The project investigated the effect of modeling metaphors to children as a means of increasing their own unique production of figurative language (i.e. metaphor, simile). Originally investigated in Augsbach (Submitted); six year olds were found to speak more metaphorically if models of metaphors were provided.

Research on metaphor production mainly centers around the question of the existence of the U-shaped curve of children’s metaphor production—whether production drops off when children enter school, and re-emerges again in adolescence (Gardner et al., 1978; Gardner & Winner, 1982; Pollio & Pollio, 1974: 1979; Pollio & Pickens, 1980). The two competing theories explaining this unusual phenomenon are the Cognitive Literal Stage Theory (CLST), and the Situational Demand Theory (SDT). The CLST explains the U-shaped pattern of development as a literal cognitive stage during middle childhood characterized by a preference for literal and representational activities. These activities include literal ways of communicating, literal representation in artwork, and the
disdain for abstract art. Researchers believe this stage functions as a period of stabilization for the child's categorical boundaries (Matter & Davis, 1975; Osherson & Markman, 1975; Ervin & Foster, 1960; Winner, McCarthy, & Gardner, 1980; Gardner et al, 1978; Gardner & Winner, 1982; Carothers & Gardner, 1979).

However, if such a literal cognitive stage of thought existed, the reduction should be present in all patterns of conversation for early school age children. Yet, the U-shaped curve does not occur in all situations. Specifically, it has not been observed in many non-field settings (Dent, 1987b; Gardner, 1974); or has it been consistently demonstrated in studies comparing non-school tasks and school tasks (Pickens & Pollio, 1979; Pollio & Pollio, 1974:79; Pollio & Pickens, 1974). Therefore, the cognitive period of literalness during middle childhood insufficiently explains the decrease in metaphoric production.

Alternatively, the Situational Demand Theory (SDT) explains the development of metaphoric language as a constant underlying ability, used only during appropriate situations. Therefore, cognitive abilities used to produce metaphoric language appear to continue in a monotonic pattern of development. Indicating that metaphoric utterances produced in middle childhood would be qualitatively superior to those of preschoolers (Pollio & Pollio, 1974;1979; Billow, 1981; Dent & Rosenberg, 1990; Pollio & Pickens,1980). The above studies (Pollio & Pollio, 1974;1979;
Billow, 1981; Dent & Rosenberg, 1990; Pollio & Pickens, 1989) differ from the current project in the use of a more structured interview format. Thus, children's metaphors produced in these studies are limited in realistic quality. The open ended nature of the proposed interview allows for children to create more realistic metaphors indicating even stronger evidence of children's actual metaphoric ability.

In supporting the SDT, demands were placed on the child to communicate metaphorically or literally depending upon the situation. The open ended interview of this investigation was determined to be unfamiliar to children (McDonald, 1982). Unfamiliar situations often force children to model the behavior of individuals they are interacting with, in order to successfully meet the demands of the situation (Bandura, 1963; 1969; 1977; Bandura & Walters, 1963).

The type of information requested was also examined in order to determine whether that situational demand can influence a child into answering a question metaphorically or literally. Two types of questions, the fact question structure (i.e. "what is a cavity?") and the experience question structure (i.e. "what does a cavity feel like?"), represent the two types of questions that will be posed to the participants. Dent & Rosenberg (1990) examined discourse structure in the form of a question, finding that children used more metaphors for questions asking them to think about something "... in a new and different way" as opposed to "Tell me what you see" (Dent & Rosenberg, 1990).
Augsbach & Dent (1990) found that children were more likely to use metaphors in response to questions about experiences than facts.

To summarize, the focus of the present project was to place situational demands on communicating in a particular fashion in order to shed light on why children’s developmental production varies across situations. Demands will be placed on the situation in two ways

1) modeling either literal or metaphoric examples.

2) Phrasing questions in ways known to obtain either literal or metaphoric ways of communicating.

Results

90 (ages adult, 11, 9, 7, 5) participants were involved in the project. Analyses showed that the effect of modeling was significant. There was a significantly greater number of metaphors in the metaphor condition (2.35) than in the literal condition (1.59), $F=(1,70)=7.71$, $p>.00071$. There was also a developmental progression for the production of metaphor. $F(1,70)=5.68$, $p<.0005$ production of metaphor. Adults (2.65) produced the greatest number of metaphors, followed by nine year olds (2.53) and eleven year olds (2.22). Adults, nine, and eleven did not differ significantly. Seven year olds (1.60) did not differ from eleven year olds. Seven and five year olds (.84) also did not differ significantly from each other (See Table 1).

The type of question used also facilitated the production of metaphor. Experience questions (3.5) were answered metaphorically more often than Fact questions (.47), $F(1,70)=134.76$, $p<.0001$.

Two interactions also occurred. An Age by Type of Question,
F=(1,69) 4.18, p > .0044, was due to the difference between the use of metaphor across question structure increased steadily with age (See Table 2). A Condition by Type of Question interaction, F (1,69) 8.11, p > .0058 was due to modeling enhancing the difference between the two questions across conditions (See Table 3).

Discussion

The current findings do not support the existence of a U-shaped curve of metaphor production in children -- whether production drops off when children enter school, and re-emerges again in adolescence (; Pollio & Pollio, 1974: 1979; Pollio & Pickens, 1980). Therefore it does not appear that the Cognitive Literal Stage Theory (CLST), can explain the apparent U-shaped pattern of metaphor production in some studies (Gardner et al., 1978; Gardner & Winner, 1982). If such a cognitive stage existed in middle childhood the curve should have appeared in the current study.

Alternatively, the Situational Demand Theory (SDT) was supported by the results. Metaphors were produced more often in the situation encouraging its production. Further a linear pattern of development was illustrated. It should be noted, non significant dip in production did occur between ages eleven and nine. Eleven year olds did not differ from nine year olds but they also did not differ from seven year olds. While this is a dip in production it is not a u-curve as described by the CLST. The SDT support the results, perhaps the demands are more salient to different age groups and creating different patterns of production depending upon
the situation. One possibility which needs to be investigated is
the topic. The dental health topic is very salient to children who
are visiting the dentist for the first time and/or the arrival of
new teeth; events much more salient to seven and nine year olds
than eleven year olds. Further investigation is needed to determine
the possibilities raised by these results.

The type of information requested was also examined in order
to determine if "question structure" can influence a child into
answering a question metaphorically or literally. Two types of
questions, the fact question structure (i.e. "what is a cavity?")
and the experience question structure (i.e. "what does a cavity
feel like?"), were examined. More metaphors were produced for
questions requesting experience information than factual
information. Indicating that metaphor is more conducive to
describing more intangible than concrete forms of information.

The two interactions further supported the SDT. Illustrating
that the way we request information greatly influences how an
individual chooses to answer that question. Specifically for the
age by question interaction, older children much more than young
children became aware of the situational demands of the situation
and communicated according to those demands. In very strong support
of the SDT the two demands (modeling and question) worked together
to create the best situation for creating metaphors.

To summarize, the results indicate that the SDT is a more
appropriate theory for describing children’s production of
metaphor. Further research is needed in order to confirm this finding. Further, while metaphor is a useful tool for adults gathering information about children's experience. Many situations exist where an adult must gather different types of information and knowledge from a child. From the above results, it is clear that the encouragement of metaphor can be done with minimal effort for experiential information such as health interviews (Gaffney & Dunne, 1987). However, interviews of more factual nature such as legal interviews (Geiselman & Bornstein, 1992) may need more effort to obtain creative communication. Further research is needed to find ways of gathering figurative information of a more factual nature.

References


Table 1
Mean Age Differences for Production of Metaphor

<table>
<thead>
<tr>
<th>AGE</th>
<th>n</th>
<th>M</th>
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<tbody>
<tr>
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</tr>
<tr>
<td>11</td>
<td>16</td>
<td>2.53</td>
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<td>9</td>
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<tr>
<td>5</td>
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</tr>
<tr>
<td>p &gt; .0005</td>
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Table 2
Table Describing the Age x Type of Question Interaction Mean Frequency of Metaphoric and Literal Language for Type of Question and Age

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<th>Fact</th>
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<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Age</td>
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<tr>
<td>Adult</td>
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<td>2.70</td>
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<tr>
<td>5</td>
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<td>1.89</td>
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Table 3
Table Describing the Condition by Type of Question Interaction
Mean Frequency of Literal and Metaphoric Language for each Question Type

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<thead>
<tr>
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<th>Condition</th>
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<tbody>
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<td></td>
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<td>Fact</td>
<td>.50</td>
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