

Depressed Mood and Speech in Chilean Mothers of 5½-Year-Old Children

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Abstract

Previous research on maternal speech and depression has focused almost exclusively on how depressed mothers talk to their infants and toddlers in the U.S. and U.K., two English-speaking countries. This study considered how depressed Spanish-speaking mothers from a Latin American country talk about their preschool-age children. Five-minute speech samples were provided by 178 Chilean mothers who were asked to talk about their 5½-year-old children to a project psychologist. Maternal depressive symptomatology was measured by the Spanish-language version of the Center for Epidemiologic Studies Depression Scale (CES-D). In multivariate analysis of covariance (MANCOVA), higher maternal depressed mood showed statistically significant associations with the following maternal speech characteristics: more criticisms, less laughter, fewer medium pauses, less positive satisfaction with the child's behavior or characteristics, a rating of a negative overall relationship with the child, and more crying (suggestive trend). A structural equation model confirmed these findings and found an indirect effect between laughter and criticisms: mothers with higher depressed mood who laughed less criticized their children less. The findings illustrate that depressed mood adversely affects how a group of Chilean mothers speak about their children.

Keywords: Depressed mood; Speech; Maternal; Latin American.

Humor Deprimido y Discurso en Madres Chilenas de Niños de 5½ Años de Edad

Compendio

Las investigaciones anteriores sobre el discurso y la depresión maternas se han enfocado casi exclusivamente en la manera en que madres deprimidas hablan con sus infantes y sus niños jóvenes en los EE.UU. y el Reino Unido, dos países anglófonos. Este estudio exploró la manera en que las madres deprimidas de un país latinoamericano hablan sobre sus niños. Muestras de discurso de 5 minutos fueron proporcionadas por 178 madres chilenas que se les pidió hablar de sus hijos a un sicóloga del proyecto. La sintomatología de depresión maternal fue medida por la versión en español de la Escala de Depresión del Centro de Estudios Epidemiológicos (CES-D). En el análisis multivariado de covarianza (MANCOVA), humor deprimido maternal alto mostró asociaciones estadísticas significativas con las siguientes características del discurso maternal: más críticas, menos risa, menos pausas medianas, menos satisfacción positiva con la conducta y las características del niño, una negativa clasificación de la relación global, y más llanto (una tendencia sugerida). Un modelo de ecuación estructural confirmó estos datos y encontró un efecto indirecto entre la risa y las críticas: las madres con humor deprimido más alto quien se rieron menos también les criticaron a sus hijos menos. Estos resultados ilustran que el humor deprimido afecta desfavorablemente como un grupo de madres chilenas hablan de sus hijos.

Palabras clave: Humor deprimido; Discurso; Maternal; Latinoamérica.

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Depression is a worldwide public health problem, with women suffering at twice the rate of men regardless of race, ethnicity, or economic status. Of women with children, it is estimated that 10-42% experience an episode of depression in their lives (Horwitz, Briggs-Gowan, Storfer-Isser, & Carter, 2007). Risk of depression is even greater for mothers of young children and those from low-income backgrounds (Horwitz et al., 2007; Knitzer, Theberge, & Johnson, 2008). In Latin America, high prevalence rates of depressed mothers with young children appear to be comparable to those in the United States and United Kingdom (Wolf, De Andraca, & Lozoff, 2002).

Maternal depression has negative consequences for women, families, and children. With regard to impact on children, maternal depression is associated with reduced quality of mother-child interaction; increased risk of insecure attachment, child behavioral problems, and the development of psychopathology; and poorer cognitive, language, and social emotional development (Fritsch, Montt, Solis, Pilowsky, & Rojas, 2007; Goodman, 2007; Hammen, 1991; Herrera, Reissland, & Shepherd, 2004; Sohr-Preston & Scaramella, 2006). The mechanisms by which the effects of depression are transmitted from mother to child are less well-known. Maternal speech, the focus of the current study, may be one way.

Previous research has shown speech differences between depressed and non-depressed adults. Depressed adults have been reported to talk less (Breznitz, 1992; Vanger, Summerfield, Rosen, & Watson, 1992), talk slower (Stassen, Bomben, & Gunther, 1991), pause longer (Breznitz, 1992; Stassen et al., 1991; Vanger et al., 1992), express more negative affect such as sadness and anger (Breznitz, 1992), use less emphasis and inflection (Alpert, Pouget, & Silva, 2001), and repeat themselves more often than non-depressed adults (Breznitz, 1992). Studies of speech specifically in depressed mothers have focused mostly on their dialogue with infants and toddlers in the first 1-3 years following childbirth. Depressed mothers have been found to speak less than non-depressed mothers, unless in mildly stressful situations when they speak more (Breznitz & Sherman, 1987). They express more negative emotion and comments (Hammen, 1991; Murray, Kempton, Woolgar, & Hooper, 1993; Radke-Yarrow, Belmont, Nottelmann, & Bottomly, 1990) and use fewer affective features in their speech (Herrera et al., 2004). They speak in a higher mean pitch (Reissland, Shepherd, & Herrera, 2003) and respond less quickly to the cessation of their infant's or toddler's speech (Bettes, 1988; Breznitz & Sherman, 1987; Zlochower & Cohn, 1996). To our knowledge, there is only one study specifically on maternal depression and speech about, rather than directly to, older children. This study focused on the relationship

between speech and past episodes of depression rather than concurrent depression. Goodman, Adamson, Riniti, and Cole (1994) found that mothers with a history of depression expressed more critical attitudes about their 8- to 10-year-old children in a semi-structured interview than mothers without a past depressive episode.

The purpose of the present study was to consider the relationship between current depressed mood and speech in Chilean mothers whose children were 5½ years old. The study fills a gap in prior research on speech and maternal depression by exploring speech and maternal depression in mothers of children older than infant or toddler age and assessing the speech of Spanish-speaking mothers in a Latin American country. Available research on speech and maternal depression has been conducted exclusively with English-speaking populations in the U.S. and U.K. As well, this study considers speech *about* the child rather than directly *to* the child. Children are often present when their mothers talk about them to another adult such as a family member or health care provider and thus may be frequently exposed to comments about themselves in their mother's speech.

We predicted that speech differences in Chilean mothers with or without depressed mood talking about their 5½-year-old children would be similar to those observed in mothers from the U.S. and U.K. talking directly to their infants and toddlers. Specifically, we predicted that mothers with elevated depressed mood would report more negative characteristics about their 5½-year-old children, be less satisfied with their mother-child relationship, and speak with more depressive speech patterns, such as disfluencies.

Methods

Participants

Data were collected in the course of a study of the behavioral and developmental effects of preventing iron deficiency anemia in healthy full-term infants (Lozoff et al., 2003). The project was a collaboration between the University of Michigan and the Instituto de Nutrición y Tecnología de los Alimentos (INTA) at the University of Chile.

The infancy phase of the study was conducted from 1991-1996. Infants from working-class communities near Santiago, Chile who received well child care in community clinics were considered for study participation. Infants were born at term, weighed 3.0 kg or more, and were free of acute or chronic health problems. Exclusion criteria included illiterate or psychotic caregiver, or no caregiver able to accompany the child to testing appointments; infant in day care; residence outside the neighborhoods; and more than 1 child under 12 months of age in the household at the time of entrance

into the project. Based on blood testing at 6 and 12 months, children with iron deficiency anemia and non-anemic controls were identified and invited to join the study's neuromaturation component ($n = 357$); all were given iron in infancy.

Two hundred forty children in the neuromaturation component participated in a follow-up assessment at 5½ years (33% attrition). Of those who were not tested, approximately two-thirds moved out of the area or were unable to be located due to the high mobility of the urban population. The remainder repeatedly missed testing appointments or declined to participate, mostly due to parental work schedules. There were no differences between those who were or were not assessed at 5½ years in gestational age, birth weight and length, maternal age, IQ, and depressive symptoms, number of children, number of people in household, single parent status, and parental education. Children not in the 5½ year follow-up had somewhat lower socioeconomic status ($p < .05$) and less supportive home environments ($p < .01$) in infancy, but differences were small (2 points or less).

Mothers who participated in both the infancy and follow-up phases of the study had grown up in Chile during the brutal military dictatorship of Pinochet (1973-1988). The country was generally conservative and patriarchal, heavily influenced by Catholicism and a culture of machismo, where men had considerable power over women. At the time of the 5½ year follow-up, divorce was not legal in Chile; domestic violence was prevalent (Ceballos, Ramirez, Castillo, Caballero, & Lozoff, 2004). Mothers lived with their families in crowded, periurban communities, and their homes were small, prefabricated concrete homes or assembled with movable wooden panels. Most women, while literate, had not completed high school and were not employed outside the home.

Audio taped speech samples were obtained for all but 9 of the 240 participants in the 5½ year follow-up. Thirty-one speech samples were subsequently eliminated due to technical difficulties with the tapes or speech samples by a caregiver who was not the mother. Three tapes with a total of 22 speech samples were stolen. Thus, the final sample size was 178 speech samples. There was only one difference in the background variables mentioned above between those with analyzable speech samples and those without. The children of mothers in the final sample were younger at the follow-up than children of mothers not included ($p < .01$), but the difference was less than one month.

Procedures

Signed informed consent was obtained from mothers for both the infancy and 5½-year phases. The research

protocols for both phases were approved by the Institutional Review Boards of the University of Michigan Medical Center, Ann Arbor, and of INTA, University of Chile, Santiago.

Maternal depressive symptomatology when the child was 5½ was measured by the Spanish-language version of the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). Scores range from 0-60 with a score ≥ 16 commonly used as a threshold for depressive symptomatology (Radloff, 1977). The CES-D has shown satisfactory reliability and validity across ethnic groups within the U.S. and internationally (Naughton & Wiklund, 1993; Soler et al., 1997).

For the speech sample, project psychologists invited mothers to talk about their child for 5 minutes while audio taped. Project psychologists used instructions from an expressed emotion paradigm (Magana et al., 1986), asking mothers to share their thoughts and feelings about their child and alerting the mothers that the psychologists preferred not to interrupt or answer any questions until after the 5 minutes. The child was not in the room while the mother spoke.

Audio tapes were transcribed utterance by utterance by Spanish speaking undergraduate students at the University of Michigan. Pilot coding of transcriptions was then performed as part of a senior honor's thesis by one of the coauthors (RM). She and another coauthor (HR), native Spanish speakers from Puerto Rico and Ecuador respectively, were blind to maternal depressive symptoms and trained to $>80\%$ reliability. After they coded 89 speech samples, the transcription and coding phases were reassessed, resulting in some final refinements to the coding system, especially related to pauses. Since RM had graduated, we decided that all speech samples would be transcribed and coded by HR (including those previously transcribed and coded by RM) to ensure consistency in transcription and coding. In addition, HR, a native of Ecuador, spoke Spanish that was closest to that of the Chileans. Using the refined coding system, HR coded some transcriptions twice to reach $>80\%$ intra-rater reliability and then completed all 178 speech samples.

The coding system was derived from an expressed emotion coding system (Magana et al., 1986), modified based on the literature on speech and depression (Alpert et al., 2001; Breznitz, 1992; Breznitz & Sherman, 1987; Goodman et al., 1994; Hammen, 1991; Herrera et al., 2004; Murray et al., 1993; Radke-Yarrow et al., 1990; Reissland et al., 2003; Stassen et al., 1991; Vanger et al., 1992; Zlochower & Cohn, 1996), and refined through pilot coding. The following information was coded: positive remarks, criticisms, positive and negative satisfaction comments, positive and negative comments specifically about the child's school performance,

immediate and lagged repetition of statements, and instances of elaboration in describing the child and/or the child's behavior in the past. Other variables counted or rated included pauses, laughter, crying, length of the speech sample, number of words spoken in the first minute, mother's initial statement regarding her child, and mother's overall relationship with her child. Descriptions and examples of codes follow. In all examples provided we use the child names of Isabel and Mauricio as pseudonyms to preserve participants' anonymity.

Based on the previous literature showing that depressed mothers expressed more negative emotion and criticisms than mothers without depressed mood (Goodman et al., 1994; Hammen, 1991; Murray et al., 1993; Radke-Yarrow et al., 1990), several types of positive and negative comments were coded. Positive remarks and criticisms were defined as short, brief, or even blunt comments of praise or criticism without explanation such as "La Isabel es cariñosa (Isabel is affectionate)" or "El es terrible! (He is terrible!)". These were coded separately from positive and negative satisfaction comments which included an explanation of satisfaction or dissatisfaction with the child's behavior or characteristics. Examples of positive and negative satisfaction comments include, "La Isabel me ayuda en la casa con los quehaceres (Isabel helps me at home with the chores)" or "El Mauricio es travieso porque siempre esta peleando con sus hermanos (Mauricio is naughty because he is always fighting with his brothers)."

Positive and negative comments about the child's school performance or experience were counted separately from positive and negative satisfaction comments. Our rationale for looking at school comments separately was based on the fact that at age 5½ children were experiencing their first year of formal schooling, an important milestone for child and family. Thus, it seemed maternal comments about school (or a lack of comments) might demonstrate the mother's level of interest or engagement with something important that her child was experiencing at 5½ years. We hypothesized that depressed mothers might make less positive and/or more negative comments about their children's school experience. An example of a positive school comment is "La tía me dice que es el estudiante mas inteligente que tiene en el salon (The teacher says that he is the most intelligent student that she has in the room)." An example of a negative school comment is "La tía me dice que no se porta bien en la escuela (The teacher tells me that she [the child] does not behave well at school)."

Previous studies have found repetitions to be a form of speech disfluency and an indicator of depression (Breznitz, 1992; Stassen et al., 1991). Two different types of repetition were coded. Immediate repetitions were made more than once directly following an identical

preceding statement: "La Isabel tiene una personalidad muy linda. Tiene una personalidad muy linda (Isabel has a very lovely personality. She has a very lovely personality.)" Lagged repetitions were repeated more than once in different parts of the speech sample.

A mother's description of past negative experiences was also coded. Previous research has shown a link between depressed mood and exaggeration of and rumination on past negative experiences (Hall & Farel, 1988; Nolen-Hoeksema, Larson, & Grayson, 1999). Thus, we thought that depressed mothers might talk at length about past experiences, especially occurrences of negative child behavior. Here is an example of a mother elaborating on a negative past event:

y un día y le dije que... en el cumpleaños le dije que mas fácil tenia un hermanito y el me dijo que 'no', que no queria tener hermano porque quiere ser solito... porque dice que si tengo otro hijo el va quedar a un lado, se puso a llorar porque el solo quiere ser y ves que yo tomo una guagua celoso.

(and one day I told him that... on his birthday I told him that it was easier if he had a little brother and he told me 'no', that he didn't want to have a brother because he wants to be the only one... because he says that if I have another son he is going to be pushed to one side, he started to cry because he wants to be the only child... and you see that I have a jealous little boy.)

Paralinguistics or non-semantic aspects of speech were also coded, including crying, laughing, and pauses. Because sadness has been shown to be the predominant mood of depressed women's speech (Breznitz, 1992), we thought depressed mothers would cry more and laugh less than non-depressed mothers. From previous research (Breznitz, 1992; Stassen et al., 1991; Vanger et al., 1992) it also seemed likely that depressed mothers would pause more often or longer than mothers with little or no depression. Pauses were classified into three types using the following guidelines, which emerged after pilot coding. Short pauses of 3 seconds or less were coded as pauses that indicated a simple pause to catch a breath. Medium pauses lasted 4 to 9 seconds; based on listening to the tapes, they seemed to reflect pausing to gather thoughts. Long pauses lasted 10 seconds or more; they were considered evident disruptions in the flow of talking.

The length of the speech sample in seconds was measured because previous research on speech in depressed adults has found they talk less or slower (Breznitz, 1992; Stassen et al., 1991; Vanger et al., 1992). The number of words spoken in the first minute was counted to see how fast the mothers spoke at the outset, before fatigue or running out of things to say may have become issues. The mother's initial statement about her child was also rated as positive, neutral, or negative. An

example of a positive initial statement was “La Isabel es una niña inteligente (Isabel is an intelligent girl)” vs. a negative initial statement of “El Mauricio es un niño de mal genio (Mauricio is a bad tempered boy).” We thought that limited speech in the first minute or a negative first comment would be associated with depressed mood and/or indicate a lack of excitement, interest, or engagement on the depressed mother’s part regarding her child.

The overall relationship between mother and child as communicated by the mother was also rated as positive, neutral, or negative. This global relationship rating was based on listening to the entire 5 minutes of speech. The coder considered the mother’s statements describing how she and her child got along, paying particular attention to the number of positive or negative satisfaction remarks. The coder also considered the mother’s tone of voice and expression overall, specifically whether during most of the speech sample the mother sounded energetic/happy or lethargic/monotone.

The number of times the mother spoke her child’s name was also counted. This count was exploratory and emerged during pilot coding when it appeared some mothers spoke their child’s name more often than other mothers. We wondered if mothers with little or no depressed mood would use the child’s name more often, possibly indicating more engagement with the child or recognition of the child’s agency.

Background Factors

Detailed family information was obtained at the 5½ year follow-up. Project psychologists administered the Graffar (Alvarez, Muzzo, & Ivanovic, 1985) to measure socioeconomic status. Widely used in Chile, the Graffar differentiates families at the lower end of the socioeconomic status spectrum and includes questions about number of people and children in the house, parental education, work, housing, and major household possessions. The child’s environment was assessed through the questionnaire form of the Home Observation for Measurement of the Environment-Revised (HOME) (Caldwell & Bradley, 1984). Maternal IQ was obtained during the infancy phase of the study using a short form of the Wechsler Adult Intelligence Scale-Revised (WAIS) (De Andraca, Cobo, Rivera, & Pizarro, 1993; Wechsler, 1981).

Per study design in the infancy phase, some children had received a year-long home-based intervention program. The intervention focused on fostering mothers’ abilities to support their infants’ development. Those who were not in the intervention program received home visits to monitor health and intake of iron supplements but without psychosocial stimulation. Intervention group in infancy was considered as an additional background factor.

Data Analysis

A multivariate analysis of covariance (MANCOVA) was used to examine the relationship between maternal speech characteristics and CES-D scores at the 5½ year follow-up. MANCOVA allows analysis of multiple dependent variables when inter-correlations exist among these variables. The speech characteristics were treated as the dependent variables; maternal depressed mood as a continuous variable was treated as the independent variable. Data transformations were performed as appropriate to meet assumptions of normality.

Pearson correlations for continuous measures and *t*-tests for binary measures were used to examine the relationship between background characteristics and speech outcomes that showed statistically significant relationships with maternal depression. The following background characteristics were considered: child’s gender, child’s age at follow-up, intervention group and iron status in infancy, parental education, maternal age, maternal IQ (collected in the infancy phase), mother’s number of children, number of people in household, father absence, and SES (Graffar).

We further evaluated the relationship between maternal depressed mood and speech characteristics by fitting the significant outcomes from the MANCOVA in a structural equation model. Structural equation modeling offers parsimonious modeling of the data and allows for identification of mediating effects as well as determining a model that fits well and represents the reality of the data.

We had also hoped to consider the chronicity of maternal depressed mood in relation to speech. However, depression scores in infancy and at 5½ years were substantially correlated ($r = .50, p < .001$) for the 152 participants with both data points. This correlation suggested a high degree of colinearity such that it was problematic to determine separately the effects on speech of depressed mood in infancy or at 5½ years or the change between the two time points.

Data were analyzed using SAS 9.1, SPSS 16.0 and AMOS7.0 (Arbuckle, 2006). An alpha level of 0.05 was defined for tests of statistical significance.

Results

Characteristics of the 5½-year sample are shown in Table 1. Mothers had a high prevalence of depressed mood, with 96 of 178 mothers (54%) scoring ≥ 16 , the widely used threshold for depressive symptomatology. The average score for maternal IQ in the mid 80s was similar to that of US women with less than a high school education from lower socioeconomic groups (Jacobson, Jacobson, & Frye, 1991). The mean years of education showed that both mothers and fathers generally had only 1-2 years of high school. Most families were in the

Table 1
Sample Characteristics^a

	<i>N</i> ^b	178	<i>Minimum</i>	<i>Maximum</i>
<i>Child</i>				
Age, years	5.5 ± 0.002		5.5	5.6
Gender, % male (<i>n</i>)	61 (108)		—	—
Birth weight, kg	3.55 ± 0.03		3.00	4.50
Birth length, cm	50.9 ± 0.1		47.0	58.0
Gestational age, weeks	39.4 ± 0.1		37.0	42.0
<i>Family</i>				
Maternal depressive symptoms	19.8 ± 1.0		0	55
% (<i>n</i>) scoring ≥ 16 on CES-D	54 (96)		—	—
Maternal age, years	32.5 ± 0.5		20.0	51.6
Maternal IQ ^c	84.1 ± 0.8		51.8	105.1
Maternal education, years	9.5 ± 0.2		2	14
Paternal education, years	9.6 ± 0.2		3	17
Number of children in the house	2.5 ± 0.1		1	7
Number of people in the house	5.3 ± 0.1		3	14
Father absent, % (<i>n</i>)	21 (37)		—	—
Socioeconomic index ^d	37.4 ± 0.6		23	59
Home environment ^e	34.7 ± 0.5		17	49

Notes. ^a Values are means ± SE for continuous variables and percentages and *n* for categorical variables. ^b *N* varies slightly due to occasional missing data for some measures. ^c Obtained in the infancy phase of the study. ^d Measured by the Graffar scale, designed to differentiate families at the lower end of the socioeconomic spectrum. A score of 37 falls in the medium range of the lower class spectrum. ^e Assessed by Home Observation for Measurement for the Environment-Revised.

medium range of the lower-class spectrum. Fathers were generally present in the home.

MANCOVA analyses showed that the relationship between maternal depressed mood at 5½ years and maternal speech was statistically significant for five speech characteristics and showed a suggestive trend for another. Higher depressed mood was related to a negative overall relationship rating ($p < .05$), less positive satisfaction with the child's behavior or characteristics ($p < .01$), more criticisms ($p < .05$), less laughter ($p < .05$) and fewer medium pauses lasting 4-9 seconds ($p < .05$). The relation to more crying was suggestive ($p < .09$), but only 8 women cried. All these women scored ≥ 16 on the CES-D, and 7 had male children.

Of the background characteristics considered, none correlated with speech outcomes, except gender which was significantly correlated with one outcome: crying. Therefore, we controlled for gender in the MANCOVA. Since the HOME scale contains a number of items about maternal speech and relationship with the child, it was not considered as a covariate.

The structural equation model confirmed the findings from the MANCOVA analyses and further illuminated the relationship between outcomes. As shown in Figure 1, higher (more depressed) CES-D scores were related to a more negative overall relationship rating, less positive satisfaction, higher number of criticisms spoken,

less laughter, more crying and fewer medium pauses. In addition to the direct effect between higher depressed mood and more criticisms spoken, there was an indirect effect between laughter and criticisms: mothers with higher depressed mood laughed less and also criticized their children less. To put it another way, mothers with lower depressed mood laughed more and criticized their children more. There was also a positive pathway between laughter and positive satisfaction.

Discussion

Consistent with previous research with mothers in Latin America (Wolf et al., 2002) and with U.S. mothers of young children in economically stressed situations (Lanzi, Pascoe, Keltner, & Ramey, 1999), the Chilean mothers had a high prevalence of depressed mood. This study found significant relationships between the mothers' depressed mood and their speech characteristics as they talked about their 5½-year-old children. These findings will be discussed with respect to the available studies from the U.S. and U.K. on speech in depressed adults and speech in depressed mothers, mostly to infants and toddlers.

Mothers with higher depressed mood were significantly more likely to receive a negative overall relationship rating in our study. The finding makes sense in

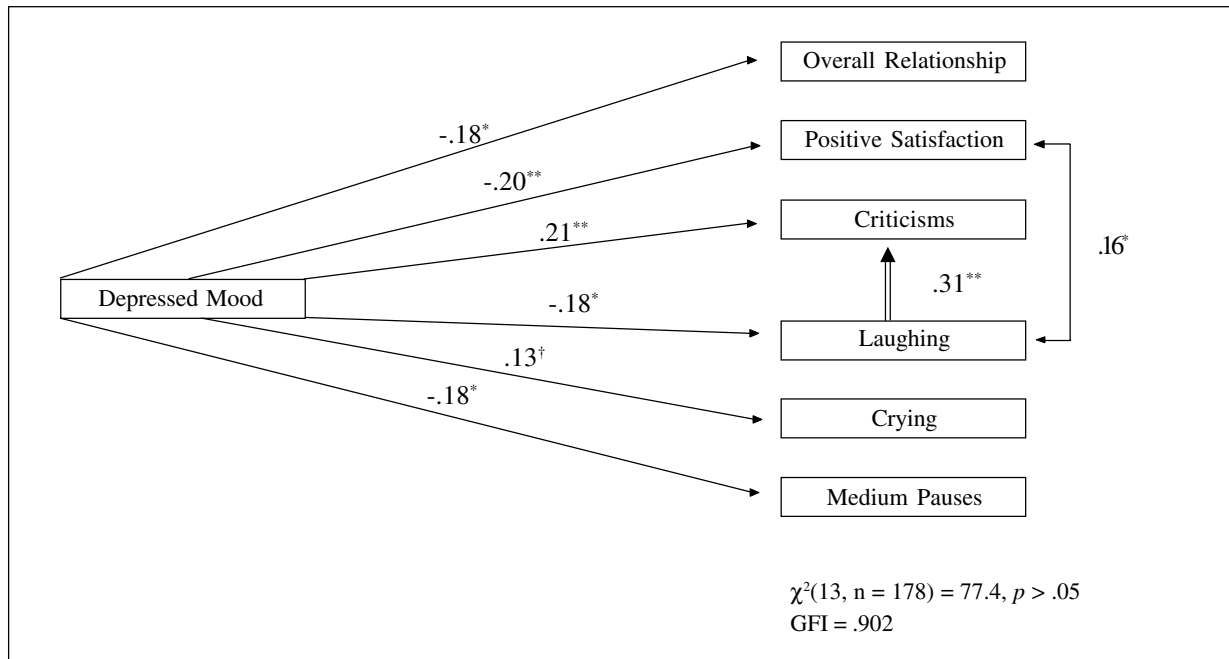


Figure 1. The structural equation model shows significant pathways between depressed mood and speech characteristics. Single line arrows indicate direct effects. The double line arrow indicates an indirect effect. Values are standardized scores.

Notes. * $p < .05$; ** $p < .01$; $^\dagger p < .10$.

light of previous research. Symptoms of depressed mood include speech that is monotonous or less expressive (Brenzitz, 1992; Stassen et al., 1991), and depressed mothers have been found to be more negative when speaking to their infants and toddlers (Murray et al., 1993; Radke-Yarrow et al., 1990). Our finding that mothers with higher depressed mood were more likely to have their relationship with their 5½-year-old children, as communicated through their own speech, rated as more negative seems consistent with these previous findings.

The results confirmed our prediction that mothers with elevated depressed mood would make more critical remarks about their children than mothers with less depressed mood. We based this prediction on previous studies linking maternal depression to more critical attitudes toward their children (Hammen, 1991), including the expression of more negative emotion to their infants (Murray et al., 1993), more explicit negative evaluations to their toddlers (Radke-Yarrow et al., 1990), and more critical attitudes about their 8- to 10-year-old children (Goodman et al., 1994). We also expected mothers with elevated depressed mood to voice more negative satisfaction comments, but we did not observe this. According to the coding scheme, criticisms were short statements (e.g., "My daughter is bad"), while negative satisfaction comments included an explanation of the behavior criticized (e.g., "My daughter is bad because she does not help me").

Why differences were found in number of criticisms, but not negative satisfaction comments, is unclear. However, we hypothesize that our findings are in line with behavior typical of depression. Mothers with higher depressed mood may have experienced symptoms such as psychomotor retardation (Zlochower & Cohn, 1996), apathy (Radke-Yarrow et al., 1990), and reduced responsiveness to people (Zlochower & Cohn, 1996), which may have contributed to their inability to elaborate negative statements with an explanation. That is, psychomotor retardation may contribute to lack of effort to talk beyond a short criticism, while apathy may leave mothers unmotivated to explain their critical comments. As well, perhaps mothers experienced that explaining a criticism required more responsiveness to the psychologist taping their speech.

This interpretation of the results concerning criticisms and negative satisfaction comments makes sense when considering the results regarding positive remarks and positive satisfaction comments, that is, positive remarks with an explanation. There was no difference between mothers more or less depressed in the number of short positive remarks spoken. However, mothers with higher depressed mood made significantly fewer positive satisfaction comments than mothers with lower depressed mood. It was the mothers with lower depressed mood who seemed to take the time and make the effort to explain why their child's behavior was pleasing.

We found differences in all three paralinguistic characteristics that were coded: laughter, crying, and pauses. Higher depressed mood was related to fewer instances of laughter in speech, which mirrors previous research. Indeed, sadness has been shown to be the dominant mood of depressed women's speech (Breznitz, 1992), which is also characterized by negative affect (Hammen, 1991; Radke-Yarrow et al., 1990). In this population from Chile lack of laughter was also associated with higher depressed mood.

Crying has long been considered a symptom of depression, so it was not unexpected to find higher depressed mood suggestive of more episodes of crying in our study. Of the 8 depressed mothers who cried, 7 had male children. One previous study of maternal depression and speech found altered speech specifically with male infants (Murray et al., 1993). The speech to male infants of mothers with postpartum depression was less infant-focused than that of non-depressed mothers. It is interesting that we also found a gender-specific difference regarding depressed mood and speech, although the male children in our study were 5½ years old, not infants, and their mothers were speaking about them, rather than to them. More studies are needed to further explore the relationship between male gender, maternal depression, and maternal speech.

Based on previous studies (Breznitz, 1992; Vanger et al., 1992; Zlochower & Cohn, 1996), we had predicted that higher depressed mood would be associated with a greater number of long pauses in speech, indicating a speech disfluency. In prior studies, though, longer pauses by depressed participants were observed when they interacted with another adult or child. Our paradigm differed in that mothers were asked to talk without interruption for 5 minutes while being audio taped. Mothers with elevated depressed mood may have found this mildly stressful. Depressed participants have been shown to increase verbal productivity in mildly stressful situations (Breznitz & Sherman, 1987; Radke-Yarrow et al., 1990) even though they show reduced speech productivity in naturalistic settings. The mildly stressful nature of the paradigm we used may have contributed to the lack of differences in total number of long pauses. It may also be a reason we did not find a difference in speech productivity as measured by the number of words spoken in the first minute.

In our study mothers with higher depressed mood used significantly fewer medium pauses (4-9 seconds) in their speech. The coding of medium pauses emerged during pilot coding to differentiate pauses that were neither long (evident disruptions) nor really short (naturally occurring pauses in speech). Medium pauses of 4-9 seconds seemed to reflect attention or thought about what the mother was saying. Thus, we interpret the use of fewer medium pauses by mothers with higher

depressed mood as indication of less thoughtful speech. That is, mothers with higher depressed mood may not have gathered their thoughts as much before speaking as mothers with lower depressed mood. In other words, they were less likely to consider what they were saying before they said it. While we speculate that this tendency not to gather their thoughts led to the use of fewer medium pauses, perhaps it also contributed in some way to the findings of more negative speech characteristics. Indeed, if depressed mothers thought less about what they said before they said it, then it is not surprising that depressed mothers spoke with more criticisms and less positive satisfaction about their children and were rated as having a more negative overall relationship than mothers with lower depressed mood.

The structural equation model was generally consistent with the MANCOVA, but uncovered an indirect pathway between depressed mood, laughing, and criticisms. At first glance, this pathway seems contradictory. Why would mothers with higher depressed mood who laughed less also criticize their children less? The indirect pathway seems more interpretable when considered from the viewpoint of mothers at the other end of the spectrum, i.e., those with lower depressed mood; these mothers laughed more and criticized their children more. We speculate that this result reflects that the speech of mothers with lower depressed mood is richer and more complex than mothers with higher depressed mood. A mother with lower depressed mood might laugh while saying "Mauricio is bad". This is very different than a mother with elevated depressed mood who does not laugh while saying "Mauricio is bad." Both statements would be coded as criticisms but have different meaning due to the tone of voice or the accompanying laughter. The ability of the mothers with lower depressed mood to laugh while criticizing their children could also signal that these mothers were more aware of, and familiar with, their children, recognizing both strengths and weaknesses. This interpretation seems consistent with prior literature on maternal depression and speech. This literature has considered that maternal speech characteristics such as slower responsiveness to infant vocalizations (Bettes, 1988; Zlochower & Cohn, 1996) or less infant-focused speech (Murray et al., 1993) indicated that depressed mothers were less attuned to their infants.

We did not find an effect of maternal IQ or the psychosocial intervention study on the speech of mothers with or without depression when their children were 5½ years. Maternal IQ, which was assessed in the infancy phase, was quite low, averaging 84.1. Although it seems plausible that differences in the speech of mothers with or without depression might be exacerbated by lower IQ, we did not observe such an association, perhaps because the IQ distribution in our sample was markedly shifted to the left, e.g., the highest IQ among the mothers

was 105. IQ was not reported in other studies of maternal speech and maternal depression, but participants in those studies generally had at least a high school education and were from middle-class backgrounds (Brenzitz & Sherman, 1987; Goodman et al., 1994; Herrera et al., 2004; Murray et al., 1993; Reissland et al., 2003; Zlochower & Cohn, 1996). Thus, our study adds a novel perspective to the literature on maternal depression and speech with its results from a less educated population of lower socioeconomic status.

Participation in a psychosocial intervention program, administered in infancy to some of the children in our sample, is a particularity of the study. However, it did not seem to impact the associations between maternal depression and speech. It is possible that our speech paradigm at the 5½ year phase – speaking about the child without the child present – did not pertain to the specific focus of the intervention, which was fostering the mother's ability to support her infant's development.

The current study was limited in several ways. Interrater reliability (between two coders) was established during the pilot phase, but data from a single coder with intra-rater reliability was used in analysis. This ensured uniformity and consistency, but having a single coder could be considered a limitation of the study. There may also be unmeasured differences in the speech of depressed Chilean mothers that were not captured by our coding system. Furthermore, tone of voice was not coded per statement. Rather, it was only included in an overall rating of the mother's relationship with the child based on the entire speech sample, a rating significantly associated with maternal depressed mood. Also, acoustic measurements such as loudness or inflection were not made. Differences in tone and acoustics have been previously reported in depressed participants (Alpert et al., 2001; Radke-Yarrow et al., 1990; Reissland et al., 2003), and it would be interesting to determine if these differences exist in Latin American populations as well as Hispanic populations in the U.S. Of course, these populations themselves vary widely. The Hispanic population in the United States is comprised largely of Mexican and Central American descendents. Populations from some Latin American countries may not be as literate or have as much formal schooling as the population in this study from Chile. Thus, it is not clear whether our results would generalize to other populations.

Latin American researchers have pointed out the paucity of research on the importance of sociocultural influences on disorders like depression (Bergenza et al., 2001). Socio-cultural factors that might influence depression in Latin American populations include machismo (exaggerated masculinity), marianismo (ideal femininity), mestizaje (mixed ethnicity), mesogyny (rejection of origin), and political circumstances. There seems little doubt that living under an oppressive regi-

me or having modest control over one's family life affects mental health. Since these factors vary across Latin America and across different time periods, such sociocultural differences might lead to differences in depression in different countries. The same factors could interfere with women's willingness or ability to express themselves freely in speech. We feel that our study would have been enriched by further knowledge of the sociocultural aspects of the mothers' lives.

Conclusion

Our study extends the literature on maternal depressed mood and speech by finding differences in speech according to depressed mood in a Chilean sample. As the vast majority of women with depressed mood reside outside the U.S. and U.K., it is vital to study not only Latin American populations, but also other populations in places such as Asia and Africa. Moreover, while the value of studying postpartum depression is undeniable, looking at the adverse effects of depression on maternal speech at other time points, including this study's assessment when the children were 5½-years-old, contributes to a more detailed picture of depression in the lives of mothers, families, and children. Finally, awareness of such speech differences might complement the standard clinical interview for depression.

Significant differences emerged in the speech of Chilean mothers with higher depressed mood as they talked about their children. Children are often present when their mothers talk about them to another adult such as a family member or health care provider. It thus seems likely that the 5½-year-old children of mothers with higher depressed mood in our study were exposed to more criticism, less positive affect, and fewer expressions of positive satisfaction with their behavior. More research is necessary to determine if this assumption is correct and elucidate how the adverse effects of maternal depression are transmitted from mother to child through speech. Future inquiry is also needed on speech and chronic maternal depression. Imagine the impact on children who hear such speech about themselves throughout infancy, early childhood, and beyond.

References

- Alpert, M., Pouget, E. R., & Silva, R. P. (2001). Reflections of depression in acoustic measures of the patient's speech. *Journal of Affective Disorders, 66*, 59-69.
- Alvarez, M., Muzzo, S., & Ivanovic, D. (1985). Escala para la medicion del nivel socioeconomico en el area de la salud. *Revista Medica de Chile, 113*, 243-249.
- Arbuckle, J. (2006). *AMOS7.0*. Chicago: Small Waters.
- Berganza, C. E., Mezzich, J. E., Otero-Ojeda, A. A., Jorge, M. R., Villasenor-Bayardo, S. J., & Rojas-Malpica, C. (2001). The Latin American guide for psychiatric diagnosis. A cultural overview. *Psychiatric Clinics of North America, 24*, 433-446.

- Bettes, B. A. (1988). Maternal depression and motherese: Temporal and intonational features. *Child Development, 59*, 1089-1096.
- Breznitz, Z. (1992). Verbal indicators of depression. *The Journal of General Psychology, 119*, 351-363.
- Breznitz, Z., & Sherman, T. (1987). Speech patterning of natural discourse of well and depressed mothers and their young children. *Child Development, 58*, 395-400.
- Caldwell, B. M., & Bradley, R. H. (1984). *Home observation for measurement of the environment* (Rev. ed.). Little Rock, AR: University of Arkansas.
- Ceballo, R., Ramirez, C., Castillo, M., Caballero, G. A., & Lozoff, B. (2004). Domestic violence and women's mental health in Chile. *Psychology of Women Quarterly, 28*(4), 298-308.
- De Andraca, I., Cobo, C., Rivera, F., & Pizarro, F. (1993). Evaluación de la inteligencia a través de formas cortas del WAIS para poblaciones de nivel socioeconómico bajo [Intelligence assessment through WAIS short forms in population studies]. *Revista de Saúde Pública, 27*, 334-339.
- Fritsch, R. M., Montt, M. E., Solis, J. G., Pilowsky, D., & Rojas, M. G. C. (2007). Como es la salud mental de los hijos de madres deprimidas consultantes a servicios de atención primaria? (Psychopathology and social functioning among offspring of depressed women). *Revista Médica de Chile, 135*, 602-612.
- Goodman, S. H. (2007). Depression in mothers. *Annual Review of Clinical Psychology, 3*, 107-135.
- Goodman, S. H., Adamson, L. B., Riniti, J., & Cole, S. (1994). Mothers' expressed attitudes: Associations with maternal depression and children's self-esteem and psychopathology. *Journal of the American Academy of Child and Adolescent Psychiatry, 33*, 1265-1274.
- Hall, L. A., & Farel, A. M. (1988). Maternal stresses and depressive symptoms: Correlates of behavior problems in young children. *Nursing Research, 37*, 156-161.
- Hammen, C. (1991). *Depression runs in families: The social context of risk and resilience in children of depressed mothers*. New York: Springer-Verlag.
- Herrera, E., Reissland, N., & Shepherd, J. (2004). Maternal touch and maternal child-directed speech: Effects of depressed mood in the postnatal period. *Journal of Affective Disorders, 81*, 29-39.
- Horwitz, S. M., Briggs-Gowan, M. J., Storfer-Isser, A., & Carter, A. S. (2007). Prevalence, correlates, and persistence of maternal depression. *Journal of Women's Health, 16*, 678-691.
- Jacobson, S. W., Jacobson, J. L., & Frye, K. F. (1991). Incidence and correlates of breast-feeding in socioeconomically disadvantaged women. *Pediatrics, 88*(4), 728-736.
- Knitzer, J., Theberge, S., & Johnson, K. (2008). *Reducing maternal depression and its impact on young children: Toward a responsive early childhood policy framework* (Rep. No. Project THRIVE Issue Brief No. 2). New York: Columbia University.
- Lanzi, R. G., Pascoe, J. M., Keltner, B., & Ramey, S. L. (1999). Correlates of maternal depressive symptoms in a national Head Start program sample. *Archives of Pediatrics and Adolescent Medicine, 153*, 801-807.
- Lozoff, B., De Andraca, I., Castillo, M., Smith, J., Walter, T., & Pino, P. (2003). Behavioral and developmental effects of preventing iron-deficiency anemia in healthy full-term infants. *Pediatrics, 112*, 846-854.
- Magana, A. B., Goldstein, M. J., Karno, M., Miklowitz, D. J., Jenkins, J., & Falloon, I. R. H. (1986). A brief method for assessing expressed emotion in relatives of psychiatric patients. *Psychiatry Research, 17*, 203-212.
- Murray, L., Kempton, C., Woolgar, M., & Hooper, R. (1993). Depressed mothers' speech to their infants and its relation to infant gender and cognitive development. *Journal of Child Psychology and Psychiatry, 34*, 1083-1101.
- Naughton, M. J., & Wiklund, I. (1993). A critical review of dimension-specific measures of health-related quality of life in cross-cultural research. *Quality of Life Research, 2*, 397-432.
- Nolen-Hoeksema, S., Larson, J., & Grayson, C. (1999). Explaining the gender difference in depressive symptoms. *Journal of Personality and Social Psychology, 77*, 1061-1072.
- Radke-Yarrow, M., Belmont, B., Nottelmann, E., & Bottomly, L. (1990). Young children's self-conceptions: Origins in the natural discourse of depressed and normal mothers and their children. In D. Cicchetti & M. Beeghly (Eds.), *The self in transition: Infancy to childhood* (pp. 345-361). Chicago: University of Chicago Press.
- Radloff, L. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385-401.
- Reissland, N., Shepherd, J., & Herrera, E. (2003). The pitch of maternal voice: A comparison of mothers suffering from depressed mood and non-depressed mothers reading books to their infants. *Journal of Child Psychology and Psychiatry, 44*, 255-261.
- Sohr-Preston, S. L., & Scaramella, L. V. (2006). Implications of timing of maternal depressive symptoms for early cognitive and language development. *Clinical Child and Family Psychology Review, 9*, 65-83.
- Soler, J., Pérez-Sola, V., Puigdemont, D., Pérez-Blanco, J., Figueres, M., & Alvarez, E. (1997). Estudio de la evaluación del Center for Epidemiological Studies-Depression (CES-D) en una población española de pacientes con trastornos afectivos. *Actas Luso-Española de Neurología, Psiquiatría y Ciencias Afines, 25*, 243-249.
- Stassen, H. H., Bomben, G., & Gunther, E. (1991). Speech characteristics in depression. *Psychopathology, 24*, 88-105.
- Vanger, P., Summerfield, A. B., Rosen, B. K., & Watson, J. P. (1992). Effects of communication content on speech behavior of depressives. *Comprehensive Psychiatry, 33*, 39-41.
- Wechsler, D. (1981). *Manual for the Wechsler Adult Intelligence Scale-Revised*. San Antonio, TX: The Psychological Corporation.
- Wolf, A., De Andraca, I., & Lozoff, B. (2002). Maternal depression in three Latin American samples. *Social Psychiatry and Psychiatric Epidemiology, 37*, 169-176.
- Zlochower, A. J., & Cohn, J. F. (1996). Vocal timing in face-to-face interaction of clinically depressed and nondepressed mothers and their 4-month-old infants. *Infant Behavior and Development, 19*, 371-374.

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