

Knowing, Thinking, Wondering: Complement Clauses and Theory of Mind

Karen Barako Arndt ♦ C. Melanie Schuele
Vanderbilt University School of Medicine

INTRODUCTION

Complex syntax development and proficiency can have a great impact on academic success. Complex syntax emerges in the oral language of typically developing children between the ages of two and three (Limber, 1973; Bloom, Tackeff, & Lahey, 1984) with proficiency at entry to kindergarten (Bloom, Tackeff, & Lahey, 1984; Paul, 1981; Tyack & Gottsleben, 1986). Although complex syntax development in typical language learners is far less understood than other aspects of grammatical development, even less is known about the complex syntax development of children with specific language impairment (SLI). The findings from this small body of work indicate that children with SLI are less proficient than age- and MLU-matched peers in complex syntax production. Children with SLI produce fewer instances of complex syntax (Craig & Washington, 1994; Marinellie, 2004). When complex syntax is attempted, children with SLI more frequently omit grammatical elements in complex syntax (e.g., relative markers, the nonfinite “to” marker; Leonard, 1995; Schuele & Nicholls, 2000; Schuele & Tolbert, 2001; Schuele & Dykes, 2005; Owen & Leonard, 2006; Barako Arndt & Schuele, 2012).

One measure of syntactic complexity is verb complement structure. Embedded clauses such as full propositional complement clauses and WH-finite/non-finite complement clauses utilize mental state verbs as part of the verb phrase. Mental state verbs describe abstract inner cognitive, emotive, or perceptive events (Montgomery, 1997). Mental state verbs include verbs such as *know*, *think*, *forget*, *remember*, *guess*, and *wonder*. While all mental state verbs can take complements, they can also take a variety of other syntactic forms, from simple sentences to verb phrases. For example, the verb *forget* can be used in the following utterances:

- ♦ I *forget*. (Simple sentence)
- ♦ You *forgot* your lunch. (Simple sentence)
- ♦ She *forgot* to call her mom. (Infinitival complement clause)
- ♦ Dad *forgot* when Sue likes to eat breakfast. (WH-finite complement clause)
- ♦ He *forgot* how to ride a bike. (WH-nonfinite complement clause)
- ♦ I *forgot* (that) you can’t stay out past midnight. (Full propositional complement clause)

Some verbs might lend themselves to production more often in one argument structure than another. This tendency toward one structure is likely based on semantic knowledge in concert with syntactic knowledge. If children do not expand their understanding of the mental state verbs, it is likely to limit their use of these verbs to simple syntactic forms.

Recent studies pose opposing theories about whether the influences on complement clauses are semantic or syntactic (Owen Van Horne & Lin, 2011; Rahklin, et al., 2011). These studies primarily focus on spontaneous language samples as evidence of production or do not take Theory of Mind into account in examining use of mental state verbs.

PURPOSE

This study involves feasibility testing for the first author’s dissertation project. The larger study explores the relationship among mental state verbs, complement clauses, and theory of mind in preschool-age children. Of interest is the production of complement clauses in elicited tasks. Productions are examined across two elicited contexts. Syntactic scores will be analyzed via correlation with theory of mind scores. For the current feasibility testing, mental state verbs were analyzed as potential items in the elicited task. The aims of this feasibility study are as follows:

- ♦ To investigate the relationship among use of mental state verbs (MSVs), production of complement clauses (CCs), and theory of mind (ToM) in typically developing children
- ♦ To analyze selected MSVs and CCs as chosen targets for elicited tasks

PARTICIPANTS

Two typically developing children ages 48 months (J; female) and 57 months (PB; male) participated in this feasibility study. Both children were monolingual English speakers from college-educated families. Parents of both children reported that language development and other milestones were typically developing.

METHOD

Participants for this larger study will include children with SLI ages 5 to 8 and typically developing children matched for chronological age and vocabulary. Children will be seen on two 1-hour visits. Visit 1 will include the PPVT, EVT, TEGI, Leiter, a False Belief task, and a narrative language sample. Visit 2 will include the TOLD, short-term memory tasks, elicited language tasks and a spontaneous language sample.

Participants for this feasibility testing were seen on 1 visit and were given the two elicited language tasks and the false belief task. Elicited language tasks included an Infinitival Complement task and a Full Propositional Complement Clause task. Sixteen verbs were chosen as target Mental State verbs based on the literature. Eight verbs were considered High Frequency verbs and eight were considered Low Frequency verbs (see Table).

About Our Tasks

ELICITED LANGUAGE TASKS

Small toys and pictures were used to elicit target structures. For each target utterance, a scenario was presented and a scripted verbal prompt was provided to obligate or guide the child to produce the desired complex syntax structure. Prompts included the main clause verb.

INFINITIVE TASK

This task, adapted from Eisenberg (2005), elicited ten single-noun infinitives (e.g. *Mickey wants to stand up*) and six two-noun infinitives (e.g., *Mickey wants Goofy to swim*).

Target: **Mickey wants to stand up.**
MICKEY AND GOOFY ARE PLAYING SCHOOL. GOOFY IS THE TEACHER. MICKEY RAISES HIS HAND.
Mickey to Goofy: *CAN I STAND UP?*
MICKEY WANTS ~ YOU FINISH THE STORY. MICKEY ~

METHOD

FPC / WH- TASK

In this task, four stories were acted out and within each story four or five target utterances were elicited. Fifteen Full Propositional complements and two WH-complements were targeted.

Target: **Elmo knows where the candy is.**
LOOK. SOME CANDY. HERE COMES ELMO.
Elmo: *I see some candy. Hey! I can’t find my candy.*
YOU TELL THE GIRL. ELMO KNOWS ~
YOU FINISH THE STORY. ELMO ~



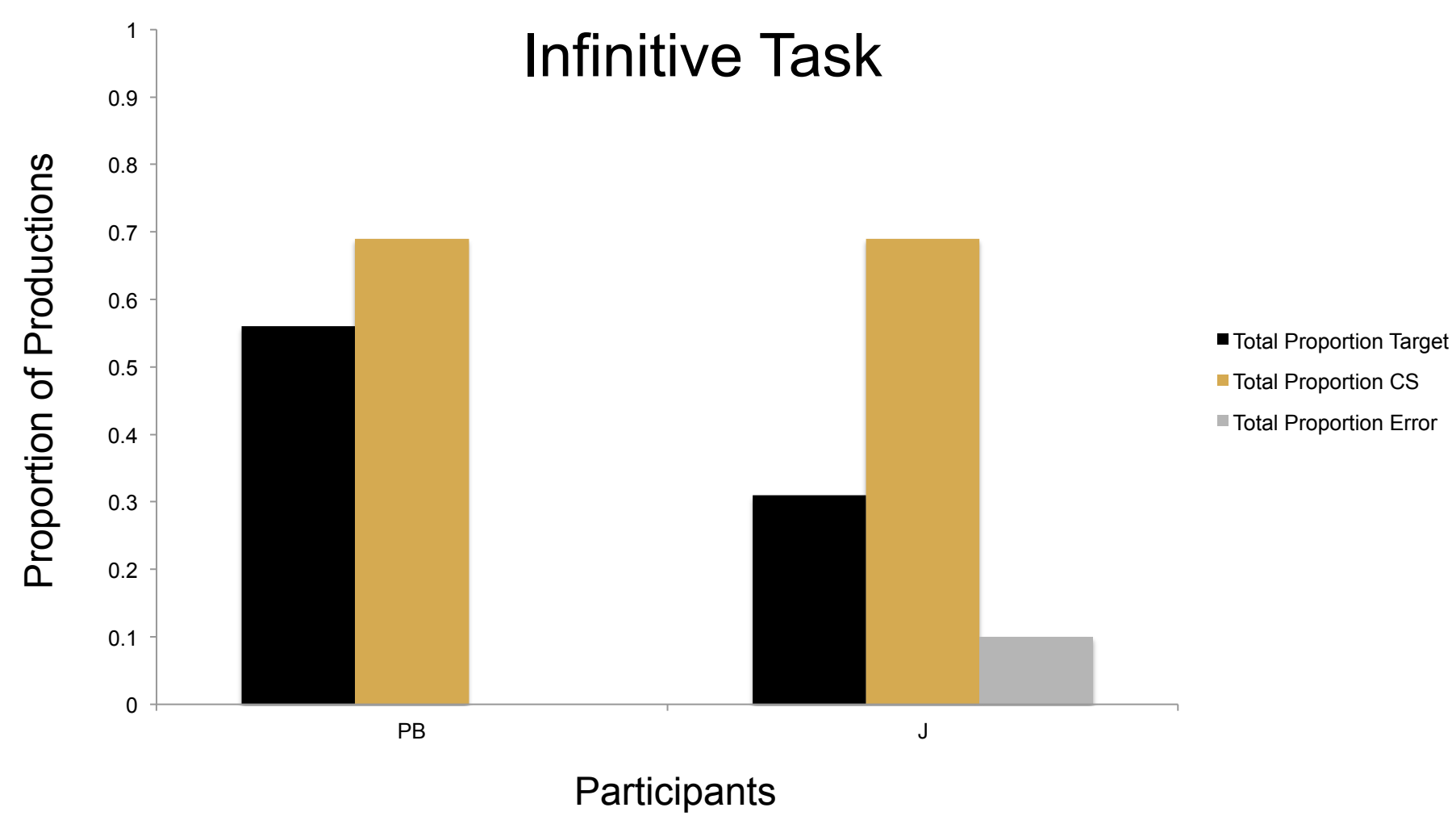
Target Verbs	
High Frequency	Low Frequency
see **	<i>forget</i>
<i>want</i> *	<i>remember</i>
<i>know</i>	<i>ask</i>
<i>like</i>	<i>promise</i>
<i>say</i>	<i>decide</i>
<i>look</i> **	<i>pretend</i>
<i>think</i> **	<i>remind</i>
<i>tell</i>	<i>hate</i>
Mental State Verbs, Verbs of Communication, Verbs of Desire * only in INF task; ** only in FPC task	

FALSE BELIEF TASK

This task is a standard Unexpected Transfer task based on Wimmer & Perner, 1983. Each child responded to two False Belief scenarios.

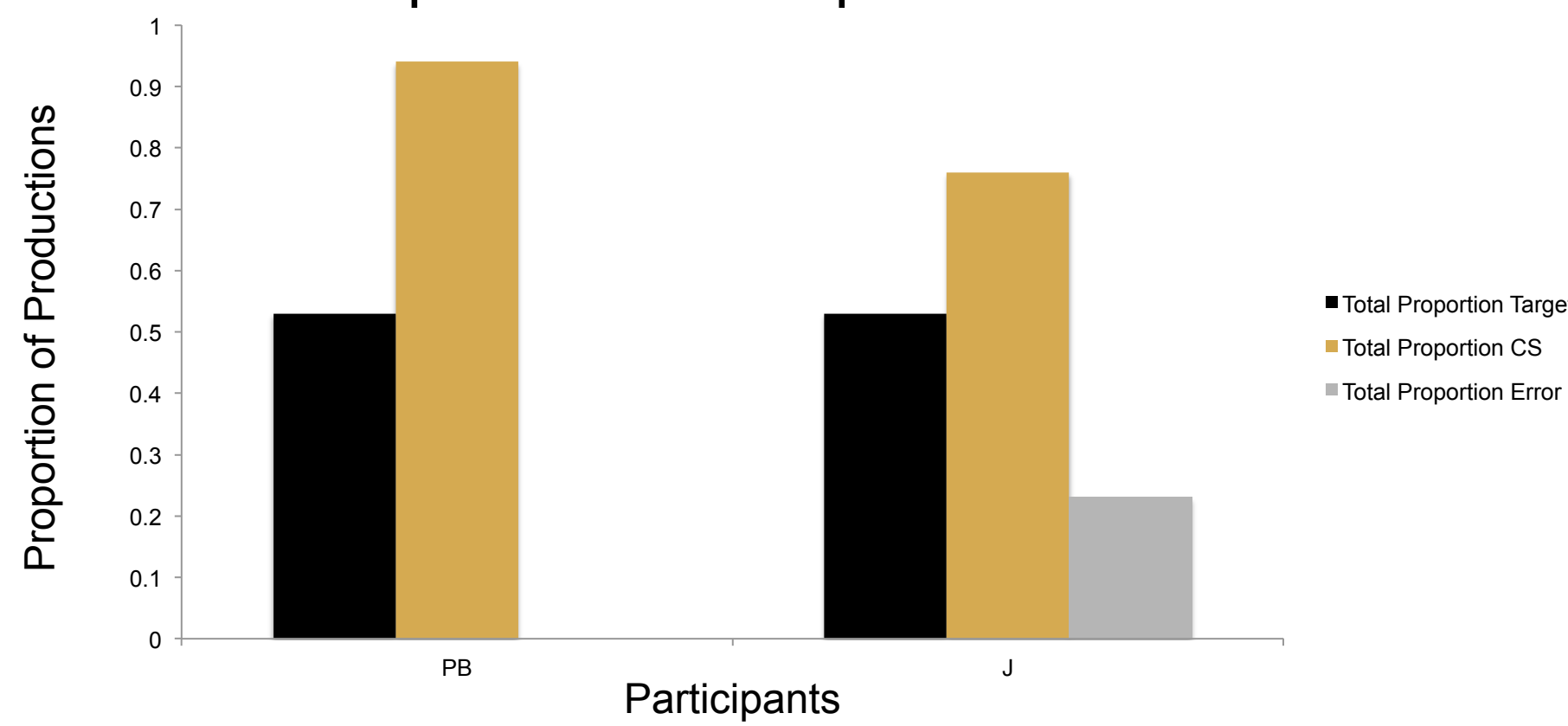
RESULTS

ELICITED LANGUAGE TASKS



PB and J perform similarly on overall proportion of CS produced in the Infinitive Task, although PB had greater success in production of target utterances. J had one utterance with an error in CS and PB had none.

Full Propositional Complement Clause Task



PB and J perform similarly on overall proportion of target utterances produced in the Full Propositional Complement Clause Task. PB had greater success in production of overall utterances with CS. J had three utterances with an error in CS and PB had none.

RESULTS

Item Analyses

Items missed by both participants

INF Task: *says*, *forgets*, *hates*

FPC Task: *likes*, *hates*

Verbs used in target utterances for INF but not FPC Task

PB: *ask*, *forget*, *remember*, *tell*, *promise*; J: *like*

Additionally, J had 3 verbs in the FPC task that she did not have in the INF task: *know*, *say*, *forget*

FALSE BELIEF TASK

	PB	J
Belief Question	+	O
Reality Question	+	+
Memory Question	+	+

PB (57 months) passed all aspects of the FB task in both scenarios.

J (48 months) failed the Belief question but passed the Reality and Memory questions in both scenarios, indicating that she was unable to understand the false belief of another person although she was able to accurately recall the story.

DISCUSSION

There seems to be a slight age effect in success on the elicited language tasks. PB was more productive with target utterances in the Infinitive task and with total utterances with CS in the Full Propositional Complement clause task. PB did not make any errors in CS production on either task, whereas J had errors across both tasks when attempting CS structures. PB also passed all aspects of the False Belief task, whereas J failed the Belief question. Concerns with the False Belief task include the language used the story script: Does a passing score on the FB task represent a true achievement of Theory of Mind or is the FB task a proxy for Complex Syntax abilities?

The high and low frequency verbs for the task will be revisited to replace both verbs and target utterances that were ineffective. More feasibility testing will be completed prior to finalizing the tasks.

Further analysis of verbs will occur by verb category. Should verbs of communication be considered separately from true mental state verbs?

Language in the FB task will be reviewed to consider whether or not the scripted story should be comprised of all simple sentences rather than including complex sentences throughout.

ACKNOWLEDGEMENTS

Completion of this study and preparation of this poster were supported by NIH/NIDCD DC007329

VANDERBILT UNIVERSITY

MEDICAL CENTER
VANDERBILT KENNEDY CENTER
FOR RESEARCH ON HUMAN DEVELOPMENT

LIST OF CITED REFERENCES AVAILABLE ON REQUEST
www.mc.vanderbilt.edu/LANGUAGELAB

Poster Presented at the American Speech-Language-Hearing Association Convention
Atlanta, GA, November 2012

