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# Maternal and paternal pragmatic speech directed to young children with Down syndrome and typical development

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# Abstract

The aim of this study was to compare functional features of maternal and paternal speech directed to children with Down syndrome and developmental age-matched typically developing children. Altogether 88 parents (44 mothers and 44 fathers) and their 44 young children (22 children with Down syndrome and 22 typically developing children) participated. Parents' speech directed to children was obtained through observation of naturalistic parent–child dyadic interactions. Verbatim transcripts of maternal and paternal language were categorized in terms of the primary function of each speech unit. Parents (both mothers and fathers) of children with Down syndrome used more affect-salient speech compared to parents of typically developing children. Although parents used the same amounts of information-salient speech, parents of children with Down syndrome used more direct statements and asked fewer questions than did parents of typically developing children. Concerning parent gender, in both groups mothers used more language than fathers and specifically more descriptions. These findings held controlling for child age and MLU and family SES. This study highlights strengths and weaknesses of parental communication to children with Down syndrome and helps to identify areas of potential improvement through intervention.

## Keywords

Language; Parenting; Down syndrome

Parental speech directed to young children is crucial in early child development for many reasons. Language is among the most immediate and relevant means parents have to convey both affect and information to children. As a result, speech directed to children has been thoroughly investigated in typical development, and associations between parent speech and child language, social, and emotional development abound in the literature (Blount, 1990; Garton, 1992; Hampson & Nelson, 1993; Longobardi, 1992; Stern, 1985; Thiessen, Hill, & Saffran, 2005). However, the characteristics of parental speech to children with intellectual disabilities are far less well documented (cf. Longobardi, Caselli, & Colombini, 1998; Spiker, Boyce, & Boyce, 2002), although parents of children with intellectual disabilities to adapt to their children's mental and language level in ways believed to promote their children's communication and attention skills (Legerstee & Fisher, 2008; Legerstee, Van Beek, & Varghese, 2002). Only one study has examined and compared mothers' with

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fathers' speech addressed to children with intellectual disabilities (Maurer & Sherrod, 1987), and even for children developing typically very few studies focus on paternal speech (Bredart-Compernol, Rondal, & Peree, 1981; Golinkoff & Ames, 1979; Rondal, 1980). The aim of this study was to compare functional features of maternal and paternal speech directed to children with Down syndrome, the most common genetic cause of intellectual disability, and developmental age-matched typically developing children. We focused on pragmatic or functional aspects of parental speech as several studies of typical development have highlighted their concurrent and predictive relations with child development (Hampson & Nelson, 1993; Roach, Barratt, Miller, & Leavitt, 1998; Yoder, 1989). Parents of children with Down syndrome should also be oriented to maximizing pragmatic aspects of parent– child communication, and we aimed to determine if this were so and, if so, which aspects of functional language they would favor. We also wanted to assess similarities and differences in parents verbal interactive styles across parental gender and child developmental status. Our results are intended to deepen our understanding of the language environment of children with Down syndrome.

Among the different approaches that have been used to study parent speech to young children, the analysis of functional aspects is central. Functional analyses focus on the purposes and pragmatics of language. In typical development, a basic distinction has been drawn between parental utterances that have the principal goal of providing information to the child and parental utterances that are mainly used to express affective content to maintain proximity and social contact with the child (Bornstein et al., 1992; Bretherton, McNew, Snyder, & Bates, 1983; Penman, Cross, Milgrom-Friedman, & Meares, 1983; Sherrod, Crawley, Petersen, & Bennett, 1978; Toda, Fogel, & Kawai, 1990). More specific subcategories are subsumed by these two functional domains. For example, affect-salient speech includes different subcategories of idiomatic or non-propositional communications such as greetings and onomatopoeia. Information-salient utterances consist of direct statements, descriptions, or questions, and they may also be classified in terms of their referent, that is the child's actions or feelings, the parent him/herself, or the environment (Penman et al., 1983).

The frequency of different parental language functions varies as typically developing children grow (Adamson & Bakeman, 1984; Bornstein & Tamis-LeMonda, 1990). More specifically, affect-salient speech tends to decrease, whereas information-salient speech tends to increase across the first years of life (Bornstein et al., 1992; Camaioni, Longobardi, Venuti, & Bornstein, 1998; D'Odorico, Salerni, Cassibba, & Jacob, 1999; Longobardi, 1995; Venuti, Bornstein, Toniatti, & Rossi, 1997). Moreover, parents of older children tend to refer less to the child's states and feelings (such as physiological status, desire, and emotional words) and to themselves, and more often to the environment, compared to parents of younger children (Snow, 1977). These developmental trends appear to be consistent in different cultures and languages (Bornstein et al., 1992).

Previous studies of parental language in Down syndrome have focused on structural aspects and reported no differences between mothers of children with Down syndrome and mothers of mental-age or verbal-age matched typically developing children (D'Odorico, 2005; Mundy, Sigman, Kasari, & Yirmiya, 1988; Rondal, 1988). Few investigations have focused on functional aspects of parental speech (Legerstee et al., 2002; Longobardi et al., 1998; Roach et al., 1998). These studies have tended to concentrate on specific categories of language, namely directiveness and restrictions (Roach et al., 1998), finding that mothers of children with Down syndrome tend to be more verbally directive than mothers of typically developing children. Moreover, mothers of children with Down syndrome are more verbally didactic than mothers of typically developing children (Pino, 2000). Longobardi et al. (1998) observed less use of information-salient speech in mothers of children with Down syndrome

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compared to mothers of age-matched typically developing children. These differences between mothers of children with Down syndrome and typical development have been interpreted to reflect mothers' adjustments to the specific needs and capabilities of their children (Legerstee & Fisher, 2008; Legerstee et al., 2002) and particularly to specific language deficits that affect children with Down syndrome and that go beyond their general developmental delay (Chapman, Seung, Schwartz, & Kay-Raining Bird, 1998; Rondal, 1988). Accordingly, Legerstee et al.' work (2002) speaks complex relations between maternal directives and child performance. Through sequential analyses these authors found that parental redirecting of child attention is not related to the child production of referential behaviors. However, redirecting child attention significantly precedes parents' maintaining of child attention which, in turn, precedes the production of referential gestures.

The studies reported above were all conducted with mothers. In the only study that specifically compared the two parents' language directed to children with Down syndrome, Maurer and Sherrod (1987) found no differences in verbal directives related to parent gender. In the realm of typical development, some developmental scientists have reported substantial similarities between mothers and fathers in structural and functional aspects of speech to children (Bredart-Compernol et al., 1981; Golinkoff & Ames, 1979; Rondal, 1980), whereas others have claimed that fathers use less language and more direct statements compared to mothers (see Kleen Shinn & O'Brien, 2008; Leaper, Anderson, & Sanders, 1998; Malone & Guy, 1982). In general, the dearth of studies on father-child interaction in Down syndrome is notable, even as recent studies have brought to light important strengths of this relationship. For example, de Falco, Esposito, Venuti, and Bornstein (2008) reported that, during collaborative play fathers, compared to mothers, play a unique and supplementary role in successfully scaffolding their child with Down syndrome; fathers also showed a high degree of attunement adapting to the specific play level of their children. Moreover, fathers have been found to be as emotionally available to their children with Down syndrome as mothers (de Falco, Venuti, Esposito, & Bornstein, 2009), and different to fathers of typically developing children who are often reported to be less so compared to mothers (Lovas, 2005; Volling, McElwain, Notaro, & Herrera, 2002). Although both parents of children with intellectual disabilities typically suffer from parenting stress and decreased levels of well-being (Hodapp, 2002; Roach, Orsmond, & Barratt, 1999), according to some authors fathers, compared to mothers, experience less stress and feel themselves in more control (Bristol, Gallagher, & Shopler, 1988; Damrosch & Perry, 1989; Goldberg, Marcovitch, MacGregor, & Lojkasek, 1986; Olsson & Hwang, 2001; Shin et al., 2006).

This study aims to fill a gap in the literature by comparing functional features of maternal and paternal speech directed to children with Down syndrome and developmental agematched typically developing children. Based on the extant literature, we tested several specific hypotheses. We hypothesized that, perhaps reflective of their different parenting agenda, parents of children with Down syndrome would use different functional patterns of language compared to parents of children of the same developmental level behaving as if children with Down syndrome were at a younger developmental age: They would use more affect-salient and less information-salient speech (Fidler, 2003; Snow, 1977) and more reference to simple child internal states and less reference to the environment (D'Odorico et al., 1999). Moreover, we expected a significant effect of child status on parental direct statements; consistent with the literature, we hypothesized that parents of children with Down syndrome would use more direct statements and consistently more references to child actions, while asking fewer questions (Roach et al., 1998). Additionally, by comparing mothers and fathers, this study aimed to assess the generality and specificity of functional aspects of speech directed to children with Down syndrome between parental genders. Based on the limited existing literature, we hypothesized that mothers would use more

speech compared to fathers and that fathers would produce more direct statements than mothers in both groups (Kleen Shinn & O'Brien, 2008; Leaper et al., 1998; Malone & Guy, 1982).

## 1. Methods

#### 1.1. Participants

Altogether 88 parents (44 mothers and 44 fathers) and their 44 children (22 boys and 22 girls) participated. Forty-four (22 mothers and 22 fathers) were biological parents of 22 children with Down syndrome (chronological age: M = 40.27 months; SD = 7.28; range = 26–48; developmental age: M = 22.14 months; SD = 3.55; range = 15–26) and 44 (22 mothers and 22 fathers) were biological parents of 22 typically developing children (chronological age: M = 24.09 months; SD = 4.14; range = 19–31). Parents of children with Down syndrome were recruited from an early intervention center and parents of typically developing children from public day care centers. The Bayley Scales of Infant and Toddler Development (2nd ed., Bayley, 1993) was used to determine the developmental age of children with Down syndrome. No developmental age data were available for the control group, but interviews with parents, examination of health records, and observations during the study all indicated that they were developing typically; therefore, their developmental age was considered equivalent to their chronological age for statistical analysis. Children in the two groups were equivalent in developmental age, F(1, 43) = 2.67, ns, but differed in

chronological age F(1, 43) = 80.00, p < .001,  $\eta_p^2 = .67$ . We collected data on child language in the two groups. The mean length of utterance (MLU), calculated on 10 min of mother–child naturalistic interaction, was of ~1 word in both groups of children, DS: M = 1.28, SD = .48, TD: M = 1.38, SD = .24, F(1, 40) = .49, *ns*. Participants were from the metropolitan area of Naples and ethnically homogeneous of European heritage. Mothers in the two groups were similar in age (DS: M = 37.41 years, SD = 6.34; TD: M = 35.47 years, SD = 4.98), F(1, 43)= .59, *ns*, as were fathers (DS: M = 39.77 years, SD = 6.15; TD. M = 39.53 years; SD =6.26), F(1, 43) = .20, *ns*. Fathers were significantly older than mothers (Mothers: M = 36.56

years, SD = 5.79; Fathers: M = 39.66 years, SD = 6.11), F(1, 79) = 5.28, p < .01,  $\eta_p^2 = .07$ . The socioeconomic status of the parents, calculated with the Four-Factor Index of Social Status (SES; Hollingshead, 1975), was lower in families of children with Down syndrome compared to families with typically developing children (DS: M = 28.95, SD = 11.81; TD:

M = 39.63, SD = 14.56,  $F(1, 43) = 14.27, p < .01; \eta_p^2 = .14$ .

#### 1.2. Procedures

Parents' speech directed to children was studied through observation of naturalistic parentchild interactions. Data were collected during two consecutive 10-min sessions videorecorded continuously by a female filmer. Observations took place in a quiet room, which was familiar to the participants. During each session, mothers or fathers were asked to play individually with their child in ways they typically would and to disregard the filmer's presence. Mothers/fathers and children could use any or all of a standard set of toys provided. The order of mother- and father-child play sessions was counterbalanced.

From the 88 videos of parent–child interaction, word-for-word transcripts were made of maternal and paternal language. Six of the 88 videos were not completely audible, and it was not possible to make accurate transcripts; therefore, further coding was made on the remaining 82 transcripts. The CHAT system was used to provide a standardized format for producing computerized transcripts of face-to-face conversations (MacWhinney, 2000). The transcripts were then compared with the videos by a second transcriber, and necessary

corrections were made (Jonson-Glenberg & Chapman, 2004). The CLAN (MacWhinney, 2000) program was used to compute child MLU.

Parental speech was categorized in terms of the primary function of each speech unit, using a coding scheme validated in previous studies of maternal speech that highlighted its appropriateness across cultures (Bornstein et al., 1992; Rossi, 1998; Venuti et al., 1997). Several functional taxonomies of maternal speech have been developed (Delia Corte, Benedict, & Klein, 1983; Folger & Chapman, 1978; Morikawa, Shand, & Kosawa, 1988; Penman et al., 1983; Rondal, 1985; Sherrod et al., 1978; Toda et al., 1990), and our analysis followed them closely. See Table 1. (a) Affect-salient speech-expressive, generally nonpropositional, idiomatic, or meaningless statements and (b) information-salient speechfully propositional statements that give or ask information about the child, the parent him/ herself, or the environment. Subcategories of information-salient speech were also taken into account. Three subcategories differentiated the basis of speech unit type (direct statements, descriptions, or questions), and four subcategories of referent (child's action, child's internal state, parent, or environment) resulting in 9 categories. A third class of other parental speech (including vocatives, speaking on behalf the dyad, the child, or a toy, and unintelligible) was also identified (including this class in analyzing the classes of main interest also eliminated statistical limitations of linear dependence). Together, these three classes are mutually exclusive and exhaustive of parental functional speech to children.

The coding unit was each speech unit for which a single functional category could be reliably identified, and the unit changed when there was a change in coded utterance class or when an utterance terminated and a silence of at least 2 s ensued. Thus, the minimum unit size could be a single word. On the basis of these parameters, we determined the frequency of each class of parental speech and a total of speech count per participant.

Functional analysis was applied to the transcripts by two independent coders so that mothers and fathers of the same child were analyzed by different coders, and each coder analyzed 50% of maternal and 50% of paternal transcripts. Coders were trained on the functional analysis of speech and on the use of CHAT (for MLU). Interrater reliability for functional analysis on 25% of the transcripts was carried out through Cohen's (1960) Kappa and ranged from .80 to .96 for different categories.

# 2. Results

#### 2.1. Preliminary analyses

Preliminary correlations between demographic variables and parental speech measures were conducted to investigate possible covariates. Child developmental age was positively associated with environment-referent and negatively correlated with the total number of parental speech units, the affect-salient category, and subcategories of direct statements and child's action-referent. Family SES correlated significantly with affect-salient speech and questions. Thus, child developmental age and SES were controlled as appropriate in further analyses. No child gender differences were found in parental speech; therefore, we pooled the data for parental speech to girls and boys.

#### 2.2. Total number of speech units

We carried out a univariate  $(2\times 2)$  Analysis of Covariance, with parent gender (mother vs. father) and group (Down syndrome vs. typical development) as between-subjects factors on the total frequency of utterances; child developmental age and family SES served as

covariates. A main effect of parent gender emerged, F(1, 81) = 6.71, p = .001,  $\eta_p^2 = .19$ , revealing that mothers produced more utterances than fathers. Further analyses confirmed

that this difference held for both Down syndrome, t(39) = 2.90, p < .01, d = .93, and typically developing groups, t(39) = 2.97, p < .01, d = .95. No significant group or Group × Parent gender effects were found. Thus, to control for "talkativeness" subsequent analyses were performed also using the total number of speech units as a covariate.

#### 2.3. Main speech categories

Descriptive statistics show that information-salient speech was used more often than affectsalient speech in both groups and by both parents (see Table 2). Multivariate Analysis of Covariance was carried out, with parent gender (mother vs. father) and group (Down syndrome vs. typical development) as between-subjects factors, specifying the frequencies of affect-salient and information-salient speech as dependent variables; child developmental age, family SES, and total number of speech units served as covariates. Results showed a

main effect of child group, R(1, 81) = 6.82, p < .005,  $\eta_p^2 = .13$ . No parent gender effect or interaction emerged.

2.3.1. Affect-salient speech-A main effect of child group was found for affect-salient

speech, F(1, 81) = 13.81, p < .001,  $\eta_p^2 = .13$ . Parents of children with Down syndrome used more affect-salient speech than parents of typically developing children, Mothers: t(40) = -3.07, p < .01, d = -.97; Fathers: t(38) = -4.12, d = -1.34. No parent gender main effect or interaction were found.

**2.3.2. Information-salient speech**—No main or interaction effects for the frequency of information-salient speech emerged. However, we planned a certain number of comparisons for the subcategories of information-salient speech.

#### 2.4. Type of information-salient speech

Descriptive statistics are reported in Table 2. Multivariate Analysis of Covariance was carried out with parent gender (mother vs. father) and group (Down syndrome vs. typical development) as between-subjects factors, specifying the frequency of the 3 types of information-salient categories as dependent variables; child developmental age, family SES, and total number of speech units served as covariates. Results showed main effects of parent

gender, R(1, 81) = 8.65, p < .001,  $\eta_p^2 = .11$ , and group, R(1, 81) = 9.10, p < .001,  $\eta_p^2 = .26$ . No interaction emerged.

2.4.1. Direct statements—Univariate analyses revealed a group main effect for

frequency of direct statements, F(1, 81) = 19.54, p < .001,  $\eta_p^2 = .21$ ; direct statements were used more often by both mothers and fathers of children with Down syndrome compared to parents of typically developing children, Mothers: t(40) = -3.55, p = .001, d = -1.11; Fathers: t(38) = -3.31, p = .002, d = -1.04. No parent gender main effect or interaction emerged.

2.4.2. Descriptions—A main effect of parent gender was found for the frequencies of

descriptions, F(1, 81) = 26.25, p < .001,  $\eta_p^2 = .10$ ; descriptions were used more often by mothers than by fathers in both groups, DS: t(39) = 4.74, p < .001, d = 1.52; TD: t(39) = 2.50, p < .02, d = .80. No group main effect or interaction were found.

**2.4.3. Questions**—A group main effect emerged, R(1,81) = 7.04, p < .01,  $\eta_p^2 = .09$ , and post hoc analyses revealed that both parents of children with Down syndrome asked fewer questions than parents of typically developing children, Mothers: t(40) = 3.12, p < .01, d = .

99; Fathers: t(38) = 2.07, p < .05, d = .67. No parent gender main effect or interaction emerged.

#### 2.5. Referent of information-salient speech

Descriptive statistics are reported in Table 2. Multivariate Analysis of Covariance was carried out, with parent gender (mother vs. father) and group (Down syndrome vs. typically developing) as between-subjects factors, specifying the frequencies of the 4 referents of information-salient speech as dependent variables; child developmental age, family SES, and total number of speech units served as covariates. Results showed a main effect of group only, R(1, 81) = 5.80, p < .001,  $\eta_p^2 = .24$ . No parent gender main effect or interaction emerged.

2.5.1. Reference to child action—Univariate analyses yielded a significant group main

effect, F(1, 81) = 12.43, p < .001,  $\eta_p^2 = .14$ ; post hoc analyses revealed that parents of children with Down syndrome referred more often to their children's actions compared to parents of typically developing children, Mothers: t(40) = -3.17, p < .005, d = -1.00; Fathers: t(38) = -2.42, p < .05, d = .79. No parent gender main effect or interaction emerged.

**2.5.2. Reference to child state**—No main or interaction effects were found for the frequency of parent reference to child state.

**2.5.3. Reference to the parent**—No main or interaction effects were found for the frequency of parent reference to the parent.

**2.5.4. Reference to the environment**—A main effect of group emerged for reference to the environment, F(1, 81) = 7.50, p < .01,  $\eta_p^2 = .20$ . Post hoc analyses revealed that mothers of children with Down syndrome referred to the environment less often than mothers of typically developing children, Mothers: t(40) = -3.17, p < .005, d = -1.00; Fathers: t(38) = -1.28, *ns*, d = .40. No parent gender main effect or interaction was found.

#### 3. Discussion

The aim of this study was to compare functional features of maternal and paternal speech directed to children with Down syndrome and developmental age-matched typically developing children. To reach our aim we analyzed the functional features of parental language during naturalistic parent-child dyadic interaction. In general, results highlighted both similarities and differences between parents of children with Down syndrome and typical development as well as between mothers and fathers. In summary, compared to parents of typically developing children, parents of children with Down syndrome used more affect-salient speech, they used more direct statements and asked fewer questions, and, finally, they referred less often to the environment and more often to their child's actions. Parents of children with Down syndrome and children who were typically developing used the same amount of information-salient speech and referred to their children's states and to themselves equally. Independent of child status, mothers used more language, especially descriptions, than fathers, but the two parents showed similarities in the other functional domains of speech. Below we described the results with respect to each functional aspect of parental language we investigated.

Considering the main categories of language functions, we found that parents in both groups used more information-salient than affect-salient speech, as has been reported in other studies on typically developing children of the same developmental age living in the same country or different countries (Bornstein et al., 1992; Venuti et al., 1997). At this

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developmental age, the use of information-salient speech (especially tutorial and didactic features) has positive predictive associations with child language acquisition (Longobardi, 1992). As expected, parents of children with Down syndrome used more affect-salient speech compared to parents of children with typical development, but (in contrast to what we hypothesized), they used the same amount of information-salient speech. These results are partially consistent with our hypothesis that parents of children with Down syndrome engage in a linguistic style more suitable to children of a lower developmental age (Bornstein et al., 1992; D'Odorico et al., 1999; Longobardi, 1995; Venuti et al., 1997). The emphasis on affective speech, as if children were younger, might reflect parents' ability to adapt to the specific expressive language deficit displayed by children with Down syndrome, apart from their intellectual delay (Chapman et al., 1998; Rondal, 1988). Children in the two groups were matched for developmental age and were similar in MLU. However, Down's syndrome includes specific deficits in (expressive) language skills. MLU may not capture the deficit in the total number types and tokens (DS have less than typical). Thus, parents of children with Down syndrome may still adapt to a perceived lack of receptive or other expressive language deficits that were not measured here. The use of affect-salient speech may also reflect a parental strategy to compensate their children's difficulty in play (Venuti, de Falco, Giusti, & Bornstein, 2008, 2009), as vocal praise has been found to be positively associated with child play in typical development (Roach et al., 1998).

Although the overall amount of information-salient speech was similar, when we examined specific types and referents of this speech domain group differences emerged: Parents of children with Down syndrome used more direct statements and asked fewer questions than did parents of typically developing children, as we expected. Moreover, concerning the possible referents of information-salient speech, we found that parents of children with Down syndrome referred more often to the child's actions and less often to the child's environment than did parents of typically developing children, also confirming our hypotheses. Our results appear to be consistent with the literature about the directive style that is believed to characterize parenting in mothers of children with intellectual disabilities (Beeghly & Cicchetti, 1987; Cielinski, Vaughn, Seifer, & Contreras, 1995; Landry & Chapiesky, 1989; Longobardi & Caselli, 2007; Marfo, Cynthia, Dedrick, & Barbour, 1998).

The directive style we found in parents of children with Down syndrome as compared to those of children developing children does not necessarily mean an inadequate style, and could instead reveal a parental aptitude to tailor language to the special needs of their children (Legerstee et al., 2002; Legerstee, Markova, & Fisher, 2007; Longobardi & Caselli, 2007). The debate about the positive outcomes of directiveness and negative effects of intrusiveness still need to be fully addressed, but it is clear that directiveness per se is not necessarily associated with nonoptimal parenting (Cielinski et al., 1995; Legerstee et al., 2002; Marfo, 1990; Murray, Kempton, Woolgar, & Hooper, 1993). We believe that the directive style we observed in parents of children with Down syndrome reflects their attempt to maximize the efficacy of their verbal stimulation to scaffold child play and communication. Parent-child interaction, including language, reflects a bidirectional transaction (Bornstein, 2002; Legerstee et al., 2007; Sander, 2000; Trevarthen & Aitken, 2001; Van Egeren, Barratt, & Roach, 2001), and so it could be that parents of children with Down syndrome have modified their language to accommodate relatively diminished shared attention during interactions with children with Down syndrome (Legerstee & Fisher, 2008; Slonims & McConachie, 2006) or, as stated earlier, to their specific language deficits. Also, it could be that parents' language style reflects negative feelings connected with rearing a child with intellectual disabilities (see Drotar, Baskiewitz, Irvin, Kennel, & Klaus, 1975; Solnit & Stark, 1961). We cannot definitively support any conclusion as we did not address the effects of children's abilities and parents' feelings on parental language use.

With respect to the comparison between mothers and fathers, we found that mothers used more language with children than fathers, independent of child condition and even when participating in the same naturalistic situation. These results replicate those of studies of parental language directed to typically developing children and extend the tendency to use more language compared to fathers to mothers of children with atypical development (see Leaper et al., 2008; Malone & Guy, 1982). Controlling for "talkativeness," we found only one difference between parents in the two groups, namely mothers' use of descriptions; no differences emerged in the other functional language types or in the referents of informationsalient speech or in affect-salient speech. In the first years of life language that aims at describing what surrounds the child is extremely important for child language development (Hampson & Nelson, 1993). Thus, it could be that, compared to fathers, mothers exert a more powerful role in verbally scaffolding children's understanding by attempting more often to describe the environment to their children. The same pattern of results was found in parents of children with Down syndrome and in parents of typically developing children and seems therefore to reflect a characteristic of parenting that is independent of child status. Our results accord with previous studies that have highlighted general similarities in the speech mothers and fathers direct to their children (Bredart-Compernol et al., 1981; Golinkoff & Ames, 1979; Rondal, 1980).

Several limitations in this study deserve mention. First, having a second control sample matched for chronological age with DS children would enhance our ability to verify that the distribution of language of parents of children with Down syndrome is adapted to their developmental vs. chronological age. Second, having additional information about the language of children with Down syndrome would contribute to analyzing concurrent associations with parental speech and understanding child effects on parent speech. Moreover, adding longitudinal measurements of children's language development would permit us to predict associations between the different categories (and subcategories) of parental speech and children's subsequent language development.

That said, our findings have some clinical implications. Although appropriate, directiveness may not imply following the child's lead, and following the child's lead is pivotal to optimize children's achievements (Greenspan, 1997). Moreover, it has been suggested that parents' question asking predicts child language acquisition (Yoder, 1989). Thus, verbal interaction between parents and children with Down syndrome, and perhaps other kinds of intellectual disabilities, have some non-optimal features that might profitably be targeted for early intervention with foci on child language skills and on parent child-directed speech. Programs so targeted may help parents recognize effective ways of speaking with their children with Down syndrome which in turn might facilitate their children's language development (Venuti, 2007). Second, these results support a family systems approach (Bornstein & Sawyer, 2006) and point to the significance of including fathers in early intervention programs. As fathers in both groups were less verbally scaffolding than mothers, it may be the case that, through intervention, fathers of children with Down syndrome could learn to be as verbally supportive as mothers and to give their children additional stimulation that may help young children cope better with their intellectual deficits.

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#### Table 1

# Macrocategories and subcategories of parental language and examples.

| Main categories   |  | Subcategories   | Examples   |   |  |
|---|--|---|--|---|--|
| AFFECT: Expressive, generally<br>nonpropositional, idiomatic, or<br>meaningless statements. |  | Encouragement   | uragement Bravo! [Well done!]  |   |  |
|   |  | Discouragement  | Smettila! [Not that way!]  |   |  |
|   |  | Nonsense  | Vocal sounds without meaning   | <i>ng</i> : "na na"   |  |
|   |  | Greetings   | Ciao! [Hello!]   |   |  |
| Mimic<br>Singing and Recitin  |  | The child says "ba" and the parent repeats "ba".<br>"Stella stellina la note si avvicina" ["Here we go round the Mulberry Bush" |  |   |  |
|   |  |   |  |   |  |
|   |  | Conventions   | Urrà! [Yahoo!]   |   |  |
| Information   | Types of information                       |   | Referents  |   |  |
| Fully<br>propositional<br>statements about<br>child, parent, or<br>the environment          | Direct statements                          | s (   | Child's action   | Lancia la palla! [Throw the ball!]                          |  |
|   |  |   | Child's state (physiologic state<br>and simple feelings)                       | Non essere triste. [Don't be sad.]                          |  |
|   | Descriptions                               |   | Child's action   | Hai aperto il libro. [You've opened the book.]              |  |
|   |  | (   | Child's state  | Ti stai divertendo. [You're having a great time.]           |  |
|   |  | I   | Parent   | La tua mamma fa il caffè. [Your mom makes the coffee.]      |  |
|   |  | Η   | Environment  | Sta squillando il telefono. [The phone is ringing.].        |  |
|   | Questions                                  |   | Child's action   | Stai giocando con la palla? [Are you playing wit the ball?] |  |
|   |  | (   | Child's state  | Hai fame? [Are you hungry?]                                 |  |
|   |  | I   | Parent   | E' tuo padre al telefono? [Is your dad calling?]            |  |
|   |  | I   | Environment  | Dov'è la botte rossa? [Where is the red barrel?]            |  |
| Others  | Vocatives (Child name or Endearments)      |   | Francesco, tesoro [Francesco, sweetheart]                                      |   |  |
|   | Speaking for both the mother and the child |   | Diamo da mangiare alla bambola. [We give food to the doll.]                    |   |  |
|   | Speaking in place of the child             |   | The child hang up the phone and the mother says Pronto nonna! [Hello grandma!] |   |  |
|   | Speaking in place of a toy                 |   | The mother animates the doll and says Ho fame. [I'm hungry.]                   |   |  |
|   | Unintelligible/not codable                 |   |  |   |  |

#### Table 2

Descriptive statistics of categories and subcategories of maternal pragmatic speech by child condition and parent gender.

|   | Down syndrom     | e                | Typical development |                  |  |  |  |
|---|------------------|------------------|---------------------|------------------|--|--|--|
|   | Mother<br>M (SD) | Father<br>M (SD) | Mother<br>M (SD)    | Father<br>M (SD) |  |  |  |
| Main speech categories                      |                  |                  |                     |                  |  |  |  |
| Affect-salient speech                       | 29.79 (13.80)    | 24.80 (12.01)    | 17.66 (7.19)        | 16.15 (10.21)    |  |  |  |
| Information-salient speech                  | 130.57 (32.79)   | 108.96 (35.86)   | 132.06 (36.54)      | 99.96 (26.76)    |  |  |  |
| Subcategories of information-salient speech |                  |                  |                     |                  |  |  |  |
| Direct statements                           | 53.41 (24.79)    | 47.97 (21.71)    | 30.88 (14.41)       | 27.58 (12.80)    |  |  |  |
| Descriptions                                | 41.52 (15.43)    | 30.28 (13.15)    | 51.10 (20.70)       | 43.31 (18.60)    |  |  |  |
| Questions                                   | 35.44 (14.47)    | 30.78 (18.75)    | 50.08 (17.28)       | 28.94 (8.40)     |  |  |  |
| Referents of information-salien             | nt speech        |                  |                     |                  |  |  |  |
| Reference to child action                   | 68.55 (28.91)    | 57.19 (22.43)    | 45.04 (16.86)       | 39.94 (16.73)    |  |  |  |
| Reference to child state                    | 7.96 (5.33)      | 6.86 (3.49)      | 7.80 (4.79)         | 5.51 (3.91)      |  |  |  |
| Reference to the parent                     | 5.01 (3.63)      | 4.39 (2.94)      | 5.39 (4.24)         | 4.65 (4.54)      |  |  |  |
| Reference to the environment                | 49.05 (17.78)    | 40.52 (19.45)    | 73.81 (30.06)       | 48.21 (18.06)    |  |  |  |