

Touch in the Mother-Infant Dyad: Implications for Infant Self-Concept

By

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I would like to express my appreciation ...

To my parents, Ray and Betty, for the gift of my childhood.

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ABSTRACT

TITLE: Touch in the Mother-Infant Dyad: Implications for
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Examination of the role of touch in United States culture has occurred primarily in the media. Yet touch plays a major role in survival as well as in physiological and psychological human development. This study described qualities of touch and relational characteristics of mothers and their 1-year-old infants involved in a brief teaching situation, and then compared this data with a measure of child self-concept at 2 years of age. The convenience sample of 60 mother-infant dyads from a family practice clinic was composed primarily of older, partnered, Caucasian mothers and their healthy infants. Low income and maternal depression contributed to risk factors.

Videotaped observations of mother-child dyads at 12 months were coded for four touch qualities using the Weiss Tactile Interaction Index. The role of the child in initiating touch was also examined. Relational characteristics were measured with the Barnard Nursing Child Assessment Teaching Scale. Results

of the 1-year measures were then compared with child self-concept at two years as assessed by the maternal report Toddler Behavior Questionnaire.

Complete data was available on 55 of the observed dyads and statistical analysis was performed. Correlational results indicated that mothers rated high in sensitivity, social-emotional growth fostering and cognitive growth fostering used less touch in this interaction with their 1-year-olds. It may be that more sensitive mothers recognize and respect their child's developmental need to begin separating from them. Mothers rated high in response to child distress/disengagement cues used more intense touch and positive actions. Infant clarity of cues and responsiveness to caregiver was also related to more touch, again of a positive nature.

Interestingly, higher maternal sensitivity was related to lower scores on two of the five self-concept subscales, and weak trends indicated that more touch was positively related to three of the self-concept subscales. It may be that children of more attuned mothers differentiate self from mother at a later age. Factors contributing to more touch of the 1-year-old include the possibility of more concrete or controlling mothers, and suggest that the child might be challenged at an earlier age to separate self from mother.

Generalizations from this study are limited by the sample, the brief nature of the interaction, the relatively limited use of the Tactile Interaction Index, and

lack of interrater reliability for this researcher. Results, however, indicated that tactile experiences play a quantifiable role in early relationships and development of sense of self.

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CHAPTER I

INTRODUCTION

The role of touch in interpersonal relations has far-reaching personal, social, and cultural implications. In the United States, media expression of the role of touch ranges from soap opera sexuality to issues of sexual harassment and child abuse. Nurses have a professional immunity, a right to touch, based on their role as deliverers of health care; caring involves touching. Touching, however, cannot be taken for granted. Psychiatrists also deliver care, but touch in the arena of mental health is generally considered inappropriate and unethical. As a result of legal actions regarding child abuse, non-instrumental touch has also become taboo for teachers and child care providers.

There is a wide range of attitudes and affects regarding touch in United States culture, reflecting individual perceptions, and cultural and socioeconomic norms. These variables are experienced on the personal as well as the interpersonal level, both of which contribute to the individual's identity as a person, a "self", within society.

Touch can be considered a primary communication tool with the preverbal child ... serving to energize, focus attention, soothe. Helen Keller, blind and deaf since infancy, demonstrated the potential of touch in communication. Yet the significance of touch for the developing human remains little recognized with its potential underutilized in the United States. The emphasis instead is on the sexual aspects of touch, with prurient or negative implications.

This study examined the role of maternal touch in her infant's development of a sense of self. Touching behaviors are both instinctual and learned, and have implications for the species and the individual. Instinctual behaviors promote survival: the individual develops physiological and psychological responses, and physical behaviors, subsequent to interaction with the environment. These interactions can promote healthy growth and development; likewise they can result in maladaptation and defensive reactions.

This purpose of this study was to explore the role of maternal touch, the impact of its expression within the mother-child dyad at the preverbal stage, and the child's development of self-concept. Improving caregivers' awareness of the power of touch in communication with infants and children can contribute to more positive outcomes for children and the people they become.

CHAPTER II

REVIEW OF THE LITERATURE

The following reviews the physiological and psychological significance of touch, and the pivotal maternal role in infant development of sense of self.

This includes contributing aspects of the mother/infant relationship as described by Bowlby's attachment theory and Ainsworth's empirical studies, with emphasis on maternal sensitivity and responsiveness. The theoretical basis for development of a sense of self is explored, integrating the psychological and the physical components (the psyche and the soma) (Winnicott, 1965).

Physiological Aspects of Touch

Montagu (1971) considers touch "the mother of the senses" (p.1). Skin arises from the embryonic ectoderm, as do the brain, the nervous system, and the organs of smell, taste, hearing and vision. As such, the skin could be considered "the outer surface of the brain, or the brain ... the deepest layer of the skin" (Juhan, 1987, p.35). Embryologically, the earlier developing functions are considered more fundamental, providing a base for future system development. Classic studies of the 1930s by Hooker (1957) documented fetal responsivity to touch of the lips or nose at seven and a half weeks, expanding to the chin, lateral lips and nose, then to the eyelids and, by eleven and a half weeks, to the entire front of the face. The familiar sensory homunculus (Appendix A) reflects the preponderance of facial and oropharyngeal representation in the cortex. By

fourteen weeks gestation, only the top and back of the fetus' head remain insensitive to touch. Human cerebral cortex dendrites and dendrite spines are formed and able to respond by 32 weeks gestation, contributing to rudimentary perceptions of one's body in utero (Gottfried, 1990).

Myelination and maturation of infant cutaneous sensory pathways precede vestibular, auditory and visual pathways. Thus, repeated tactile impressions combine to form "cognitive maps" or "cortical representations," and are important in integrating early undifferentiated bodily sensations (Weiss, 1990). Tactile functions "are a sensitive indicator of the degree of central nervous system integration" (Ayres, 1972). Among mammals (other than man) licking of the newborn in the perineal region is a prerequisite for genitourinary and gastrointestinal function (Montagu, 1971).

Role of Touch in Psychological Development

The skin is the largest organ of the body, and forms the boundary for self. Every postnatal touch contributes to a mental image of what has been touched, identifying the "me" and the "not me".

A person's entire developing sense of self, although not limited to sensations generated by the body, appears to be rooted in body awareness, body functions, and body activities. This assumption is supported by studies which show a significant correlation between one's feelings and perceptions regarding the body and one's concept of the total self...Both sentiment for the body and the cognitive model of the body have been identified as fundamental substrata which are necessary in order to build up other response systems; that is, they are primary dimensions in an individual's overall system of standards for interpreting the world (Weiss, 1990, p. 425).

The role of touch in human development has received intermittent attention since the recognition of a high mortality among infants in institutions; prior to 1920, nearly 100% of institutionalized U.S. infants less than a year old died (Montagu, 1971). The leading child care booklet at the time, The Care and Feeding of Children (with 15 editions between 1894 and 1935), recommended against spoiling the child with too much handling, with feeding on demand, or by responding to distress. It was not until after World War II that studies of marasmus (Greek for “wasting away”) revealed the importance of handling, cuddling, and caressing to the infant’s well-being (Montagu, 1971). This shift toward the value of touching reversed a long-standing trend.

A series of rat studies by Hammett in Philadelphia in the 1920s, focused on survival after removal of thyroid and parathyroid glands. A surprisingly high survival rate was found among rats that had been “gentled” (frequently handled and stroked). Beyond the survival findings were important behavioral sequelae: “Gentling produced gentle, unexcitable animals; lack of gentling resulted in fearful, excitable animals” (Montagu, 1971, p. 14). This further demonstrated the crucial role of touch for well-being.

In 1958, Harlow stunned the American Psychiatric Association convention with his Presidential Address, “The Nature of Love.” Director of the University of Wisconsin’s Primate Laboratory, his work with infant monkeys had shown that the contact comfort provided by a cloth-covered surrogate took precedence over the wire mesh surrogate with a bottle of milk. Prior to this, the accepted

theory across disciplines was that hunger gratification, provided through the infant's nursing, formed the basis for all subsequent social relationships (Suomi, 1990). The critical role of physical contact in the development of social relations had emerged.

The ventral to ventral (anterior) contact characteristic of rhesus monkey mother-infant pairs which supports thermoregulatory and nourishment roles, is replaced by grooming behaviors after the first month, except in alarm states. Abnormal patterns of behavior were found in laboratory-born monkeys reared in single cages who, in the absence of a mother or a surrogate, clung to themselves and sucked on their digits. Lacking stimulation from mother or peers, they developed "idiosyncratic patterns of stereotypic behavior" (Suomi, 1990, p.147). Those raised in tactile isolation their first six months avoided social contact throughout their lifespan, and tended to be hyperaggressive in social interactions. Primate studies of single-cage reared monkeys, Harlow's "motherless mothers," showed them to be abusive or neglectful to their first-born, but able to rear subsequent offspring. This suggests a "priming" effect from the first unsuccessful birthing (Suomi, 1990), another example of the crucial role of touch in socioemotional adaptation.

Touch in the Mother-Child Relationship

During the early 1950's, Bowlby developed attachment theory, influenced by ethology, developmental psychology, and psychoanalysis. Ethological

descriptions of imprinting in newborn goslings struck Bowlby as biologically related to the attachment a child forms with his/her primary caregiver. Bowlby's attachment behavioral system has been found to be instinctual to all ground-living primates. Activation by alarm leads to the infant either signaling to bring the primary caregiver closer (i.e. crying) or taking direct action to get closer. Bowlby contends that "physical (tactual) contact with an attachment figure is ... the ultimate signal that the infant is in safe (secure) circumstances" (Main, 1990, p. 462). Ainsworth's empirical studies in Uganda and in Baltimore confirmed attachment theory, demonstrating the role of parenting styles in individual personality differences, and that "there can be a psychology of relationships and that relationships can be measured" (Sroufe, in Karen, 1990, p. 43).

Ainsworth developed the Strange Situation as a means of rating mother-infant attachment. Following home observations of the dyad, mother and infant were observed in the lab, in situations involving a stranger's presence, the mother leaving, and the mother returning. Three patterns of infant reactions were noted. Securely attached infants protested when their mothers left and greeted her return with proximity-seeking behaviors. The other two groups were considered anxiously or insecurely attached. The ambivalent behavior classification described a child who was clingy, reluctant to explore, and/or extremely distressed on mother's departure. Upon the mother's return, the child sought proximity but resisted her efforts to console. Avoidant behavior entailed independence in mother's presence, ignoring her departure, and avoiding her on

her return. Further studies have discerned a fourth attachment style of “disorganized” to describe children who seek closeness with their mother but in a distorted fashion, common among abused children (i.e. approaching backwards, stopping mid-movement) (Karen, 1990).

Data from Ainsworth’s Baltimore studies of attachment found some mothers aversive to contact, independent of the infant’s cuddliness. Since alarm from any source activates attachment behaviors, even when the mother’s aversion is the source of alarm, the conflicting messages to withdraw from and to approach the attachment figure contribute to self-perpetuating conflict and aggression. Maternal aversion to the infant in the first few months predicts an avoidant attachment pattern for the infant by the end of the first year. In effect, the infant has internalized the mother’s pattern (Weiss, 1990).

Maternal Sensitivity and Responsiveness

Ainsworth describes the essential components of maternal sensitivity as awareness and accurate interpretation of her infant’s signals, with a prompt and appropriate response to these signals(1978). Winnicott notes that the word infant actually implies ‘not talking’ (*infans*) (1965, p. 40). The most sensitive mother is attuned to the infant’s subtle cues; the least sensitive perceives only the most blatant communications. Distorted perceptions on the part of the mother interfere with accurate interpretation of infant cues. The mother’s ability to

empathize, to understand her infant's feelings from the child's perspective, is prerequisite to sensitive interactions with him/her (Ainsworth, 1978).

Promptness is essential for the infant to perceive a relationship between communication and response. The attention span of newborns is approximately five seconds (Barnard, 1994). Appropriate responses contribute to the child's cumulative development of a "sense of competence," an ability to control his/her social environment (Ainsworth, 1978). The child who senses his/her mother is really listening also learns that s/he is understood and valued, and that his/her feelings are deserving of attention (Wexler, 1991).

Development of "Self"

Winnicott emphasized the importance of maternal care, stating "There is no such thing as an infant ... whenever one finds an infant one finds maternal care, and without maternal care there would be no infant" (1965, p. 39). The infant has an inherited potential, including that toward growth and development, but the potential is dependent on maternal care. This involves both psychological and physical (psycho and somatic) aspects of care; both are integral to the child's progress from absolute dependence, through relative dependence, to independence (pp. 42-43).

Wolf (1988) describes the self as a psychological structure, a metaphor for introspected subjective experience, with a history and stability over time. This stability is subject to change, and reflects the individual's experiences within the

environment. Furthermore, "the human psyche ... organize[s] itself so that it experiences the 'I am I' as a unified and historically continuous self" (pp. 27-30).

Cohesion, a sense of internal organization and unity, is central to self development and requires the presence of other people. Whereas the infant requires concrete others to relate to, the mature adult can use symbols (i.e., a song, place, thought) to represent self-stabilizing relationships with others. When affective states (feelings) are recognized, appropriately labeled and valued by the caregiver, the infant is able to integrate affect into the organization of his/her sense of self. Well-being results when there is an internal sense of experiences fitting together, and of effectiveness over the environment and internal responses (Wexler, 1991).

Winnicott stated that emotional maturity is closely related to the capacity to be alone. The infant who consistently experiences empathic psychological and physical support from the mother is gradually able to internalize that relationship. Thus "good-enough mothering" allows the child "to build up a belief in a benign environment ... through a repetition of satisfactory instinctual gratifications" (Winnicott, 1965, pp. 31-32). Good-enough mothering allows the infant to grow from total mergence in the prenatal period through states of physical and psychological dependence and eventually to a state of physical independence and mental separation, an individual self (Guntrip, 1973).

Stern (1985) reviewed studies reflecting the infant's active engagement in organizing experiences, and described the process. By two or

Three months
of

age, this organization results in an identity, a sense of a "core self," which reflects the integration of the infant's experiences. Based on the infant's developmental level, this is not a cognitive construct but rather an existential assumption, an integration of experiences at the preverbal level.

Over time the infant experiences frustration as mother is no longer able to magically meet all unspoken needs. This process contributes to the infant's recognition of him/herself as separate from the mother. Caregiving that is good-enough supports the child so that frustration is not overwhelming, but contributes to emotional growth and integration of experience. Thus the infant progresses from total dependence on the adult environment to an active role in achieving his/her goals. In situations where the adult continues performing tasks the child could be doing, the child maintains an image of the omnipotent parent and is hampered in achieving the experience of competence separate from an adult (Wexler, 1991; Winnicott, 1965).

Winnicott (1965) describes a "psychosomatic existence ... referred to as the psyche indwelling in the soma", the basis for which is:

... a linkage of motor and sensory and functional experiences with the infant's new state of being a person. As a further development there comes into existence what might be called a limiting membrane, which to some extent (in health) is equated with the surface of the skin, and has a position between the infant's 'me' and his 'not-me'. So the infant comes to have an inside and an outside, and a body-scheme (pp. 44-45).

The infant experiences the world through tactile exploration, especially with the lips and mouth. As the child explores his/her own body shapes, textures, and sensations, a body image begins to form. This image is "reinforced

textures, and sensations, a body image begins to form. This image is “reinforced or often negated by pleasurable or painful tactile experiences with other human beings” (Frank, 1957, p. 225), particularly the primary attachment figure.

Furthermore, as the child becomes more mobile, caregivers communicate cultural norms and the limits of exploration.

This involves the curtailment and prohibition of tactile experiences, forbidding the child to touch whatever is defined by adults as inviolable (property, sacred places, forbidden objects, persons). His naive approach to these inviting object-persons is blocked and prohibited, often with painful punishment, until they are perceived as not-touchable except when he has permission or has performed the necessary rituals, negotiations, buying, etc. Not only are these tactile experiences of crucial significance for social order, but the transformation of the child’s naive impulsive response to the world into the learned observance of inviolability, usually involves emotional disturbances, conflicts with parents and often over-learning, so that the child may become inhibited and less capable of making tactile contacts, even those which he or she may seek as occasions for interpersonal relations, as in intercourse (Frank, 1957, p. 228).

As the child matures and develops symbolic representation, s/he is able to retain the mental image of mother and others, and to carry on internal conversations. As social interactions increase, so too the number of internal conversations. Significant relationships are incorporated into one’s perceptions of oneself...“We are our others” (Cashdan, 1988, p. 47). The early pre-linguistic experiences can result in strong feelings which people cannot logically explain, having been internalized before there were words to identify them (Cashdan, 1988).

Summary

Tactile experiences, being the predominant mode of communication in early childhood, seem to contribute significantly to perceptions of one's self, both physically and emotionally. Research reflecting this contribution does not appear in a review of the literature. However, research on physical and sexual abuse reflects serious developmental, cognitive and psychological sequelae (Boyer & Fine, 1992; Brown, Pipp, Martz & Waring, 1993; Houck & King, 1989). It would seem that tactile experiences have significant potential for positive contributions to human development, as well as negative repercussions. This study examined the role of touch in maternal care of the infant and subsequent development of sense of self.

Conceptual Framework

Tactile experience contributes significantly to organization of a sense of self and other, both physically and emotionally, and is integral to human development. Personality organizes around the self in relation to others, and the child's relationships develop within a framework of expectations based on the primary attachment relationship (Sroufe & Fleeson, 1986). Especially in the preverbal stages, this relationship provides a template for affect and behavior which precedes cognitive explanations.

Because touch is reciprocal, we cannot touch without being touched (Weber, 1990). The primary caregiver moderates the infant's experience in a manner reflective of the parent's own tactile experience, and largely outside of

cognitive understanding. Parent tactile interaction with the infant contributes to the infant's sense of physical and emotional self, both as an individual and in relationship to others. Thus the parent's own history is transmitted to the next generation.

Research Questions

The purpose of this study was to examine tactile interaction within the mother-infant dyad and describe possible relationships between tactile interaction and the child's development of a sense of self. The following questions were addressed by this investigation.

- (1) What is the relationship of tactile interaction to the quality of mother-child dyadic interaction at 12 months as assessed by the Nursing Child Assessment Teaching Scales (NCATS)?
- (2) What is the relationship between interactional characteristics at 12 months and development of self-concept as manifested at 24 months?

CHAPTER III

METHODS

This study proposed to examine mother/infant tactile interaction in the context of a teaching situation at 12 months and assess it in relation to development of self-concept at 24 months. It was based on secondary analysis of data collected by Houck in her current longitudinal study of mother-child qualities and interactional characteristics relative to the development of self-esteem, as manifested during the transition to toddlerhood (Mother-Toddler Project).

Sample

The Mother-Toddler Project recruited one hundred fifty mother-infant dyads from the Oregon Health Sciences University Family Practice Clinic during the first 9 months after birth. Because the clinic serves a larger population of male infants (due to its role as sole provider of circumcision services at OHSU), gender distribution was uneven with 70% of subjects male. Comprised of a middle to lower socioeconomic population, infants were free of physical handicaps or mental retardation, and were not involved in any other interventions. In order to avoid confounding factors, only Anglo- and Afro-Americans with English as a primary language were included. Observations of mother-child dyads were carried out at 12, 24, and 36 months.

The Tactile Interaction/Self Concept Study reviewed videotapes of sixty mother-infant dyads from the larger sample at 1 year of age. Table 1 gives information on child and maternal ages at the time of this observation.

Table 1

Maternal and Child Ages

Variable	Mean	Std. Dev.	Min.	Max.	N
Maternal Age	29.18yr	6.88	18yr	44yr	60
Child Age	13.19mo	2.01mo	9mo	20mo	60

The Tactile Interaction/Self Concept Study included 32 males (53%) and 28 females (47%). Parental ethnicity is reviewed in Table 2.

Table 2

Parental Ethnic/Racial Background

Description	Maternal		Paternal	
	N	Percent	N	Percent
Afro-American	13	21.6	14	23.3
Caucasian	43	71.7	44	73.3
Native American	4	6.7	2	3.4
Total	60	100.0	60	100.0

Background information, including marital and socioeconomic factors, was assessed at intake with updates at subsequent visits (see Appendix B). Most mothers (73%) in the Tactile Interaction/Self-Concept Study were married or cohabitating. The sample included well-educated mothers, with 83% high school graduates. In 52% of these families, mothers were employed outside the home. Fifteen percent of mothers (N=9) received unemployment compensation, and 50% of families had received public assistance in the past year. Table 3 reviews specifics of these categories. Income among this sample represents a social risk factor. The median income was \$15,000 - 17,000 per year, and Table 4 reviews gross annual income for these families.

Table 3

Maternal Marital, Educational and Employment Status

Description	N	Percent
<u>Marital</u>		
Never married	11	18.3
Currently married	39	65.0
Living together	5	8.3
Currently separated	1	1.7
Divorced	4	6.7
	-----	-----
Total	60	100.0
<u>Educational</u>		
High school drop-out	10	16.7
High school graduate	26	43.3
Some college	10	16.7
College graduate	12	20.0
Missing cases	2	3.3
	-----	-----
Total	60	100.0
<u>Employment</u>		
Homemakers	27	45.0
Outside home:		
<= 50%	11	18.4
50 - 63%	6	10.0
Full time	12	20.0
Missing cases	4	6.6
	-----	-----
Total	55	100.0

Table 4

Gross Annual Income

Dollar Amount	N	Percent
< 5,000	9	15.0
5 - 8,000	7	11.7
9 - 11,000	4	6.7
12 - 14,000	9	15.0
15 - 17,000	4	6.7
18 - 23,000	4	6.7
24 - 28,000	3	5.0
29,000 +	20	33.2
Total	60	100.0

Among the sample mothers, 5.2% had a history of mental illness; 12% reported a history of alcohol abuse, and 7% a history of drug abuse. Among the mother's parents, one-third had a history of alcoholism, 5% a history of substance abuse, and 7% a history of mental illness. Twenty-seven percent of the mothers had witnessed marital violence in their family of origin and 26% had experienced child abuse by their parents. Although not a social risk sample in terms of psychosocial history, these figures suggest that at least one-fourth of the sample is at risk for parenting difficulties given the history of family violence.

Forty percent of the sample mothers reported experiencing the "baby blues", and 33% reported postpartum depression, with one third of these receiving treatment (10% of the total sample). Twenty percent of the dyad

mothers identified their own mother as emotionally unavailable and over one-third identified their father as emotionally unavailable. Again, this represents a sizeable portion of the sample as having a history of emotional unavailability in family of origin. It is not surprising then that over 18% reported experiencing spousal abuse. Table 5 summarizes this data.

Table 5

Aspects of Maternal Mental Health

Description	N	Percent of total sample
Maternal History		
Mental illness	3	5.2
Alcohol abuse	7	12.1
Drug abuse	4	6.9
Abuse by spouse*	11	18.3
Parent's mental illness	4	6.9
Parent's drug abuse	5	5.2
Parent's alcohol abuse	15	25.9
Abuse by parent (as child)	16	27.2
Parental marital violence*	16	27.2
Experienced "baby blues"***	25	43.9
Experienced postpartum depression***	19	31.7
Treated for postpartum depression***	6	10.0

(Note 2 missing cases in all above categories except * with 1 missing case, and *** with 3 missing cases.)

Among the infants, 2 were premature but without complications (age corrected at intake). One child was adopted at 2 weeks of age. Thirty-nine percent (N=23) were first-born, 27% second (N=16) and 23% third (N=14). One dyad is currently involved with Child Protective Services.

In summary, data for this sample consisted of videotaped observations at 12 months and self-report data at 24 months of sixty mother-infant dyads from the larger Mother/Toddler Project. This population was recruited from a family practice clinic, and included a primarily Caucasian population. The majority of the mothers were older, partnered, and had completed high school and some college. Risk factors include: (1) low income, with almost half of the sample mothers employed outside the home, and more than half receiving public assistance in the past year; and (2) maternal depression, with a sense of lacking support from their family of origin. More than a quarter of the sample mothers had witnessed marital violence in their family of origin, and nearly a fifth had experienced spouse abuse. The majority of the children were first- or second-born; 2 were premature without complications, and 1 was adopted at 2 weeks of age.

This study met standards set by the Oregon Health Sciences University Institutional Review Board for research involving human subjects (IRB # 4113 EXP.)

Procedures

For the larger Mother/Toddler Project, intake assessment at eight months was followed by laboratory observations of limit-setting, play, and conversation at 12, 24, and 36 months, with standard demographic data collected at each visit. Observational assessments reflected infancy (8 months), as well as early transition to toddlerhood (12 months), mid-transition (24 months), and end of transition (36 months). Contributing maternal characteristics included depression, control orientation, and conceptualization of infant development which were assessed by the Beck Depression Inventory, Parental Locus of Control, and Concepts of Development respectively. Contributing child characteristics included temperament and developmental status, as assessed by the Revised Infant Temperament Questionnaire, Toddler Temperament Scale, and Infant/Child Monitoring Questionnaire. Child outcomes were measured by the Toddler Behavior Questionnaire, Adaptive Social Behavior Inventory, Knowledge of Self as Agent Tasks, and infant scores from the Nursing Child Assessment Teaching Scale.

Sample retention was maximized by emphasis on participants' contribution to an understanding of parenting; provision of child care for siblings during visits; facilitation of transportation; written pre-visit reminders and post-visit thank-you notes; partial payment after each visit (to a total of \$100 for full participation); and providing a videotaped copy of the observations at the conclusion of the study.

Measures

The Tactile Interaction/Self-Concept Study utilized the mother-child teaching situation to assess touch and the quality of the interaction at 12 months, and related these variables to maternal report of child self-concept at 24 months. Following an open play session, the mother was briefly instructed on teaching her child to stack blocks and a 4-5 minute episode was videotaped (Sumner & Speitz, 1994).

Dyadic Observations: Tactile Interaction Index

The Tactile Interaction Index (TII) is the product of Dr. Sandra Weiss' efforts to articulate a language of touch at the University of California, San Francisco, over the past two decades. Dimensions of touch coded on the TII include: (1) location - body part being touched, (2) action - specific gesture or movement, (3) intensity - degree of pressure applied to the skin, and (4) duration. Statistical evaluation of this instrument is limited but encouraging (Weiss, 1992), and it is currently in use at UCSF in a study of low birth weight babies (The Effects of Family Environment and Perinatal Vulnerability on Health Outcomes for High Risk Infants).

Appendix C includes the Weiss Tactile Interaction Index coding procedure, action and location indices, and scoring categories. Individual descriptions of each touch quality (intensity, location, action) were totaled for the frequency, and each category was then divided by the frequency to arrive at a

total percentage for each category. Locations were combined into categories of high innervation (including face, foot, groin, hand, head, neck) and low innervation (including arm, abdomen, back, buttocks, chest, leg, shoulder, thigh, torso, waist). Positive actions include hugs, kisses, pats, strokes and tickles; negative actions include bites, pinches, pokes, slaps, hits, and kicks. Cutaneous actions include contacts, holds, kisses, licks, pats, picks, strokes and taps.

Proprioception refers to the sensory perception of motion, and includes information arising from limb movement (involving muscles, ligaments and joints) as well as information arising from body orientation and motion in space (vestibular, involving the inner ear and semicircular canal) (Ayres, 1972; Ayd, 1995). In the Tactile Interaction Index, proprioceptive action refers to bites, hugs, massage, pinches, pokes, presses, rubs, scratches, slaps, squeezes, sucks, and tickles. Vestibular actions include kicks, lifts, hits, pulls, pushes, and shakes.

The formulas for computing composite scores are available in Appendix C. Table 6 shows the mean, standard deviation, and range for each touch quality obtained in the current study. The researcher was reviewed for accuracy, by the principal investigator, on 15% of the sample.

Table 6

Tactile Interaction Index Categories

Description	Mean	Std. Dev.	Min.	Max.
Intensity:				
Total	19.85	12.82	.00	55.00
Strong %	.09	.12	.00	.63
Moderate %	.18	.15	.00	.50
Light %	.69	.24	.00	1.00
Location:				
Total	25.36	18.90	.00	103.00
High innervation %	9.84	7.62	.00	28.00
Low innervation %	15.11	14.46	.00	78.00
Action:				
Total	23.60	15.68	.00	68.00
Positive touch %	1.37	1.88	.00	7.01
Negative touch %	.29	1.38	.00	10.00
Cutaneous %	14.68	10.12	.00	51.03
Proprioceptive %	2.94	3.31	.00	14.02
Vestibular %	5.06	4.95	.00	20.04

Dyadic Observations: Nursing Child Assessment Teaching Scale

Developed and refined over the past two decades by Dr. Kathryn Barnard and the University of Washington Nursing Child Assessment Project, the Nursing Child Assessment Teaching Scale (NCATS) reflects qualities of mother-infant participation in a "teaching loop." Components of this loop include (1) level of child's alertness, (2) parental instruction, (3) child performance, and (4) parental feedback. Because the teaching task is relatively brief and outside the

dyad's routine, it places some stress on the mother-child system and reflects their adaptive response. For the Tactile Interaction/Self-Concept Study, it was expected that nonverbal communication in the form of tactile interaction patterns would also be elicited.

Consisting of 73 binary items, the Teaching Scale provides a total score as well as scores reflecting caregiver and child components (Appendix D). With a database including approximately 2100 mother-infant dyads (54% Caucasian, 26.8% Afro-American, 19.2% Hispanic), the scale has proven a reliable and valid assessment for dyadic interaction and communication patterns. Caregiver components include subscales of sensitivity, response to child's distress, social-emotional growth fostering, and cognitive growth fostering. Child components include subscales clarity of cues and responsiveness to caregiver. It should be noted at this point that a score in the caregiver response to distress subscale indicates that the child has exhibited potent signals to take a break or disengage from the interaction. This could additionally suggest that the child's subtle cues were not noticed by the caregiver. In the interest of clarity, the Tactile Interaction/Self-Concept Study refers to this subscale as "response to distress/disengagement."

Among findings thus far, lower scores have been shown with caregivers who were less educated, adolescent, abusive and neglecting; moderately higher scores have been linked with increased maternal education and age at time of infant's birth. Validity studies have demonstrated (1) a significant relationship

between early teaching assessment scores and later language and IQ outcomes, and (2) among full-term infants, concurrent validity with the Bayley Mental and Psychomotor Development Index (MDI; PDI) and with the Home Observation Measure of the Environment (HOME) inventory (Sumner & Spietz, 1994, pp. 115-116).

NCATS coding was performed by 2 observers who had previously achieved 85% or greater reliability on NCATS training tapes. Interrater reliability ranged from .73 to .93 on tapes from the Mother/Toddler Project, with a mean of .84. The ranges, means, and standard deviations for the NCATS subscale scores in the Tactile Interaction/Self-Concept Study are included in Table 7. The NCATS database has established the 10th percentile as the cut-off score for identifying "worrisome" individuals/dyads (Sumner et al, 1994, p. 110). Of the fifty-five dyads in the present study, 29% of caregivers (N=16) but no infants were considered at risk. Dyadic scores identified only 3 of the dyads (5.5%) at risk. The difference between caregiver risk and dyad risk could be a reflection of the child's compensation for maternal factors.

Table 7

NCATS Teaching Subscale Scores

Subscale	Mean	Std. Dev.	Min.	Max.	Max. Possible
Caregiver:					
Sensitivity to cues	9.31	1.00	7	11	11
Response to child					
distress/disengage	8.71	1.29	5	11	11
Social-emotional					
growth fostering	7.67	1.36	6	11	11
Cognitive growth					
fostering	11.16	2.48	5	15	17
Caregiver total	36.85	4.39	25	47	50
Child:					
Clarity of cues	8.45	1.00	6	10	10
Responsiveness to					
caregiver	10.15	2.24	5	13	13
Child Total	18.60	2.97	12	23	23
Caregiver/Child total	55.45	5.80	38	65	73
Caregiver contingency	13.51	3.07	4	20	20
Child contingency	9.35	1.96	5	12	12

Child Self-Concept

The Toddler Behavior Questionnaire was chosen as the measure of self at 2 years for the Tactile Interaction/Self-Concept Study. This questionnaire is a maternal rating of 25 child behaviors reflecting the developmental progression of a sense of self. Physical sense of self generally occurs by 18 months of age,

a-sense of self. Physical sense of self generally occurs by 18 months of age, followed by self-description and self-evaluation (i.e. "sticky hands," "good girl") by about 30 months. Emotional responses to misbehavior (i.e. hiding broken item) tend to overlap or follow the self-descriptive/self-evaluative stage, providing a basis for development of conscience. Autonomy is also rated in a general way, and the authors of the questionnaire suggested further differentiation was needed on this category. Mothers rated child "self" behavior on a 3 point scale indicating whether the behavior had definitely, sort of, or definitely not been manifested. Interrater reliability between mothers and other caretakers yielded a mean r of .67, and Guttman Scale analysis showed a .93 coefficient of reproducibility (.90 indicates a valid scale) (Stipek, Gralinski, & Kopp, 1990).

Data was currently available through the 24 month assessment on 55 of the 60 dyads observed for this study. This did not significantly alter socioeconomic or psychosocial characteristics of the sample population, and statistical analysis was performed on the measures described for the 55 dyads. Table 8 lists the means, standard deviations and ranges of scores for the Toddler Behavior Questionnaire categories.

Table 8

Toddler Behavior Questionnaire

Description	Mean	Std. Dev.	Min.	Max.
Self-Eval	13.62	6.24	.00	24
Self-Recognitn	8.73	1.99	1.00	10
Emotnl Respons	6.45	2.41	.00	10
Autonomy	4.89	1.56	.00	6
TBQ Total	33.69	9.4	11.00	50

Data Analysis

Statistical analysis of the data obtained for the Tactile Interaction/Self-Concept study was performed on the SPSS computer program. Correlation coefficients were determined among individual categories of the Tactile Interaction Index and the NCATS subscales. Correlation coefficients for tactile categories and NCATS subscales were then performed to detect relationships between touch and dyadic interaction at 1 year, and between interaction at 12 months and self-concept at 24 months.

CHAPTER IV

RESULTS

In the following section, the relationships between tactile and dyadic interaction in a teaching session at 12 months, and between maternal behavior and child self-concept at 24 months are described. They were assessed through the use of correlation coefficients.

Maternal-Child Touch Variables:

Correlations Among TII Subscales

Tactile Interaction Index descriptive data were reported in Table 6. The following reviews significant correlation coefficients among the tactile variables. As seen in Table 9, there was a significantly negative relationship between (1) the maternal use of light touch in combination with strong or moderate touch, and (2) the use of light touch to the child's low innervation areas (i.e. arm, abdomen, back, thigh). Strong and moderate intensity touch was more commonly used in low innervation areas, although there was also a trend to use moderate touch in high innervation areas. Touch tended to occur more frequently in areas of low innervation rather than areas of high innervation (i.e. face, hand, head).

Table 9

Tactile Interaction Correlations: Intensity and Location

	Strong	Mod	Light	Tch Totl	Hi nerv	Lo nerv
Proportion Intensity:						
Strong						
Moderate						
Light	-.48 ^{***}	-.51 ^{***}				
Proportion Location:						
Total	.28 [*]	.37 ^{**}				
High innervation		.19 t		.70 ^{***}		
Low innervation	.35 ^{**}	.37 ^{**}	-.25 [*]	.93 ^{***}		

t p < or = .10

* p < or = .05

** p < or = .01

*** p < or = .001

Low innervation areas received significantly more positive touch than high innervation areas, and cutaneous actions (i.e. simple contacts, kisses, pats) generally occurred more frequently than proprioceptive (muscle/limb movement) and vestibular (movement through space) actions. Light intensity was inversely related to proprioceptive and vestibular actions, reflecting the increased intensity necessary for mothers to perform those actions (i.e. proprioceptive hugs, massage, presses or vestibular lifts, pulls, pushes).

Interestingly, this was the only significant relationship between light intensity and action (Table 9a).

Mothers who touched more used significantly more positive touch as well; negative touching was not linked to the amount of touch. Cutaneous and proprioceptive actions occurred fairly equally among the child's high and low innervation areas; vestibular actions were more common in low innervation areas. In other words, actions like kisses, pats, hugs, and squeezes involved all areas; actions like lifting, pulling, shaking were generally directed at areas like arms, backs and legs. These results are summarized in Table 9a.

Table 9a

Tactile Interaction Correlations: Action, Intensity and Location

	Strong	Mod	Light	Tch Total	Hi inerv	Lo inerv
Proportion Action:						
Total	.32**	.37**		.94***	.70***	.85***
Positive touch	.18t	.20 t		.55***	.23*	.59***
Negative touch					.20t	
Cutaneous				.84***	.74***	.71***
Proprioceptive	.38**	.43***	-.32**	.60***	.42***	.54***
Vestibular	.48***	.55***	-.43***	.74***	.38**	.76***

t p < or = .10

* p < or = .05

** p < or = .01

*** p < or = .001

Positive maternal actions (i.e. hugs, kisses, pats, tickles) were associated with cutaneous, proprioceptive and vestibular actions, but negative maternal touch (i.e. pinching, poking) was more significantly related to proprioceptive actions. This is consistent with the preponderance of proprioceptive type actions within the negative action category (4 of the 6 are proprioceptive). Cutaneous, proprioceptive and vestibular actions were fairly equally correlated with each other, as shown in Table 9b.

Table 9b

Tactile Interaction Correlations: Action

	Pos touch	Neg touch	Cutan	Proprio	Vestib
Proportion Action:					
Total	.48***	.21t	.91t	.64***	.77***
Positive touch			.38**	.34**	.34**
Negative touch				.50***	
Cutaneous				.40***	.50***
Proprioceptive					.49***
Vestibular					

t p < or = .10
 * p < or = .05
 ** p < or = .01
 *** p < or = .001

Maternal-Child Teaching Situation:
Correlations Among NCATS Subscales

Nursing Child Assessment Teaching Scale descriptive statistics were reported in Table 7. Correlations among the NCATS subscales follow.

As one would expect, the caregiver total scores correlated significantly with all maternal subscales (Table 10), the strongest relationship being with the cognitive growth subscale. This finding was reflective of NCATS as a teaching scale. Notably, maternal sensitivity was significantly correlated with all the other maternal subscales.

The significant relationships between the child subscales and maternal subscales response to distress/disengagement and contingency would support the feedback notion of the teaching loop. Maternal responses in a timely manner contribute to the clarity of infant cuing and to infant responsiveness. Child total scores were not as significantly related to the maternal subscales as they were to the caregiver and dyadic totals, reflecting the relatively independent roles of mother and child within the interaction. These results may be seen in Table 10.

Table 10

Correlations Among NCATS Caregiver Subscales

Caregiver:	sens	resp dstrs	soc-emot growth	cogn growth	cg total
CG sensitiv					
respons dstres		.36**			
soc-emot growth	.34**	.26*			
cogn growth	.32**	.24*	.42***		
CG total	.61***	.59***	.70***	.84***	
Child clarity		.24*			
responsiv		.23*		.19t	.23*
Child total		.26*		.18t	.21t
CG/child total	.45***	.58***	.60***	.73***	.87***
CG contingency	.51***	.69***	.57***	.67***	.87***
Child contingency		.21t			

t p < or = .10
 * p < or = .05
 ** p < or = .01
 *** p < or = .001

Infant subscales were significantly correlated with each other, most highly in the responsiveness subscale (Table 10a). The correlations between infant subscales and caregiver contingency were lower, though still significant, reflecting the infant's rudimentary communication abilities.

Table 10a

Correlations Among NCATS Child Subscales

	Child: clarity	respons	total	CG/child total	CG Conting
Child clarity	1.00				
Child responsiv	.63***	1.00			
Child total	.81***	.97***	1.00		
CG/child total	.50***	.67***	.67***	1.00	
CG contingency	.23*	.31*	.31*	.82***	1.00
Child contingency	.65***	.99***	.97***	.63***	.27*

t p < or = .10
* p < or = .05
** p < or = .01
*** p < or = .001

Relationship Between Mother-Infant Touch and Interaction Variables

In order to assess the research question as to the relationship between touch and the dyadic interaction at 12 months, correlations were carried out between the NCATS and the Tactile Interaction Index scores.

As shown in Table 11, maternal sensitivity to child cues was significantly related to less total touch between the mother and child. In contrast, maternal response to child distress/disengagement was linked to the use of more touch, which tended to be strong touch. In other words, sensitive mothers used less touch but mothers responding to child distress/disengagement used more touch, especially of strong intensity.

As with total touch, mothers who rated higher in sensitivity to the child's cues used significantly less touch in both high and low innervation areas, as well as in all actions (except positive which did not have a significant relationship). In responding to distress/disengagement, mothers used more positive actions to low innervation areas. In other words, the more sensitive mothers used less touch, and mothers used positive actions in low innervation areas in response to infant distress/disengagement. It may be that touch to low innervation areas is used for soothing.

Mothers higher in the social-emotional growth fostering category used less light and cutaneous touch. Higher cognitive growth fostering mothers tended to use less strong, less cutaneous, and less low innervation touch, with significantly fewer vestibular actions. More contingent mothers were significantly less likely to use negative touch, and high total caregiver scores were associated with fewer negative, cutaneous and vestibular actions. Since cutaneous actions were most frequent, occurring nearly 3 times as often as vestibular and 5 times as often as proprioceptive (Table 6), this reinforces the picture of higher quality mothers (with higher NCATS scores) using less touch. Mothers rated more adept at fostering their child's cognitive growth used fewer vestibular actions (i.e. pushing, pulling, shaking). These results are summarized in Table 11.

Table 11

NCATS Caregiver and Tactile Interaction Correlations

Caregiver:	Sens	Resp	SocEmot Gro	Cogn Gro	CG Total	CG Conting
Intensity:						
Strong		.18t		-.19t		
Moderate						
Light			-.21t			
Location:						
Total	-.28*	.25*				
High innervatn	-.22t					
Low innervatn	-.25*	.23*		-.19t		
Action:						
Total	-.44***		-.20t	-.23*	-.26*	
Positive touch		.32**				
Negative touch	-.36**	-.25*		-.20t	-.28*	
Cutaneous	-.40***		-.22*	-.20t	-.24*	
Proprioceptive	-.23*					
Vestibular	-.35**			-.24*	-.25*	
t	p < or = .10					
*	p < or = .05					
**	p < or = .01					
***	p < or = .001					

Clarity of infant cues was significantly related to the total amount of touch in the interaction, as well as to positive and cutaneous actions and touch involving low innervation areas. Infant responsiveness to mother tended to be related to positive touch and to touch of high innervation areas. It may be that touch in high innervation areas serves to focus the child's attention. Higher

NCATS infant total and contingency scores were also related to more maternal touch in high innervation areas, and to more positive touch. These results are reviewed in Table 12.

Table 12

NCATS Infant Subscores, Contingency, and Tactile Interaction Correlations

	Infant: Clarity	Resp	Total	Conting
Intensity:				
Strong				
Moderate				
Light				
Location:				
Total	.26*		.20t	.19t
High innervation		.20t	.20t	.20t
Low innervation	.27*			
Action:				
Total	.25*		.20t	.20t
Positive touch	.25*	.20t	.24*	.23*
Negative touch				
Cutaneous	.28*			
Proprioceptive				
Vestibular				
t p < or = .10				
* p < or = .05				

To summarize, higher NCATS scores in the maternal sensitivity and the cognitive and social-emotional growth fostering subscales were related to less tactile interaction. However, in response to child distress/disengagement, higher maternal scores were related to more frequent and stronger touch, to significantly more positive than negative actions, and to more involvement of low innervation areas.

Higher infant scores were related to more tactile interaction. Clarity of infant cues was more significantly related to positive, cutaneous and low innervation touching. Among infants rating higher in responsiveness there was a trend to more positive touch and in high innervation areas. More contingent infants were also related to more overall touching, more positive touch and touch in high innervation areas.

Toddler Self-Concept Outcomes

Self-recognition, self-evaluation and emotional response to wrongdoing were highly correlated in this sample of 2-year-olds. Autonomy was significantly related to emotional response to wrongdoing although not to self-evaluation or self-recognition. The TBQ total score was more highly correlated with self-evaluation than with self-recognition, a slight variation from the developmental trend for this age as suggested by the authors. Table 13 summarizes the present study subscale correlations .

Table 13

Toddler Behavior Questionnaire Correlations

	Self-eval	Self-recog	Emot Resp	Auton	TBQ Totl
Self-evaluation					
Self-recognition	.58***				
Emotional Response	.42***	.43***			
Autonomy			.41***		
Todlr Behavr Qstnr Total	.92***	.72***	.70***	.37**	

** p < or = .01
*** p < or = .001

Mother-Child Interaction at 1 year and

Toddler Self-Concept at 2 Years

In order to assess the research question regarding the relationship between interactional characteristics at 12 months and toddler self-concept at 24 months, correlations were carried out between the 1 year measures (TII and NCATS) and the 2 year measure (TBQ).

Touch at 1 year with Self-Concept at 2 years

There was a trend for total touch scores to be positively related to toddler self-evaluation, self-recognition and autonomy scores. Cutaneous touch to low innervation areas tended to be related to self-recognition, autonomy and total TBQ scores.

This is interesting in light of the findings that more sensitive mothers used less touch, and that mothers used more touch in response to child distress/disengagement cues. It may be that the child who communicates distress/disengagement more clearly also differentiates self from mother at an earlier age. This could be consistent with the relationship between greater clarity of infant cues and more tactile interaction.

Table 14

TII Correlations with TBQ at 2 years

	Self-eval	Self-recog	Emot Resp	Auton	TBQ Totl
Intensity:					
Strong					
Mod					
Light					
Location:					
Total	.17t	.18t		.19t	
High innervation					
Low innervation				.19t	
Action:					
Total					
Positive Touch					
Negative Touch					
Cutaneous		.18t		.22t	.18t
Proprioceptive					
Vestibular					

t p < or = .10

Maternal-Child Interaction at 1 year with Child Self-Concept at 2 years

Interestingly, NCATS caregiver sensitivity to child cues was inversely related to toddler self-evaluation and to the total TBQ score. In contrast,

maternal responsiveness to child distress/disengagement was positively related to ratings of the child's emotional response to wrongdoing and self-regulation. There was a trend for autonomy to be related to higher scores on the caregiver social-emotional growth fostering and child clarity of cues subscales on the NCATS.

Since toddler self-description and self-evaluation are generally in place by about 30 months, the inverse relationship between maternal sensitivity and child self-evaluation could again reflect an inverse relationship between sensitivity and child development of sense of self as separate from the mother. It is interesting that higher maternal response to distress/disengagement was related to more (and stronger) tactile interaction as well as to child emotional response to wrongdoing. This may reflect the nature of distress/disengagement in the teaching situation, and the messages perceived by the child. That is, maternal perceptions of her child's success or failure could be communicated through the qualities of her touch. Results are shown in Table 15.

Table 15

NCATS Correlations with TBQ at 2 yrs

	Toddler: Self-eval	Self-recog	Emot Resp	Auton	TBQ Totl
Caregiver:					
Sensitivity	-.25*				-.20*
Responsiv			.24*		
Soc-emot Groth				.18t	
Cogn Groth					
Total					
Child:					
Clarity				.20t	
Responsv					
Total					
t p < or = .10					
* p < or = .05					

Additional Noteworthy Relationships

In coding the videotapes of mother-infant pairs, the active role of the 1-year-old child and the duration of touch seemed to contribute significantly to the quality of the interaction and potentially to child outcomes. Although duration is a TII variable, it was not included in the variable coding formulae (Appendix D) nor in the initial analysis of study results. The following explicates the role of these two variables.

Child-Initiated Touch and Duration Variables

Child-initiated action describes touch initiated by the child toward the mother. As described in the Tactile Interaction Index Coding Procedure (Appendix D), the tactile variables are each coded independently. There are not necessarily an equal number of actions, locations and intensities coded. For

necessarily an equal number of actions, locations and intensities coded. For example, the mother can lightly contact, moderately squeeze and pull the child's arm resulting in coding 3 actions, 1 location and 2 intensities.

Duration describes the total touch during each teaching situation, whether initiated by mother or by child. Child-initiated/mother refers to the proportion of child-initiated actions relative to the frequency of mother-initiated actions (i.e. child-initiated divided by mother-initiated actions). Table 16 reports the descriptive statistics for these variables.

Table 16

Child-Initiated Touch and Duration Variables: Descriptive Statistics

	Mean	Std.Dev.	Min.	Max.
Child-Initiated Actions	7.44	5.78	0	23
Total Duration	40.76 sec	36.89 sec	0	140 sec
Duration/Action	1.56 sec	1.07 sec	.00	5.55 sec
Proportion: Child-Init/Mother	.35	.27	.00	1.64

Touch, Child-Initiated Touch and Duration Variables

As seen in Table 17, child-initiated actions were significantly related to the total duration of maternal touch, and the proportion of child-initiated actions were significantly correlated with both duration categories. The child, it seems, played an active role in the tactile interaction.

Table 17

Correlations Between Child-Initiated and Duration Variables

	Child Init	Totl Duratn	Duratn Actn	Proprtn: Child/Mother
Child Initiated				
Total Duration	.43***			
Action Duration	.28*			
Proprtn: Child/Actn	.57***	.70***	.90***	

* p < or = .05

*** p < or = .001

As indicated by more initiation of touch, a larger role on the child's part was related to increased moderate intensity touch by the mother, with a trend toward more strong touch as well. Greater child-initiated actions increased the frequency of high innervation touch, and decreased the low innervation contacts (i.e. more hand or face touch rather than back or arms). These data are reviewed in Table 18.

Recall that interactions characterized by more strong and moderate touch contained significantly less light touch (Table 9). Positive touch was much less likely to occur in high innervation areas than low, and there was a trend for negative actions to be related to touch in high innervation areas (Table 9a). Infants rating higher in responsiveness to caregiver also tended to have more high innervation and positive touch, though clarity of infant cues was more strongly associated with positive touch and low innervation areas (Table 12).

To maintain a balanced picture, although mothers responding to distress/disengagement tended to use more strong touch, significantly more positive touch than negative was used (Table 11).

Table 18

Touch Related to Child-Initiated and Duration Variables

	Child Init	Totl Duratn	Duratn Actn	Proprtn: Child/Mother
Intensity:				
Strong		.21 ^t		-.28*
Mod	.24*	.34**	.30*	
Light				.32**
Location:				
Total	.54***	.83***	.32**	
Hi innervtn	.71***	.44***		
Lo innervtn	.33**	.85***	.39**	-.23*
t	p < or = .10			
*	p < or = .05			
**	p < or = .01			
***	p < or = .001			

Interestingly, the greater child's role, evidenced in more child-initiated actions, was associated with fewer total actions by the mother and significantly fewer vestibular actions. This ties in with the more sensitive mother using less touch overall, thereby allowing the child to make the contacts (which tend to be fewer given the child's developmental level). Further, it follows that the 1-year-old child would contribute less frequently to vestibular actions (i.e. lifting, pushing) and more to cutaneous actions (i.e. kisses, pats). The significant

relationship between child-initiated touch and negative, cutaneous, and proprioceptive actions in this sample may reflect maternal use of poking, pinching or holding to maintain the child's focus on the teaching task. Statistical results are included in Table 18a.

Table 18a

Tactile Actions Related to Child-Initiated and Duration Variables

	Child Init	Totl duratn	Duratn Actn	Proprtn Child/Actn
Action:				
Total	.52***	.79***	.24*	-.20t
Positive	.24*	.54***	.37**	
Negative	.36**			
Cutaneous	.58***	.73***	.23**	
Proprioctv	.43***	.50***		
Vestibular		.60***		-.36**

t p < or = .10

* p < or = .05

** p < or = .01

*** p < or = >.001

Mother-Child Interaction, Child-Initiated Touch and Duration Variables

As shown in Table 19, caregiver subscales were linked to duration in patterns similar to those found with the other touch variables. The mother more sensitive to her child's cues tends to use a lower duration touch; conversely, greater duration touch was used by mothers responding to child distress/disengagement cues.

Interestingly, caregiver contingency was related to the duration of touching actions although this subscale had not related to any previous tactile categories (Table 11).

Table 19

NCATS Caregiver Subscales Related to Child-Initiated and Duration Variables

	Child Init	Duratn Totl	Duratn Actn	Proprtn: Child/Mother
Caregiver:				
Sensitivity		-.22t		
Response		.27*	.28*	
SocEmot Gro Fostr				
Cogntv Gro Fostr				
CG Total				
CG Conting			.21t	

t p < or = .10
* p < or = .05

As shown in Table 19a, there was a greater duration of touch and more child-initiated actions among children who were more contingent and more responsive to maternal cues. Infant contingency was significantly related to other tactile subscales as well (Table 12).

Table 19a

NCATS Child Subscales Related to Child-Initiated and Duration Variables

	Child Init	Duratn Totl	Actn Duratn	Proprtn: Child/Mother
Infant:				
Clarity				
Responsv	.24*		.26*	.18t
Total	.20t	.21t	.23*	
Conting	.24*	.21*	.27*	
CG Infant Total				.20t
t p < or = .10				
* p < or = .05				

Self-Concept, Child-Initiated Touch, and Duration

Table 20 reviews the relationship between the Toddler Behavior Questionnaire, child-initiated touch and duration variables. Total duration of touch in the mother-child interaction at 1 year of age was significantly related to higher toddler scores in the self-recognition, self-evaluation and total categories.

Table 20

Child Self-Concept Related to Child-Initiated and Duration Variables

	Child Init	Duratn Totl	Actn Duratn	Proprtn: Child/Mother
Self-Evaluatn		.25*		
Self-Recogntrn		.23*		
Emotn Respns				
Autonomy		.18t		
TBQ Total		.28*		
t p < or = .10				
* p < or = .05				

CHAPTER IV

DISCUSSION

Tactile experiences are predominant in early childhood, contributing to physiological development, promoting survival, and signaling safety in relationships with caregivers. Touch also seems to contribute significantly to one's sense of physical and emotional self, although there is little research in this area. The Tactile Interaction/Self-Concept study examined the role of touch in the mother-infant relationship at 1 year of age, and the child's sense of self at 2 years.

The literature review included physiological and social aspects of touch for both primates and humans. Descriptions by Bowlby and Ainsworth of the attachment relationship, and the roles of touch and of maternal sensitivity and contingent responsiveness were reviewed. The importance of "good-enough mothering" in facilitating the child's simultaneous physical and psychological development from total dependence on the adult environment, through relative dependence, to independence was described. The infant's organization and integration of experiences of him/herself, and expectations of others, are based primarily on the relationship with the mother. Because touch involves being touched, parental caregiving reflects the parent's own experiences, including those at the preverbal stage which are largely outside of cognitive understanding.

The Tactile Interaction/Self-Concept study is based on secondary analysis of videotapes and data from Houck's longitudinal study of mother-child qualities and interactional characteristics relative to development of toddler self-esteem (Mother Toddler Project). In beginning to explicate the role of touch in the mother-child relationship, two research questions were addressed. The first question asked about the nature of the relationship between tactile interaction and the quality of the mother-child interaction at 12 months. The second question concerned the nature of the relationship between interactional characteristics at 12 months and development of self-concept at 24 months.

Sample Characteristics

The Tactile Interaction/Self-Concept sample initially included 60 mother-infant dyads. Fifty-five dyads had completed all measures at 12- and 24-months and were included in the data analysis. Primarily Caucasian, the majority of mothers were older, partnered, and had completed high school. Income represented a social risk factor, with a median gross annual income of \$15,000-17,000; half the families had received public assistance in the past year. Half of the mothers were employed outside the home and 15% of the mothers received unemployment compensation.

Although not a risk sample in terms of mental illness or substance abuse, more than a quarter of the mothers had witnessed and/or been victims of violence in their family of origin. In addition, nearly one-fifth of the sample

mothers reported experiencing spousal abuse. Twenty percent of the mothers felt their own mothers were not emotionally available to them and over one-third felt their fathers were emotionally unavailable. Further, forty percent of the mothers reported experiencing the "baby blues" and a third experienced postpartum depression; only 10% of the total sample had been treated for postpartum depression. These factors describe mothers at risk for parenting difficulties.

Measures

To assess the question whether maternal touch related to other qualities of the mother-child relationship at 12 months, videotapes of a dyadic teaching situation were coded according to both the Tactile Interaction Index (TII)(Weiss, 1992) and the Nursing Child Assessment Teaching Scale (NCATS), which reflects qualities of mother-infant participation (Sumner & Spietz, 1994).

To assess the relationship between mother-child interaction at 12 months and child self-concept at 24 months, the touch and interactional quality scores were assessed in relation to scores from the Toddler Behavior Questionnaire (TBQ), which was completed by mothers at 24 months. During data collection and analysis, the variables of duration of touch and the child's role in initiating touch seemed qualitatively significant within the interaction. These variables were additionally examined in relation to the other study variables.

Quality of Maternal Touch

This sample of mothers used positive actions almost 5 times as often as they used negative actions (i.e. hugs, kisses, pats versus pinches, pokes). Light intensity touch was used nearly 4 times as often as moderate intensity, and 8 times as often as strong intensity. Cutaneous actions (i.e. contacts, pats) occurred 5 times as often as proprioceptive actions (those involving muscle or joint movement, such as hugs, squeezes, pinches). Cutaneous actions also occurred 3 times as often as vestibular (those involving motion through space such as lifts, pulls, shakes). Touch involving low innervation areas occurred almost twice as frequently as that involving high innervation areas. In other words, more touch was directed at less sensitive areas (i.e. back, arm, leg rather than face, hand, head).

It is noteworthy that positive actions are primarily of the cutaneous type, and negative actions are composed of proprioceptive and vestibular type actions. There is less ambiguity in tactile interactions involving skin only, rather than those involving muscle and joint or full body movement. Tactile interactions of the proprioceptive and vestibular types are potentially more intrusive, as would be tactile interactions in the more sensitive high innervation areas.

Positive actions were more frequently associated with touch of low innervation areas. There was a trend for negative actions to occur more frequently in interactions where there was also more touch to high innervation areas. Strong and moderate intensity touch also occurred more frequently in

conjunction with touch to high innervation areas, and the more strong/moderate intensity touch in the interaction, the less likely light touch would also occur. Additionally, the use of moderate and strong touch was associated with a greater duration of touch.

In other words, mothers who used more strong/moderate touch did not simultaneously use more light touch. Because negative actions and the stronger intensities of touch tended to occur simultaneously with greater duration and with touch to the more sensitive locations of the child, it would seem that mothers employing this repertoire of touch were more controlling and less attuned to the child's feelings.

Maternal-Child Interactional Quality

The NCATS database has established scores below the 10th percentile as at risk: this describes nearly a third of the mothers and none of the infants in this sample. Only 5.5% of the dyadic scores were in the high risk category, however, possibly reflecting child compensation for maternal factors.

Consistent with the NCATS as a teaching scale, the cognitive growth fostering subscale was most highly correlated with the caregiver total score. Maternal sensitivity was significantly related to all other maternal interactional characteristics assessed by the NCATS, as was maternal response to child distress/disengagement (though at lower magnitude correlations). Further,

maternal response to child distress/disengagement was related to infant clarity and infant responsiveness to mother, but maternal sensitivity was not.

It may be that more sensitive mothers are able to attune and respond to their child's subtle cues, thereby obviating the need for more potent disengagement/distress cues from the child. It may further be that in dyads with mothers who do not notice the subtle cues, there is a demand for infants to develop greater clarity of cues and responsiveness to the mother. This could be another manifestation of infant compensation for maternal factors.

Further, the pattern of more sensitive mothers using less touch was reflected in a trend to also use a shorter duration of touch. Expectedly, mothers rating higher in response to child distress/disengagement cues had a greater duration of touch. Another consideration might be that more touch frustrated or interfered with child goals, resulting in more child distress/disengagement cues.

Relationship Between Maternal Touch and Mother-Child Interaction

Except for positive touch, the more sensitive the mother was to her child, the less likely she was to use touch in the teaching interaction. It may be that sensitive mothers recognize and respect their child's fledgling efforts to separate from them. It is also possible that more sensitive mothers are able to communicate with their child symbolically, using verbal and nonverbal signals rather than physical contact.

Mothers responded to child distress/disengagement with significantly more positive and fewer negative actions, involving low innervation areas. There was also a trend to use strong touch. This is in contrast to the previous finding of strong touch occurring in conjunction with negative actions and touch to the child's more sensitive areas. The present results indicate mothers rated high in responding to distress/disengagement use strong positive actions involving less sensitive areas of the child. It may be that mothers rated poorly in their response to child distress/disengagement account for the findings of strong negative actions involving the child's more sensitive areas.

Mothers with high scores in the cognitive growth fostering subscale also used less touch. Their profile included less strong intensity, less involvement with low innervation areas, fewer cutaneous and even fewer vestibular actions. This may indicate a mother who contributed to the child's focus on the task of stacking blocks by avoiding tactile distractions, perhaps helping the child with coordinating hand actions.

Infant clarity of cues was significantly related to the amount of touch in the interaction, with greater clarity related to more positive and cutaneous actions, and touch of low innervation areas. Child responsiveness to caregiver tended to be related to more positive touch and high innervation areas. It may be that clear infant cues result in positive cutaneous low innervation maternal touch, and that mothers elicit child response by positive touch involving more highly innervated areas.

Maternal-Child Interactional Quality and Child Self-Concept

Weak trends among the touch subscales and self-concept categories indicated that more overall touch and cutaneous actions were related to self-evaluation, self-recognition, and autonomy. Interestingly, higher maternal sensitivity, related to significantly less touch, was also related to lower self-evaluation and total self-concept scores. In other words, children who received more touch during the interaction at 1 year, especially the lighter cutaneous type touch, tended to have a more developed sense of self at 2 years. This is contrary to what might be expected, i.e. that children of more sensitive mothers would have a more developed sense of self. Perhaps this reflects a delay in toddler differentiation of self when the mother is more attuned to him/her. It may be that the compensation for a less sensitive mother is the infant's earlier recognition of self as separate from the mother. Whether this is positive or negative would be the subject of another study.

Role of Child-Initiated Actions

With a larger child role in the interaction, there was more moderate intensity touch and greater involvement of high innervation areas. Interestingly, the larger child role corresponded to both more positive and negative touch, but especially more negative touch. Actions were of the cutaneous and proprioceptive types, rather than vestibular. Further, when the proportion of child-initiated actions was greater than mother-initiated, strong intensity was

child-initiated actions was greater than mother-initiated, strong intensity was used less and light intensity more. Low innervation areas were also touched less often, and there were significantly fewer vestibular actions.

It would appear there were two patterns of greater child involvement. The first describes mothers responding to a greater child role with the use of moderate intensity touch, negative actions and more high innervation touch. Such mothers were more focused on task accomplishment, attempting to control child participation with a hands-on approach. The second pattern describes dyads with more sensitive mothers who used less touch altogether, allowing the infant to initiate the contacts. Thus, there was significantly less strong intensity and even more light intensity touch, less involvement of low innervation areas and less vestibular action. In other words the child-initiated touch was light, involving hands, and tactile interaction did not include the mothers moving the child around.

Children more contingent and responsive to maternal cues also initiated more actions. It may be that these children used touch to communicate what they had not yet developed words for.

Limitations and Recommendations

Generalization from this study was limited by the characteristics of the sample: primarily Caucasian, English speaking, lower socio-economic

and older mothers with healthy infants. As noted in the literature review, the range of acceptable touch experiences varies significantly with culture.

There were additional limitations with the measures used in this study. The Tactile Interaction Index has not been employed extensively and, although reviewed by the principal investigator, this researcher's TII interrater reliability had not been established. Further, the scoring of touch was based on one brief interaction, which may not be representative of overall maternal-child relational characteristics. Although touch was considered a patterned interactional characteristic -- occurring repeatedly across interactions -- further study of maternal touch in several interactional settings for the same dyads is needed.

Although the NCATS has a significant database and the study observers were certified reliable, bias cannot be absolutely ruled out. Additionally, the Toddler Behavior Questionnaire is a maternal report questionnaire, subject to bias and social desirability (Polit & Hungler, 1991). Thus, an observational measure or some other independent measure could strengthen assessment of this outcome variable.

Despite the limited generalizability of the study findings, results indicated that tactile experiences play a quantifiable role in mother-child interactions and are involved in child development of a sense of self.

Implications

The results of this study suggest descriptive parameters for assessing the tactile interaction between mother and child as the infant transitions into toddlerhood. Qualities of maternal touch include the following variations:

- (1) frequency and duration, ranging from absent to continuous;
- (2) intensity, ranging from light to moderate and strong;
- (3) location, whether involving the child's most or least sensitive areas;
- (4) qualitative perception of action, whether positive or negative;
- (5) extent of action, whether involving only the surface of the skin, the deeper layers of muscles and joints, or the entire body.

Qualities of dyadic touch include the interactional aspects of initiation and response. At this developmental stage the child's verbal skills, particularly the expressive ones, are rudimentary. The tone of the interaction, physically and verbally, is largely determined by the mother's perceptions and support of her child's individuality. Although not addressed in the present study, temperament of both mother and child would seem to play a role in tactile interaction, with particular attention to the affective component's contribution.

Thus, very different sets of circumstances could contribute to the extent of child-initiated touch. One combination could be the child who feels safe and supported in expressing him/herself and therefore takes an active role in the tactile interaction. Another could be the child who takes an active role in moving away from the mother's limits/physical interference with his/her mobility.

Further, the self-absorbed mother may not initiate or respond to infant bids for touch. The mother sensitive to her child's developmental level may gauge her touch relative to her infant's expressions of need/desire for contact. The mother less sensitive to her child's developmental need to begin attempting separation may physically interfere with the child's efforts. The mother who is concrete, functioning at the more physically apparent than at the mentally symbolic level, may tend to recognize only blatant signals from her child and respond to them on a physical level. The mother who does not recognize the child as separate from her may seek to control the child's attention and movement. The mother who cannot separate her child's characteristics from those of other significant people in her world experience may physically control the child with an intensity resulting from the feelings aroused in her. For example, she may perceive her child as trying to make her look dumb and unable to teach a child a simple task, and react physically to this frustration.

More specific guidelines for assessing the quality of mother-infant tactile interaction could contribute to clinician recognition of nonverbal cues and earlier detection of relationships at risk for parenting difficulties and poor child outcomes. With "good-enough mothering" the child experiences a range of tactile interactions which contribute to positive child growth and adaptation. Optimal touch could be considered that which most closely matches the child's needs for safety, nurturance and support of his/her development as a unique individual. Tactile experiences which interfere with these adaptive areas disrupt

the child's ability to organize and give positive meaning to the world and his/her role as a "self" within that world.

Summary

The review of the literature suggests the wide range of influence of touch on human development, including survival, physiological, social and psychological aspects. Early experiences form a foundation for later development, and can contribute to competencies or to maladaptation (Cicchetti, 1987). Touch plays a predominant role among early preverbal experiences, and one that is largely outside cognitive awareness. Thus the affective component associated with tactile experiences is often difficult to explain with words. Because one cannot touch without being touched, the significant role of touch in parenting an infant can trigger unexpected feelings and behaviors.

Despite socioeconomic risk factors for parenting difficulties, tactile interactions among this sample involved significantly more light and positive actions than moderate or strong intensity and negative actions. The fact that low innervation areas were touched more than twice as frequently as high innervation might indicate maternal respect for the child's increased sensitivity in these areas.

Of note, mothers rated more sensitive to child cues and higher in social-emotional and cognitive growth fostering tended to use significantly less touch in interactions with their 1-year-old. Mothers rating high in the response to child

distress/disengagement category tended to use strong intensity and positive actions involving low innervation areas. Consistent with this, greater clarity of infant cues to the mother also resulted in positive actions involving low innervation areas. These results could point to a soothing role for touch in low innervation areas. The more responsive the infant to the mother, the more positive touch in high innervation areas. Accordingly, touch of high innervation areas may serve to focus child attention, with mothers using positive touch in more sensitive areas to get clearer responses from their infants.

It is interesting that maternal sensitivity, significantly associated with less touch in the mother-infant interaction, was also related to lower self-evaluation and total self-concept scores. This may indicate that children of more sensitive mothers differentiate self from mother more slowly. Another consideration is that sensitive mothers give more realistic representations of their infants.

Weak trends indicated a positive relationship between more maternal touch (especially cutaneous actions) in the one year interaction and the self-evaluation, self-recognition, and autonomy components of self-concept at two years. A greater duration of touch in the one year mother-child interaction was also related to higher self-recognition, self-evaluation and total scores. Since there was a link between maternal response to child distress/disengagement cues and the amount of touch in the interaction, it may be that mothers who do not recognize and respond to subtle child cues use more touch. It may also be that children who experience touch as interfering with their ability to move

independent of the mother exhibit more distress/disengagement cues. At any rate, perhaps these children have been challenged to separate self from mother more distinctly and this contributed to their higher self-concept scores.

At one year of age, children are able to begin playing a larger role in their interactions with others. In this sample there appeared to be two patterns reflecting greater child involvement. Mothers who were more sensitive used less touch, allowing the infant to initiate tactile interactions. Mothers who were more focused on the task tended to respond to infant attempts or disengagement cues with more physical control.

Despite the limitations of the sample, the results of this study suggest a role for tactile interaction observations in the behavioral assessment of mother-infant dyads during the transition to toddlerhood. Recognition of tactile patterns that may indicate parenting difficulties or suggest less-than-optimal relational development could contribute to effective clinical interventions with the preverbal child.

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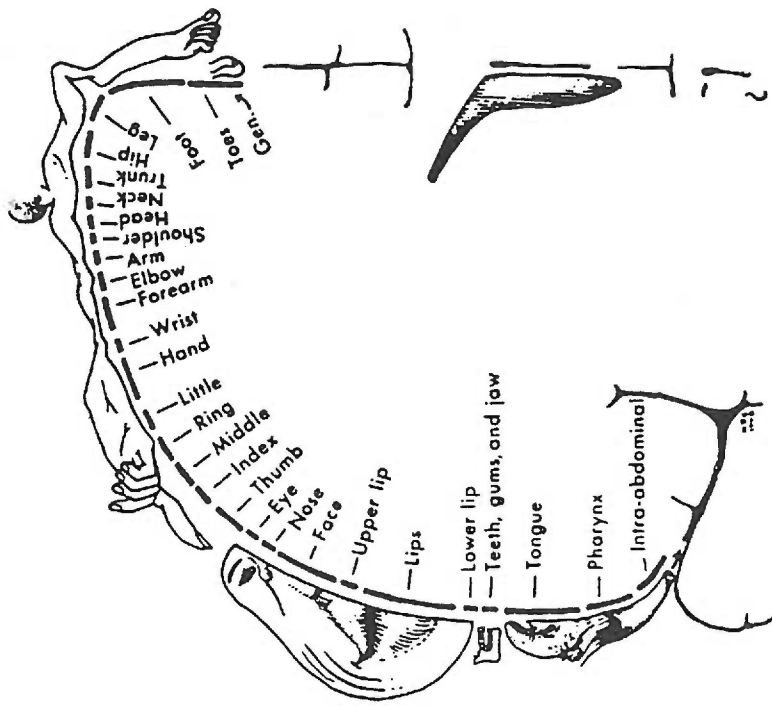
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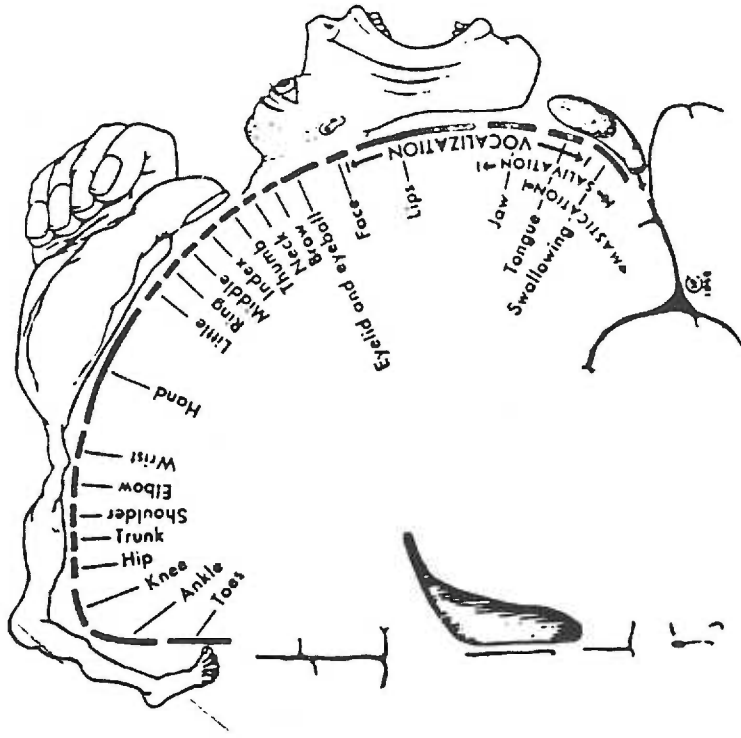
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Appendix A
Sensory Homunculus

THE MIND OF THE SKIN



THE MIND OF THE SKIN



(Montagu, 1971, pp. 8-9)

Appendix B

Background Information, 8 and 12 months

BACKGROUND INFORMATION
8 Month Assessment

Child's First Name: _____

Age: _____

Date of Birth: _____

- 1. Sex
 - 0 Male
 - 1 Female

I. MEDICAL/DEVELOPMENTAL

A. Pregnancy

- 2. Is this child...
(please circle appropriate response)
 - 1 Natural
 - 2 Adopted
 - 3 Foster Child
 - 4 Your stepchild

- 3. If other than your natural child, at what age did he/she come into your home?

- 4. Did mother have any illnesses or complications while carrying this child?
0 No
1 Yes (if Yes, please specify)

- 5. Did mother take any medications or drugs during pregnancy?
0 No
1 Yes (if Yes, please specify)

- 6. Was baby full-term (9 months) or premature?
1 Full-term
2 Premature

7. Was there anything unusual about the delivery of this child?

- 0 No
- 1 Yes (if Yes, please describe what occurred)

8. Indicate which child this is for you (mother) (number):

B. Postpartum

- 1. Were there any difficulties during baby's first few months at home?
0 No
1 Yes (if Yes, please describe what occurred)

- 2. Did you experience baby blues?
0 No
1 Yes

- 3. Did you experience postpartum depression?
0 No
1 Yes

- 4. Were you treated for postpartum depression?
0 No
1 Yes

C. Who cares for the child the most?

II. FAMILY BACKGROUND

Mother's (your) age _____
Father's age _____

A. Marital Status (Mother)

- 1 Never married
- 2 Currently married
- 3 Currently separated
- 4 Divorced
- 5 Widowed
- 6 Common law marriage/living together

Previous marriage(s) (use 0 for none): _____ times

How long was past marriage? _____ year(s)

Number of children from previous marriage: _____

Does your child have contact with any non-custodial parents?
Yes _____ No _____

B. Education of (please check one of the following):

- _____ Biological mother
- _____ Stepmother
- _____ Adoptive mother

(Circle highest level or last grade completed)

Grade School: 1 2 3 4 5 6 7 8

High School: 9 10 11 12

College: 13 14 15 16

Postgraduate: Specify _____

Business or trade school: Specify _____

Education of (please check one of the following):

- _____ Biological father
- _____ Stepfather
- _____ Adoptive father

(Circle highest level or last grade completed)

Grade School: 1 2 3 4 5 6 7 8

High School: 9 10 11 12

College: 13 14 15 16

Postgraduate: Specify _____

Business or trade school: Specify _____

C. Is father currently employed? 1 Yes 0 No

Percentage of time: _____ %

Are you (mother) currently employed? _____ Yes _____ No

Percentage of time: _____ %

What type of work do you do? Please check those that apply.
m=mother f=father

An employee of a **private** company, business, or individual for wages, salary or commissions?

_____ m _____ f

A **government** employee (federal, state, county or local government)?

_____ m _____ f

Self employed in **own** business, professional practice, or farm?

_____ m _____ f

Working without pay in a family business or farm?

_____ m _____ f

In the past year have you received unemployment compensation or insurance?

1 Yes 0 No

In the past year have you received direct public assistance?

1 Yes 0 No

D. Gross Annual Income (Please check one of the following):

- | | |
|-------------------|------------------|
| 1 less than 5,000 | 8 24,000-26,999 |
| 2 5,000- 8,999 | 9 27,000-29,999 |
| 3 9,000-11,999 | 10 30,000-32,999 |
| 4 12,000-14,999 | 11 33,000-35,999 |
| 5 15,000-17,999 | 12 36,000-38,999 |
| 6 18,000-20,999 | 13 39,999-41,999 |
| 7 21,000-23,999 | 14 42,000+ |

E. Ethnic background of:

Mother (you) _____

Father _____

F. How many children do you have?
(Please indicate number)

What is the age and sex of each child, starting with your oldest child? (If not applicable, enter "2")

	Age	Gender:	
		(Please circle one)	
		Boy	Girl
First Child	_____	0	1
Second Child	_____	0	1
Third Child	_____	0	1
Fourth Child	_____	0	1
Fifth Child	_____	0	1
Sixth Child	_____	0	1
Seventh Child	_____	0	1

G. Do you have any concerns regarding the social or emotional development of your child?
1 Yes 0 No (If yes, please explain):

H. How many persons, including yourself and your children, currently live in your home?

_____ (number)

I. How many people, including you (and your spouse), depend on you (and your spouse) for money?

_____ (number)

J. How many different homes (houses, apartments, trailers, etc.) have you lived in during the past year?

_____ (number of homes)

During the past five years?

_____ (number of homes)

K. Is there a history of alcohol or drug abuse, mental illness, or criminal activity in your family?

	Alcohol	Drug	Mental Illness	Jail	Other
Child's Mother	___	___	___	___	___
Child's Father	___	___	___	___	___
Current Partner	___	___	___	___	___
Mother's Parents	___	___	___	___	___
Father's Parents	___	___	___	___	___

L. When you were a child, did you ever witness your parents physically abusing each other? (Please circle one of the following):

0 Never/rarely 1 Sometimes 2 Often

M. Did your parents abuse you when you were a child?

0 Never/rarely 1 Sometimes 2 Often

N. Do you think your mother was supportive and understanding?

0 Never/rarely 1 Sometimes 2 Often

O. Do you think your father was supportive and understanding?

0 Never/rarely 1 Sometimes 2 Often

P. Have you ever experienced spouse abuse yourself?

0 Never/rarely 1 Sometimes 2 Often

Q. Have you ever been reported for child abuse (or have you ever abused your child?) When?

1 Yes 0 No _____

R. Are you currently involved with CSD?

1 Yes 0 No

BACKGROUND INFORMATION**12 Month Update**

Child's First Name _____
 Age _____
 Date of Birth _____

I. MEDICAL DEVELOPMENTAL**A. Child health**

1. Did your child have any illnesses in the past 4 months?

0 No

1 Yes (if yes, please specify)

2. Were any chronic or unusual medical problems diagnosed in the past 4 months?

0 No

1 Yes (if yes, please specify)

3. Did your child experience any injuries in the past 4 months?

0 No

1 Yes (if yes, please specify)

4. Has your child been prescribed any long-term medications in the past 4 months?

0 No

1 Yes (if yes, please specify)

B. Growth and Development

1. Were there any difficulties with your child's behavior in the past 4 months?

0 No

1 Yes (if yes, please specify)

2. Do you have any concerns about your child's physical development at this time?

0 No

1 Yes (if yes, please specify)

3. Is your child in daycare?

0 No

1 Yes (if yes, please specify)

4. Who cares for the child the most (at home)?

5. Do you have any concerns about your child's social or emotional development at this time?

0 No

1 Yes (if yes, please specify)

II. FAMILY BACKGROUND

A. Have there been any changes in your marital status in the past 4 months?

0 No

1 Increased marital conflict (arguments, fights)

2 Separated

3 Divorced

4 Widowed

5 Reunited

6 Common law marriage/living together

7 Married

B. Has your child's contact with any non-custodial parent(s) changed in the past 4 months?

0 No

1 Yes (if yes, please specify)

9 Not applicable

Subject # _____

C. Have there been any changes in the employment status of:

1. Mother?
 - 0 No
 - 1 Yes, now employed
 - 2 Yes, now unemployed
 - 3 Yes, increase to full-time
 - 4 Yes, decrease to part-time

2. Father/partner?
 - 0 No
 - 1 Yes, now employed
 - 2 Yes, now unemployed
 - 3 Yes, increase to full-time
 - 4 Yes, decrease to part-time

3. Have you changed the type of work you do in the past 4 months?
 - 0 No
 - 1 Yes (if yes, please specify)

4. Has your partner changed the type of work he does in the past 4 months?
 - 0 No
 - 1 Yes (if yes, please specify)

5. In the past 4 months have you received unemployment compensation or insurance?
 - 0 No
 - 1 Yes

6. In the past 4 months have you received direct public assistance?
 - 0 No
 - 1 Yes

7. Has your income changed in the past 4 months?
 - 0 No
 - 1 Yes, increased
 - 2 Yes, decreased

8. Has the number of persons living in your home changed in the past 4 months?
 - 0 No
 - 1 Yes, increased
 - 2 Yes, decreased

9. Have you moved in the past 4 months?
 - 0 No
 - 1 Yes

10. Please describe any stresses or changes in your family life in the past 4 months:

Appendix C
Tactile Interaction Index,
Coding and Scoring Procedures

GROWTH AND DEVELOPMENT OF LOW BIRTH WEIGHT BABIES
Center for Family Health Studies
UCSF School of Nursing

Weiss Tactile Interaction Index
CODING PROCEDURE

With the TII, 4 qualities of touch are coded:

Location	part of body being touched
Action	specific gesture used by the parent
Intensity	degree of pressure put on the skin
Duration	length of time for the touch

For each baby in the study, we have 4 five minute videotape segments analyzed using the TII:

- 2 segments, feeding and play, taped when the baby was 3 months
- 2 segments, feeding and play, taped when the baby was 6 months

We are coding the 3 month segments first.

I. Coding procedure:

1. Watch the segment without coding, at regular speed and with sound, if desired.
2. Watch the segment 3 additional times, each time coding 1 quality of touch.

EXPLANATION: At this point, do not code the segments for Duration. We will have separate training sessions for Duration. Therefore, code for Action, Intensity, and Location.

3. While coding, do not vary the speed of the tape and do not stop the tape. You may, however, use the "pause" function as necessary.

EXPLANATION: If you press stop on the VCR remote control, the VCR rewinds the tape slightly. Therefore, when you start the tape again, you would see that portion of the tape twice, and would code that portion of the interaction twice.

Using the "pause" button does not rewind the tape.

4. Speak clearly into the dictaphone. The audiotape you are creating has to be transcribed. Make certain that the dictaphone is turned on (check the tiny button on the bottom of the machine). Record at 12 Speed.

II. Introduction of each Five Minute Segment:

At the beginning of the coding session for each Five Minute Segment, begin the recording on the audiotape with the following information:

1. Subject number
2. Date of coding session
3. RA name
4. Whether a 3 month or a 6 month segment
5. Whether a feeding or a game segment
6. Identify the specific TII index (Location, Action, or Intensity). Then, as you code the other indexes, specify the index name.

EXAMPLE: You begin coding with Location; state "Location," and code for location. You are then ready to code for Intensity, state "Intensity," and proceed to code for Intensity. Then, state "Action" and code for Action.

III. Order of Coding

As you code the Five Minute Segments, please vary the order of coding the indexes in the following way:

First segment	Action	Intensity	Location	
Second segment		Intensity	Location	Action
Third segment	Location	Action	Intensity	
Fourth segment	Intensity	Action	Location	
Fifth segment	Action	Location	Intensity	
Sixth segment	Location	Intensity	Action	

IV. Specific points to remember when coding each index

Defining a touch

1. If the mother touches the baby with an indirect object, such as a bottle or blanket, this does not count as a touch.
2. If the mother touches the baby **through a blanket**, or **through clothing**, these touches should be coded.

A. Location Index

1. Code a new Location each time the area of the body being touched changes.
2. Remember that Location can change **without** a cessation of contact, and a new Location will be named when this happens.
3. If there is a break in contact, with a new initiation of contact or new touch, the Location should be named, even if the same Location is touched again.
4. If two or more body parts are touched simultaneously, **all** parts need to be named.
5. With continuous contact, **all body parts** in contact should be stated.
6. **Torso** includes:
 - on body front, neck to groin
 - on body back, neck to buttocks

B. Action Index

1. Code a new Action each time the action changes.
2. Assume that a Lift includes a Hold.
3. If the body part is moved in space without lifting first, Hold is coded.
4. If two or more actions take place simultaneously (such as stroke with one hand and hold with the other), both actions should be coded.

C. Intensity Index

1. If you are wondering whether to code **Strong** or **Moderate**, code **Strong**; choosing between **Light** and **Moderate**, code **Light**.
2. Code a new Intensity each time the intensity changes. The Intensity can change within a single contact.
3. Code the Intensity for each initiation of contact.

If you make a mistake, for example, naming an incorrect body part:

Pause the videotape.

Say "Delete one head. Replace with one face".

Continue the videotape and the coding.

Do not stop the dictaphone.

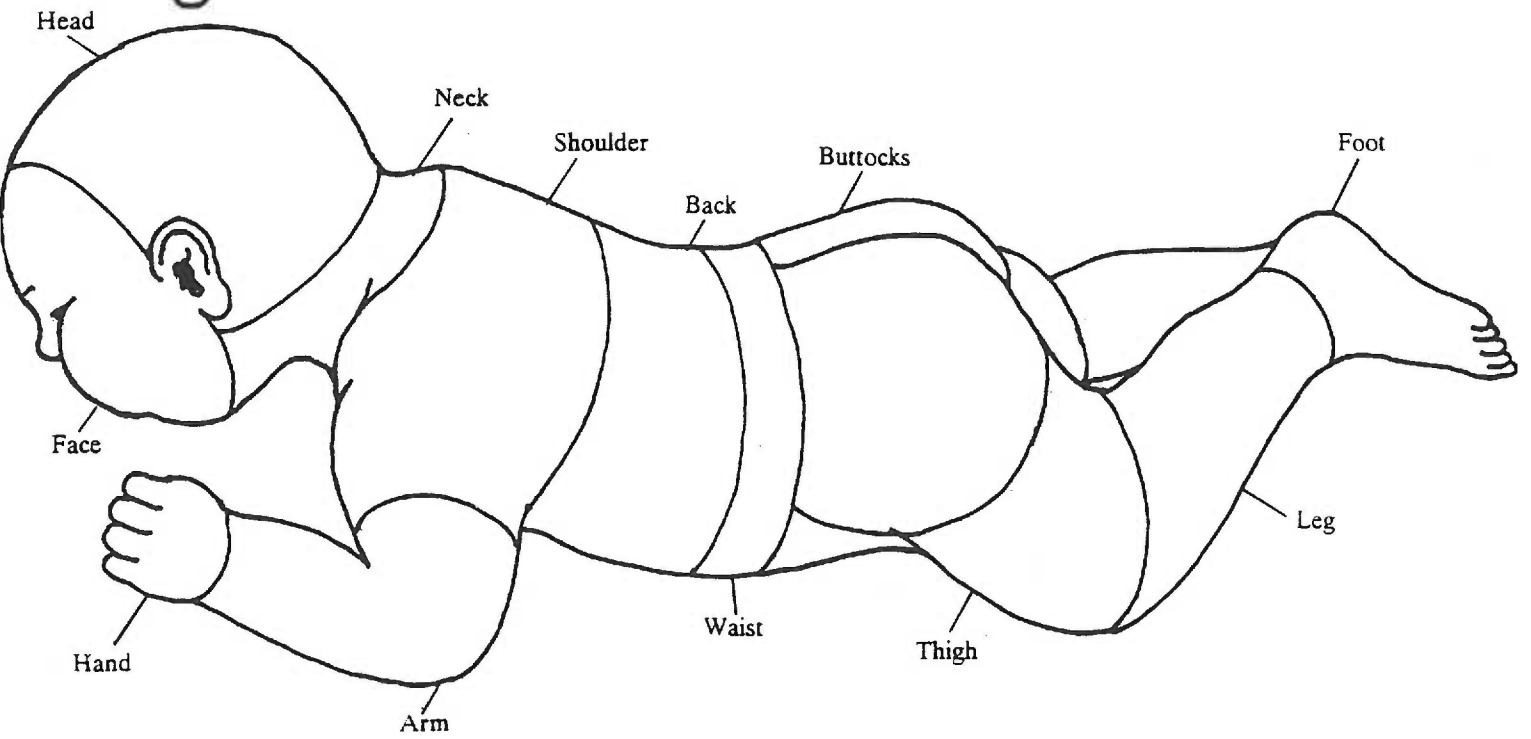
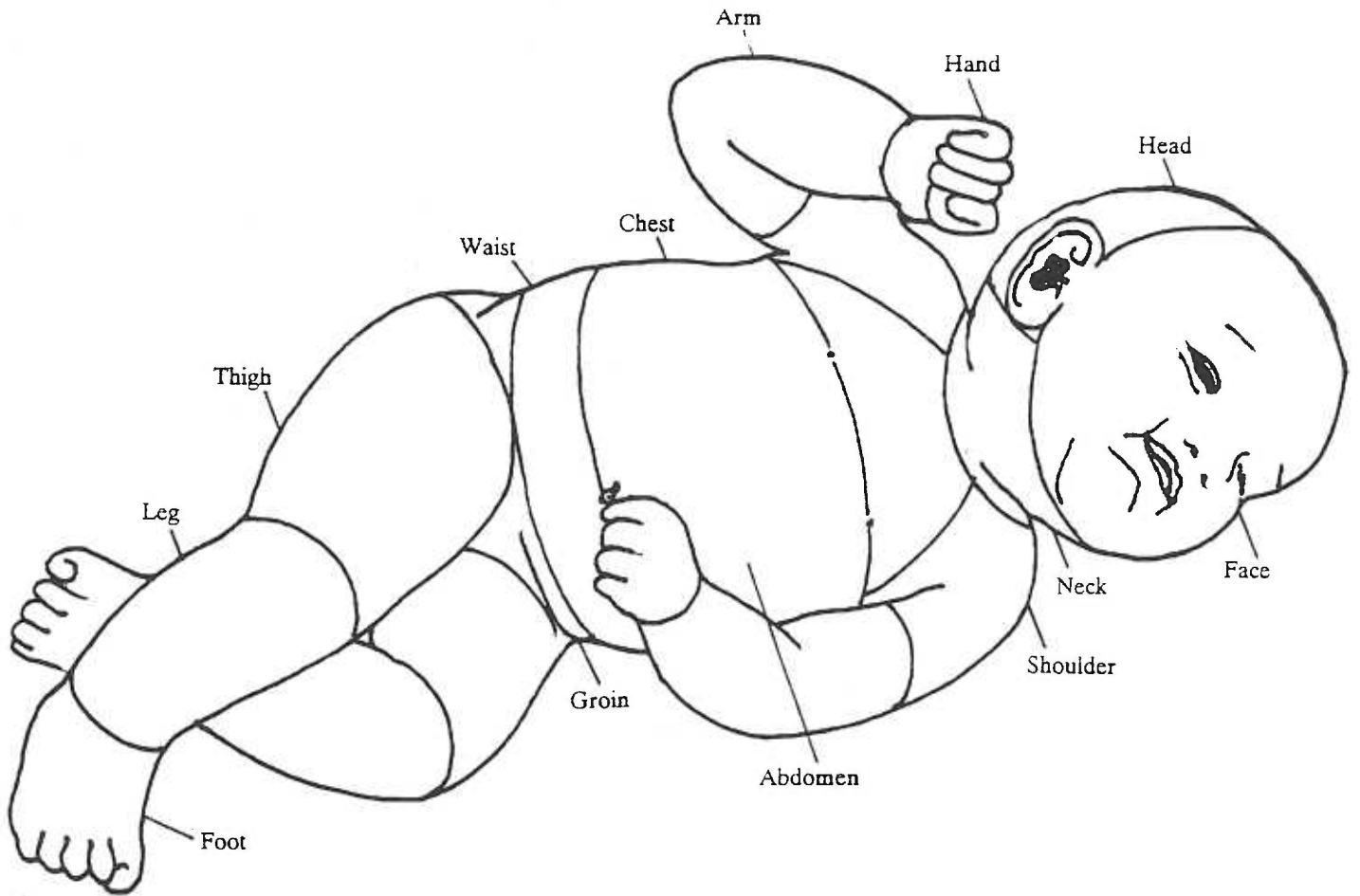
REMEMBER:

1. For each Five Minute Segment, you will code each quality of touch **once**.
2. Do not "SCRAP" a coding session because you feel that the coding was not quite right. Previous validity and reliability testing has shown that coders' best judgments are indeed very good.

TII ACTION INDEX

contact	connection, no motion
hold	support
hug	encircle
lift	raise
shake	rapid jerks
rub	one way, back & forth
stroke	caress, one way
massage	knead, in circle
press	steady force
squeeze	pressure, fr. 2 sides
pinch	compress small area
pull	force, toward self
push	force, away fr. self
pick	pluck
poke	jab with finger
scratch	scrape w. nails
tickle	rub, scratch rapidly
bite	with teeth
kiss	caress w. lips
lick	with tongue
suck	into mouth
pat	tap w. fingers, palm
slap	strike, open hand
hit	forcible blow, w. fist
kick	with foot

III
Location Index



GROWTH AND DEVELOPMENT OF LOW BIRTH WEIGHT BABIES
Center for Family Health Studies
UCSF School of Nursing

Wells Tactile Interaction Index
FORMULAE FOR TII VARIABLES

Intensity

1. Frequency for Intensity (Freq-Int) = strong + moderate + light
2. Strong % = Strong / Freq-Int
3. Moderate % = Moderate / Freq-Int
4. Light % = Light / Freq-Int

Location

1. Frequency of touch (Freq) = arm + abdomen + back + buttocks + chest + face + foot + groin + hand + head + leg + neck + shoulder + thigh + torso + waist

Obtain the percentage of touch using each Location. Divide the number of occurrences of each location by Freq.

2. Limb freq = Arm + Hand + Leg + Foot
3. Limb % = Limb freq / Freq
4. Trunk freq = Freq - Limb freq
5. Trunk % = Trunk freq / Freq
6. Areas of high innervation freq = face + foot + groin + hand + head + neck
7. High innervation % = high innervation freq / freq
8. Areas of low innervation freq = arm + abdomen + back + buttocks + chest + leg + shoulder + thigh + torso + waist
9. Low innervation % = Low innervation freq / freq

Action

1. Freq-act = contact + bite + hit + hold + hug + kick + kiss + lick + lift + massage + pat + pick + pinch + poke + press + pull + push + rub + scratch + shake + slap + squeeze + stroke + suck + tap + tickle

Obtain the percentage of touch using each action. Divide the number of occurrences of each action by Freq-act.

2. Positive action % = (hug + kiss + pat + stroke + tickle) / freq-act
3. Negative action % = (bite + pinch + poke + slap + hit + kick) / freq-act
4. Cutaneous action % = (contact + hold + kiss + lick + pat + pick + stroke + tap) / freq-act
5. Proprioceptive action % = (bite + hug + massage + pinch + poke + press + rub + scratch + slap + squeeze + suck + tickle) / freq-act
6. Vestibular action % = (kick + lift + hit + pull + push + shake) / freq-act

Appendix D

Nursing Child Assessment Teaching Scale

Appendix E
Toddler Behavior Questionnaire

TODDLER BEHAVIOR QUESTIONNAIRE

24 months

Self-Description and Evaluation

Does Your child...	No	Sort of	Yes
1. Ever use general evaluative terms about himself/herself (e.g., "I'm a good girl" or "Susie's pretty")?	0	1	2
2. Ever resist your help by saying "do it myself," "Cindy do it," or the equivalent?	0	1	2
3. Ever use general evaluative terms when talking about someone else (e.g., "bad dog," "Johnny's bad or mean")?	0	1	2
4. Ever say "I can't"?	0	1	2
5. Ever use descriptive terms that contain some evaluation (e.g., "sticky hands," point to toys and say "dirty" or "broken")?	0	1	2
6. Ever use his/her own name (e.g., "Give it to Andrew," or "Andrew's truck")?	0	1	2
7. Ever insist on wearing certain clothing?	0	1	2
8. Use the word "me"?	0	1	2
9. Use the word "mine"?	0	1	2
10. Know whether he/she is a girl or boy?	0	1	2
11. Use the word "I"?	0	1	2
12. Describe himself/herself by physical characteristics (e.g., curly hair)?	0	1	2

Self-Recognition

Does your child...	No	Sort of	Yes
13. Recognize himself/herself in the mirror (identify himself/herself by name; point to mirror when you say "where is ____?")?	0	1	2
14. Ever call attention to something about himself/herself, like hair or clothing?	0	1	2
15. Communicate likes and dislikes verbally?	0	1	2
16. Recognize himself/herself in pictures?	0	1	2
17. Ever call attention to something she/he did (e.g., "Look what I did" or by gesture-showing you something she/he did)?	0	1	2

Emotional Response to Wrongdoing and Self-Regulation

Does your child...	No	Sort of	Yes
18. Does your child ever seem upset when calling your attention to something he/she has done wrong?	0	1	2
19. Does your child ever seem upset (ashamed, remorseful) when you find him/her doing something he/she shouldn't do and you show your disapproval?	0	1	2
20. Has he/she ever tried to hide the evidence of something he/she did that he/she wasn't supposed to do?	0	1	2
21. Has he/she ever called your attention to something he/she did that he/she wasn't supposed to do (e.g., pulled the TV knob off)?	0	1	2
22. Has your child ever inhibited himself/herself from doing something he/she obviously wanted to do because you were watching?	0	1	2

Autonomy

Does you child...	No	Sort of	Yes
23. Ever assert his/her own will contrary to yours, just for the sake of being contrary?	0	1	2
24. Ever resist physical intervention (e.g., diapering, dressing, kissing, picking up)?	0	1	2
25. Ever resist your help by pushing your hand away or saying "no"?	0	1	2