

Effects of Mothers' and Preschoolers' Communicative Function Use and Demographics on
Concurrent Language and Social Skills

Danai Kasambira Fannin

Northern Illinois University, DeKalb

Oscar A. Barbarin

University of Maryland, College Park

Elizabeth R. Crais

University of North Carolina, Chapel Hill

Author Note

Danai Kasambira Fannin, School of Allied Health and Communicative Disorders,
Northern Illinois University.

Oscar A. Barbarin, Department of African American Studies, University of Maryland,
College Park.

Elizabeth R. Crais, Division of Speech and Hearing Sciences, University of North
Carolina, Chapel Hill.

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Correspondence concerning this article should be addressed to Danai Fannin, 360 Wirtz
Hall, Northern Illinois University, DeKalb, IL, 60115. Email: dfannin@niu.edu.

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Abstract

Purpose: Achievement gaps exist between children from racial/ethnic minority and low SES homes and their peers, yet clear explanations for the gap have been elusive. In addition to vocabulary, some are examining pragmatics to help understand the gap, as functional language can a) reflect how caregivers stimulate language; b) show how preschoolers communicate and; c) affect academic performance. The purpose of this study was to examine links between linguistic performance and the communicative functions (CFs) of typically developing African American, European American, and Latino American preschool boys and girls and their mothers.

Method: CFs were coded from one learning and play mother-child interaction ($N=95$) from the National Center for Early Development and Learning's (NCEDL, 2005) study of Family and Social Environments. Relationships among CFs, demographics and performance on standardized language, receptive vocabulary, and social competence measures were analyzed.

Results: Mother *Reporting*, mother *Reasoning*, mother *Total Utterances*, gender, and poverty predicted performance, while *Predicting* was the only child CF to predict performance.

Conclusion: Associations between gender, poverty, and mothers' CFs suggest that lower performance for boys and children who are poor may reflect a lack of experience rather than a lack of basic communicative competence, as few child CFs were related to performance. By implication, determinations of language deficits in CLD children should consider that observed difficulty may be due to differences in early exposure to some CFs by their mothers or how teachers are measuring performance.

Keywords: Preschool, Mothers, Pragmatics, Development, Achievement.

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Effects of Communicative Function Use and Demographics on Preschoolers' Concurrent Language and Social Skills

Children from homes of lower socioeconomic status (SES), which is a measure of economic and social position based on occupation, income, and education, experience an achievement gap. The gap is especially apparent between boys from culturally and linguistically diverse (CLD) backgrounds and their female counterparts from European American (EA), middle SES backgrounds, despite focused programs designed to close the gap (Barbarin, 2013; Jensen, 2009; Owens, 2016; Rothschild, 2016). Demographic differences in word knowledge have been cited as potential reasons for deficiencies in language, cognitive, social, and academic performance (Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; Hart & Risley, 2003), but the concentration on word deficiency alone has been viewed as too simplistic or as playing a smaller role than once thought (Avineri et al., 2015; Rothschild, 2016). A more comprehensive investigation would include other language domains like pragmatics.

Pragmatics involves use of utterances and non-verbal communicative intent in social contexts (Ninio & Snow, 1996). The skills of making inferences about others' mental states, understanding emotions, and understanding mistaken beliefs are correlated with communicative competence, vocabulary, and metalinguistic skills (Hoff, 2003). Conversely, pragmatic deficits relate to social difficulty that can manifest as behavioral problems and ensuing academic failure (Barbarin, 2013; Timler, Vogler-Elias, & McGill, 2007). Communicative Functions (CF) are within the domain of pragmatics and defined as reasons for communicating. Even though adults appraise CFs when referring children for special services and cultural differences in pragmatic discourse can be misinterpreted as behavioral problems (Delpit, 1995), CFs have not always been recognized as a crucial reason for disproportionality (Nungesser & Watkins, 2005). Thus,

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knowledge of diverse CF development and its influence on aspects of children's daily lives could inform practice (Hyter, Rivers, & DeJarnette, 2015; Marquis & Baker, 2014).

Communicative Function Definition and Hierarchy

Generalization of CF research has been hampered by variation in CF operationalization where they have been coded at the utterance level, social interaction level, or interaction context level (Chapman, 1981; Goffman, 1976; Ninio, Snow, Pan, & Rollins, 1994; Ninio & Snow, 1996; Pinnell, 2002; Searle, 1975). Although Tough (1984) provided a foundation for coding of preschool CFs, little cross-cultural information or published norms on CF development exist and few studies (Blake, 1993; Hammer & Weiss, 1999; Pellegrini, Brody, & Stoneman, 1987) have described racial/ethnic minority mother-child interactions in terms of the proposed CFs.

Further, social cognitive researchers have shown that CFs advance from earlier emerging, directing functions to later emerging CFs used to inform or gather information (Bruner, 1986; Carpendale, 2006; Carpenter, Mastergeorge, & Coggins, 1983; Hudson & Fivush, 1991; Lucariello, Hudson, Fivush, & Bauer, 2004; Owens, 2016; Pears & Moses, 2003; Tough, 1984; Westby, 2012), but inquiry into whether the emergence pattern holds across cultures is lacking. For example, although later emerging CFs like *Projecting* or *Predicting* are more difficult for all preschoolers because they are still in an egocentric stage, hindering their ability to take others' perspectives (Greene & Burlison, 2003; Lucariello et al., 2004), Hwa Froelich, Kasambira, and Moleski (2007) rarely observed these CFs in preschoolers that were African American (AA) and low SES. Therefore, study of the emergence of CFs across cultures and its relationship to school readiness is also of theoretical importance.

Theoretical Framework

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Examination of whether CF use varies by sociocultural factors is grounded in developmental, cognitive, linguistic, and sociocultural theories. Increased complex expressive language is indicative of more complex ideas and receptive language, which allows children to process others' input in order to produce an appropriate response (transactional model of development), can develop at a faster rate than expressive language (Becker, 1994; Bredekamp & Copple, 2009; McLean & Snyder-McLean, 1999; Snow, 1994). Parts of expressive language and cognitive development are similar across humans, but variations in emergence of specific linguistic structures occur across cultures (DeHouwer, 2009; Paradis, Genesee, & Crago, 2011). Thus, Vygotsky's (1962) theory that cognitive and linguistic development is socially constructed and scaffolded by adults is pivotal to researchers who posit that development must be considered within social and cultural contexts (Berk & Winsler, 1995; Bodrova & Leong, 2007; Bredekamp & Copple, 2009; Castro, García, & Markos, 2013).

As teaching academic language through play in natural environments is developmentally appropriate practice, the cultural context of the home might influence academics (Bodrova & Leong, 2007; Bredekamp & Copple, 2009). However, play can differ where some parents teach as done in mainstream schools, while others teach differently. Their children may experience conflicting interaction rules if their home culture is not in congruence with the school culture (Barbarin, 2010; 2013; Hall, 1989; Halliday, 2002; Heath, 1982). A strong home-school congruence has been moderately linked to school readiness (Barbarin et al., 2010) so this study could explore whether culturally influenced language from home relates to preschool academics.

The relationship between CFs and academics (Tough, 1984) is supported by theory that cognitive development occurs via talk with others (Vygotsky, 1962; Piaget & Inhelder, 1969). When children describe their actions and ascribe meaning to those actions, they are also learning

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to think and develop understanding (Tough, 1984). For instance, didactic interactions where children ask and answer questions are comprised of various CFs essential to access of school curriculum, such as directing—requests for information or responding—response to a question (Ryder & Leinonen, 2003; Vazquez, Delisle, & Saylor, 2013). CFs are also linked to social outcomes because social competence, “...encompasses skills and abilities relating to all aspects of interpersonal problem solving, from the self-regulation of emotions aroused in social interaction, to the negotiation of solutions in interpersonal conflicts” (Mills & Rubin, 1993, p. 98). Social proficiency is characterized by emotional impulse control, amicable behavior, assertiveness, sharing, helping, and comforting of others (Burluson & Kunkel, 1996; Eisenberg et al., 2001; Leaper & Smith, 2004) and socially and emotionally competent children will more likely experience positive psychosocial outcomes such as peer acceptance, reduced loneliness, and more meaningful relationships (Hart, Newell, & Olson, 2003; Rubin, Coplan, Nelson, Cheah, & Lagace-Seguin, 1999). Yet, researchers have not often scrutinized CFs needed to demonstrate social proficiency, and the influence of CFs on learning may be a clue in the achievement gap mystery (Barbarin et al., 2010; Rothschild, 2016).

Parental Factors Influencing Differences in Child Communicative Function Use

Differences in parent discourse have been attributed to race/ethnicity¹ (Chen, 2011; Coolahan, McWayne, & Fantuzzo, 2002; Flynn & Masur, 2007; Fuligni & Brooks-Gunn, 2013; Green, 2002; Hart & Risley, 2003; Hyter et al., 2015; Lewis, 2000; Ochs & Schieffelin, 1984;

¹ Race is defined as groups of people with similar physical and biological traits considered significant by society, resulting in people treating others differently because of said traits (e.g., skin color). Ethnicity is shared cultural heritage characterized by traditions and perspectives that distinguish one group from another. While racial traits are inherited, ethnic traits are learned. As race/ethnicity is self-reported in the current study and entities such as the American Anthropological Association (AAA) have identified difficulty in objectively separating race from ethnicity in large data collection efforts, consolidation of the two categories has been suggested to be more meaningful to Americans (AAA, 1997).

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Qi, Kaiser, Milan, & Hancock, 2006) and researchers have characterized parenting styles using the CFs of *Directing*, *Reasoning*, *Responding*, and *Reporting* (Blake, 1993; Hammer & Weiss, 1999; Pellegrini et al., 1987). More responsive and sensitive styles that include Expanding, Explaining, and Supporting (Barbarin & Jean-Baptiste, 2013) positively affect child language (Mesman, van Ijzendoorn & Bakermans-Kranenburg, 2013; Paavola, Kunnar, & Moilanen, 2005; Rowe, 2012; Tamis-LeMonda et al., 2001), while lower level, Active-restrictive (Coolahan et al., 2002) or authoritarian styles consist of adults directing the interaction, leading to less variety in the child's language (Kloth, Janssen, Kraaimaat, & Brutton, 1998). Authoritarian parenting is reportedly more common in parents who are AA (Becker, 1994; Chen, 2011; Teichman & Contreras-Grau, 2006). Roberts et al., (2005), however, found that responsiveness during storybook reading occurred often for mothers who were AA and of low SES, and was the best predictor of early literacy and language. Mesman et al. (2013) also observed parental sensitivity that augmented child development in racial/ethnic minorities.

Child Demographic Factors and CFs

As with parent communication styles, previous studies suggest racial/ethnic variations in child development, and gender and SES have been associated with differences in word knowledge. Hwa-Froelich et al. and Stockman's data showed that children who were AA enrolled in Head Start may have CF usage that differs from Tough's (1984) mostly EA sample. Riojas-Cortez (2000), however, found Mexican American preschoolers to display CFs similar to their peers who are EA when allowed sociodramatic play without restriction on their ability to draw on their home culture. Hammer and Weiss (1999) also found similar CF use between children who were EA and AA regardless of SES, yet the language goals and play between low SES and middle SES mothers who were AA varied.

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Earlier studies suggest boys use simpler types of *Reporting* (Hwa-Froelich et al., 2007), while girls gain cooperative strategies, affiliative speech, talkativeness, and advanced cognitive complexity earlier (Leaper & Smith, 2004; Tonyan & Howes, 2003). Though this may be the nature of girls and boys, parents use a more explaining style with boys (Kloth et al., 1998) and more casual style with girls (Pellegrini et al., 1987), possibly contributing to variance in CFs as shown by Leaper, Tenenbaum, and Shaffer's (2004) meta-analysis and Middleton's (1992) sample of children who were from AA and low SES homes.

Although there is evidence of links between CF use and other language measures in younger children, few pragmatic studies have included older preschoolers in relation to academic performance, despite later preschool being a crucial time in development (Hudson, Shapiro, & Sosa, 1995). Thus, examination of CFs in 4-year-olds is warranted. The few studies analyzing communicative functioning have concerned a) age of onset of particular pragmatic skills; b) how skills are acquired; c) individual differences that emerge in acquisition and; d) the order and speed of acquisition (Leaper & Smith, 2004; Ninio & Snow, 1996). Using the following research questions, the current study diverges by analyzing the potential influence of CF use and demographics on language and social competence performance:

- 1) To what extent do the frequency and proportion of (overall talk) of Early Emerging, Late Emerging, Total Child CFs, and Total Mother CFs across gender, poverty status, and race/ethnicity relate to performance on standardized measures of a) receptive vocabulary; b) expressive and receptive language and; c) teacher perception of social competency?
- 2) To what extent do the frequency and proportions (of overall talk) and type of individual CFs across gender, poverty status, and race/ethnicity relate to the performance on standardized measures of a) receptive vocabulary; b) expressive and receptive language

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and; c) teacher perception of social competency?

Methods

Data from the Familial and Social Environments (Family) study, which was a supplement to the National Center for Early Development and Learning (NCEDL) Multistate Study of Prekindergarten were used in this study. Two hundred forty childcare centers (40 per state) were randomly selected from six states (GA, NY, OH, KY, IL, and CA) for the NCEDL study. The Pre-K programs were public or private, full or part day, and had diverse geography and educational requirements for teachers. The average day lasted 4.8 hours, 71% percent of teachers had a bachelor's degree, and 50% were early childhood education or child development majors. One classroom from each center was selected randomly to account for variation in teacher credentials and school day duration. Two boys and two girls were then randomly selected from each classroom for a total of 960 participants. A subset of the NCEDL sample (511 families) from five states (GA, NY, CA, IL, and OH) participated in the Family component, with 296 consenting to home-based interviews, from which the mother-child interaction was observed. See Aikens et al., (2008) for more Family supplement details.

Participants

Twenty-five interviewers contacted families via postcards and conducted follow-up, scripted phone calls to schedule home visits and obtain written consent. Ninety-five, English-speaking EA, AA, and Latino American (LA) dyads with complete data at the time of the analysis were drawn from the Family study. The distribution of this subset was 35% AA (60% poor, 40% not poor), 37% EA (46% poor, 54% not poor), and 28% LA (35% poor, 65% not poor), with 54% of the sample being girls. Fifty-one percent ($n= 48$) had incomes \leq 150% of the federal poverty guideline which was \$32,107 for a family of five (USDHHS, 2001). The

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mothers' mean educational level in the NCEDL dataset was 12.9 years, with 41% declaring a high school diploma as their highest grade, and 17% having not graduated from high school. All children were 4 years old and met the age criteria for kindergarten eligibility the next year. The average age at the time of assessment was 53.86 months ($SE = 0.21$, range 48.12-59.60 months).

Procedures

Dyads were videotaped at home during an Early Childhood Research Network (NICHD, 2003) interaction for up to 30 minutes with a Mean duration of 15.14 minutes ($SD = 3.98$). One task prompted play and two tasks were designed to be difficult for 54-month-olds to complete independently (NICHD, 2003). Mothers were asked to a) teach the child how to complete a maze on an Etch-a-Sketch toy; b) teach the child to solve a block puzzle and; c) engage in free play with animal puppets. Videos were transcribed and placed in Microsoft Excel 2000 for coding.

Development of coding system. Joan Tough's (1984) CF coding system is designed for children older than age 3 through adulthood, with codes divided into broad categories including cognitive distinctions showing variations in intent, making the taxonomy more comprehensive and detailed than others (Ninio et al., 1994). An adaptation of Tough's system with the addition of *Responding* from Stockman's (1996) study of preschoolers enrolled in Head Start who were AA was used. Thus, CFs refer to seven major categories: *Responding*: providing nonverbal/verbal replies; *Self-Maintaining*: communicating needs; *Directing*: guiding/controlling others' actions; *Reporting*: referencing an activity or reflecting on an event; *Reasoning*: explaining a process; *Predicting*: using language to anticipate or get others to anticipate; and *Projecting*: expressing how others might feel. Five of the codes were mutually exclusive with one code per utterance, except in one case where double coding was allowed when participants reasoned with directive language, which reflected difficulty researchers have had assigning one

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CF per utterance (Linares & Pastrana, 2013). For example, “You check if that's an open way first before you go” was coded as both “*Directing*: Guiding or Controlling the Listener’s Actions” and “*Reasoning*: Explaining a Process.”

<Insert Table 1 Here>

Training and reliability. The first author trained two research assistants (RA) who were EA, one who was AA, and one who was Asian American to transcribe. Language samples were segmented into Communication Units (C-Units), which are independent clauses and their modifiers (Loban, 1976). Craig, Washington, and Thompson-Porter (1998) segmented by C-Units as they permit single words such as, “oh,” “yes,” “nope,” and other types of nonclausal verbalizations to serve as utterances, as long as they are an immediate response to an adult. From this point on, C-Units will be called “Utterances”. When disagreements arose, the RAs and first author came to a consensus about how the utterance should be transcribed or coded. Once 90% word-by-word agreement was reached on practice cases, the RAs began independent transcription. Reliability was calculated for 15% of the transcripts, and checks were randomly executed to ensure that reliability remained $\geq 90\%$. Interrater reliability was calculated as number of agreed utterances/total number of utterances, resulting in a range of 89%-98%. The first author then trained one RA to code for CFs by reviewing the coding system and practicing on non-study interactions. The same seven CFs were used for both children and mothers. Interclass Correlation Coefficient (ICC) estimates and their 95% confidence intervals were calculated using SPSS statistical package version 24 (IBM, 2016) based on a mean-rating ($k = 3$), absolute agreement, 2-way mixed effects model. The first author coded the entire sample and interrater agreement was calculated on 20%, resulting in an ICC of .907, for all codes combined, which is excellent reliability, with its 95% confidence interval ranging between .720

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and .961. The ICC for child codes was .692, which approaches acceptable reliability of .700, and ICC for mothers' codes was .934, which is excellent reliability.

Measures. Spring scores for all three measures were used to allow teachers time to become accustomed to the child.

Parent questionnaire (NCEDL, 2005). Race/ethnicity and family income were established via parent-report. The determination of poor status was household income \leq 150% of the federal poverty guideline (USDHHS, 2001).

Teacher report of social skills. Each teacher completed the *Teacher Child Rating Scale* (TCRS, Hightower et al., 1986), which is a rating of the socio-emotional adjustment.

Language assessments. The *Peabody Picture Vocabulary Test-3rd edition* (PPVT-III, Dunn & Dunn, 1997) tests receptive vocabulary. The *Oral and Written Language Scale* (OWLS, Oral Expression Scale, Carrow-Woolfolk, 1995) measures expressive and receptive language.

Data Analysis

There were no missing data, and distributions of race/ethnicity, gender, and poverty were normal. CFs were slightly skewed right, as 36/95 of the children did not demonstrate *Predicting* and 77/95 had no *Projecting*. A square root transformation was used to change the scale and smooth the data distribution. Although child *Predicting* and *Projecting* distributions were still skewed right after the transformation, these variables remained since they represent higher level CFs that may yet be emerging in typical 4-year-olds; or might not have been elicited as often.

To avoid over fitting, the stepwise method was used so that only variables that increase the probability of *F* by at least 0.05 were included and those where the *F* increased by less than 0.1 were excluded. Adjusted R squared (R^2_{adj}), which is the multiple correlation coefficient of determination, was used to identify how much variance in the performance measures could be

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accounted for by the set of CFs and demographic factors. For each unit increase in a significant predictor, the child performance measure score would increase or decrease by the number of unstandardized beta coefficients. To meet assumptions for running stepwise linear regressions, Pearson's correlations were examined. There was multicollinearity between mother race/ethnicity, and child race/ethnicity as 99% of them were of the same race/ethnicity. Thus, only child ethnicity was used in the model. There was a linear relationship between the predictor variables and each performance measure. The scatterplot showed that the residuals were not distributed in any pattern with the predicted values, so the models did not violate the assumption of homoscedasticity. A visual check of the residuals histograms showed the errors were close to being normally distributed. The P-P plot showed some deviation from normality between the observed cumulative probabilities of 0.0 and 0.5 but it appeared to be minor. Overall, there did not appear to be a severe problem with non-normality of residuals.

Three stepwise multiple linear regression models were conducted to explore whether frequencies of Total Utterances, Early Emerging, and Late Emerging CFs, and demographic variables of poverty, child race/ethnicity, and gender predicted the performance measures of vocabulary (PPVT-III), language (OWLS), and social competence (TCRS). For the second, follow up question based on whether Early or Late Emerging CFs in research question one become significant, stepwise multiple linear regression models were conducted to explore whether frequencies of individual CFs and demographics predicted the performance measures. The analyses were repeated with proportions of CFs to control for varied talkativeness, instead of frequencies. The term 'talkativeness' (Leaper & Smith, 2004) refers to Total Utterances.

Results

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To verify that samples were comparable, total seconds spent in each interaction, duration of the block task, duration of the maze task, and duration of free play served as dependent variables in three Independent Samples Median tests with demographics as independent variables. As the tests showed no significant differences by group, the lengths of the interactions were considered comparable and used in their entirety. Descriptive statistics for scores on the PPVT-III, OWLS, and TCRS by gender, race/ethnicity, and poverty are in Table 2.

<Insert Table 2 Here>

Frequencies

Predictors of receptive vocabulary by emergence frequency and talkativeness.

Descriptive statistics for frequencies of mother and child Early Emerging, Late Emerging, and Total Utterances by gender, race/ethnicity, and poverty are in Table 3. The best fitting model for prediction of the PPVT-III produced $F(4, 90) = 8.78$, $p = .01$, with an $R^2_{adj} = .249$ accounting for 25% of the variance. Children's predicted PPVT-III scores were equal to $97.708 + 2.502$ (*Mother Early Emerging*) $- 3.91$ (*Mother Total Utterances*) $+ 8.44$ (*Child Late Emerging*) $- 8.198$ (poverty). *Mother Early Emerging* CFs ($\beta = .72$, $p = .01$) and *Child Late Emerging* ($\beta = .20$, $p = .05$) had positive regression weights and *Mother Total Utterances* ($\beta = -.82$, $p = .01$) and poverty ($\beta = -.28$, $p = .02$) had significant negative regression weights, showing PPVT-III scores were positively affected by mothers using Early Emerging CFs and children using Late Emerging CFs, while poverty and *Mother Total Utterances* negatively affected PPVT-III scores.

<Insert Table 3 Here>

Predictors of expressive and receptive language by emergence frequency and talkativeness. The best model for prediction of the OWLS produced $F(1, 93) = 7.40$, $p = .02$, with an $R^2_{adj} = .064$ accounting for 6% of the variance. Children's predicted receptive and expressive

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language scores were equal to $100.234 - 6.78$ (poverty). Poverty ($\beta = -.27, p = .01$) had a significant negative regression weight, indicating that children from homes of poor status were expected to have lower OWLS scores.

Predictors of social competence by emergence frequency and talkativeness. The best fitting model for prediction of the TCRS produced an $F(1, 93) = 6.08, p = .02$, with an $R^2_{adj} = .051$ accounting for 5% of the variance. Children's predicted social competence scores were equal to $3.446 + .380$ (gender). Gender ($\beta = .25, p = .02$) had a significant positive regression weight, indicating that girls were expected to have higher TCRS scores. As only *Mother Early Emerging* and *Child Late Emerging*, poverty, and *Mother Total Utterances* were significant in the initial regression analysis for the PPVT-III, only individual CFs from those categories were used in the follow up analysis. No follow-up analyses were conducted for the OWLS or TCRS as no Early, Late, or Total CFs were significant in the initial analysis. Descriptives for individual child CF frequencies by race/ethnicity, poverty, and gender are in Table 4.

<Insert Table 4 Here>

The best fitting model for vocabulary produced $F(4, 90) = 12.66, p = .01$, with an $R^2_{adj} = .332$ accounting for 33% of the variance. Children's predicted receptive vocabulary scores were equal to $97.863 + 3.959$ (*Child Predicting*) + 4.288 (*Mother Reporting*) – 2.824 (*Mother Reasoning*) – 8.506 (poverty). *Child Predicting* ($\beta = .22, p = .01$) and *Mother Reporting* ($\beta = .39, p = .01$) had significant positive regression weights, indicating children who used more *Predicting* with increased *Mother Reporting* were expected to have higher PPVT-III scores, while *Mother Reasoning* ($\beta = -.45, p = .01$) and poverty's ($\beta = -.29, p = .01$) negative regression weights indicated lower scores for children who were poor with mothers who did more *Reasoning*. Descriptives for individual mother CF frequencies by race/ethnicity and poverty, and gender are in Table 5.

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<Insert Table 5 Here>

Proportions

Predictors of receptive vocabulary by emergence proportions and talkativeness. The best fitting model for prediction of the PPVT-III produced $F(2, 92) = 9.54$, $p = .01$, with an $R^2_{adj} = .154$ accounting for 15% of the variance. Children's predicted PPVT-III scores were equal to $49.869 + 46.133$ (*Mother Early Emerging* proportion) $- 10.950$ (poverty). *Mother Early Emerging* proportions ($\beta = .25$, $p = .01$) had a positive regression weight while poverty ($\beta = -.37$, $p = .01$) had a significant negative regression weight, showing PPVT-III scores were positively affected by mothers using a larger proportion of Early Emerging CFs, and negatively affected by being poor.

Predictors of expressive and receptive language by emergence proportions and talkativeness. The best fitting model for prediction of the OWLS produced $F(1, 93) = 7.40$, $p = .02$, with an $R^2_{adj} = .064$ accounting for 6% of the variance. Children's predicted OWLS scores were equal to $100.234 - 6.776$ (poverty). Poverty ($\beta = -.27$, $p = .02$) had a significant negative regression weight, showing OWLS scores were negatively affected by being poor.

Predictors of social competence by emergence proportions and talkativeness. The best fitting model for prediction of the TCRS produced $F(1, 93) = 6.081$, $p = .02$, with an $R^2_{adj} = .051$ accounting for 5% of the variance. Children's predicted TCRS scores were equal to $3.446 + 3.80$ (gender). Gender ($\beta = .25$, $p = .02$) had a significant positive regression weight, showing TCRS scores were positively affected by children being girls. Since proportion of *Mother Early Emerging* CFs and poverty were significant in the first regression for the PPVT-III, only individual CFs from the *Mother Early Emerging* category and poverty were used in the follow-up analysis. No follow-up analyses were conducted for the OWLS or TCRS as no Early, Late, or Total CFs were significant in the initial analysis.

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Individual predictors of receptive vocabulary. The best fitting model for vocabulary produced $F(2, 92) = 18.35, p = .01$, with an $R^2_{adj} = .270$, accounting for 27% of the variance. Children's predicted receptive vocabulary scores were equal to $60.858 - 7.731$ (poverty) + 110.633 (*Mother Reporting*). Poverty ($\beta = -.26, p = .01$) had a negative regression weight, and *Mother Reporting* ($\beta = .42, p = .01$) had a significant positive regression weight, showing that children whose mothers used more *Reporting* were expected to have higher PPVT-III scores, while being poor predicted lower PPVT-III scores.

Overall, no child CFs predicted performance when proportions of CFs were used, and only *Child Predicting* predicted the PPVT-III when frequencies were analyzed. Both *Mother Reasoning* and *Mother Total Utterances* were negative predictors of PPVT-III scores when analyzing frequency of CFs, but neither predicted performance as proportion variables. For both frequency and proportion models, however, *Mother Reporting* positively predicted the PPVT-III and frequencies for both *Mother Early Emerging* and *Child Late Emerging* CFs positively predicted the PPVT-III. When considering demographics, poverty negatively predicted both the PPVT-III and OWLS. In general, there were few associations among individual child CFs and race/ethnicity, while poverty, gender, and mother CFs were stronger predictors.

Discussion

The authors posited that specific CFs might correspond with skills required to execute preschool academic processes assessed in the Head Start Child Early Learning Outcomes Framework (USHHS, 2015), such as, language development or social and emotional development. *Predicting* was the only one of the *Child Late Emerging* CFs that predicted receptive vocabulary, however. Since *Predicting* is later emerging with only 36/95 of children using any, it is understandable that it would be associated with students who have more advanced

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communication skills (Hoff, 2003; Nichols, 2000). The fact that none of the other child CFs were associated with performance was somewhat surprising, but may indicate that the children had reached a base level of CF use by this age and/or that mothers' CFs might be more influential on language and standardized tool performance at age 4 than child CFs.

Indeed, mother CFs had more influence on PPVT-III performance, with increased mother *Reporting* linked with higher scores and mother *Reasoning* predicting lower scores. Given that *Reasoning* is a Later Emerging CF and usually associated with more complex language skills, this result does not match previous work showing *Reasoning* to be advantageous (Crowley et al., 2001; Gleason & Schauble, 2000; Kloth et al., 1998; Rowe, 2012; Vernon-Feagans et al., 2013). Previous studies have measured children longitudinally, though, rather than concurrently as in the current study which might contribute to the difference in *Reasoning* results.

When comparing the current definition of *Reasoning* with other studies, however, noteworthy differences are revealed. For example, Gleason and Schauble (2000) included inferences in their *Reasoning*, but the current study did not. Rather, Gleason and Schauble's code of making an inference could have been *Reasoning*--expressing a causal and dependent relationship, *Predicting*--using language to anticipate events, or *Projecting*--expressing how others might feel, in the current study, depending on the utterance context. Crowley et al. (2001) determined that the more explanatory the parents were, the more likely the children would be to produce their own explanations and reasons. If mothers' *Reasoning* utterances were less explanatory and more directive, though, this may partially explain *Reasoning*'s contribution to lower child performance in the current study, as this represents a less sensitive/responsive parenting style (Coolahan et al., 2002; Flynn & Masur, 2007). *Mother Reasoning* was often coded with *Mother Directing* because mothers sometimes used more of a directive style to relate

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why or how a child should do something. The two CFs also constituted the largest proportions of the interactions across all mothers (Kasambira Fannin, Barbarin, & Crais, in press). Hence, perhaps a deconstruction of this study's *Reasoning* sub-categories and *Directing* subcodes might elucidate how *Reasoning* might be indirectly operating negatively during an interaction.

Like earlier studies (Hammer, 1999; McDonald & Pien, 1982; Nelson, 1973), mothers who were poor used more *Directing* and less *Responding* (Kasambira Fannin et al., in press), yet, *Mother Directing* itself was not a predictor of lower vocabulary, which has been associated with race/ethnicity and poverty. Pine (1992b) commented on researchers who deem low SES and minority mothers as more "intrusive" or "bossy," owing to increased directives. Pine refutes this idea by observing that, because parents of low SES have been found to talk less, the amount of utterances in their language samples will be smaller, which is true for high context cultures (Hall, 1989), possibly skewing interpretations that base comparisons on relative frequency of types of utterances. In addition, the less naturalistic method of language sample collection used in several studies may cause low SES parents to be more inhibited, while middle SES parents may be more apt to demonstrate how well they interact with their child, resulting in more utterances with no significant increase in directives (Avineri et al., 2015; Pine, 1992b). Hence, it may seem as if mothers who are low SES are more directive when they may actually have fewer utterances from which to calculate relative frequency of CFs. This is why proportions were also examined in the current analyses, but they yielded little difference from the frequency analyses.

In contrast, *Mother Reporting*, which is in line with Dickinson and colleagues' (2008) finding, seems to be highly responsive and is often used by mothers to answer questions or make comments in response to the child's actions or utterances. The two levels of *Directing* and *Explaining* in Kloth et al.'s (1998) study parallel, respectively, with *Early Emerging* versus *Late*

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Emerging CFs coded in the current study. Consequently, using later emerging CFs like *Mother Reasoning* might not be as sensitive to the child's language needs as use of simpler mother CFs like *Reporting* (Dickinson et al., 2008). In fact, the thought that mothers using language strategies that may not be as developmentally appropriate when reasoning is consistent with Girolametto and Weitzman's (2002) data showing that early emerging reporting encourages child talkativeness and expressive language that requires responding. Accordingly, current regression showed that mothers using more *Reporting* had children with higher PPVT-III scores.

Mother talkativeness suppressed PPVT-III scores initially, but once follow-up analysis was conducted, *Mother Total Utterances* fell out of the statistical model. For the proportion analyses, *Mother Total Utterances* was not a predictor, suggesting that, despite those from low SES homes having significantly less *Total Utterances* (Kasambira Fannin et al., in press), in line with Hart & Risley's (2003) word gap data, this variable was not a deficiency that affected child performance (Hyter et al., 2015), which is supported by Hall's (1989) description of high context cultures that may have less utterances as a cultural difference.

It is of interest that race/ethnicity did not predict performance on measures that have historically shown disproportionality for CLD children (Abel, Schuele, Barako Arndt, Lee, & Guillot Blankenship, 2016; Qi et al., 2006; Washington & Craig, 1992). This may show that when examining the achievement gap, low SES is a stronger predictor (Jensen, 2009). On the PPVT-III and OWLS, children who were poor scored significantly lower. Thus, when considering poor vs. not poor poverty parameters in relation to vocabulary, this research supports the word-gap literature (Hart & Risley, 2003; Hoff, 2003; Rowe, 2012).

In a related analysis of the current dataset, the CF of *Self-Maintaining* distinguished boys from girls (Kasambira Fannin et al., in press) where boys did less and this result, coupled with

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the current result of boys being rated lower for social competence by teachers suggests consequences for boys in preschool classrooms. *Self-Maintaining* is needed for the domain of Language Development which includes self-expression by using appropriate words or gestures to relate feelings, needs, or opinions; and Social and Emotional Development which entails resolving conflicts by expressing wants/needs, standing up for their ownership rights, and learning about oneself by talking about one's own interests (USDHHS, 2015). As indicated by Leaper and Smith (2004), "... the ability to coordinate the use of self-assertive and affiliative communication functions is generally viewed as the hallmark of the highest levels of psychosocial competence (see Selman, 1989) (p. 993)". Therefore, teachers may perceive boys' reduced affiliative speech (Leaper & Smith, 2004), reduced ability to express emotions (Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996), and reduced *Self-Maintaining* use as deficient social skills. Presuming that *Self-Maintaining* corresponds to Leaper and Smith's (2004) self-assertive speech, however, these results are contradictory as boys demonstrated *less Self-Maintaining* in the current dataset, but more self-assertive speech in Leaper and Smith's (2004) review. Thus, analyses of *Self-Maintaining* subcodes such as a) Protection of self and self-interests: Ex: "This is my space"; b) Criticizing others or themselves: Ex: "You always do that wrong" and; c) Expressing emotions about self: Ex: "That makes me mad when you do that" may help clarify these *Self-Maintaining* results, as not all subcodes have the same positive or negative connotation. Conflicting results for gender are not completely unexpected, however, because the current study's teaching and play interactions diverged from the activities and settings included in Leaper and Smith's (2004) meta-analysis. In fact, because the children in this study were being taught during two out of three tasks, this context may not have allowed demonstration of

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Self-Maintaining as much as when engaged in free play. However, the age group, gender comparison, and goal to examine CFs matched.

Another analysis of the NCEDL dataset (Early et al., 2010) showed that these boys were more often involved in didactic interactions with teachers during routines and meals, characterized by discipline and explaining rules such as “sit still” or “be quiet”. This was likely a result of boys not adhering to the rules as easily as girls, leading to discipline for misbehavior; and once disciplinary interactions occur, boys’ decreased expression of emotions or needs (*Self-Maintaining*) makes didactic experiences more challenging. The teachers’ lower ratings of the boys’ social skills in the current study, coupled with Early et al.’s (2010) larger analyses of the same children supports the well-documented concept that boys are more often perceived as misbehaving or involved in conflict, and expelled or referred due to aggression and disruptive behavior (Barbarin, 2013; Gillam, 2005). In essence, less *Self-Maintaining* (Kasambira Fannin et al., in press) may relate to boys’ lower psychosocial competence and increased discipline.

One limitation of this study was that only seven major categories in Tough’s (1984) coding system were analyzed. Although these categories provided a wealth of information, few were significant predictors of variance in performance. Yet, results do provide future direction on subcategories to be examined. Other NCEDL variables like teacher/preschool quality or family variables were not analyzed, and those may have explained more variance. Once participants were grouped by demographics, the subgroups became small but the overall sample size (N=95) was, however, larger and more diverse than some past studies of preschoolers and CFs. The use of secondary data also posed a limitation, in that, although improved from initial editions, measures like the PPVT-III and OWLS are known to result in disproportionality which may be showing for participants who were poor. For future design, assessments like the

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Diagnostic Evaluation of Language Variation Norm-Referenced Test (DELV-NR) (Seymour, Roeper, & de Villiers, 2005) or *Bilingual English Spanish Assessment (BESA)* (Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, 2014) might serve as more accurate language measures. The DELV-NR can be used with any race/ethnicity and determines if there is a language difference or disorder for those who do and do not speak a dialect of Standard American English; and the BESA ensures bilingual assessment for children from Spanish speaking homes.

Clinical Implications

Some important results emerged and continued research in pragmatics may have implications for CLD preschoolers. The finding that *Mother Reporting* predicted child vocabulary provides additional information on how adults can promote vocabulary development. Although it is more complex, *Reasoning* may not be the most effective way for mothers to increase their children's lexicon and language skills at age 4. Instead, *Reporting* might be a better way to augment receptive vocabulary development since it allows the mother to model and expand on the child's words when labeling or referring to details about an object (Justice, 2002). Furthermore, that *Child Predicting* was also related to vocabulary suggests that teachers encourage prediction, so as to affect other language domains like vocabulary. In addition, strategies to enhance the language environment, such as, provision of costumes and symbolic materials for dramatic play could help elicit later emerging CFs which are important for preschool play and learning (Pinnell, 2002). Study of how adults can model all *Self-Maintaining* types for boys and prepare the environment to foster expression of all CFs is also important.

Poverty predicting lower scores on the OWLS and PPVT-III reflects the possibility that the relationship between consistent language stimulation in the home and learning may be mediated by SES (Jensen, 2009; Lareau, 2004). Because of the intersection of low SES and AA

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and LA status in the U.S., the results could be reflecting how the OWLS and PPVT-III are standardized tools on which children from low SES minority homes tend to score lower (Coolahan et al., 2002; Flynn & Masur, 2007; Gutman et al., 2003; Hart & Risley, 2003; Rowe, 2012; Teichman & Contreras-Grau, 2006).

These data add to the scientific corpus on how 4-year-olds and their mothers demonstrate CFs and potential associations with academic performance. Previous research has shown perceived discipline problems for boys and an achievement gap in language and vocabulary for children from low income homes. Because children are socialized at home and in school and their CF use is reflective of their own experiences shaped by gender, race, SES or interaction partner (Becker, 1994; Chen, 2011; Hall, 1989; Leaper & Smith, 2004; Leinonen, 2003; Pellegrini et al., 1987), CLD children may not be familiar with specific types of adult language input or assessment strategies encountered at school entry (Barbarin, 2010; Halliday, 2002; Rothschild, 2016; Washington & Craig, 1992), even though differences should not necessarily be considered deficient (Avineri et al., 2015; Labov, 1969; Pine, 1992a; Rothschild, 2016). No racial/ethnic differences predicted performance, however, but because racial/ethnic minorities are overrepresented among low SES groups, researchers should continue to parse the combined effects of race/ethnicity and social class. In addition, normative data on CFs across cultures is lacking, impeding our ability to make resolute conclusions concerning CFs' effects on academic performance. Yet, we surmise that gender, poverty, and mother CF use appear to be related to performance and further exploration of these predictors may inform those who study the achievement gap and the potential pragmatic mismatch between home and school that influences preschool education and discipline.

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