic aspect was inconsistent, but the individuals with LD had a much harder time than did the typical population. She proposes that this is due to the limited capacity perspective of language processing which says, "If a child must devote substantial resources towards one aspect of language processing because that processing is not yet automatic for the child, then there are fewer available resources for the processing of another aspect of language." This essentially means that a child can only focus on one thing at a time. Thus, if they are performing well in one area, another will be sacrificed. This limited
capacity perspective would be relevant to the discussion of sarcasm comprehension, because, as explained above, many pieces of information must be retained and synthesized in order for comprehension to occur.

Wright & Newhoff (2001) studied story retelling and inference making abilities in children with language-learning disabilities. Their findings indicated that children with LLD, when compared with their language-aged matched peers, had poorer inference making skills and poorer story-retelling skills in all stimulus presentation modes. The best performance on inference making in the LLD population was seen when the stimulus was presented orally. This differed from typically developing children, both chronologically matched and language-age matched, who performed best with written stimuli. This is relevant to the issue of sarcasm comprehension because, as Capelli, Nakagawa, and Madden (1990) brought to light, inference making must be a skill in the child’s repertoire in order for them to comprehend sarcasm.

Children with LLD have many weaknesses in the area of semantics. They are disordered in their ability to define abstract nouns (Nippold, 1999). While often on pace with peers in comprehension of literal meaning, though not all are, non-literal language tends to be more problematic (Seidenberg & Bernstein, 1986). According to Seidenberg & Bernstein (1986), a sizeable number of children in the LLD population have
difficulties with metaphors, idioms, and all non-literal language. They studied students with learning disabilities compared with non-learning disabled students on their comprehension of similes and metaphors. Participants ranged in grade level from 3rd to 6th. Findings indicated that the young non-learning disabled students were at the same level of comprehension as the older learning disabled students. Also, it was shown that similes were easier for the students with learning disabilities to understand than metaphors. This difference was not seen in the non-learning disabled students. In a study by Riedlinger-Ryan & Shewan (1984) thirty control students and thirty students with learning disabilities were compared in their auditory comprehension skills. Several tests were used to examine different aspects of comprehension. 73% of the learning disabled students had scores that were lower than every typically developing adolescent on at least one test. These findings suggest that students with disordered language would have difficulties with a task, such as sarcasm comprehension, which requires strong semantic skills.

In another study, Curran and Hedberg (1996) compared adolescents with language disabilities to typically developing children in comprehension of complex narratives. The narratives involved the emotional reactions that characters displayed in realistic situations. The results showed that the students with language disabilities could recall less of the narrative and also had difficulties understanding the importance of
parts of the narrative. The entire group of language impaired and typical adolescents lacked sufficient information on the interactions between the characters, however, when probed, the typical children could supply this information, whereas the children with language disabilities had difficulty when asked to do the same. The weaker abilities of children with language disabilities in remembering the narrative, recognizing importance of specific parts, and attaching the emotional reaction are all relevant to the comprehension of sarcasm.

**Sarcasm and Language Learning Disabilities**

As noted above, research indicates sarcasm comprehension is a difficult semantic and pragmatic task for typically developing children to acquire. It requires children not only to understand that what is being said is not what is meant, but also to determine the true intent of this non-literal language. It is a skill that may not be fully developed until adolescence. Given that it is a difficult ability for typical children to obtain, it is likely that children with disordered language are at significant risk for delayed acquisition of sarcasm comprehension. In particular, for children with LLD for whom semantic and pragmatic development may be dysfunctional within the context of average intellectual abilities, it is logical that sarcasm would be an ever later developing skill than it is in typically developing children. To date, however, no one has studied sarcasm interpretation in
the LLD population. The purpose of the present research, therefore, was
to study the acquisition of sarcasm interpretation in children with LLD.
More specifically, I posed the following questions: Do children with LLD
differ significantly from typically developing children in the acquisition of
sarcasm comprehension? What are the effects of gender and age on
sarcasm comprehension? Do children with LLD follow the same sequence
of acquisition of sarcasm comprehension as typical children as outlined
by Demorest, Meyer, Phelps, Gardner, and Winner (1984)?
Method

Participants

Participants in this study included 51 children between the ages of 8 and 15. These subjects were divided between three age groups, resulting in 14 participants in the 7-9 year old group, 23 participants in the 10-12 year old group, and 14 participants in the 13-15 year old group. The subjects within each age group were further divided into two categories. The children in the first category were identified as having a speech and language impairment in the presence of a nonverbal IQ within normal limits and in the absence of confounding diagnoses. Some of the children in this category also carried a diagnosis of a learning disability. The other portion of each age group was a control group consisting of children who carried no diagnoses. Table 1 shows the breakdown of participants by age group, gender, and typical versus LLD status.
Table 1

Number of Participants by Group

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<tr>
<td>Typical</td>
<td>10</td>
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I recruited children via two means in order to expand the pool of potential participants. One recruitment method was via the local school systems. The second method was via email which included a web-based form of the test. Both recruitment methods outlined below were approved by the UNH Human Subjects Review Board.

In the first recruitment method, participants were recruited from local elementary schools, middle schools, and high schools serving a predominantly middle class population in the seacoast New Hampshire and southern Maine region. Information regarding the study was distributed by email to over twenty local schools, specifically to the speech-language pathologist or the principal. Of the schools contacted, five schools agreed to facilitate the research process at the school. After obtaining permission from the principal at these five schools, the speech-language pathologist identified appropriate children. The teachers of potential children were notified by the speech language pathologist, and
were asked to distribute information to the parents of all potential children. A description of the procedure and purpose was included in the packet, as well as contact information for the examiner and the UNH research committee in the event that any questions arose. For those who chose to allow his or her child(ren) to participate at school, a signed parent consent form was required. For a copy of the school-based consent form, see Appendix C.

In the second recruitment method, the researcher emailed personal and professional contacts in order to distribute the consent letter containing the website address to the parents of appropriately aged children. Due to the website version, the participant pool expanded to include the states of Massachusetts, Connecticut, Washington, and New York. For the website version of the test, a consent form was not required. If the parent chose to set his or her child up with the test, this was considered implied consent. For a sample of the email letter sent to parents, see Appendix D.

**Materials**

The following materials were developed or adapted for use in this research study. The sarcasm test consisted of a total of 8 plot lines, resulting in 16 short stories. These stories were adapted from Capelli, Nakagawa, & Madden (1990). Each plot line resulted in two story versions.
by varying the facts and/or the final statement to make the stories consistent with a classification of sincere or sarcastic. The stories included a description of the facts of the situation, dialogue between the characters, and a final remark that was either sarcastic or sincere. The stories were narrated by Terry Shepperd, a relative of the researcher, and accompanied by a picture depicting the facts of the story, illustrated by Chelsea Cox, a personal contact of the researcher. Sarcastic intonation was used for the final line of the sarcastic version of the story. This sarcastic intonation was marked by lowered pitch and exaggerated stress. The 16 stories were divided between two tests, titled Form A and Form B. The two forms had equal numbers of sarcastic and sincere stories, specifically 4 sincere and 4 sarcastic. For each story, Form A had one version of the story (sarcastic or sincere) and Form B had the alternate version. The stories are randomly ordered so that there was no pattern to the order of story versions. The picture and the narration were compiled in a PowerPoint presentation which was copied onto CDs for distribution and accompanied by a paper test. The test contained 24 multiple choice questions. These questions inquired about the facts of the story, the knowledge of the speaker’s belief, and the understanding of the speaker’s purpose. See Appendix E for sample stories and questions.

In addition to the PowerPoint test version, a website based version was created. This version contained the same stories and narrations as
the PowerPoint version. The website contained a child assent checkbox which was required to be checked before the child could proceed. This was in lieu of the child assent paragraph which was read to the children who participated using the PowerPoint test version. The parent was asked in the email letter to assist the child in providing his or her age, state of residence, and academic ability (in terms of average, above average, below average). After this information was provided, the test followed the same procedure as above.

When participants signed in to the website, it recorded which form of the test they were given. The website was set up to automatically alternate between Form A and Form B to randomly disperse students between the two forms of the test. The picture, the written text, the questions, and the sound bar to control the narration were all visible on the screen at one time. The website did not allow students to move beyond a story until all questions had been answered. The test questions followed the same format as the paper based test outlined above.

Procedure

Prior to data collection, the testing materials were piloted with three typically developing children, ages 9, 11, and 12. One child gave feedback that it would have been beneficial to her had she been able to repeat the narration. This feature was added prior to data collection.
The following testing procedures for the school-based and website-based participants were followed. Administration of the school-based testing took place during non-academic periods (morning meeting, study hall, etc.) in participating schools; the school speech-language pathologist set up appropriate times with teachers who had participating children in their classrooms. I was the test administrator for two of the participating school districts, and the speech-language pathologist was the test administrator for two of the participating school districts. The decision as to who would administer the test was made by the school principal in the participating districts. In the fifth participating school district, parents indicated a preference for after-school test administration, so information on the website based test was sent home by the principal to the parents of three children. Those children taking the test at school were set up individually on a school computer, using headphones, to listen to the narrations. Repetitions of the narrations were allowed.

After each story, children were asked to respond to the set of multiple choice questions. For the website-based version, the questions were completed on the computer. For the PowerPoint version, a paper and pencil test was completed. After the questions were completed, children were required to click the "next" button at the bottom of each picture. On the website-based test, the button read "submit" and was required to submit answers as well as to move on to the next story. There
were no time constraints for completing the test. The average time to complete all 8 stories and their corresponding questions was 10-15 minutes for typical children and 15-30 minutes for children with LLD.

When all children had completed the test, paper-based test answers from the PowerPoint version were input into the website-based test for ease of analysis. All results were compiled into a spreadsheet based on child information. Specific information was analyzed to assure that each child met the criteria for inclusion, resulting in the removal of six children's test scores. Five of the six children who were not included had confounding diagnoses; the sixth child was not within the age range being studied.

After narrowing the participant pool to the most appropriate children, scores were calculated for each child. The answers submitted by the children were compared to an answer key, and a percentage correct for the entire test, as well as percentage correct of sarcastic questions, and percentage correct of sincere questions was calculated. Results were ordered based on child LLD versus typical status, child age, and child gender in preparation for data analysis.

**Data Analysis**

The following statistical analyses were used to answer each of the questions posed earlier and listed below.
LLD and the Comprehension of Sarcasm

Was there a significant difference in the comprehension of sarcasm between children with a language learning disability and their typical peers? To answer this question, participant's scores for the total test, the sarcastic questions and the sincere questions were sorted into two groups: typical and LLD. The mean score for the total test, as well as the sarcastic and sincere scores was calculated for each group. Independent sample t-tests were then calculated for the groups to determine whether a significant difference existed between the typical children and the children with a language learning disability on the a) total test score, b) sarcastic score, and c) sincere score.

Gender, Age and the Comprehension of Sarcasm

Was there a significant difference in the comprehension of sarcasm between males and females? To answer this question, participant's scores for the a) total test score, b) sarcastic score, and c) sincere score were sorted into male and female groups. The mean scores were calculated for each group. Independent sample t-tests were calculated for the gender groups to determine whether a significant difference existed between males and females on the a) total test score, b) sarcastic score, and c) sincere score.
Age and the Comprehension of Sarcasm

Was the comprehension of sarcasm influenced by age for all participants? To test the influence of age alone, participants test performance was coded by age, in months, and subjected to regression analyses. Three regression analyses were performed to test the effect of age on the following variables: a) total test score b) sincere test score c) sarcastic test score.

Was the interpretation of sarcasm by group (LLD and typical) influenced by age? To test the combination of age and LLD status on test performance, participants test performance was coded by age, in months, and LLD status. In this model, three regression analyses were performed to test the effects of age and LLD status on a) total test score b) sincere test score and c) sarcastic test score.

Typical Developmental Sequence of Sarcasm and LLD

Did children with a language learning disability follow the same sequence of sarcasm comprehension that was described by Demorest, Meyer, Phelps, Gardner, and Winner (1984) when examining typical children? To answer this question, participants were divided into two groups (typical children and children with language learning disabilities). Within those groups, children were further divided into three age categories: youngest (7-9 year olds), middle (10-12 year olds), older (13-
15-year-olds). For each group, percentages were calculated for: children that interpreted a sarcastic story as a) sincere, b) deceptive and c) sarcastic. Based on the percentages by group, a frequency distribution chart was created.
CHAPTER III

RESULTS

Results

The purpose of the present research was to study sarcasm interpretation in children with language learning disabilities. Participants took a 24 question sarcasm test which was scored for the following results: percentage correct on total test, percentage correct on sarcastic questions, and percentage correct on sincere questions. Scores were compared for the 19 children with LLD and the 32 typical children. Four specific areas of inquiry were pursued. Group data are presented following a description of each question.

In order to address the area of sarcasm comprehension by group based on LLD versus typical status, as well as sarcasm interpretation based on gender, independent sample t-tests were performed.

LLD and the Comprehension of Sarcasm

The first area of investigation was to determine the relationship between LLD and sarcasm comprehension. To explore this area, the
following question was posed: Do children with LLD differ significantly from typically developing children in the acquisition of sarcasm comprehension? To determine whether there was a significant difference in the a) total test score b) sincere score and c) sarcastic score between groups based on LLD versus typical status, independent sample t-tests were calculated. The group means for this analysis are presented in Table 2.

Table 2
Comparisons of Group Means for Test Scores by LLD vs. Typical Status

<table>
<thead>
<tr>
<th>Scores</th>
<th>Typical Children</th>
<th>Children with LLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>32</td>
<td>19</td>
</tr>
<tr>
<td>Total test score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>91.9</td>
<td>80.84</td>
</tr>
<tr>
<td>SD</td>
<td>9.79</td>
<td>12.59</td>
</tr>
<tr>
<td>Sarcastic test score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>90.66</td>
<td>76.26</td>
</tr>
<tr>
<td>SD</td>
<td>10.99</td>
<td>18.45</td>
</tr>
<tr>
<td>Sincere test score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>92.94</td>
<td>85.11</td>
</tr>
<tr>
<td>SD</td>
<td>17.25</td>
<td>17.50</td>
</tr>
</tbody>
</table>

Typical children consistently outperformed children with LLD on all three test scores; however, only two of the group differences reached statistical significance. As shown in Table 3, independent sample t-tests revealed that typical children performed significantly higher on the total
test score and sarcastic score than the children with LLD. Analysis of the sincere scores by group revealed that the difference between means was not statistically significant.

Table 3

<table>
<thead>
<tr>
<th>Test</th>
<th>Group Differences</th>
<th>SD</th>
<th>Df</th>
<th>t-stat</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total test score</td>
<td>11.06</td>
<td>3.16</td>
<td>49</td>
<td>3.5</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Sarcastic test score</td>
<td>14.40</td>
<td>4.11</td>
<td>49</td>
<td>3.5</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Sincere test score</td>
<td>7.83</td>
<td>5.05</td>
<td>49</td>
<td>1.55</td>
<td>p&gt;0.05</td>
</tr>
</tbody>
</table>

Gender and the Comprehension of Sarcasm

The next area of investigation was to determine if the comprehension of sarcasm was influenced by gender. The following question was addressed: Is there a significant difference in the comprehension of sarcasm between males and females? To determine whether there was a significant difference between genders on the comprehension of sarcasm, independent sample t-tests were performed. The group means for this analysis are presented in Table 4.
Table 4

Comparisons of Group Means for Scores by Gender

<table>
<thead>
<tr>
<th>Score</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>31</td>
<td>20</td>
</tr>
<tr>
<td>Total test score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>88.13</td>
<td>87.25</td>
</tr>
<tr>
<td>SD</td>
<td>12.48</td>
<td>11.70</td>
</tr>
<tr>
<td>Sarcastic test score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>87.01</td>
<td>82.55</td>
</tr>
<tr>
<td>SD</td>
<td>15.17</td>
<td>16.54</td>
</tr>
<tr>
<td>Sincere test score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>88.97</td>
<td>91.65</td>
</tr>
<tr>
<td>SD</td>
<td>17.45</td>
<td>18.13</td>
</tr>
</tbody>
</table>

As shown in Table 5, t-test results indicate no significant difference in sarcasm comprehension between genders.

Table 5

Gender T-test Results

<table>
<thead>
<tr>
<th>Test</th>
<th>Group Differences</th>
<th>SD</th>
<th>Df</th>
<th>t-stat</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total test score</td>
<td>.88</td>
<td>3.52</td>
<td>49</td>
<td>0.25</td>
<td>p&gt;.05</td>
</tr>
<tr>
<td>Sarcastic test score</td>
<td>4.46</td>
<td>4.46</td>
<td>49</td>
<td>1.00</td>
<td>p&gt;.05</td>
</tr>
<tr>
<td>Sincere test score</td>
<td>-2.68</td>
<td>5.06</td>
<td>49</td>
<td>0.53</td>
<td>p&gt;.05</td>
</tr>
</tbody>
</table>

Age and the Comprehension of Sarcasm

I next analyzed the data to determine whether age is a significant variable in the comprehension of sarcasm. More specifically, the following questions were posed: (1) Is the comprehension of sarcasm
influenced by age for all participants? (2) Is the comprehension of sarcasm by group (LLD and typical) influenced by age? Participants' test performance was coded by age, in months, and subjected to regression analysis.

**Sarcasm comprehension by age alone.** To test the influence of age alone, three regression analyses were performed: a) total test score b) sincere test score and c) sarcastic test score. Results indicate that relationships between age and both total test score and sincere test score were not significant. However, a significant relationship between age and sarcastic test score was found. As shown in Table 6, 16% of the variance in performance on this measure is explained by age alone.

Table 6

Regression Analysis Results

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Dependent variable</th>
<th>F stat</th>
<th>t-stat</th>
<th>Beta</th>
<th>SE Beta</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Total test score</td>
<td>0.12</td>
<td>1.60</td>
<td>0.11</td>
<td>.07</td>
<td>0.05</td>
</tr>
<tr>
<td>Age</td>
<td>Sarcastic score</td>
<td>0.003</td>
<td>3.09</td>
<td>0.25**</td>
<td>0.08</td>
<td>0.16</td>
</tr>
<tr>
<td>Age</td>
<td>Sincere score</td>
<td>0.75</td>
<td>-0.32</td>
<td>-0.03</td>
<td>0.10</td>
<td>0.002</td>
</tr>
</tbody>
</table>

**p<.01**

**Age, LLD and the comprehension of sarcasm.** To test the combination of age and LLD status on test performance, a multivariate regression analysis was performed. In this model, effects of age and LLD status on a) total test score b) sincere test score and c) sarcastic test score were tested. As shown in Table 7, both the total test score and the sarcastic score were significantly associated with age and LLD status. The
sincere score did not show a significant association with age and LLD status. As noted above, age alone explained 16% of the variance in sarcasm comprehension; when LLD status was added as a variable, these two factors together explained 25% of the variance in the total test score, and 36% of the variance in the sarcastic score. Thus, the summative effect of age and LLD status is markedly higher than the effect of age alone.

Table 7

Multivariate Regression Analysis Results

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Dependent variable</th>
<th>F stat</th>
<th>t-stat</th>
<th>Beta</th>
<th>SE</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Total test score</td>
<td>0.001</td>
<td>1.72</td>
<td>0.10</td>
<td>0.06</td>
<td>0.25</td>
</tr>
<tr>
<td>LLD status</td>
<td></td>
<td></td>
<td>-3.54</td>
<td>-10.97**</td>
<td>3.09</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Sarcastic score</td>
<td>0.0000248</td>
<td>3.42</td>
<td>0.24***</td>
<td>0.07</td>
<td>0.36</td>
</tr>
<tr>
<td>LLD status</td>
<td></td>
<td></td>
<td>-3.80</td>
<td>-14.16***</td>
<td>3.72</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Sincere score</td>
<td>0.29</td>
<td>-0.35</td>
<td>-0.03</td>
<td>0.10</td>
<td>0.05</td>
</tr>
<tr>
<td>LLD status</td>
<td></td>
<td></td>
<td>-1.55</td>
<td>-7.86</td>
<td>5.07</td>
<td></td>
</tr>
</tbody>
</table>

** p<.01 *** p<.001

Typical Developmental Sequence of Sarcasm

Finally, the data were analyzed to determine the sequence of acquisition of sarcasm interpretation for both groups (LLD and typical). The following question was addressed: Do children with LLD follow the same sequence of acquisition of sarcasm interpretation as typical children? This developmental sequence of interpretation of communicative intent (first interpreting sarcasm as sincere, then as
deceptive, and finally as sarcastic) was outlined by Demorest, Meyer, Phelps, Gardner, and Winner (1984) and discussed in Chapter I. Students were broken into three age groups: 7-9, 10-12, and 13-15. The percentage of students who interpreted a sarcastic utterance as a) sincere b) deceptive and c) sarcastic were calculated for both typical children and children with LLD at each of the three age groups. Figure 1 displays the percentages, by group, of the sarcastic utterances that were interpreted as: a) sincere, b) deceptive, and c) sarcastic. As can be seen, at the youngest age group (children ages 7-9) children with LLD interpreted half of sarcastic utterances as sincere, whereas typical children interpreted more than half of sarcastic utterances as sarcastic. At the second and third age group (children ages 10-12) children in both groups interpreted the majority (more than 70%) of the sarcastic utterances as sarcastic. In all three age groups, for both typical children and children with LLD, few children made the second interpretation (deception) in the three step developmental sequence. Evidence of all three stages of interpretation was seen for both typical children and children with LLD, but not in the expected developmental sequence as outlined above. Namely, the second stage of interpreting sarcastic utterances as deceptive is passed over by most children, both typically-developing and children with LLD.
Figure 1 Percent of Responses by Perceived Intent of Utterance

Ages 7-9

Ages 10-12

Ages 13-15
CHAPTER IV

DISCUSSION

Discussion

The present study sought to expand on research in the area of sarcasm interpretation by examining a specific disability group, children with language learning disabilities. Four areas of inquiry were pursued. The following discussion will focus on the findings pertaining to each research question posed, and will end with a discussion of limitations of the present study.

LLD Status and the Comprehension of Sarcasm

Results of this study reveal a significant difference in the ability of children with LLD to process sarcasm relative to typically developing children. The data show a significant difference between groups in the total test score and the sarcastic score, but not in the sincere score. This demonstrates that the differences between groups were isolated to sarcastic stories, and not due to general auditory comprehension or memory difficulties. Therefore, the ability to interpret sarcasm is a distinct processing problem for children with LLD. This finding makes sense in view of what is known about the language abilities of this population, and is
consistent with prior research documenting problems processing non-literal language and abstract language (Seidberg & Bernstein, 1986). Why is sarcasm so problematic for these children?

As noted in Chapter I, children with LLD are known to have broad difficulties in semantics. Wright and Newhoff (2001), for example, demonstrated that children with LLD had poorer inference making skills and poorer story-retelling skills than the typical peer group. In order to make connections between the context of the situation and the language used to correctly interpret sarcasm, inference making must be within the child’s skill base. Children with LLD have been found to have trouble defining abstract nouns (Nippold, 1999). Further, they have been found to have difficulties interpreting and attaching an emotional reaction to a complex narrative (Curran and Hedberg, 1996).

In addition to the above semantic deficits, children with LLD have been found to have pragmatic difficulties, most notably recognizing and utilizing prosodic cues (Fisher et al., 2007). These skills would be important for recognizing and interpreting sarcastic intonation. Though the prosodic cues aid more in the identification of sarcasm than its comprehension, they provide additional information leading to its interpretation.

Collectively, the verbal and pragmatic difficulties that characterize children with LLD may impair their acquisition of this complex form of language. The results of the present study lead to the conclusion that
strong language skills, specifically in the area of semantics, are necessary for correct interpretation of sarcasm.

In addition to a significant difference in percentage of correct answers for sarcastic stories, I noted differences in test taking strategies between groups. Several students with language impairments correctly answered the first two questions about the facts of the story and the speaker's thoughts about the facts, but when it was time to answer the third question inquiring about the intent of the utterance, they changed their previous answers to make them consistent with the utterance. Thus, they took the speaker's utterance as sincere rather than sarcastic and changed the facts to reflect that interpretation. This finding supports research by Demorest, Meyer, Phelps, Gardner, and Winner (1984) which explains that students "rely on the speaker's statement as evidence of his belief and purpose." Thus, they hold the speaker's utterance as truth, and misinterpret the sarcastic utterance as sincere.

Children with language learning disabilities made many more erasures, changing answers and second guessing noticeably more than the typical peer group. Due to this pattern of erasures as well as an overall lengthier response time, the average testing time was significantly longer for children with language learning disabilities; the average time for typical children was 10-15 minutes as opposed to the 15-30 minutes
that children with language learning disabilities required to complete the test.

In addition to the above empirical findings, several observational evaluations may be relevant. First, an interesting pattern was noted in the behavior of the typical children when processing the sincere stories. In the oldest age group, there was a tendency to interpret sincere stories as sarcastic. I hypothesize that once the child realized that one story was sarcastic, he or she had a tendency to answer all as if they were sarcastic without waiting to listen through the narration. It may also be that this group was more likely to quickly read the story rather than listen to the narration, which is read at a moderately slow speed, and thus were more at risk for making careless errors in interpretation.

Second, one story in particular, the "Music Recital" story, was problematic in the sincere form. The written story was somewhat ambiguous, because the speaker claims to enjoy going to the recitals, but also complains of their length, which evokes confusion as to whether he is sad or happy when the recital is cancelled. The picture, however, makes it quite apparent that the character is sad the recital is cancelled. I speculate that older children relied more on the text, and thus misinterpreted the utterance, while younger children relied more on the picture, and correctly identified the character's feelings, and thus interpreted the story correctly.
Anecdotal evidence, by parent report, from an 8 year old typical child in the present study supports research by Capelli, Nakagawa, and Madden (1990), who found that children may be able to identify sarcasm based on intonation but may miss entirely the non-literal nature, thus misinterpreting the sarcastic utterance. The child in the present study listened to the story, remarked on the degree of sarcasm expressed, then proceeded to answer the interpretation as a lie. This highlights the difference between sarcasm identification and sarcasm comprehension.

Gender and the Comprehension of Sarcasm

The data in the present study indicate no significant difference between genders in the comprehension of sarcasm. This finding was surprising based on prior language research that demonstrates significant gender differences. Specifically, research has demonstrated a slight gender difference in favor of females in the development of language skills, as well as a female superiority in attending to and interpreting the intended message from nonverbal cues, which was expected to affect sarcasm comprehension (Hall, 1984; Schneideri & Schneider, 1984; Jensen & Carlin, 1981; Smith, 1973). Perhaps the children in this study were above the age range at which the female advantage persists, and below the age range to have the gender difference in nonverbal cues take effect.
Age and the Comprehension of Sarcasm

The data in the present study indicate a significant association between age alone and sarcasm comprehension when participants' performance was analyzed as a whole in the present study. Age alone was not significantly associated with total test score or sincere score. When the variable of LLD status was combined with age, together they had significant role in sarcasm comprehension, but were not significantly related to the comprehension of sincere stories at the ages studied. As age of the children increased, the comprehension of sarcasm, as measured by percentage of sarcastic questions correct, gradually increased as well. The results in this facet of the study are consistent with research (Capelli, Nakagawa & Madden, 1990; Demorest, Meyer, Phelps, Gardner, and Winner, 1984) studying typical children, in which sarcasm comprehension has been found to associate with age.

Typical Developmental Sequence of Sarcasm

Demorest, Meyer, Phelps, Gardner, and Winner (1984) described sarcasm comprehension as occurring in three developmental stages. In the first stage, children take all remarks as sincere because they "rely on the speaker's statement as evidence of his belief and purpose." In the second stage, children are able to appreciate the discrepancy between the facts and the speaker's statement, but they still rely on the statement
for determining the speaker's purpose. In this case, both sarcasm and lies are taken as deceptive utterances. In the third stage, children can discriminate between sarcasm and deception because they can see the separation of the speaker's purpose and the statement.

The current research revealed evidence of all three stages of sarcasm development for both typical children and children with language learning disabilities; however, the sequence did not progress as expected for either group (typical or LLD). I hypothesize that typical children were not tested at young enough ages to see the early stage of development of sarcasm interpretation, specifically, an interpretation of sarcastic utterances as sincere. The majority of children with LLD progressed from a sincere interpretation directly to a sarcastic interpretation, with few children making the deceptive interpretation in between. I speculate that this difference is due to the distribution of the age groups. In the youngest group, the majority of the children are age 8; in the middle group, the majority of the children are age 11. This clustering leaves a three year gap which is underrepresented and could explain the lack of the middle stage of sarcasm interpretation (interpreting a sarcastic utterance as deceptive).

Although children in both groups (LLD and typical) progressed through the same stages of acquisition of sarcasm comprehension, the ages at which children reached each stage were noticeably different. In
the youngest age group, children ages seven to nine, 50% of children with language learning disabilities took the sarcastic utterances as sincere, a much higher percentage than the same age typical peers (15%). This demonstrates that not only did a higher percentage of children with language learning disabilities misinterpret sarcastic utterances, but the interpretation was also at an earlier stage in the sequence of acquisition of sarcasm comprehension. Of interest was the continuation of the first stage, interpreting sarcastic utterances as sincere, for a longer period in children with language learning disabilities. Not one typical child above the first age group (seven to nine year olds) interpreted a sarcastic utterance as sincere; however, children with language learning disabilities made this interpretation into the oldest age group (children ages 12-15).

The findings of the current study have clinical as well as theoretical implications. First, sarcasm is a widely used form of social communication. It is important, if not vital, in building and maintaining social relationships. The inability to access this social form of communication could be detrimental to the social development of children with LLD. It could be speculated that due to difficulties with social forms of communication, including sarcasm, children with LLD retreat to a passive social role, and thus find less social acceptance. Indeed, prior research has documented passivity and decreased social acceptance in this population (Vaughn, Elbaum & Boardman, 2001; Bryan, Donohue, & Pearl, 1981). Second,
sarcasm interpretation is vital to overall language comprehension. Misinterpretation of this form of language contributes to broader comprehension failure.

**Limitations to the Study**

The first limitation to the study was the unequal distribution of participants by age, with an inordinate amount of participants at the mid-ages, and few participants at the outer age ranges. Based on the small number of participants in the third age group, making judgments about the age of acquisition of sarcasm comprehension is not possible in this study. Another limitation was the limited geographical area of participant recruitment. Findings are not generalizable to the general population due to this limitation. Finally, due to the web-based format, I was limited in the control of several variables, including test administration and anecdotal observations during test taking. Specifically, I was left to assume that parents followed to protocol outlined in the parent letter, which clarified that parents were to have no input and offer no assistance in the test taking process. Anecdotal information gained about test taking strategies and amount of time required per child was limited due to the accessibility of the web based form of the test.
List of References


24-Jan-2008

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Study: A Study of Language-Based Learning Disabilities and Sarcasm Comprehension
Approval Date: 14-Nov-2007

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study with the following comments:

Before conducting any research in a school, the researcher needs to submit to the IRB a letter from the principal in support of the study from the principal.

Approval is granted to conduct your study as described in your protocol for one year from the approval date above. At the end of the approval period you will be asked to submit a report with regard to the involvement of human subjects in this study. If your study is still active, you may request an extension of IRB approval.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, Responsibilities of Directors of Research Studies Involving Human Subjects. (This document is also available at http://www.unh.edu/osr/compliance/irb.html.) Please read this document carefully before commencing your work involving human subjects.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,

Julie F. Simpson
Manager

cc: File
    Webster, Penelope
29-Apr-2008

Shepperd, Kristin
Communication Sciences & Disorders, Hewitt Hall
66 Back River Road
Dover, NH 03820

IRB #: 4117
Study: A Study of Language-Based Learning Disabilities and Sarcasm Comprehension
Approval Expiration Date: 14-Nov-2008
Modification Approval Date: 29-Apr-2008
Modification: Inclusion of appropriately-aged siblings, addition of Web-based test, and request for waiver of signature on parental consent form for participants who take the Web-based test and are recruited via email

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved your modification to this study, as indicated above. Further changes in your study must be submitted to the IRB for review and approval prior to implementation.

Approval for this protocol expires on the date indicated above. At the end of the approval period you will be asked to submit a report with regard to the involvement of human subjects in this study. If your study is still active, you may request an extension of IRB approval.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the document, Responsibilities of Directors of Research Studies Involving Human Subjects. This document is available at http://www.unh.edu/osr/compliance/irb.html or from me.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,

Julie F. Simpson
Manager

cc: File
Webster, Penelope
Dear family:

I am a graduate student in the Department of Communication Sciences and Disorders at UNH conducting a research project to find out how children with language-based learning disabilities acquire sarcasm comprehension relative to their typically developing peers. I am writing to invite you to allow your child to participate in this project. I also invite other appropriately aged siblings (ages 8-15) to participate using the online form. I plan to work with approximately 80 students in this study.

If you agree for your child(ren) to participate in this study, your child(ren) will be asked to listen to 8 narrated stories and answer 3 multiple choice questions per story. In addition, he or she will be provided with pictures depicting the facts of the story. The expected time commitment is approximately 20 minutes.

You can choose to sign the consent slip at the bottom of this page, allowing your child to participate in this research during a non-academic time block at his or her school, or you can log onto http://76.24.151.63/kds-thesis/ to set your child(ren) up with the online test. If you choose the online form of the test, the act of allowing your child(ren) to log on will be taken as implied consent, and a signature will not be required. If you do not consent to the test, you do not need to access the web site. For the purposes of research, I ask that you do not assist your child(ren) during his or her participation.

There are no risks of participating in this study as your child(ren) will be given the opportunity to decline participation at any time during the process.

Participation is strictly voluntary; refusal to participate will involve no prejudice, penalty, or loss of benefits to which your child(ren) would otherwise be entitled. If you agree to let your child(ren) participate and then change your mind, you may withdraw your child(ren) at any time during the study.

I seek to maintain the confidentiality of all data and records associated with your participation in this research. You should understand, however, there are rare instances when I am required to share personally-identifiable information (e.g., according to policy, contract, regulation). For example, in response to a complaint about the research, officials at the University of New Hampshire, designees of the sponsor(s), and/or regulatory and oversight government agencies may access research data. You also should understand that I am required by law to report certain information to government and/or law enforcement officials (e.g., child abuse, threatened violence against self or others, communicable diseases). Data will be kept in a locked file cabinet in an office at the University of New Hampshire; only I and my supervisor will have access to the data.

The work will be conducted by me, with guidance from Penny Webster, faculty member in the Department of Communication Sciences and Disorders at UNH and my thesis chairperson.
If you have any questions about this research project or would like more information before, during, or after the study, you may contact me by phone, (603)866-1667, or e-mail, shepperd@unh.edu. If you have questions about your rights as a research subject, you may contact Julie Simpson in the UNH Office of Sponsored Research at 603-862-2003 to discuss them.

I have enclosed two copies of this letter. If you agree for your child to participate in this project during a non-academic period at school, please sign one copy and return in your child’s backpack. The other copy is for your records. Thank you for your consideration.

Sincerely,

Kristin Shepperd
Graduate Student
Communication Sciences and Disorders, UNH

Yes, I, __________________________________________ consent/agree for my child __________________________________________ to participate in this research project.

No, I, __________________________________________ refuse/do not agree for my child __________________________________________ to participate in this research project.
Dear family:

I am a graduate student in the Department of Communication Sciences and Disorders at UNH conducting a research project to find out how children with language-based learning disabilities acquire sarcasm comprehension relative to their typically developing peers. I am writing to invite you to allow your child(ren) between the ages of 8 and 15 to participate in this project. I plan to work with approximately 80 students in this study.

If you agree to let your child(ren) to participate in this study, you will log onto http://76.24.151.63/kds-thesis/ to set your child(ren) up with the online test. The act of allowing your child(ren) to log on will be taken as implied consent, and a signature will not be required. If you do not consent to the test, you do not need to access the web site.

When you log onto the website, your child(ren) will listen to 8 narrated stories and answer 3 multiple choice questions per story. The narrations may be repeated as many times as necessary. In addition, he or she will be provided with pictures depicting the facts of the story. The expected time commitment is approximately 20 minutes. For the purposes of research, I ask that you do not assist your child(ren) during his or her participation.

There are no risks of participating in this study as your child(ren) will be given the opportunity to decline participation at any time during the process.

Participation is strictly voluntary; refusal to participate will involve no prejudice, penalty, or loss of benefits to which your child(ren) would otherwise be entitled. If you agree to let your child(ren) participate and then change your mind, you may withdraw your child(ren) at any time during the study.

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mail, shepperd@unh.edu. If you have questions about your rights as a research subject, you may contact Julie Simpson in the UNH Office of Sponsored Research at 603-862-2003 to discuss them.

Thank you for your consideration.

Sincerely,

Kristin Shepperd
Graduate Student
Communication Sciences and Disorders, UNH
Football Story

Sarcastic version
Dick and Wendy were playing catch with a football at recess. Wendy threw out a long pass, and Dick was running full speed for it, when he slipped in the mud. His feet flew out from under him and he landed flat on his bottom. The ball bounced off his head and landed next to him in the mud. "Oh, nice catch," said Wendy.

Sincere Version
Dick and Wendy were playing catch with a football at recess. Wendy threw out a long pass, and Dick went running full speed for it. He jumped in the air and then had to fall over backwards to catch it. "Oh, nice catch," said Wendy.

1. Dick went running for a pass. He:
   a. Made a great catch
   b. Did not catch the ball
   c. Did cartwheels in the grass

2. Wendy thought that Mike:
   a. Made a good catch
   b. didn't make the catch
   c. she didn't see what happened

3. Wendy said "Nice catch" to:
   a. Compliment Dick
   b. Make fun of Dick
   c. Lie to Dick
Little Sister Story

Sarcastic version
Jim ran into his friend Matt at the mall. Matt was there with a little girl about 6 years old.
"Hey," said Jim, "Who's this?"
"Oh, this is my little sister, Janet. I'm supposed to be baby-sitting today," said Matt. "Janet, say hi to Jim."
Janet stuck out her tongue and kicked Jim in the shins.
"You're a lucky guy. Matt," said Jim. "I wish I had a little sister like yours."

Sincere Version
Jim ran into his friend Matt at the mall. Matt was there with a little girl about 6 years old. "Hey," said Jim, "Who's this?"
"Oh, this is my little sister, Janet. I'm supposed to be baby-sitting today," said Matt. "Janet, say hi to Jim."
Janet smiled and said, "Hi, it's nice to meet you, Jim."
"You're a lucky guy. Matt," said Jim. "I wish I had a little sister like yours."

1. Do you think Janet was:
   a. polite to Jim
   b. mean to Jim
   c. Didn't pay attention to Jim
2. Jim thought that having a sister like Janet
   a. Would be great
   b. Would be awful
   c. He didn't think about it
3. Jim said, "I wish I had a sister like yours" to:
   a. Compliment Janet
   b. Make fun of Janet
   c. Lie to Matt
Christmas Story

Sarcastic version
It was Christmas at Laura VanFlynn's house. Laura and her sister Ann were talking about what they wanted to get for Christmas. “Gee, I hope no one gives me socks,” said Laura. “Everyone always gives me socks. I probably have about 30 pairs that I’ve never even worn.”
That evening, Laura and her sister Ann opened their gifts. Laura opened her first one and in it were six pairs of socks. “This is great,” said Laura to Ann. “Just what I needed.”

1. For Christmas, Laura:
   a. Wanted socks
   b. Did not want socks
   c. Did not want books
2. When Laura opened the socks, she was:
   a. Happy
   b. Disappointed
   c. She did not care
3. Laura said, “This is great,” to:
   a. Compliment the present
   b. Make fun of the present
   c. Lie to Ann

Sincere version
It was Christmas at Laura VanFlynn’s house. Laura and her sister Ann were talking about what they wanted to get for Christmas. “Gee, I hope no one gives me books,” said Laura. “Everyone always gives me books. I have enough books to start my own library.”
That evening, Laura and her sister Ann opened their gifts. Laura opened her first one and in it were six pairs of socks. “This is great,” said Laura to Ann. “Just what I needed.”

1. For Christmas, Laura:
   a. Wanted books
   b. Did not want socks
   c. Did not want books
2. When Laura opened the socks, she was:
   a. Happy
   b. Disappointed
   c. She did not care
3. Laura said, “This is great,” to:
   a. Compliment the present
   b. Make fun of the present
   c. Lie to Ann
Wagon Story

Sarcastic version
Mike was sitting on his porch when his friend Cary came by. "Hey," said Cary, "what are you playing with?"
"Oh, it's a wagon I got from Peter," replied Mike. I traded him my baseball mitt, my baseball bat, and my Mets cap for this wagon. He got it from a junk yard. It's missing both front wheels, the bottom is rusted out, and the handle just broke off."
"Sounds like you got a great deal," said Cary.

Sincere version
Mike was sitting on his porch when his friend Cary came by. "Hey," said Cary, "what are you playing with?"
"Oh, it's a wagon I got from Peter," replied Mike. I traded him my baseball mitt, my baseball bat, and my Mets cap for this wagon. He got it from a junk yard, but it seems to work okay. I just need to clean it up a little."
"Sounds like you got a great deal," said Cary.

1. The wagon was:
   a. Dirty but worked well
   b. Broken and rusty
   c. Brand new
2. Gary thought that Mike:
   a. Made a good trade
   b. Made a bad trade
   c. Bought the wagon at the store
3. Gary said, "Sounds like you got a great deal," to:
   a. Compliment Mike
   b. Make fun of Mike
   c. Lie to Mike
Day Camp Story

Sarcastic version
Heather and Stacy went to day camp together and were talking about it one day.
"Day camp is so boring. We always do the same stuff every day," said Stacy. "We spent 3 weeks weaving mats, now we're doing potholders." "Yeah, I know," said Heather. "Well, maybe we'll do something different today."
That day Stacy and Heather got to camp and their day camp counselor said, "Today we're going to make potholders."
Stacy turned to Heather and said, "Gosh, that'll be fun for a change."

Sincere version
Heather and Stacy went to day camp together and were talking about it one day.
"Day camp is so boring. We always do the same stuff every day," said Stacy. "We spent 3 weeks learning about plants, now we're learning about birds."
"Yeah, I know," said Heather. "Well, maybe we'll do something different today."
That day Stacy and Heather got to camp and their day camp counselor said "Today we're going to make potholders."
Stacy turned to Heather and said, "Gosh, that'll be fun for a change."

1. At day camp, Stacey was tired of:
a. Making potholders
b. Learning about plants and birds
c. Making friendship bracelets

2. The counselor said, "We are going to make potholders." Stacey was:
a. Excited
b. Disappointed
c. Home sick

3. Stacey said, "Gosh, that'll be fun for a change," to:
a. Compliment the activity
b. Make fun of the activity
c. Lie to Heather
Bully Story

Sarcastic version
Kevin was walking home from school when his friend Dave caught up with him. "Hey," said Dave, "I hear Pete is really mad at you." "Pete who?" asked Kevin. "You know, Pete the ultra-wimp, the skinny kid with glasses who's two grades below us," said Dave. "I heard he's gonna beat you up tomorrow after school. Aren't you scared?"
"Yeah, I am scared," said Kevin. "I guess I better watch out, huh?"

Sincere version
Kevin was walking home from school when his friend Dave caught up with him. "Hey," said Dave, "I hear Pete is really mad at you." "Pete who?" asked Kevin.
"You know. Big Pete, Killer Pete, the one who's always in trouble for fighting," said Dave "I heard he's gonna beat you up tomorrow after school. Aren't you scared?"
"Yeah, I am scared," said Kevin. "I guess I better watch out, huh?"

1. Pete is:
   a. A wimpy, skinny kid
   b. A big, mean kid
   c. A teacher

2. Kevin is:
   a. Scared
   b. Not scared
   c. Not going to fight

3. Kevin said, "Yeah, I am scared. I guess I better watch out, huh?" to:
   a. Compliment Pete
   b. Make fun of Pete
   c. Lie to Dave
Girl Scouts Story

Sarcastic version

Mary wanted to join the Girl Scouts and was trying to get her friend Becky to join with her.
"Come on," said Mary. "It'll be so fun! We'll get to go swimming and horseback riding and go on all kinds of field trips. Come on—please!"
"Well, OK," said Becky. "You've talked me into it."
At the first meeting for the Girl Scouts, the troop went on a 20-mile hike through the woods. It was pouring rain and the girls were soaking wet and freezing cold by the time they got home. Some of the girls were crying. Becky leaned over to Mary and said, "Gee, I'm sure glad I joined the Girl Scouts."

Sincere version

Mary wanted to join the Girl Scouts and was trying to get her friend Becky to join with her.
"Come on," said Mary. "It'll be so fun! We'll get to go swimming and horseback riding and go on all kinds of field trips. Come on—please!"
"Well, OK," said Becky. "You've talked me into it."
At the first meeting for the Girl Scouts, the troop went on a 10-mile hike through the woods. They were tired when they got back, and their troop leader had carrots and celery sticks for them for a snack. Becky leaned over to Mary and said, "Gee, I'm sure glad I joined the Girl Scouts."

1. The first hike:
   a. Was good
   b. Was rainy and bad
   c. Was cancelled
2. Becky was:
   a. Happy she joined the Girl Scouts
   b. Upset that she joined the Girl Scouts
   c. Sad that the hike was cancelled
3. Becky said, "Gee, I'm sure glad I joined the Girl Scouts," to:
   a. Compliment the Girl Scouts
   b. Make fun of the Girl Scouts
   c. Lie to Mary
Piano Recital Story

Sarcastic version
Bob and Curtis's little sister Julie took piano lessons and every year they went to her piano recital. "I hate those recitals. They are always so long and boring and the music stinks" said Bob. "I wonder how long it will be this year."
"Mom said it should be about 2 hours long," said Curtis. Later that evening, Curtis said to Bob, "Hey, Mom says June's piano recital has been canceled."
"Oh, what a shame," said Bob. "I was really looking forward to it."

Sincere version
Bob and Curtis's little sister Julie took piano lessons and every year they went to her piano recital. "I just love to hear Julie play, but sometimes the recitals get a little long," said Bob. "I wonder how long it will be this year."
"Mom said it should be about 2 hours long," said Curtis. Later that evening, Curtis said to Bob, "Hey, Mom says June's piano recital has been canceled."
"Oh, what a shame," said Bob. "I was really looking forward to it."

1. Bob:
   a. Liked Julie's recitals
   b. Hated Julie's recitals
   c. Had never been to Julie's recitals

2. The recital was canceled. Bob was:
   a. Happy
   b. Sad
   c. Didn't care

3. Bob said, "oh, what a shame. I was really looking forward to it," to:
   a. Compliment the recital
   b. Make fun of the recital
   c. Lie to Curtis