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MOTHERS' COMMUNICATION STYLE AND THE DEVELOPMENT OF CHILD
COMPLIANCE AND NONCOMPLIANCE DURING THE THIRD YEAR OF LIFE

A Dissertation

Submitted to the Graduate Faculty of the
University of New Orleans
in partial fulfillment of the
requirements for the degree of

Doctor of Philosophy
in
Psychology
Applied Developmental

by

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Abstract

Learning to comply with parental commands and requests is an important developmental achievement during toddlerhood. Although more responsive parenting often is associated with increases in children's compliance during the toddler years, the role of mothers' and toddlers' language abilities on change in compliance has largely been ignored. The current study addressed this gap using a sample of low-income, primarily African American mothers and toddlers ($N = 55$). Two models examining the role of receptive vocabulary were evaluated. First, mothers with higher receptive vocabulary scores were hypothesized to display more warm responsive communication in a teaching situation, which would be related to higher children's receptive vocabulary scores, and increased child compliance from age 2 to 3. Conversely, mothers with lower receptive vocabulary scores were expected to use more hostile intrusive communication, or communication patterns that would predict lower receptive vocabulary scores in children and increases in noncompliance over the third year. While direct associations were supported linking mothers' communication style with mothers' receptive vocabulary and change in compliance and noncompliance from age 2 to age 3, mediational hypotheses were not supported. The results of this study, while limited by small sample size, indicate that mothers' use of warm responsive or hostile intrusive communication in teaching situations affects their toddlers' development of compliance and noncompliance during the third year of life.

Introduction

The transition from infancy to toddlerhood, or the developmental period from 12 to 36 months of age, involves dramatic changes in children's physical, cognitive, motor, and regulatory abilities (Edwards & Liu, 2002; Scaramella & Leve, 2004). Nascent skills develop incrementally. Consequently, children's earliest attempts at independent behavior often are clumsy, unsuccessful, or even dangerous. For example, with the emergence of walking, toddlers are able to venture independently into new or forbidden areas, or into potentially harmful situations (Scaramella & Leve, 2004; Shaw, Bell, & Gilliom, 2000). Parenting must adjust to children's newly emerging skills. In contrast to the infancy period in which sensitive parenting involved consistent and regular responses to children's demands, parenting during the toddler period involves setting clear expectations and limits for appropriate behavior (Scaramella & Leve, 2004; Shaw & Bell, 1993; Shaw, Bell, & Gilliom, 2000). Somewhat paradoxically, then, responsive and sensitive parenting during toddlerhood involves selectively responding to children's needs. Such parenting facilitates children's emerging autonomy while simultaneously maintaining control over children's behavior (Edwards & Liu, 2002; Shaw et al., 2000). Finding the appropriate balance between autonomy and control becomes more difficult when children begin to protest parental rules and restrictions, as during toddlerhood.

Although some protesting and noncompliance is common during the toddler years (Kuczynski & Kochanska, 1990), more than expected rates of toddler noncompliance can be cause for concern. Developmentally, rates of noncompliance seem to be highest during the toddler period and decrease during early childhood (Edwards & Liu, 2002). When rates of noncompliance do not decline during early childhood, risk for disruptive behavior disorders during middle childhood increases (Keenan & Shaw, 1994; Shaw, Owens, Giovanelli, &

Winslow, 2001). Efforts to prevent disruptive behavior problems may benefit from a clearer understanding of the social interactional processes associated with the emergence of compliance and noncompliance during the toddler years.

The goal of the present study was to consider how mothers' own receptive vocabulary affected their communication patterns during parenting situations with their toddler-aged children. Mothers' use of warm and responsive communication was expected to predict: a) increases in observed compliance during the toddler years and b) more developed receptive vocabulary among their children. Conversely, mothers' use of harsh and intrusive communication was expected to predict: a) increases in observed noncompliance and b) less sophisticated receptive vocabulary skills among their toddler-aged children. Unique to the present study, the relationship between mothers' own receptive vocabulary and their communication patterns during parenting situations was considered.

The following sections will first review the theoretical model tested in the proposed study as well as the empirical evidence supporting these assumptions. Recent empirical work suggests that ethnic differences may be related to systematic variations in children's exposure to harsh or responsive parenting. The effects of socioeconomic circumstances, like ethnicity and poverty, on expected associations proposed in the theoretical model will be outlined. Finally, the specific hypotheses guiding the present study will be delineated.

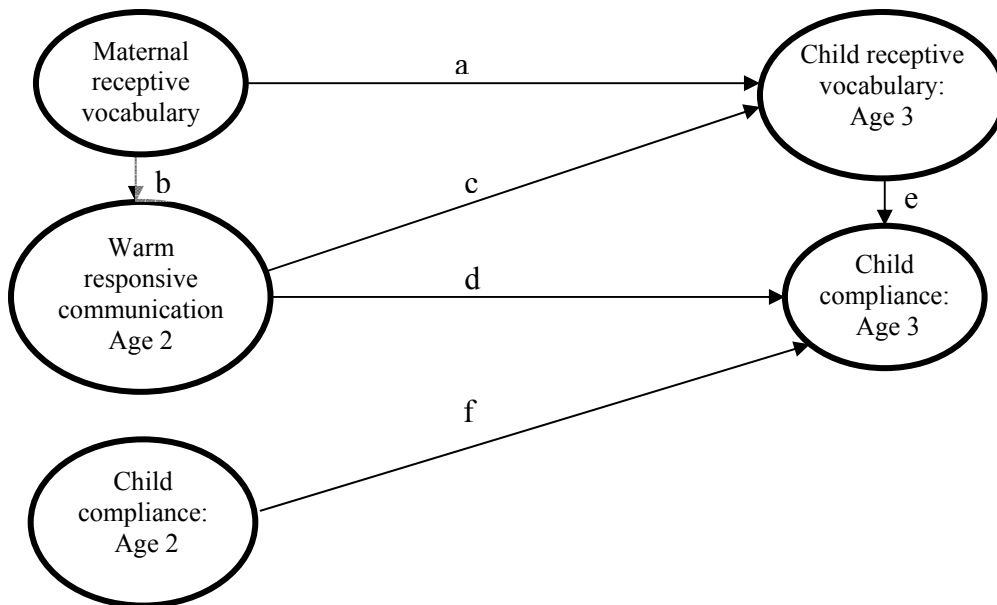
Warm Responsive Communication and Children's Compliance: A Process Model

The premise of the theoretical model depicted in Figure 1 lies in the expectation that young children's own cognitive skill and language comprehension likely influence their ability to comply with parents' requests (Kochanska, 1993). In other words, children who cannot understand verbal communication are less able to comply with parents' requests or demands. The

role of parents' and children's language abilities on the process of socializing compliance has received little empirical attention, but may represent a critical missing link in theoretical models outlining the process by which children internalize parental rules and standards. As illustrated in Figure 1, language skills, in the form of receptive vocabulary, may affect mothers' communication styles, children's emerging comprehension, and children's compliance. Each of the paths labeled with a letter in the figure reflect a specific hypothesis or set of hypotheses evaluated in the current study. The following sections provide the rationale and empirical support for each of these hypotheses.

Figure 1:

The Comprehension Model of Early Childhood Compliance



Associations between mothers' and children's receptive vocabulary (Figure 1, path a)

Receptive vocabulary refers to the ability to comprehend words through listening or hearing; receptive vocabulary is distinct from expressive vocabulary, which involves the capacity

to produce or generate words meaningfully (Dunn & Dunn, 1997; Sattler, 2001). During the toddler period, children's understanding and use of language expands rapidly, causing many to assert that toddlers are particularly primed for learning language (Golinkoff & Hirsh-Pasek, 1999; Pinker, 1994). However, the rapidity and variety of words children learn depends largely on their exposure to environments in which language is used. That is, the size of children's vocabulary during early childhood has been linked directly to the number of words to which they have been exposed (Golinkoff & Hirsh-Pasek, 1999; Hart & Risley, 1995).

Since young children are primarily dependent on the learning environment parents create (Scarr & McCartney, 1983), parents play a critical role in promoting language development during childhood. Mothers who frequently talk with their children and who use a variety of words during these conversations seem to enhance children's acquisition of language (Hart & Risley, 1995; Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991; Rush, 1999; Walker, Greenwood, Hart, & Carta, 1994). In contrast, mothers with restricted vocabularies know and use fewer words and are less able to introduce their children to novel words. In a comprehensive evaluation of the role of the environment on children's cognitive development, the NICHD Early Child Care Research Network (2000) found that mothers' receptive vocabulary, assessed when their children were 36 months old, was positively correlated with toddlers' verbal comprehension at that same point in time. Similarly, a statistically significant and positive association between mothers' and children's receptive vocabulary is expected in the present study (see Figure 1, path a). Importantly, since socializing language skills and compliance involves communicating expectations to children, mothers' language abilities also may affect their communication patterns used during parenting situations.

Mothers' warm responsive communication as a mediator of mothers' and children's receptive vocabulary (Figure 1, paths b and c)

Responsive parenting is often defined as mothers' ability to establish and communicate age-appropriate expectations for their children's behavior while enforcing these expectations in ways that are sensitive to children's developmental abilities (Baumwell, Tamis-LeMonda, & Bornstein, 1997; Bornstein & Tamis-LeMonda, 1989; Hart & Risley, 1995; Kochanska, 1997; Landry, Smith, Miller-Loncar, & Swank, 1997; Landry, Smith, Swank, Assel, & Vellet, 2001; Tamis-LeMonda, Bornstein, & Baumwell, 2001). By definition, responsive parenting is child-centered in that parents adapt their expectations for children's behavior to their children's developmental abilities (Bornstein & Tamis-LeMonda, 1989; Landry et al., 1997). While typically studied holistically, affect and communication are two important features of responsive parenting.

First, the affective tone that parents use may affect children's willingness to comply with parental requests. Theoretically, parenting that involves high levels of negative affect increases children's own negative emotional arousal to levels that interfere with children's ability to comprehend, comply with, and internalize parental instructions and requests (e.g., Kochanska, 1993, Scaramella & Leve, 2004). In contrast, parenting that includes warmth or positive affect does not over-elevate children's arousal levels and children are able attend to and understand parents' requests (Grusec & Goodnow, 1994; Scaramella & Leve, 2004). Consequently, warm affect seems to be associated with increases in children's willingness to attend to and cooperate with parents (Kochanska, 1997).

Second, parents' word choices and style of communicating with their children should influence children's ability to understand parents' requests. While parents' use of labeling

facilitates children's vocabulary development, parents who increase the complexity of their labeling by using sentences to describe objects and activities challenge children to understand increasingly complex communication patterns (Gauvain, 2001). Thus, offering reasons for children's behavior exposes children to language and increases children's ability to comprehend parents' requests. In contrast, parents who rely heavily on directives and commands (e.g., "Put this away.") not only use fewer words; they may overuse unclear or ambiguous words (Girolametto, Weitzman, & Greenberg, 2003). As a result, children exposed to frequent directives and commands without sufficient explanations and encouragement may have less exposure to language and a less enriched vocabulary.

Taken together, both the affective tone and the words used to communicate parental expectations likely influence toddler-aged children's emerging receptive vocabulary. Two different communication patterns will be evaluated in the present study. First, consistent with the theoretical model, warm responsive communication is defined as verbal assistance, encouragement, and explanations regarding how and why children must complete an action that is delivered with neutral or positive affect. Mothers who frequently use warm responsive communication are expected to have toddlers with more enriched receptive vocabularies (Figure 1, path c). Alternatively, hostile intrusive communication is defined as verbalizations, like threats, bribery, and criticisms, or physically manipulative control communicated in an affectively harsh, angry, or impatient way. The negative emotions and the lack of clear communication associated with hostile intrusive communication are expected to restrict children's development of receptive vocabulary during the toddler period.

Consistent with theoretical expectations, mothers' use of warm responsive communication has been found to enhance children's early receptive language development

(Figure 1, path c). That is, mothers' prompt, contingent, and appropriate responses to infant behaviors have been found to predict increased receptive vocabulary during toddlerhood (Bornstein & Tamis-LeMonda, 1989). Similarly, warm responsive communication during toddlerhood also appears related to later receptive language skills. Specifically, parents who communicated with their 24-month old children with developmentally appropriate language, positive emotional tone, joint attention, and informative, rather than directive, statements had children with enriched receptive vocabularies one year later (Dodici, Draper, & Peterson, 2003).

In contrast, restrictive, intrusive, or directive communication has been linked to poorer cognitive and language outcomes in young children (Baumwell et al., 1997; Landry et al., 1997; Murray & Hornbaker, 1997). Landry and colleagues (1997) examined the effects of the frequency of parents' use of statements and behaviors that impede children's actions on children's cognitive-language development during early childhood. Cognitive-language abilities were measured using children's mental age, receptive language scores, and expressive language scores at 6, 12, 24, and 40 months. Growth modeling indicated that more restrictive parenting predicted a slower rate of increase in cognitive-language skills over the course of early childhood (Landry et al., 1997). Similarly, harsh, intrusive, and controlling parenting observed during infancy was associated with lower receptive vocabulary scores among toddler-aged children (Murray & Hornbaker, 1997). Quite possibly, mothers who excessively control their young children's behaviors may unintentionally discourage language advances because these mother-child interactions are seldom reciprocal in nature (Landry et al., 1997). When language is presented without cues for young children to reciprocate, children may have fewer opportunities to use and practice language and experience more difficulty complying with parents' requests.

Although rarely studied, mothers' use of warm responsive communication during interactions with children may be affected by their own language skill (see Figure 1, path b) and may partially explain the link between mothers' and children's receptive vocabulary scores (Figure 1, path a). Mothers with limited vocabularies may be poorly equipped to label or describe children's activities or their environment. Furthermore, mothers with limited receptive vocabularies may actually discourage or ignore curious glances or questions from their children because they may not be certain of the answers or uncomfortable with the questions. For example, mothers may look away when toddlers point expectantly to a picture of a rhinoceros because they cannot label the animal. Moreover, such mothers may experience increased frustration and negative affect with children's repeated questioning, particularly when they are uncertain of the answer. Sensitively responding to children's questions or inquisitive signals necessitates familiarity with the words for the objects and concepts to which children are exposed. Thus, less verbally skilled mothers may be less able to respond to their children verbally. Given the lack of empirical work evaluating mothers' style of communicating with children as a partial explanation of the associations between mothers' and children's receptive vocabulary, the present study will begin to address this research gap.

Warm responsive communication and children's compliance (Figure 1, path d)

Although the toddler years are noted for increases in children's willful defiance (Shaw & Bell, 1993), hence the term 'terrible twos,' empirical evidence suggests that children are most willing to comply with parents' requests when parents are warm and responsive (Braungart-Reiker, Garwood, & Stifter, 1997; Crockenberg & Litman, 1990; Goin & Wahler, 2001; Kochanska, 1993; Kochanska & Aksan, 1995; Lehman, Steier, Guidash, & Wanna, 2002). Although participants in these studies were largely middle class European American families,

emerging evidence indicates that more responsive parenting also predicts fewer behavioral problems among African American and impoverished children (Bradley, Corwyn, Burchinal, & Pipes McAdoo, & García Coll, 2001a; Deater-Deckard, Dodge, Bates, & Pettit, 1996). In contrast, high levels of harsh and intrusive parenting, like threats, criticisms, physical intervention, and manipulation, has been linked to less compliance and more behavior problems among toddler-aged children (Crockenberg & Litman, 1990; Donovan, Leavitt, & Walsh, 2000; Kochanska & Aksan, 1995; Power & Chapieski, 1986; Scaramella & Conger, 2003; Shaw, Keenan, & Vondra, 1994; Shaw, Winslow, Owens, Vondra, Cohn, & Bell, 1998).

One reason why responsive parenting may be associated with increases in child compliance has to do with parents' ability to communicate and structure situations that require compliance. That is, parents who explain how to comply with a request and structure compliance situations in ways to slightly challenge children's developmental abilities, or scaffold, may increase children's interest in the activity as well as teach children how to complete a task (e.g., Kochanska, 1997). By teaching children how to complete an activity, parents grant children some level of autonomy in carrying out the request. That is, offering children choices for complying with requests may promote compliance; children are not simply deciding whether or not to comply, they are deciding on which method to use to comply (Crockenberg & Litman, 1990). In contrast, parents who use harsh or intrusive communication often issue commands that give children little choice as to how a task is completed; children choose either to comply or not to comply. In the present study, warm responsive communication is expected to lead to increases in children's compliance over time (see Figure 1, path d), with harsh and intrusive communication predicting increases in noncompliance.

Children's receptive vocabulary is associated with increases in compliance (Figure 1, path e).

While young children may not want to comply with parental directives without sufficient motivation, children's ability to comply is dependent on their ability to comprehend parents' requests (see Figure 1, path e). Young toddlers, ages 12-18 months of age, have been found to comply with 73-77% of commands they comprehend, but only with 14-22% of commands they do not understand (Kaler & Kopp, 1990). Not surprisingly, increases in children's receptive vocabulary seem to coincide with increases in parents' expectations for child compliance. That is, as children become more proficient in language (Edwards & Liu, 2002), mothers increasingly expect children to comply with their requests and to internalize parental standards for acceptable behavior (Kochanska, 1993). Consistent with this notion, increases in toddlers' rate of compliance occurring from 18 to 30 months of age have been linked to higher scores on the language portion of the Gesell Developmental Schedules (Vaughn, Kopp, & Krakow, 1984).

In contrast, active noncompliance, as defined by overt defiance or protest to parental commands, may occur in part because of language delays and comprehension problems. Just as preverbal infants use crying as a means of communicating their needs and desires to caregivers, active noncompliance may serve a similar nonverbal communicative function among toddler-aged children (Wickstrom-Kane & Goldstein, 1999). Toddlers who are unable to communicate verbally their lack of understanding may act out in emotionally negative and reactive ways, thus appearing more defiant. Consistent with this expectation, language and communication disorders have been found to frequently co-occur with disruptive behavior disorders (American Psychiatric Association, 2000). Moreover, language development measured as early as 6 months of age has been found to significantly and negatively correlate with adolescent and adult criminality (Stattin

& Klackenberg-Larsson, 1993). This link between language development and disruptive behavior may have roots in active noncompliance and verbal protest during early childhood. Thus, consistent with the model depicted in Figure 1, individual differences in receptive language competence may be associated with systematic variations in children's rates of compliance with maternal commands.

Special Considerations: Ethnicity and Socioeconomic Status

Residing in an impoverished home environment during early childhood may directly increase children's risk of problem behaviors, like noncompliance. That is, children from low-income, ethnic minority families frequently are identified as at risk for cognitive delays (Aber, Jones & Cohen, 2000; Brooks-Gunn & Duncan, 1997; Hart & Risley, 1995) and behavior problems (Bradley et al., 2001a). McLoyd (1998) argues that poverty may indirectly influence children's cognitive and social development through parenting; the stressors inherent to living in poverty may increase the likelihood that parents respond to their children harshly and punitively. Further complicating the issue, the consequences associated with exposure to harsh parenting seem to vary by ethnicity. Harsh parenting in the form of corporal punishment has been associated with elevated rates of child problem behaviors among European American children (Deater-Deckard et al., 1996; Lansford, Deater-Deckard, Dodge, Bates, & Pettit, 2004) but not among African American children (Deater-Deckard et al., 1996; Ispa et al., 2004; Lansford et al., 2004; Whiteside-Mansell, Bradley, Tresch Owen, Randolph, & Cauce, 2003). Some have argued that the more normative a behavior is within cultures, like harsh parenting among African American families, the less likely it is to be associated with maladaptive outcomes (Deater-Deckard & Dodge, 1997; Lansford et al., 2004, 2005). Two exceptions are particularly noteworthy. First, harsh parenting in the form of maltreatment negatively impacts all children,

regardless of race (Deater-Deckard & Dodge, 1997). Second, the benefits of warm and responsive parenting seem to be uniformly consistent and positive across ethnic and economic groups (Raver, 1996, 2004; Whiteside-Mansell et al., 2003).

Consistent with the model in Figure 1, meaningful differences in mothers' communication patterns also have been observed across different ethnic groups and among impoverished families. First, both impoverished children and African American children of all ages appear to have less access to books and are significantly less likely to have mothers who read to them than European American and Asian American children (Bradley, Corwyn, Pipes McAdoo, & García Coll, 2001b). Exposure to written and oral communication has been linked to more complex social, motor, and language development (Bradley et al., 2001a). Second, an intrusive, directive communication style, like harsh intrusive communication, appears to be more culturally normative among African American mothers than European American mothers (Bradley et al., 2001; McLoyd & Smith, 2002), but such communication patterns may hamper toddler's language development because of its reliance on simple word phrases and inherent lack of reciprocity. Taken together, African-American children residing in poverty may be at increased risk for experiencing compliance difficulties in part because of their risk for language delays.

Summary of Study Hypotheses

The current study empirically evaluates the Comprehension Model depicted in Figure 1 among low-income, primarily African American families in two ways. First, the model as depicted in Figure 1 will be estimated; specifically, the consequences of mothers' receptive vocabulary and warm responsive parenting on children's receptive vocabulary and increases in compliance will be estimated. Second, and in line with McLoyd's (1998) proposition, the model

depicted in Figure 1 will be re-estimated replacing hostile intrusive communication for warm responsive communication to predict change in children's noncompliance from age 2 to 3.

Specifically, the following hypotheses will be evaluated:

Hypothesis 1: Mothers' receptive vocabulary will be positively related to children's receptive vocabulary (path a).

Hypothesis 2: Observed warm responsive communication when children are 2 years of age will partially mediate the association between mother and child receptive vocabulary (paths b and c). Conversely, lower maternal receptive vocabulary scores will be associated with more observed hostile intrusive communication, communication that will be associated with lower receptive vocabulary scores among children.

Hypothesis 3: Child compliance at age 2 will be positively correlated with child compliance at age 3 (path f). Child noncompliance at age 2 will be positively correlated with noncompliance at age 3.

Hypothesis 4: Observed warm responsive communication when children are 2 years of age will predict children's compliance at age 3 (path d) after controlling for children's level of compliance at age 2 (path f). Conversely, observed harsh intrusive communication will predict increases in noncompliance over the same time period.

Hypothesis 5: Child receptive vocabulary at age 3 is hypothesized to mediate the association between observed warm responsive communication at age 2 and increases in children's compliance from age 2 to age 3. Specifically, mothers using more warm responsive communication are expected to have children who score higher on measures of receptive vocabulary at age 3; such vocabulary skills are expected to be associated with greater increases in children's compliance over time (paths d and e). In contrast, harsh intrusive communication is

expected to predict lower receptive vocabulary scores among children and lower receptive vocabulary scores are expected to be associated with increases in noncompliance from age 2 to 3.

Method

Participants

Two-year old younger siblings of children already enrolled in Head Start and their mothers were recruited to participate in the Mothers and Preschoolers Study (MAPS). Fifty-five mothers and children were recruited. Tables 1 and 2 summarize the basic demographic characteristics across both assessment waves. The first assessment wave, wave 1, occurred at or around children's second birthday and the second assessment wave, wave 2, took place near children's third birthday. At wave 1, mothers averaged 26.3 years of age and children averaged 24.4 months of age. Twenty of the children were boys and 35 girls. Since the recruitment strategy solicited younger siblings of children enrolled in Head Start, all families had at least 2 children with an average number of children of 3.2 (see Table 1). As shown in Table 1, the sample was primarily African American (83.6%). Forty-seven percent of mothers had never been married, and 34.5% were married at the time of the wave 1 assessment. About half of the mothers in the initial sample (49.1%) were employed, working 36 hours per week on average. Household incomes supported approximately 4.8 family members. At wave 1, families' total income per year averaged about \$13,737, with an average per capita income of \$3,166.

Missing Data

Although 55 families participated in wave 1, hurricane Katrina prematurely terminated the wave 2 data collection. Wave 2 data had not been collected from 18 families. Seventeen families had not completed their second interview before the hurricane struck, with only 1 family being dropped from the study because the family moved to Japan. Thus, only 37 families had

complete data at both points in time. In order to ensure that the families for whom data were collected at both points in time represented the sample as a whole, the wave 1 demographic characteristics of families with two waves were compared with families with only one wave of data. Tables 1 and 2 provide a summary of these comparisons. In terms of sample characteristics, like child gender, family ethnicity, and mothers' marital or employment status, no differences between the two groups emerged. However, families for whom two waves of data had been collected had statistically and significantly more total income than families who only completed the first wave of data ($F = 4.93$; $p < .05$), but only marginally statistically significant differences emerged in terms of per capita income (see Table 2). Taken together, families completing both assessments had slightly more economic resources than those only participating in the initial assessment.

Recruitment Procedures

Families were recruited during the fall 2003 and 2004 Head Start parent orientations. Families recruited in 2004 were most likely not to have completed both assessment waves. During each recruitment session, interested mothers completed a brief screening survey of demographic information (e.g., marital status, education level, income, number of children, and birthdates of children). Mothers interested in participating further provided additional contact information. All mothers, whether interested or not, received a \$1 gift certificate to McDonald's for completing the screener survey. Fifty-five of the eligible families were recruited.

Table 1

Comparisons of wave 1 (age 2) characteristics between families completing two assessments and families completing only one assessment by child gender, family ethnicity, and mothers' marital and employment status

	Whole sample		Complete data		Wave 1 only		Chi-square	Significance
	Frequency	%	Frequency	%	Frequency	%		
Child gender							2.15	.14
Boys	20	36.4	11	29.7	9	50.0		
Girls	35	63.6	26	70.3	9	50.0		
Family ethnicity							.79	.67
Black / African American	46	83.6	30	81.1	16	88.9		
White	8	14.5	6	16.2	2	11.1		
Indian / Middle Eastern	1	1.8	1	2.7	0	0.0		
Hispanic or Latino							1.48	.48
Non-Hispanic / Non-Latino	46	83.6	30	81.1	16	88.9		
Hispanic or Latino	2	3.6	2	5.4	0	0.0		
Not answered	7	7.3	5	13.5	2	11.1		
Mother marital status							1.63	.80
Single, never married	26	47.3	19	51.4	7	38.9		
Single, widowed	2	3.6	1	2.7	1	5.6		
Married	19	34.5	12	32.4	7	38.9		
Separated	7	12.7	4	10.8	3	16.7		
Divorced, not married	1	1.8	1	2.7	0	0.0		
Mother employment status							.01	.93
Currently working	27	49.1	19	51.4	9	50.0		
Not currently working	28	50.9	18	48.6	9	50.0		

Table 2

Comparisons of wave 1 (age 2) characteristics between families completing two assessments and families completing only one assessment by mothers' age, hours worked per week, and income

	Whole sample		Complete data		Wave 1 only		<i>F</i>	Significance
	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>		
Mother's age	26.3	5.1	26.1	5.4	26.7	4.7	.13	.72
Number of children	3.2	1.3	3.3	1.4	3.1	1.2	.24	.63
Hours worked per week	36.1	6.5	35.8	6.4	36.7	7.1	.12	.74
Income per year from primary job	6,804.32	8,174.83	7,315.82	8,168.80	5,752.89	8,320.31	.44	.51
Total income per year	13,737.29	10,648.16	15,320.58	10,670.70	8,642.59	9,221.93	4.95	.03
Number of persons supported	4.8	1.8	5.0	2.0	4.5	1.5	.85	.36
Per capita income per year	3,166.08	3,085.79	3,635.16	3,367.08	1,935.97	2,199.86	3.34	.07

Procedures

After receiving approval from the University of New Orleans Institutional Review Board (IRB# 7AUG04), all participating mothers and children completed a structured interview at or around the children's second (wave 1) and third (wave 2) birthdays. While most families completed the interview in their homes, a few families completed the interview at their children's Head Start Center. All interviews were videotaped and later coded by trained observers. Upon arrival to the home or the observation room, a video camera was turned on and remained on until the end of the interview. An interviewer and a cameraperson were present for each interview, and a babysitter attended the wave 2 interview. At the wave 1 assessment, mothers received a \$50 gift certificate to a local grocery store and children received an educational toy valued at \$10 as compensation for their time. At the wave 2 assessment, mothers' received a \$75 gift certificate to Wal-Mart to compensate them for their time and children received a prize valued at \$5.

Mothers and children completed a variety of structured activities during the assessments; only the tasks relevant to the present study will be described. During the wave 1 assessment, mothers and children completed a *puzzle activity* in which they were required to work on an age-inappropriate puzzle, or a puzzle that was too hard for children to complete alone. Before beginning the puzzle, the interviewer informed mothers that they might offer any help to their children that mothers felt necessary, but that children must complete the puzzle alone. Mothers and children had 5 minutes to work on the activity.

Both the wave 1 and wave 2 observational assessments ended with a *clean up task*. Prior to the clean up task, mothers and children were given a bin filled with toys and were told that they could play with the toys in any way they wished. The wave 1 toys included stackable cups,

a Mr. Potato Head, plush bug beads, and plastic musical instruments (tambourine and maracas). The wave 2 interview toys included a toy guitar, a keyboard, a remote-controlled moving scorpion, a drawing board, a kitten that made noise, and a Transformer action figure. After playing together for 5 minutes, the interviewer returned and played with the mothers and children only long enough to dump out any toys that were still in the bin. After creating a uniform mess, interviewers instructed mothers and children that it was clean up time. Mothers were told to make sure that their children cleaned up all the toys and, while they could offer any help that was necessary, children must clean up the toys alone. Mothers were informed that the toys were cleaned up when all the toys were reassembled properly and placed back in the bin. Mothers and children had 5 minutes to complete the task.

At the end of the wave 2 assessment, each participating family member (mother, child, and a closest aged older sibling) completed the Peabody Picture Vocabulary Test-III (PPVT-III; Dunn & Dunn, 1997). The PPVT-III was administered by a member of the interview team and each family member completed the PPVT-III out of viewing and listening range of each other.

Observational coding procedures

Mothers' and children's behaviors observed during the puzzle activity and clean up tasks were later rated by trained coders using the Mother-Child Interactional Coding System (MCICS; Sohr-Preston & Scaramella, 2003). Detailed descriptions of MCICS codes are included in the measures and appendices sections of this document. The MCICS includes both micro-social and global ratings of behavior. Micro-social coding involved marking in real time the occurrence of 12 different micro-social codes using the Observational Coding System computer program (OCS; Triangle Research Collaborative, 2003). Micro-social coding systems have an advantage over global ratings, in which a single score is assigned to an entire episode, in that micro-social

scores reflect the true variability across participants for each behavior. Prior to actually rating any interaction, MCICS coders received over 20 hours of training and were required to take a written test at the close of training. Once coders achieved a minimum of 70% agreement with the same standard coder and a score of 85% or higher on the exam, they were permitted to code.

To ensure ongoing reliability, all coders attended weekly reliability meetings. For each mother-child interaction task (i.e., puzzle activity and clean up task), 25% of all interactions were rated by two different coders. Both kappa statistics and agreement reports generated by the OCS were used to evaluate inter-rater reliability. Specifically, codes entered by each coder were directly compared using a 3-second window of tolerance. Agreement involves the proportion of matches, within the 3-second window, among the two coder files being compared. Agreements occur when both coders have entered the same code at a particular time. Disagreements occur when codes cannot be matched across the two coders. Disagreements include misses, when one coder marks the occurrence of a behavior and another one does not, or matches outside the 3-second window. The percentage of agreement is computed by comparing the number of agreements with the total number of events coded. Whenever two coders received an agreement score less than 80%, the entire coding team reviewed the task, and discussed and resolved the disagreements collectively.

In addition to tracking coder agreement for an entire task, reliability on individual codes was evaluated regularly. Systematically low agreement (less than 60%) on individual codes also merited group discussion, code clarification, and recoding at weekly coder meetings. For the puzzle activity, coders averaged 68.2% agreement, and the average kappa was .75 across all codes. For the wave 1 clean-up task, coders' average agreement was 76.1% with an average

kappa of .74 across all codes. For the wave 2 clean-up task, the average agreement was 74.1% and the mean kappa was .75.

Measures

Warm responsive communication

Mothers' use of a warm responsive communication style during interactions with their children was measured using micro-socially coded behaviors and global ratings from the wave 1 puzzle activity. Warm responsive communication was defined as emotionally positive and child-centered communication that acknowledged toddlers' emerging autonomy. Warm responsive communication was measured by mothers' attempts to explain, reinforce, and encourage children's adherence to the goals of the task. Five distinct mother behaviors were coded during the puzzle activity: positive physical behaviors, why explanations, descriptive explanations, positive reinforcements, and indirect commands. For ease of interpreting, each behavior coded was converted into rate-per-minute score by dividing the total number of occurrences for each behavior by the length of the task (5 minutes; see Table 3).

Why explanations are statements providing children with reasons why children should carry out or suppress a behavior. Why explanations tend to follow direct commands telling children what to do, but can be stated alone. For example, "It's time to play with the puzzle," counts as a why explanation, as does, "You already tried that one," when it follows, "Try another piece." Only why explanations stated in a neutral or positive tone of voice were coded. On average, mothers gave less than one why explanation per minute during the puzzle activity (mean = .70) and variation in the rate of why explanations existed ($SD = .82$).

Table 3

Means and standard deviations of the micro-social indicators of warm responsive and hostile intrusive communication: A summary of the rate-per-minute scores

	Mean	Standard Deviation
Warm Responsive Communication		
Positive Physical	.07	.25
Why Explanation	.70	.82
Descriptive Explanation	.85	.86
Positive Reinforcement	1.67	1.33
Indirect Command	.92	.87
Hostile Intrusive Communication		
Physical Intrusion	2.60	1.73
Criticism	.05	.15
Manipulation	.00	.03
Restrictive command	1.57	1.10
Non-included codes		
“Do” command	5.64	3.23
Modeling	.11	.24
Facilitation	3.64	1.31

Descriptive explanations include statements that provide information as to: 1) where an object belongs or 2) what an item is called. For instance, “They go on his feet” and “Those are his shoes” are both coded as descriptive explanations. Simply labeling objects (e.g., “Shoes”)

would not count as a descriptive explanation since labeling offers no description of the object relative to the activity. Only descriptive explanations stated in a neutral or pleasant voice were coded. As shown in Table 3, mothers gave slightly less than one descriptive explanation per minute ($SD = .86$).

Positive physical behaviors are physical gestures of affection toward children and include hugging, kissing, physically soothing, and allowing children to sit in mothers' laps. Positive physical behaviors may be accompanied by verbalizations but also may stand alone. Mothers exhibited positive physical behavior quite rarely during the puzzle activity averaging only .07 positive physical behaviors per minute ($SD = .25$).

Positive reinforcement includes any affirmative statement that increases the likelihood that children will continue their current behavior. Positive reinforcement statements, often in the form of praise, encouragement, or verbal affirmations, must be aimed at keeping children on task. In order to be coded as positive reinforcement, a verbalization must follow something the children say or do. Instances of positive reinforcement do not have to be stated as complete sentences. In other words, exclamations like "Yay!" are coded as positive reinforcement. As shown in Table 3, mothers gave positive reinforcement statements more frequently than explanations, averaging 1.67 positive reinforcements per minute ($SD = 1.33$).

Indirect commands are suggestions, requests, and/or polite commands. Like the other included codes, indirect commands must be given in a neutral or positive tone of voice. Indirect commands offer children some degree of choice about following through with the command. For example, "Do you want to pick this one up next?" and "Let's put the toys in the box," are coded as indirect commands. Rather than telling children exactly what to do, these commands grant

some autonomy to children. Mothers gave slightly less than 1 indirect command each minute although considerable variation in this rate existed (see Table 3).

Two scores were created from the micro-social rate-per-minute codes. A *support* rate-per-minute score was computed by summing the rates-per-minute of positive physical behavior, positive reinforcement, and indirect commands. On average, mothers displayed 2.66 supportive behaviors per minute during the puzzle activity with a standard deviation of 1.93 (see Table 5). An *explanation* score was created by summing the why and descriptive explanation rate-per-minute scores. Mothers used explanations less frequently than supportive behaviors (see Table 5).

In addition to the five micro-social indicators of warm responsive communication, two global indicators of warm responsive communication were included: warmth and involvement. The global *warmth* rating conveys the degree to which mothers expressed affection, liking, appreciation, care, praise, concern, and support for their toddlers. On a scale of 1 to 9 (not characteristic to very characteristic), mothers average rating on warmth was 3.22 ($SD = .96$). The global *involvement* scale measures the extent to which mothers displayed an awareness of their children's needs, moods, and abilities. This rating assesses the degree to which mothers actively participated in the task and assisted the child in completing the task. Mothers' average rating on involvement was 5.8, with a standard deviation of 1.62. Both global indicators were averaged to produce a global warmth and involvement score. The average combined score was 4.49 ($SD = 1.16$; see Table 5).

Although the pattern of correlations among the indicators of warm responsive communication reflected only modest convergence in the rate of using each behavior (see Table 4), conceptually, the frequency of mothers' use of any indicator of warm responsive

communication was critical. To create the warm responsive communication composite score, the three indicators (2 micro-social and 1 global) were standardized and then averaged. Mothers' average warm responsive communication composite score was 0, with a standard deviation of .87.

Two procedures were used to validate the warm responsive communication measure. First, the scores generated from the composite score and the 3 indicators (1 global indicator, 2 micro-social indicators) were correlated with the same scores generated from a different task, the clean up activity during the assessment at age 2. These correlations are presented in Appendix B and generally indicate strong correspondence in scores across the 2 different activities. Next, the overall score and the 3 indicators generated from the puzzle and clean up activity were correlated with age 2 externalizing and internalizing problem scores (Achenbach, 1994; see Appendix D). Consistent with previous research, these correlations indicated that the warm responsive communication scores generated from the clean up task were more strongly associated with problem behaviors than the scores generated from the teaching activity.

Hostile intrusive communication

Hostile intrusive communication was defined as maternal behaviors that restrict, punish and/or belittle toddlers' attempts at autonomy. Four behaviors were used to measure mothers' relative rate of hostile intrusive communication observed during the puzzle activity. These four codes included: physical intrusion behaviors, criticism, manipulation, and restrictive commands. All codes were converted into rate-per-minute scores for ease of interpretation. Table 3 summarizes the means and standard deviations for each of the behavioral codes.

Table 4

Intercorrelations among Rate-per-minute Indicators of Warm Responsive Communication and Hostile Intrusive Communication

Panel A						
	1	2	3	4	5	6
1. Positive Physical	1.00					
2. Why Explanation	.02	1.00				
3. Descriptive Explanation	.11	.24 +	1.00			
4. Positive Reinforcement	.21	.07	.17	1.00		
5. Indirect Command	.26 +	.37 **	.00	.38 **	1.00	
6. Warmth	.35**	-.12	.22+	.50**	.20	1.00
7. Involvement	.13	-.02	.12	.56**	.43**	.61**

Panel B						
	8	9	10	11	12	13
8. Physical Intrusion	1.00					
9. Criticism	-.18	1.00				
10. Manipulation	-.05	-.04	1.00			
11. Restrictive Command	-.07	.05	.00	1.00		
12. Hostility	.50**	-.02	.03	.10	1.00	
13. Intrusiveness	.74**	-.15	-.10	-.13	.48**	1.00

** $p < .01$

Physical intrusion includes all unwelcome and/or physically restrictive contact with children. Physical intrusion need not be clearly aggressive or harsh, but these behaviors are intrusive and are initiated by mothers rather than children. Examples of physical intrusion include slapping, taking puzzle pieces from children, forcing compliance, and picking up or moving children against their will. On average, mothers' rate of using physical intrusion varied substantially ($SD = 1.73$) with mothers averaging 2.60 physically intrusive behaviors per minute (see Table 3).

Criticism includes any verbalization that demeans or finds fault with children, and includes sarcasm, making fun of children's attempts, or angry responses to children's behavior. Examples of criticism include, "You're not trying at all!" and "You're just going to keep trying to put it in the wrong spot, aren't you?" Statements that would normally counts as explanations or positive reinforcement are coded as criticism if they are stated in a sarcastic or hostile tone of voice. For instance, both, "You got that one wrong," and "Well, that was fantastic," would be coded as criticism if said in a clearly negative, sarcastic, or demeaning tone of voice. Mothers rarely used criticisms and averaged .05 criticisms per minute ($SD = .15$).

Manipulation involves any threats or false incentives offered by mothers. For example, statements said by mothers like, "You're getting a whipping when we get home," or "Come on, the lady's going to give you a cookie if you finish it," would be coded as manipulation. Only verbal threats are coded as manipulation. Physical threats (i.e., waving a hand as if about to hit) are coded as physical intrusion behavior rather than manipulation. Mothers rarely used manipulation. On average, mothers offered .00 manipulations per minute during the puzzle activity ($SD = .03$).

Restrictive commands tell children to stop or avoid an activity. These commands block children's actions, and include, "Stop trying that one," and "Don't put that piece there."

Restrictive commands can be stated in either a positive, neutral, or negative tone of voice.

Mothers offered an average of 1.57 restrictive commands per minute, on average ($SD = 1.10$).

From these rate-per-minute scores, two indicators were computed. First, the physical intrusion rate-per-minute score stood on its own as an indicator of physically intrusive behaviors. Second, summing the rates-per-minute of criticism, manipulation, and restrictive commands produced a *verbal intrusion* score. Mothers displayed an average of 1.62 verbally intrusive behaviors per minute during the puzzle activity, with a standard deviation of 1.11 (see Table 5).

In addition to the micro-social indicators, two global ratings of hostile intrusive communication were included. First, the *hostility* global rating reflects mothers' degree of negative emotion, anger, disapproval, irritability, criticism, rejection, or contemptuous behavior. Using the same 9-point scale as with warmth and involvement, mothers' average hostility rating was 2.75 ($SD = 1.09$). The *intrusiveness* global rating score reflects mothers' use of over-controlling behaviors that are mother-centered rather than child-centered. Mothers, on average, obtained a rating of 4.29 on intrusiveness, with a standard deviation of 1.80. The global ratings of hostility and intrusiveness were averaged to create a global hostility and intrusiveness indicator (mean = 3.52, $SD = 1.26$; see Table 5).

Next, the hostile intrusive communication indicators were correlated to evaluate the extent to which rank order was consistent across the indicators (see Table 4, panel b). Little evidence of correspondence emerged. While the global indicators were significantly correlated with one another, and physical intrusion behaviors were significantly associated with each global indicator (see Table 4), no other statistically significant relationships were evident. The lack of

correlation among the indicators may be attributed to the low base rate of each micro-social indicator.

Given conceptual cohesion, the 2 micro-social and the 1 combined global rating score were used to calculate the composite score for hostile intrusive communication during the puzzle activity. As with the warm responsive communication score, the indicators were first standardized and then average to create the total score. Mothers' average hostile intrusive communication score was 0, with a standard deviation of .67.

The same procedures were used to validate the warm responsive communication score were used to validate the hostile intrusive communication score. First, the overall hostile intrusive communication score and the 6 indicators generated from the teaching activity were correlated with the same scores generated from the clean up activity (see Appendix D). Considerable cross-task consistency emerged indicating that mothers who were more hostile and intrusive during the teaching activity also were hostile and intrusive during a more commonly used clean up activity. Next, the overall score and the 6 indicators generated from the teaching and clean up activities were correlated with children's age 2 externalizing and internalizing problem scores (see Appendix C). Like the warm responsive communication results, scores generated from the clean up activity were more strongly associated with externalizing and internalizing problems than the scores generated from the teaching activity.

Table 5

Summary of the means and standard deviations of theoretical constructs

	Minimum	Maximum	Mean	Standard Deviation
Receptive vocabulary standardized scores				
Mothers	40	103	79.65	13.03
Children	49	99	73.41	11.78
Mothers' observed parenting: Wave 1				
Warm responsive communication	-1.85	1.81	0.00	.87
Global Warmth and Involvement	2.00	6.50	4.49	1.16
Support	.00	8.40	2.66	1.93
Explanations	.00	4.80	1.56	1.32
Hostile intrusive communication	-1.31	1.66	0.00	.67
Global Hostility and Intrusiveness	1.00	7.50	3.52	1.26
Verbal Intrusion	.00	4.40	1.62	1.11
Physical Intrusion	.00	7.20	2.60	1.73
Conditional probability of children's compliance				
Wave 1 (Age 2)	.00	.95	0.50	.26
Wave 2 (Age 3)	.00	1.00	0.61	.28
Conditional probability of children's noncompliance				
Wave 1 (Age 2)	.00	.50	0.09	.11
Wave 2 (Age 3)	.00	.33	0.07	.10

Child compliance and noncompliance

Compliance and noncompliance conditional probability scores were computed from micro-social ratings of mothers' and children's observed behavior during the clean up task when children were 2 and 3 years of age (wave 1 and wave 2, respectively). Children were considered *compliant* if they followed through with task demands or a direct command from mothers. *Active noncompliance* occurred when children actively refused to complete a command from mothers. Since simple frequencies or rate-per-minute scores do not take into account how often mothers issued commands to children, conditional probability scores were computed to reflect the likelihood that children would either comply with or actively defy mothers' "do" commands. Maternal "*do*" commands were defined as explicit verbal statements telling children exactly what to do (i.e., "Put that piece in the bin."). These commands were coded without regard for mothers' tone of voice.

Conditional probability scores were computed using the General Sequential Querier program (GSEQ; Bakeman & Quera, 1995). At age 2, children's average conditional probability of complying with a "do" command was .50 ($SD = .26$), meaning that, when presented with a "do" command, children on average complied about 50% of the time. By age 3, children complied with 61% of mothers' "do" commands, on average (see Table 5). At age 2, children actively defied about 9% of mothers' "do" commands, on average. The average probability of active noncompliance with a "do" command was 7% at age 3 (see Table 5). Due to video equipment difficulties, age 3 compliance and noncompliance scores could only be computed for 36 of the 37 toddlers who completed age 3 interviews.

Maternal and child receptive vocabulary

Mothers and their children were administered the Peabody Picture Vocabulary Test - III (PPVT-III; Dunn & Dunn, 1997) at the end of the 3-year-old assessment (wave 2). This instrument assesses vocabulary by presenting progressively more difficult items consisting of four line drawings. Respondents were asked to select which line drawing represented the word spoken by the examiner. The PPVT-III was selected because the instrument is easy to administer and respondents have the option of pointing or stating their answer selections. Since PPVT-III normative data are available for both children and adults, this instrument offered the additional benefit that mothers' and children's receptive vocabulary could be assessed using the same measure. Of particular importance, the PPVT-III has been demonstrated to be a culturally fair and valid measure of receptive vocabulary for at-risk preschoolers (Washington & Craig, 1999).

Considering mothers' and children's receptive vocabulary scores, both mothers' and children's scores were well below the standardized norms. As summarized in Table 5, mothers' average receptive vocabulary score was 79.65, with a standard deviation of 13.03. Children's scores were similar and lower (mean = 73.41; $SD = 11.78$). The standard scores obtained on the PPVT-III are remarkable in that both mothers' and children's scores averaged more than one standard deviation (15 points) below the standardized mean of 100 (Dunn & Dunn, 1997). Relative to the population at large, the mothers and children in the present sample had substantially lower receptive vocabulary scores.

Results

Preliminary Analyses

Before testing the specific hypotheses, three sets of preliminary analyses were computed. In light of recent evidence suggesting cultural variation in parenting, the means of all study

constructs were compared across the two primary ethnic groups using Analysis of Variance procedures (ANOVA). No statistically significant differences emerged across African American and European American participants. Second, a large percentage of data were missing (33%). In all likelihood, these data were missing completely at random because a random event was responsible for all but one missing case. To further ensure that systematic differences did not differentiate families with complete and incomplete data, ANOVA procedures were used to compare the wave 1 study constructs for the groups of participant with complete and incomplete data. No statistically significant or marginally significant differences emerged across the two groups on any of the study constructs, suggesting that those with incomplete data were not dramatically different than those with complete data. Finally, since those with complete versus incomplete data differed on total income, correlational analyses were conducted to examine whether study constructs were associated with total income. No significant relation with income emerged for any study construct.

Next, correlations among theoretical constructs were computed to evaluate whether preliminary evidence existed to support hypothesized expectations (see Table 6). Pairwise deletion was used in these analyses, thus the *n* used in the wave 1 correlations was 55 and the *n* used in the wave 2 correlations was 37 (with the exception of the compliance scores, those correlations were based on a sample of 36). In general, the correlations provided only modest support for the study hypotheses. In contrast to hypothesis 1, mothers' and children's receptive vocabulary scores were not statistically and significantly correlated ($r = -.03; p > .10$). Mixed support for hypothesis 2 emerged. Although mothers' receptive vocabulary score was statistically significantly or marginally significantly and positively correlated with warm responsive communication and all of its component indicators as well as negatively associated

with physical intrusion (see Table 6), no indicator of either warm responsive communication or hostile intrusive communication was statistically and significantly correlated with children's receptive vocabulary scores (see Table 6).

Several hypotheses related to children's compliance and noncompliance. First, children's compliance and noncompliance were expected to demonstrate stability over time (hypothesis 3). In contrast with expectations, neither compliance nor noncompliance conditional probabilities were statistically significantly correlated over time (see Table 6). Second, warm responsive communication measured when children were 2 years old was expected to predict increases in compliance from age 2 to age 3, while hostile intrusive communication was expected to predict increases in noncompliance over that same point in time (hypothesis 4). No support for this expectation emerged when using the composite score for mothers' warm responsive communication. Examination of the correlations of the individual indicators of mothers' use of warm responsive communication with compliance, however, provides some support for hypothesis 4. Specifically, mothers' use of support was marginally significantly associated with age 3 compliance. In the case of hostile intrusive communication, the composite indicator was marginally significantly related to greater probability of noncompliance at age 3, but the mothers' global hostility and intrusiveness and their use of physical intrusion were more strongly associated with age 3 noncompliance (see Table 6)

Table 6

Intercorrelations among Study Constructs

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Mothers' Receptive Vocabulary	1.00												
2. Children's Receptive Vocabulary	-.03	1.00											
3. Warm Responsive Communication	.45**	.05	1.00										
4. Global Warmth and Involvement	.38*	.07	.87**	1.00									
5. Support	.32+	.03	.85**	.61**	1.00								
6. Explain	.28+	-.00	.44**	.08	.22+	1.00							
7. Hostile Intrusive Communication	-.22	-.11	.25+	.20	.26+	.07	1.00						
8. Global Hostility and Intrusiveness	-.29+	-.26	.01	-.08	.07	.08	.82**	1.00					
9. Verbal Intrusion	.16	.25	.45**	.44**	.35**	.15	.41**	-.07	1.00				
10. Physical Intrusion	-.33*	-.13	.06	.03	.13	-.07	.81**	.75**	-.10	1.00			
11. Compliance (Age 2)	.02	.19	.04	.09	-.00	-.02	-.19	-.14	-.01	-.21	1.00		

Table 6 - continued

12. Compliance (Age 3)	-.10	.01	.20	.14	.30+	-.01	-.10	-.15	.16	-.15	.07	1.00	
13. Noncompliance (Age 2)	-.28	.12	-.20	-.18	-.14	-.10	.15	.13	.01	.18	-.40**	-.02	1.00
14. Noncompliance (Age 3)	-.05+	.00	-.29+	-.26	-.10	-.27+	.31+	.32*	-.12	.38*	-.07	.43**	-.09

+ $p < .10$; * $p < .05$; ** $p < .01$

An additional set of expectations was generated regarding children's receptive vocabulary. First, children's receptive vocabulary scores were expected to partially mediate the link between mothers' communication style measured at age 2 and children's compliance at age 3 (hypothesis 5). In contrast with expectations, neither warm responsive nor hostile intrusive communication was statistically significantly related to children's receptive vocabulary scores, providing no evidence in support of mediation. Furthermore, children's receptive vocabulary was not related to their age 3 compliance or noncompliance scores (see Table 6).

In summary, the simple correlational analyses did not support hypotheses 1, 2, 3, or 5. Based on these preliminary analyses, only hypothesis 4 merited further examination. Hierarchical multiple regression analyses were used to evaluate hypothesis 4. To fully test hypothesis 4 and evaluate the effect of communication style on change in compliance and noncompliance, earlier levels of compliance and noncompliance were statistically controlled in all regression equations.

Evaluation of Communication Style on Change in Compliance and Noncompliance

Based on patterns observed in the simple correlational analyses, hypothesis 4 was then examined using both partial correlation and hierarchical multiple regression analyses. Both of these statistical techniques allow investigators to examine associations between two variables while controlling for a third variable. First, to consider the association between age 2 warm responsive communication and age 3 compliance, partial correlations were computed controlling for age 2 compliance. Second, both age 2 compliance and warm responsive communication were entered into a multiple regression equation predicting age 3 compliance. Tables 7 and 8, panel A summarize these findings. The results generated from both the partial correlations and the

hierarchical multiple regression equations indicated that, although the warm responsive composite score was unrelated to change in children's compliance, the indicator of rate of supportive parenting responses was associated with marginally significant increases in child compliance from age 2 to 3 (see Tables 7 and 8, panel A). The R^2 for the multiple regression equation including support is .30, indicating that age 2 compliance and support account for 30% of the variance in age 3 compliance.

The link between hostile intrusive communication and change in noncompliance was examined similarly. As shown in Tables 7 and 8, panel B, both partial correlation and multiple regression indicate that the hostile intrusive communication composite score, the global hostility and intrusiveness, and physical intrusion predict increase in noncompliance from age 2 to age 3. Furthermore, both sets of analyses cast doubt on the link between verbal intrusion and change in noncompliance. Out of all the indicators of hostile intrusive communication, physical intrusion accounted for the most variance in increase in noncompliance, as evidenced by an R^2 of .16.

Table 7:

Summary of the Partial Correlations Considering the Relationship between Mothers' Communication Style and Children's Behavior at Age 3 after Controlling for Age 2 Children's Behavior

Panel A: Age 3 Compliance ^A

	<i>r</i>
Warm Responsive Communication Composite Score	.20
1. Warmth / Involvement Global Rating	.14
2. Support	.31 +
3. Explanations	-.02

+ $p < .10$

^A Correlational analyses controlled for Age 2 compliance; $N = 36$

Panel B: Age 3 Noncompliance ^B

	<i>r</i>
Hostile Intrusive Communication Composite Score	.34 *
4. Hostility / Intrusiveness Global Rating	.34 *
5. Verbal Intrusion	-.12
6. Physical Intrusion	.41 *

* $p < .05$

^B Correlational analyses controlled for Age 2 noncompliance; $N = 36$

Table 8

Summary of Multiple Regression Considering the Relationship between Mothers' Communication Style and Children's Behavior at Age 3 after Controlling for Age 2 Children's Behavior

Panel A: Predicting Change in Compliance from Age 2 to 3^A

	Warm Responsive Communication: Composite Score	Global Warmth and Involvement	Support	Explanations
Age 2 Compliance Beta	.03	.05	.02	.08
Independent Variable Beta	.19	.13	.30+	-.02
R ²	.04	.02	.30	.01

+ $p < .10$

^A Listwise deletion used ($N=36$)

Panel B: Predicting Change in Noncompliance from Age 2 to 3^B

	Hostile Intrusive Communication: Composite Score	Global Hostility and Intrusiveness	Verbal Intrusion	Physical Intrusion
Age 2 Noncompliance Beta	-.12	-.11	-.09	-.12
Independent Variable Beta	.32+	.33*	-.12	.39*
R ²	.11	.12	.02	.16

+ $p < .10$, * $p < .05$

^B Listwise deletion used ($N=36$)

Discussion

Internalization of parental rules, as evidenced by children's compliance, is a critical task of early childhood (Kochanska, 1993). Toddlers who fail to internalize parental standards and demonstrate increasing compliance with maturation seem to be at elevated risk for developing more serious problem behaviors during middle childhood (e.g., Shaw et al., 2001). Young children's ability to internalize parental standards may be affected by mothers' own communication style and children's ability to comprehend commands and requests. The goal of this study was to consider the role of mothers' own language skills and communication patterns on children's emerging language skills and compliance among a sample of at-risk toddlers.

The Comprehension Model of Early Childhood Compliance delineated a process by which mothers' own language skills affect their style of communicating with their children as well as children's emerging language skills and internalization of parental standards. Specifically, mothers' use of warm and responsive communication, rather than hostile intrusive communication, was expected to directly and indirectly increase children's ability to internalize parental standards. Limited support emerged for this model. Consistent with expectations, mothers' language skills were associated with their use of more warm responsive communication and less hostile intrusive communication. However, while specific aspects of mothers' warm responsive communication were associated with increases in children's compliance during the toddler period, no aspects of such a communication style were linked to children's receptive vocabulary development. The following sections will consider the implications of these findings.

Correlates and Consequences of Warm Responsive Communication: Implications for the Comprehension Model

Consistent with the Comprehension Model, mothers' receptive vocabulary was related to their use of warm responsive communication. Quite possibly mothers with more verbal resources may be better able to offer children warm and responsive explanations and encouragement during learning opportunities. Frequent and sustained warm and responsive exchanges with children seem to increase the likelihood that toddler-aged children will cooperate with their mothers and internalize their expectations for compliance (Grusec, Goodnow, & Kuczynski, 2000). Consistent with this notion, mothers' support (i.e., affectionate gestures, praise, and encouragement) during a learning activity appears linked to toddlers' gains in compliance as they mature. Surprisingly, neither mothers' use of explanations nor their overall level of warmth and involvement was associated with change in compliance, suggesting that maternal support functions uniquely to encourage toddlers' internalization of parental standards.

Mothers' receptive vocabulary skills were not related to toddlers' receptive vocabulary abilities. A number of reasons may explain these non-findings. First, mothers' and toddlers' receptive vocabulary scores may, in fact, not be related. Typically, mothers' and children's cognitive and language abilities are not directly compared using the same measure as in the present study (e.g., Bacharach & Baumeister, 1998; Coscia, Ris, Succop, & Dietrich, 2003; NICHD Early Child Care Research Network, 2000). That is, while an advantage of the PPVT-III is that mothers' and children's receptive vocabulary can be directly compared using the same measure, such comparisons may not be valid.

Second, the receptive vocabulary skills of the children in the present study may be delayed. The PPVT-III has been normed for children as young as 2.5 years of age and the

children in the present study completed assessments around their third birthdays. However, young children raised in impoverished home environments, like the children in the present study, have been found to be exposed less to language (e.g., Bradley et al., 2001b) and to have less sophisticated vocabularies (e.g., Hart & Risley, 1995) than young children from more affluent home environments. Moreover, previous research demonstrating the cultural validity of the instrument among low-income families has evaluated children's receptive vocabulary during the preschool years, not the toddler years (e.g., Dodici et al., 2003; Washington & Craig, 1999). The PPVT-III may simply not be a valid assessment of 3-year-old children's receptive vocabulary from low-income families.

Theoretically, mothers' use of warm responsive communication was expected to mediate the association between mothers' and children's receptive vocabulary scores (see Figure 1). While a lack of statistical association between mothers' and children's receptive vocabulary precluded such an explanatory relationship, mothers' receptive vocabulary could have been linked to children's receptive vocabulary indirectly through mothers' use of warm responsive communication, but did not. Indeed, mothers' with more enriched receptive vocabularies were more likely to use warm responsive communication; however, such communication was unrelated to children's level of receptive vocabulary. Putting aside potential limitations with the PPVT-III for measuring children's receptive vocabulary, problems may exist with how mothers' warm responsive communication was measured.

First, mothers' warm responsive communication was measured using mothers' actual communications with their children during a structured puzzle activity as well as their general tendency towards warmth and involvement. For low-income families, a puzzle activity may not typify activities in which mothers communicate expectations to their children. Rather, observing

mothers' warm and responsive communication style during a variety of structured activities (e.g., Dodici et al., 2003) or during naturally occurring interactions in the home (e.g., Landry et al., 1997) may increase the validity of the measure. Second, and related to the first issue, micro-social ratings were included in the measure of warm responsive communication; the puzzle activity may not be frustrating enough to generate sufficient variability in the frequency of mothers' use of warm responsive communicative behaviors. That is, discrete behaviors are rare events and a 5-minute interaction task may not provide sufficient variability in the rates of using each of the five indicators included in the warm responsive communication construct. Moreover, when considering the global indicators of warmth and involvement, only involvement generated sufficient variability; that is, mothers demonstrated very little warmth during the activity and very little variability in levels of warmth.

As a whole, support for the Comprehension Model was weak. Alternative hypotheses were considered that examined the influence of mothers' receptive vocabulary on their use of hostile intrusive communication and children's receptive vocabulary and noncompliance. Results from examining the role of hostile intrusive communication are discussed in the following section.

Hostile Intrusive Communication and the Development of Noncompliance

While warm and responsive communication may increase children's ability to understand parents' requests and to internalize their expectations, hostile intrusive communication may disrupt the socialization process by reducing children's opportunities to learn language. Modest support emerged for this alternative model. Although mothers who were more verbally skilled, as evidenced by higher receptive vocabulary scores, were less likely to use hostile intrusive communication patterns during interactions with their children, mother's use of hostile intrusive

communication was not associated with children's language skills. Mothers' use of hostile intrusive communication was, however linked to increases in noncompliance over the third year of life.

Both the composited and specific indicators of hostile intrusive communication were found to relate to children's noncompliance. The component of hostile intrusive communication most strongly linked to increases in noncompliance was mothers' use of physical intrusion (i.e., physically blocking or interfering with children's actions). For young children, physical intrusion may be particularly frustrating, as they are small in size and minimally able to escape these unwelcome maternal behaviors. When presented with more frequent physical intrusion, toddlers may come to act out more often in attempts to gain some control in interactions. Surprisingly, mothers' use of verbal intrusion (e.g., restrictive commands, criticisms) was not linked to increases in active noncompliance over time.

Repeatedly, hostile and intrusive communication has been linked to the development of problem behaviors (Crockenberg & Litman, 1990; Donovan et al., 2000; Kochanska & Aksan, 1995; Power & Chapieski, 1986; Scaramella & Conger, 2003; Shaw et al., 1994; Shaw et al., 1998). With the exception of the work of Shaw and colleagues, most of this research has relied on relatively low risk samples of White families. Deater-Deckard and Dodge (1997) have suggested that hostile parenting, in the form of firm control, may be less distressing when such parenting reflects the cultural norm, as in African American families. Considering the specific indicators of hostile intrusive communication used in this low-income and primarily African American sample, hostile intrusive behaviors, and not verbal communication, appears to be associated with increases in active noncompliance during a developmental period when active noncompliance is expected to decrease. Unfortunately, increases in active noncompliance during

late toddlerhood may place children at early risk for later aggressive and antisocial behavior (Shaw, Owens, Giovanelli, & Winslow, 2001).

Limitations and Future Directions

While the pattern of statistically significant and non-significant findings may contribute to general understanding of the process by which mothers' communication patterns affect children's internalization during toddlerhood, this study is not without limitations. The most notable limitation is the sample size. The study was developed as a pilot project and was intentionally small; however hurricane Katrina further reduced the already small sample. The ability to detect statistically significant associations is severely limited with a small sample. Replicating the study with a larger sample may provide increased power to detect statistically significant and theoretically consistent effects.

A second limitation also may be a strength of the study. The present investigation may only generalize to African American and low-income families. However, empirical research examining normative developmental processes often ignores ethnic minority families of various economic levels. The field of developmental science stands to gain from comprehensively studying socialization processes across a variety of ethnically, culturally, and socioeconomically diverse samples.

Importantly, the results from the present study add to the growing body of literature indicating that parents' use of support during interactions with their children is associated with the development of positive behaviors in young children across socioeconomic and ethnic groups. In addition, the results of the current study suggest that hostile intrusive communication may increase toddlers' risk for later problem behaviors. Clarifying the process by which children

learn to internalize parents' standards may substantially improve efforts to reduce problem behaviors among children.

Finally, the results of this study have important implications for intervention and prevention with families at risk for early childhood behavior problems. Mothers' and children's very low receptive vocabulary scores are alarming. Interventions targeting low-income, at-risk populations may not only benefit from enhancing language skills, but also from minimizing reliance on verbal techniques and written materials. Mothers with less developed vocabularies presented with overly sophisticated instruction and program materials may feel insulted, frustrated or embarrassed and, consequently, not gain from the program or terminate participation. Although challenging, the supported link between maternal support and children's development of compliance clearly indicates the importance of communicating expectations to children with adequate levels of support. Additionally, the supported association between hostile intrusive communication and increases in active noncompliance suggest possible deleterious effects of mothers' negative emotional tone and their degree of physically intrusive behaviors in interactions with their toddlers.

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Appendix A

University Committee for the Protection
of Human Subjects in Research
University of New Orleans

Form Number: 7AUG04

(please refer to this number in all future correspondence concerning this protocol)

Principal Investigator Laura Scaramella Title: Associate Professor

Faculty Supervisor: _____ (if PI is a student)

Department: Psychology College: Science

Project Title: The mothers and preschoolers study: Wave 2

Date Reviewed: 8/02/04

Dates of Proposed Project Period From 8/15/04 to 8/14/05


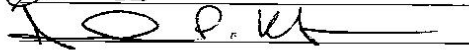

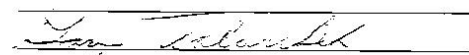



**approval is for one year from approval date only and may be renewed yearly.*

Note: Consent forms and related materials are to be kept by the PI for a period of three years following the completion of the study.

- | Approval Status | Date |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <input checked="" type="checkbox"/> Full Committee Approval | |
| <input type="checkbox"/> Expedited Approval | |
| <input type="checkbox"/> Continuation | |
| <input type="checkbox"/> Rejected | |
| <input type="checkbox"/> The protocol will be approved following receipt of satisfactory response(s) to the following question(s) within 15 days: | |

add mandated reporter right to remove data

Committee Signatures:

	Laura Scaramella, Ph.D. (Chair)
	Pamela Jenkins, Ph.D.
	Anthony Kontos, Ph.D.
	Betty Lo, M.D.
	Richard B. Speaker, Ph.D.
	Gary Talarchek, Ph.D.
	L. Allen Witt, Ph.D.

Appendix B

Micro-social parent codes for the puzzle activity: Warm responsive communication

Micro-social code	Description	Examples
Positive physical	Physical affection or soothing	<ul style="list-style-type: none"> • Hugging • Accepting a bid for a hug • Kissing
Why explanation	Tells child why to do or not do something	<ul style="list-style-type: none"> • “It’s time to do the puzzle. • “If you throw that, it could break.” • “The lady wants us to play this game.”
Descriptive explanation	Tells child what something is or where it belongs	<ul style="list-style-type: none"> • “That’s a square.” • “The car goes in this spot.” • “That one doesn’t go there.”
Positive reinforcement	Praises, encourages, or acknowledges child behavior	<ul style="list-style-type: none"> • “Good job!” • “Yay!” • “You got it right!”
Indirect command	Tells child what to do or not do while allowing some degree of choice	<ul style="list-style-type: none"> • “Let’s pick these up.” • “Give me the star, please.” • “You want to fetch the ring?”

Micro-social parent codes for the puzzle activity: Hostile intrusive communication

Micro-social code	Description	Examples
Physical intrusion	Unwelcome physical contact	<ul style="list-style-type: none"> • Taking objects from child • Slapping child • Forcing compliance
Restrictive command	Tells child what not to do	<ul style="list-style-type: none"> • “Don’t touch that.” • “Stop kicking those!” • “Don’t step on the car.”
Criticism	Demeaning statements	<ul style="list-style-type: none"> • “You’re so stupid.” • “You keep getting it wrong!” • “That was mean.”
Manipulation	Threats or false incentives	<ul style="list-style-type: none"> • “You’re getting a spanking, now.” • “I’ll give you a cookie if you try it.” • “Should I go get the time-out chair?”

Micro-social parent codes for the puzzle activity: Other codes

Micro-social code	Description	Examples
"Do" command	Tells child what to do	<ul style="list-style-type: none">• "Put this piece in it."• "Come here."• "Hand me that piece."
Modeling	Demonstrating actions	<ul style="list-style-type: none">• Placing a puzzle piece in the correct position, then handing the piece to child and saying, "Now you."• Saying, "Watch me do it," while slowly putting piece in position• Saying, "See, like this," while placing a piece in the puzzle and then physically guiding child's hand to imitate
Facilitation	Physically assisting child in task	<ul style="list-style-type: none">• Handing objects to child• Moving objects closer to child• Rotating puzzle board for child

Appendix C

Micro-social child codes for the clean-up activity

Micro-social code	Description	Examples
Compliance	<ul style="list-style-type: none"> • Placing object in its designated place • Carrying out any maternal command 	<ul style="list-style-type: none"> • Placing Mr. Potato Head's hat inside Mr. Potato Head • Handing a toy to mother after she says, "Give that to me." • Dropping stack of cups into toy bin • Freezing in place when mother shouts, "Stop!"
Active noncompliance	New behavior in response to maternal command that goes against the command	<ul style="list-style-type: none"> • Child throws toys at wall after mother says, "Put those in the bin." • Child walks away after mother shouts, "Clean them up, now!" • Child spits at mother after she says, "Give me that car." • Child starts dancing with maracas after mother says, "Leave those in the bin."

Appendix D

Validation of the Communication Scores

Two sets of analyses were computed to evaluate the validity of the communication measures. First, to ensure cross task consistency in rates of observed behaviors, the frequency scores generated from the puzzle activity were correlated with the frequency scores from the clean up activity. As expected, statistically significant cross task correlations emerged (see Table 9).

Table 9:

Summary of Cross Task Correlations of Communication Indicators

	1	2	3	4	5	6
1. Explanations	.24+	.15	-.10	.04	.24+	-.18
2. Support	.41**	.57**	-.10	.07	.33*	-.21
3. Physical Intrusion	.04	.11	.61**	.06	-.09	.49**
4. Verbal Intrusion	.23+	.16	-.05	.31*	.24+	.04
5. Global Warmth and Involvement	.19	.35**	-.07	.11	.27+	-.05
6. Global Hostility and Intrusiveness	.04	.11	.41**	-.01	.04	.39**

+ $p < .10$, * $p < .05$, ** $p < .01$; $N = 36$

Note: Clean up task codes are represented on the horizontal axis, while puzzle activity codes are represented on the vertical axis.

Second, the composited warm responsive communication and hostile intrusive communication scores generated from the puzzle activity and the clean up activity were correlated with children's externalizing and internalizing problem scores at age 2, assessed using the Child Behavior Checklist (Achenbach, 1994). Although the communication scores from the puzzle activity were unrelated to children's problem behavior scores, both parenting composites

created from the clean up activity correlated as expected. Specifically, warm responsive communication in the clean up activity was marginally significantly and negatively associated with toddlers' externalizing problems ($r = -.23; p < .10$). Furthermore, hostile intrusive communication in the clean up task was significantly and positively related to toddlers' externalizing ($r = .33; p < .05$) and internalizing problems ($r = .32; p < .05$). Quite possibly, variations in the base rates of observed parenting behavior might have accounted for these differences. That is, while global ratings were highly similar across tasks, mothers exhibited more support, physical intrusion and verbal intrusion in the puzzle activity.

Vita

Sara Sohr-Preston was born in New Orleans, LA, and earned her B.A. in psychology, cum laude, from the University of New Orleans in 1997. She earned an M.S. in general experimental psychology from the University of Louisiana at Lafayette in 2001. She began doctoral studies in the applied developmental psychology program at UNO in 2002 under the mentorship of Dr. Laura Scaramella. Since receiving her B.A., she has worked in a variety of mental healthy facilities, including Northshore Psychiatric Hospital in Slidell, LA, Impact Treatment Center in Lafayette, LA, Methodist Behavioral Resources in New Orleans, LA, DePaul Tulane Behavioral Health Center in New Orleans, LA, and Southeast Louisiana Hospital in Mandeville, LA. Upon receiving her Ph.D., she intends to continue in her research on the early childhood predictors of problems in social and cognitive development, with the ultimate goal of teaching and conducting research in a university setting.