A Window into the Timeframe of Pronoun Case Errors

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Me like juice, *her said no*, *him cry* are all examples of pronoun case errors, which are commonly seen during early stages of the grammatical development of children learning English as a first language. In the previous examples, case is misused, which means that the relationship between the noun phrase and the rest of the sentence is incorrect, according to the syntax of English (Fromkin, Rodman, & Hyams, 2011). In English, there are three different forms of case: nominative, objective, and genitive (Table 1). Nominative case is targeted for subject position, and the forms are *I, you, he, she, it, we, you,* and *they*. Objective case is targeted for object position, and the forms are *me, you, him, her, it, us,* and *them*. Genitive case is used to show possession, and the forms are *my, your, his, her, its, our, your, their*.

Errors like *me like juice*, *her said no*, *him cry* are the most common form of the error, where the objective form invades nominative subject position (O'Grady, 2005: pp. 100-102). This error has been an interest of study because the majority of English speaking children make it at some point; however the many complexities of this error have yet to be defined. Most researchers have investigated why children produce pronoun case errors and proposed various hypotheses for their occurrence. Since the majority of the current research has focused on why these errors occur, this project will begin by looking at these approaches.

An early approach was the Paradigm Building Hypothesis (Rispoli, 1994). The hypothesis assumes that the Language Acquisition Device looked for phonological consistency when first learning. However, the English pronoun case system is not phonologically consistent. Table 1 demonstrates the dramatic inconsistencies of the personal pronoun paradigm system of English. Nevertheless, English pronoun forms bear some phonological resemblance to one another. For example, syllable initial *m-* can only be found in *me* and *my*, which are the objective and possessive forms of the first person pronoun, respectively. When a child fails to retrieve the correct form of the pronoun, the Paradigm Building Hypothesis claims that the child is more than likely to replace the form with a form that contains this phonological identifier, which Rispoli called a "phonetic core" (1994). Because of this, *I* and *she* will be blocked from overextension. The hypothesis also predicted that errors would be fewer for pronouns that had consistent phonetic cores *he* and *they* because both pronouns contain consistent phonetic cores: initial *h-* for the masculine third person singular (i.e., *he*, *him*, *his*) children will have trouble with this ambiguity; therefore, their proportions should be similar.

A very different approach as to why these pronoun case errors occur can be seen in Schütze and Wexler (1996). From the data that Schütze and Wexler provide, they try to argue that children know the case system of English earlier than what was originally believed, that children make the pronoun case error in systematic patterns, and that this pattern is in accordance with the time frame of the Optional Infinitive Stage. The pronoun case error is rarely seen in languages such as, Russian, Dutch, German, and Faroese. This is because English-speaking children resort to the default case, the form that is used outside of clause structure (e.g. *Who wants to eat*? *Me*!), which is the accusative form. However, in other languages, the nominative form is also the default case. Therefore, children learning the English grammatical case system experience more difficulty. Children have a similar amount of difficulty learning to include grammatical marking on verbs, resulting in what is called the Optional Infinitive stage (Wexler, 1992). Pronoun case errors are produced around the same period that the child shows optionality in the marking of tense, suggesting a correlation among these factors.

Schütze and Wexler's basic hypothesis is that pronoun case errors are made because agreement, but not tense, assigns nominative case (1996). In a case where the verb either has no tense, or has tense and lacks agreement, children will not know that they have to assign the nominative case. Instead they use default accusative case, *me*, *him*, and *her*. During the Optional Infinitive stage, verbs may or may not be marked for tense and/or agreement, because children's initial grammar allows for such variability in root clauses. Schütze and Wexler (1996) analyzed data from the CHILDES corpora.

Although default case may be a factor in promoting pronoun case errors, it does not explain the entirety of the observed system of case in use during the Optional Infinitive Stage (Schütze & Wexler, 1996). First of all, children's non-finite forms usually have nominative subjects, even though children know that the nominative form is not the default. Second, not all children incorrectly use non-nominative subject forms during the Optional Infinitive Stage. Little acknowledgment was made on these issues, and therefore should be further considered. The results may cast more light onto whether the Optional Infinitive Stage can truly be correlated with rates of pronoun case errors.

Rispoli (2005) suggests that maybe a child's inflectional system does not allow for the pronoun paradigm to build in the early stages of development. In a study with 44 children, ranging in age from 2;0 to 4;0, Rispoli found that the expansion of the personal paradigm, as measured by the variable SDpro, was a predictor of pronoun case error rate (2005). SDpro is a measure of pronoun attempt dispersion. That is, when a child produces a pronoun, how many different cells in the potential pronoun paradigm is the child attempting? When a child had a high SDpro score, they would have a low error rate and vice-versa. A negative relationship between SDpro and error rates is evident at low levels of finiteness, but disappears at high levels of finiteness.

Thus, it appears multiple factors may contribute to the likelihood of pronoun case error. A lack of case assigning structure (Schütze & Wexler, 1996), morphological and phonological structure (Rispoli, 1994), and pronoun paradigm expansion (Rispoli, 2005) may all influence pronoun case error rates. Despite the research on factors contributing to the likelihood of pronoun case error, no research has yet tackled the question of how one predicts that a child will make an error. In particular, there is no simple developmental metric that can do this. Predicting exactly when a child will make a pronoun case error remains difficult, and that diminishes the clinical relevance of the provided explanations of the error.

Nevertheless, the phenomenon of pronoun error does have clinical relevance. Wexler, Schütze, and Rice (1998), investigated how children diagnosed with Specific Language Impairment (SLI) use the pronouns of their case system. Children with SLI struggle with expressive and receptive language, while intelligence, hearing and neurological function are unaffected. Because children with SLI have such difficulties with language, they remain in the Optional Infinitive stage for a longer period of time than children who are unaffected. Wexler, Schütze & Rice (1998) called this the Extended Optional Infinitive stage. During this Extended Optional Infinitive stage, children with SLI often present a profile with missing tense and agreement, for a longer period of time. In their study, the children in the SLI group not only had a higher pronoun case error rate, but also made pronoun case errors at a later age, as late as 5;5. Since the data demonstrate that children with SLI continued to make the error at later ages. The error can be used as an identifier of SLI in clinical assessment.

Reaching back to very early research into the phenomena, we can gain a general picture of when these errors are likely to occur. Tanz (1974) reexamined the case study of Douglas data originally collected by Huxley (1970). Tanz found that Douglas used objective forms after a period of using the correct nominative form, implying that a sequence emerged at 32 months of age. Douglas then used the objective form for sentence subjects, but nominative form for tags at 36.5 months of age, such as *Him did get stung, didn't he?* This example demonstrates how the error may fit into a developmental sequence.

Budwig (1989) tried to relate changes young children go through when referring to self and others to pronoun case error, particularly in the first person singular. The participants in her study were six children, all monolingual speakers of English, with ages ranging form 1;8 to 2;8. Of the six children, three produced *my for I* errors. At the time of producing these errors the children had MLUs of 1.72 - 2.82 and ranged in age from 20 months to 30 months. One child's age deviated about eight months away from the other two children producing *my for I* errors. This indicates that perhaps MLU is a better predictor than age. Interestingly, the children who made the most *my for I* errors produced sentences with self as subject more than 75 percent of the time, whereas the children that did not make the *my for I* errors produced about half of their utterances referring to themselves and the other half referring to others. Budwig's work suggests that errors are most likely to occur when a child has a MLU of 2.82 or lower and when children are highly limited to producing sentences with self as subject a high percentage of the time (1989). These two pieces of data also suggest that pronoun case errors may be part of a developmental sequence. Age and MLU are both measures relatively familiar to clinicians. While age is readily available in clinical circumstances, it is less predictive than MLU. MLU has a disadvantage in that it cannot be calculated without a language sample. Ideally, a clinically valuable predictor would be easily accessible to the clinician and have high predictive validity.

In sum, there are several theories proposed as to why pronoun case errors occur. Most approaches see the timing of these errors as being relative to other developmental processes. There is a clear need for a simplified picture of when pronoun case errors arise; a more precise time frame for when the errors are to be expected. It was evident from Wexler, Schütze, and Rice (1998) that children with SLI produce the error at a later age than the language-matched group, suggesting that there is a time in the normal pattern of development when it is likely for these errors to occur. Is it then possible to add greater precision to predicting when pronoun case errors occur? Most importantly, all the children had to have used *I* correctly before any error invasion occurred, suggesting that *I* is a precursor to the expansion of the first person paradigm. These data echo the observation made by Tanz (1974), that the correct nominative form is produced *before* the error.

Rispoli's (2005) work on SDpro indicates that pronoun paradigm expansion may be a contributing factor in generating the error. The purpose of this project is to use a recently generated archival database (Rispoli & Hadley, 2008) to define more precisely a developmental sequence based on pronominal development that surrounds first person pronoun case errors.

Methods

Database

Data for the current study were obtained from an existing longitudinal database (Rispoli & Hadley, 2008). The overarching purpose of the longitudinal study is to document the growth of tense and agreement between 21 and 36 months of age and the contribution of parent input to that growth. The child and primary caregiver visited the laboratory for one hour at ages 21, 24, 27, 30, and 33 months and twice at 36 months. Each session was audio and video recorded. A total of 58 families have contributed to the database.

Participants

Participants for the larger longitudinal study were recruited from the campus community and surrounding rural communities in Champaign, Vermillion, and Macon counties in Illinois through newspapers, campus listservs, and flyers distributed to day care centers and community facilities. Interested parents contacted the researchers, and researchers conducted a phone interview to determine if the child was developing typically. Parents were questioned on general health of the child, pre-maturity or trauma at birth, prolonged hospitalization, otitis media, developmental milestones, talkativeness and intelligibility. Children reported to have frank neurological or sensory impairments, repeated bouts of otitis media (i.e., 6 or more infections), the insertion of pressure equalization tubes, or delayed onset of walking or talking (i.e. after 15 months) were not invited to participate. All children selected for the study were from English-only speaking homes. For their participation, participating families were compensated $20.00 for each of the seven measurement point visits. Children also received toys as incentives (i.e., teddy bear in Illinois shirt, wind-up toy) for the 24 and 36-month measurement points.

Information was gathered for all of the children regarding their general developmental abilities at 21 and 24 months of age using the Ages and Stages Questionnaire (ASQ, Bricker & Squires, 1999). Of the 58 potential toddler participants, 29 passed the screening domains at 21 months and 24 months of age (i.e. communication, gross motor, fine motor, personal-social, and problem- solving), and 38 passed the communication screening at both ages. Information on the children's expressive vocabulary was obtained using the MacArthur Communicative Development Inventories (CDI, Dale & Fenson, 1996). The majority of children fell between the 15th and 85th percentiles, with 2 children falling below the 15th percentile, 18 in the low average range, 13 in the high average range, and 5 above the 85th percentile.

For the current study, 16 children were selected from the existing longitudinal database. The following two developmental criteria were originally imposed in order to select participants: (1) children who had no more than one personal pronoun form (*I, me, my, you*) at 21 months on either the CDI or in the language sample, to ensure the children were not developing too quickly; and (2) the children must have had *I, me, my*, and *you* by

30 months (either CDI or language sample) to ensure the children were not developing too slowly.

After the 21-month and 30-month CDI forms and transcripts were examined, 16 children passed the criteria.

Procedure

Audio and video recordings of two 30-min language samples at each measurement point from ages 21 to 36 months were available in the database. Children were recorded with a primary caregiver for the first 30-min sample and instructed to "play as they would at home" with age-appropriate toys. For the second 30-min sample, an examiner joined the child and parent and led the child through various semi-structured play scenarios designed to increase the appropriateness of the tense and agreement morphemes. These scenarios included puzzles, games, constructing Mr. Potato Head, a care-giving scenario with dolls, or play with wind-up toys. Examiners included two graduate research assistants and the primary investigator. One examiner participated in each child's second 30-min play sample.

Transcription

Each 1-hr session was transcribed using the Systematic Analysis of Language Transcripts software (SALT; Miller & Chapman, 2000). Multiple passes were completed by trained transcribers to ensure accurate transcription. First, a research assistant (RA) transcribed the child utterances. Another RA then transcribed all of the adult utterances. Finally, a third RA performed a consensus pass on the entire transcript. The consensus transcriber was instructed to remove any words or morphemes that they could not confirm from the original transcription, resulting in a more conservative transcription.

Error codes ([E] codes) were in place. These [E] codes included subject pronoun case errors made in the first person, where *me* or *my* were produced in a place of the expected *I*. A verb had to follow in order to demonstrate that the relationship between the noun phrase and the rest of the sentence is incorrect, such as C *me[E] spill/ed* and *C me[E] open this*. All first person pronouns in children's complete and intelligible utterances, as well as errors of form, were found using the Explore function in SALT.

The explore function of SALT can extract utterances where pronoun case forms are used correctly and incorrectly, when it creates a list by exploring multiple transcripts. The word and code list used when exploring the transcripts, included *I, me, my, [E]*. The search included all transcripts of the sixteen participants at the four time points, as well as the utterances that contained the occurrences of the word and code list. Other types of developmental errors appeared when using SALT to explore for errors of form, [E], because there were other errors of form besides the pronoun case error. This was kept in mind when analyzing the lists of transcripts created by SALT that contained utterances with the pronoun forms used by the children, whether they were correctly or incorrectly produced.

Measures

Developmental Measures. One measure used to describe the amount of language development from language sample to language sample was the number of utterances the child produced in a 60-min sample. Research assistants, who transcribed the language samples, indicated whether or not each utterance was complete, intelligible, and spontaneous. SALT then automatically retrieved the number of utterances produced by the child from the transcripts that had undergone consensus procedures. A second measure typically used to describe children's language production Mean Length of Utterance, MLU (Brown, 1973, Miller & Chapman, 1981). MLU is often used specifically to measure the amount of development seen in a child's grammatical profile. MLU is calculated by dividing the total number of morphemes by the total number of utterances from at least 50 intelligible utterances. SALT has already created a list of utterances and algorithms, which are in place to automatically calculate MLU in the Word and Morpheme Summary.

Dependent Variables. The number of errors, both *me for I* and *my for I*, in each transcript was one dependent variable. Once the errors had been documented, a second dependent variable was implemented, the amount of error a child was observed to produce at each time point. Amount of error was partitioned into three increments: zero errors produced, one error produced, and two or more observed errors.

Independent Variables. An independent variable in this study was the children's age. As mentioned previously, the children in this database visited the lab seven times with three-month intervals. This study specifically investigated the pronoun development and pronoun case errors at 21, 24, 27, and 30 months. The second independent variable was the data reported by parents on the MacArthur Communicative Development Inventories (CDI, Dale & Fenson, 1996), which was given to the parents during visits at 21, 24, 27 and 30 months. The CDIs allow parents to report the number of lexical items that their child is producing, and it is extensively normed. There is a pronoun subscale, and within that subscale there are 17 personal pronoun forms. The number of lexical items reported was cumulative because the previous forms were copied before the parents were given the CDI for the next data collection. Parents were then instructed to add new forms that had emerged in the children's speech since the last reporting. The number of personal pronoun forms accumulated with each visit, and therefore, no child ever showed a decrease in the number of personal pronoun forms they had acquired from sample to sample.

Coding

As stated in the *Transcription* section consensus procedures served as the transcript reliability procedure for the current study. A second trained transcriber reviewed transcripts while listening to the recording providing consensus for the transcript. In addition, trained research assistants performed error coding.

Results

The purpose of this project was to isolate a period within a developmental sequence when first person pronoun errors are most likely to occur. This question was addressed by assessing pronoun development with two different measures. The first is the personal pronoun forms MacArthur Bates Communicative Development Inventory as a measure of the development of the pronoun paradigm found in English. The second was age dependent on the language-sampling rate of the larger longitudinal database. The ages 21, 24, 27 and 30 months were chosen because language samples were taken at these ages and because CDI data were available at these ages.

General Language Measures

General language measures are presented to provide a broad sense of the linguistic profiles of the children participating in this study. The averages and standard deviations of total number of utterances, mean length of utterance (MLU), personal pronoun forms on the MCDI, and TAP scores were calculated for each time point and the results are reported in Table 2. Some of the findings will be discussed briefly.

The average total number of utterances at 21 months was 91.063, averaging to about three utterances per minute. As language developed, the number of utterances increased. By 30 months of age, the children, on average, were producing 220 utterances in a 30-min language sample, equating to about seven and a half utterances per minute. The children more than doubled their rate of utterance production per minute, which was an indicator of intense growth. No child selected was reticent to talk, which can be seen in the large number of utterances produced.

Total number of utterances was used as a measure of expressive language skills, whereas, MLU was a measure used as an indicator of morphosyntactic abilities. Miller and Chapman (1981) found significant correlations between age and MLU of one hundred twenty three typically developing children. Comparing the participants of this study to the individuals who participated in Miller and Chapman (1981)'s study showed some differences and similarities. At 21 months of age, the mean of 1.62 was one standard deviation below the mean found by Miller and Chapman. This might be caused due to the selection criteria outlined in in the current study and/or Miller and Chapman's use of cross-sectional data. However, by 27 months of age, the participants in both studies displayed a MLU of 2.23, and therefore are the same population. Within this nine-month timespan, participants developed from single words users to word combiners, which was another indicator of intense growth.

One of the variables hypothesized to be related to pronoun case error was the number of personal pronoun forms parents reported their child to be using productively, a measure that should correspond to paradigm expansion (Rispoli, 2005). At 21 months of age, the mean was .5 pronoun forms. Twelve of the 16 participants were reported as producing no personal pronoun forms. Once again, the selection criteria were designed to exclude children that may have been developing at a rate too fast to isolate the occurrence of first person pronoun case errors. The high percentage of children with zero personal pronoun forms at 21 months of age reflected this selection criterion. This was consistent by the norms provided by the *Lex2005* database from the MacArthur-Bates Communicative Development Inventories, with only 8.3 percent of children producing *I* at 16 months of age (Dale & Fenson, 1996). The children added three personal pronoun forms on average for each increasing time point, with an average of 11.875 personal pronoun forms at 30 months of age.

Incidence of First Person Pronoun Case Error as a function of Age and Opportunity

Tables 3 displays how error is distributed across age. At 21months of age, no child exhibited error. This was to be expected due to the high percentage of participants who had not acquired *I* at this point in time, indicating that productive use of *I* is a precursor to the error. From 21 months of age on, there was an increasing, linear trend in the number of participants exhibiting errors and also in the amount of errors. At 30 months of age, there were five participants that produced two or more errors.

Table 4 displays the number of opportunities a child had to produce an error within a 60-min sample. To calculate the number of opportunities, all the productions of *I* were added to the number of errors for each time point. The average number of opportunities is presented by age in Table 4. Similar to age, an obvious increasing trend arose. The greatest increase in the number of opportunities was between 21 and 24 months, with a tenfold increase in the number of opportunities, but at 24 months, only one participant had a pronoun case error.

Incidence of Pronoun Case Error as a function of CDI

The number of pronoun case errors exhibited as a function of the personal pronoun forms on the CDI can be found in Table 5 and Figure 1. There were 17 personal pronoun forms indicated on the CDI. In Table 5, zero was excluded because no child could have produced an error if they did not have at least one personal pronoun form. Therefore, the scale for the CDI ranged from 1-17. Equal increment partitioning of the CDI was used in presenting the data. With pronoun case error viewed as function of age or opportunity, a linear increase was observed. However, when viewed in relation to CDI personal pronoun forms, the incidence of first person pronoun case error was not linear.

Figure 1 is a histogram that depicts the percentage of children who made at least one error as a function of the CDI pronoun score. A distinct peak formed at seven to nine personal pronoun forms, with four children producing error from the seven children who had acquired seven to nine forms. The zone of increased risk of error was defined when a child has produced four to twelve personal pronoun forms, with an increased likelihood of making an error with first personal pronoun form between seven and nine. Children who had one to three personal pronoun forms were not within this zone of error and there was very low risk of the errors occurring, with one child producing error out of the eleven found to have acquired one to three personal pronoun forms. On the CDI, once a child had acquired 13 personal pronouns or more, it was highly unlikely that the child would exhibit errors. Only two of the ten children to have acquired 13 or more personal pronoun forms exhibited error. The data reveal a defined zone of increased risk for error.

Case Studies

The peak seen in Figure 1 indicated that there was an increased likelihood of pronoun case errors captured by the CDI pronoun scores. We will call this *the zone of error*. Now this study will further investigate individual patterns to determine whether they provided fine-grained support for the zone of error. The two types of case studies examined are children who displayed faster than expected growth in the CDI and children who remained within the zone of error for more than one time point.

Participants 36B and 38G exhibited faster than expected growth between 21 to 24 months. At 21 months, both participants had a score of zero for personal pronoun forms on the CDI. 36B acquired ten personal pronoun forms within the three-month timespan, and 38G (Figure 2) had even faster development with 13 personal pronoun forms. The expectation for these fast developers based on Figure 1 was that there would be less opportunity for us to observe these children producing errors. In fact, both participants never displayed errors with first person personal pronoun forms within the sampling framework of this study. These children “jumped the zone” because they acquired more than ten pronouns between 21 and 24 months, and therefore moved out of the zone of error too quickly.

This "jump of the zone" occurred for 26B at a later data collection sample. At 27 months, 26B was reported to use five personal pronoun forms. This participant produced fourteen errors within 60-min at 27 months. Within the three months, between 27 and 30 months, 26B acquired eleven more personal pronoun forms, for a total of 16 forms. This child appeared to stop making errors, and was not observed to produce error during the 30-month data collection. It appeared that participant 26B had exited the zone of error.

26B and three more children moved slowly enough through the zone of error that they were observed to make errors at multiple time points. In addition, children who made errors at two time points were always below the mean for CDI pronouns at the time points in which they produced errors. 10G (Figure 2) exhibited errors at 27 months and 30 months. She appeared to have been in the zone of error on both occasions with six and nine personal pronoun forms respectively reported for these time points. The same pattern was seen in 47B, except errors were made at four and seven personal pronoun forms on the CDI. The story of 30B was similar to that of 26B, in that the child exited the zone within the sampling sequence of this study. At 24 and 27 months, 30B had four personal pronoun forms and during that time was observed to make errors. However, this participant acquired nine personal pronouns between 27 and 30 months, ending with a total of 13 forms at 30 months. With this late increase, 30B exited the zone of error. In sum, multiple individual patterns seen within these case studies were congruent with the hypothesis that a zone of error existed between 4 and 12 personal pronoun forms on the CDI.

Discussion

Summary of Findings

The purpose of this project was to define more precisely the point in development when first person pronoun case errors occur. Age and data on personal pronoun forms from the CDI were analyzed as two independent variables that could lead to a finding of a relative window of pronoun case error.

The first independent variable examined was the age when errors were produced. Data collections were held when the participants were 21, 24, 27, and 30 months. The total number of errors in a one-hour sample increased at each time point. This is attributed to the fact that as the children age they are developing language. However, the children displayed an extensive range of individual variability as to the rates in which they produced the errors and for how long they produced them.

The second independent variable considered by the research question was the number of personal pronoun forms that the child had acquired on the CDI. An increased risk of error was found when a child had acquired seven to nine personal pronoun forms on the CDI. Therefore, the data from the CDI defined a "zone of error". The amount of errors increased with the number of pronoun forms until a peak was reached, and then the amount of errors decreased as more personal pronoun forms were acquired. The longer the child spent in this "zone of error", the higher the risk that errors would continue to be produced.

Implications

As children are acquiring personal pronoun forms, they are in a period of pronoun paradigm expansion (Rispoli, 2005). Rispoli points out that the personal pronoun paradigm consists of the four dimensions: person, number, gender, and case. Although only four personal pronoun forms, *I, me*, *my*, and *you*, were examined in this study, three of the four paradigm dimensions must be considered when using these forms; person, number and case. Rispoli used the independent variable of SDpro, a measure of dispersion, to determine why some children produce errors yet others do not. If a child had a low SDpro, and therefore had not acquired a large number of personal pronoun forms, the child would demonstrate a low error rate. The findings from this study are congruent with Paradigm Building Hypothesis, in that children with few pronoun forms were less susceptible to error. In this study, children with only two pronoun forms had only a nine percent chance of producing an error. The likelihood of error increased dramatically to 57%, when children had seven to nine pronoun forms. Thereafter, the likelihood decreased.

The question is now raised as to what is occurring in the child's underlying grammatical system at the "zone of error". The presence of a zone of error suggests that children do not yet control the underlying grammatical system. Rispoli (2005) found that a negative relationship between SDpro and error rates is evident at low levels of finiteness, but disappears at high levels of finiteness. During this period of pronoun paradigm expansion, as children acquire personal pronoun forms, they do not yet control the underlying grammatical system. The child's capability to analyze the underlying grammatical system of his or her language is overloaded at this point and the child will display errors. The fact that children have not yet fully mastered the case system of English implies that their underlying grammatical system is not fully intact. It appears that a lack of a fully developed grammatical system (Schütze & Wexler, 1996) and the pronoun paradigm expansion may both influence pronoun case error rates.

Limitations

There were several limitations to this study. The first limitation was the sampling rate was fixed at every three months as part of the design of the larger study from which the participants were chosen. This limitation was exemplified in the cases of 36B and 38G. These two participants jumped the zone of error between 21 months and 24 months of age. If data were collected for these two participants between the first two time points, would the errors appear? The time in between 21 and 24 months of age was a period of rapid growth for these two children. Collecting language samples within these three months might have led to the observation of errors.

The results found in this study demonstrate the number of errors was increasing with age as the children's language systems were developing. The results from this study only include errors that were made up until the 30-month language sample. More errors might be seen, if language collections were included after 30-months of age. This also raises the question as to what the cutoff age is when at least 50 percent of children or more no longer make errors with first person pronoun form. The age at which pronoun case errors disappear is currently unknown. Longitudinal studies that follow two-year olds until they are older would be helpful to answer this question.

This study did not distinguish *me for I* errors from or *my for I* errors. It would be beneficial to differentiate the types of errors made with first person pronouns and list the order in which a child acquires the personal pronoun forms. This might increase error predictability. Finally, the research questions in this study only inquired about the development of case of English speakers. A study that included cross-linguistic data would present interesting comparative data. Case marking differs across languages, and therefore, expectations for error are different, if errors of case are made at all.

Further Questions

Future research is needed in order to further narrow the timeframe in which errors occur to increase the precision of our predictions. This study used data from the CDI solely for the first person personal pronoun forms in the inclusionary criteria. Would taking into account the third person pronoun forms that the children were acquiring also have increased our ability to predict error? The zone of error was defined as a number (seven to nine pronouns), but it is possible that a specific pronoun or set of pronouns might be more closely related to the occurrence of errors. While Rispoli (2005) suggests that pronoun paradigm expansion adds to the likelihood of error, it might be the case that specific pronominal forms act as triggers for error. In particular, it is well known that the feminine pronoun form *her* is exceptionally prone to overextension replacing *she* (Rispoli, 1994). Perhaps the unusual double-cell nature of *her* is a trigger to a cascading set of errors throughout the entire pronominal system.

Understanding pronoun case errors may have clinical utility. It was stated earlier that children with SLI produce the error at a later age than the language-matched group (Wexler et al., 1998). CDI data, or an assessment of the child's pronominal system could be used to predict whether errors are likely to be made. In addition, the more we know about the relationship between these errors and the rest of a child's grammar, the better we will be able to see these errors as a symptom of a deeper problem. How to effectively incorporate data related to pronoun case errors in a clinical assessment is still part of the research agenda of the future.

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TABLE 1: Personal Pronoun Paradigm of English

Case	Person – Number - Gender						
	1st person		2nd person	3rd person			
	singular	plural		singular			plural
				masculine	feminine	neuter	
Subject	I	we	you	he	she	it	they
Object	me	us		him	her		them
Possessive	my	our	your	his		its	their

TABLE 2: General Language Measures

	21	24	27	30
Number of Utterances	91.063	165.75	189.5	221
Mean Length of Utterance	1.166	1.532	2.247	2.832
Personal Pronoun Forms MCDI	.5	4.0625	6.5625	11.875

TABLE 3: Number of Children Producing Error

	21	24	27	30
0 errors in 1 hr.	16	13	10	9
1 error in 1 hr.	0	2	4	2
≥2 errors in 1 hr.	0	1	2	5

TABLE 4: Opportunity for Error

	21	24	27	30
Average Opportunity for Error	1.125	11.4375	33.75	58.5625

TABLE 5: Incidence of Pronoun Case Error as a function of CDI

	1-3	4-6	7-9	10-12	13+
Error	1	6	4	3	2
No Error	10	8	3	4	8
Percentage of Error	9%	43%	57%	43%	20%

FIGURE 1: Percentage of Children Producing Error

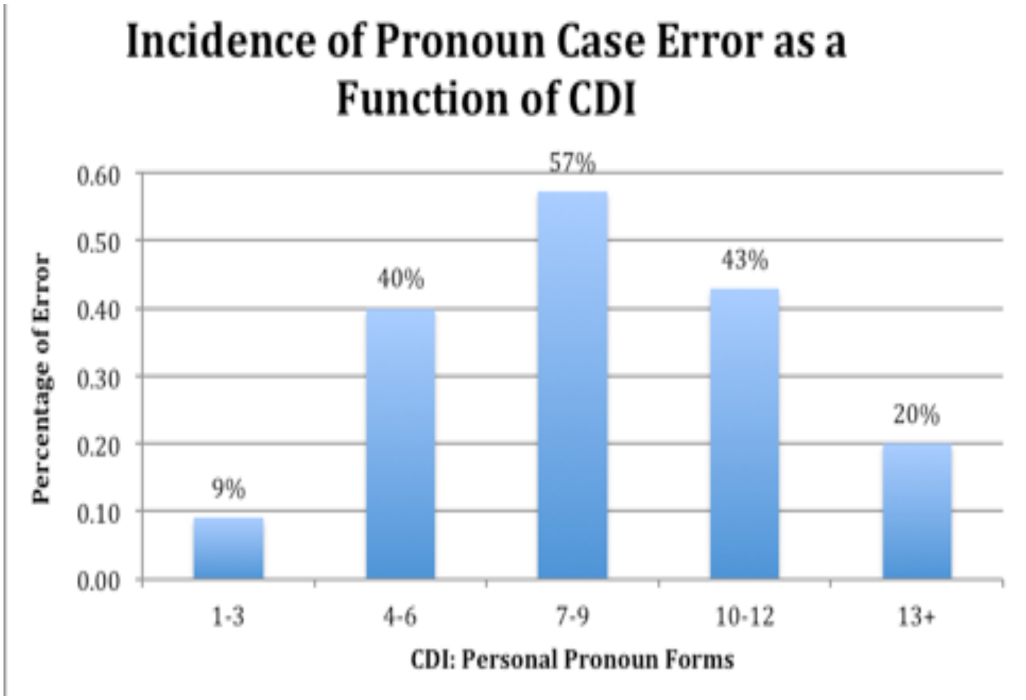

FIGURE 2: Case Studies