

Coding Scales Used for Mother-Infant Research

Appendix A. Coding of Ordinalized Behavioral Scales

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Appendix A

Coding of Ordinalized Behavioral Scales

		<u>Modality</u>		<u>Definition</u>	
Mother Facial Affect^a		<i>Mouth widen (MW)</i>	<i>Mouth open (MO)</i>	<i>Other</i>	
90	mock surprise	MW 0 (1)	MO 3 (4)	eye brows raised	
85	smile 3	MW 2	MO 3 (4)		
80	smile 2	MW 2	MO 2		
70	smile 1	MW 1	MO1 (2)		
67	oh face	} Interest MW 0	MO 2		
60	positive attention		MW 0	MO 1 (0)	[kiss/ purse]
			MW 1	MO 0	
50	neutral	MW 0	MO 0		
45	2 = woe face			empathic pout	
40	1 = negative face	grimace and/or compressed lips		and/or frown	
Infant Facial Affect^b		<i>MW</i>	<i>MO</i>	<i>Other</i>	
5	medium high/high positive	2	3 (4)		
4	low/medium positive	1	1 (2)		
3	interest/neutral	0 (1)	0		
2	mild negative	Grimace	0 (1)	[and/or frown]	
1	negative	squared anger mouth/pre-cry/cry-face (partial/full display)	2 (3)	[and/or frown]	

Appendix A, continued

	<u>Modality</u>	<u>Definition</u>
Infant Vocal Affect^c		
6	high positive	rising intonations, peals, laughter
5	neutral/positive	includes gurgles, coos, neutral sounds
4	None	
3	fuss/whimper	
2	angry protest	distinct angry quality
1	Cry	full-blown cry
<i>For data analysis, codes were combined:</i>		
4	positive/neutral	
3	None	
2	fuss/whimper	
1	angry protest/cry	
Mother Spatial Orientation^f		
3	upright	torso/shoulders perpendicular to floor
2	forward	torso bent 45 degrees, minimum 12 inches from infant's face
1	loom	torso bent 80 degrees, within 12 inches of infant's face
M/I Gaze		
	1 = on partner's face	
	0 = off partner's face	
Infant Head Orientation^d		Infant Touch^e
6	en face	0 None
5	enface/head down	1 touch/suck own skin
4	30-60 degree minor avert	2 touch/suck own clothing, strap, chair
3	30-60 avert + head down	3 touch/suck mother's skin, clothing
2	60-90 degree major avert	<i>For data analysis, codes were ordinalized:</i>
1	Arch	3 more than one code within one sec
		2 any one code
		1 None

Note. Codes within each modality coding scheme are mutually exclusive. Coding rules for multiple codes within the same sec follow Tronick and Weinberg (1990). If two codes occur in the same sec, the code occurring in the first half of the sec is attached to that sec; the code occurring in the second half of the sec is attached to the following sec. For vocalization, this coding rule was adapted as follows: if two vocalizations occur in the same sec, code the most intense one; if they are of equal intensity, code the second one. Vocalizations are scored in the sec they occur even if they occur in the second half of the sec (consistent with Weinberg & Tronick, 1990).

Dyadic Mother “Chase”- Infant “Dodge”^f: Coding Rules

- 1) The infant may initiate the chase and dodge sequence with a “dodge” that consists of at least a 30-degree lateral head aversion from the vis-à-vis orientation with the mother.
- 2) A maternal “chase” requires that mother is already in a forward or loom spatial orientation, and that she alters the position of her head or body in the direction of the infant’s head aversion. The mother must begin chasing within 1 sec of the infant’s head aversion.
- 3) If more than 1 sec elapses between the infant’s head aversion and the mother’s movement, then the chase and dodge sequence is said to be initiated by the mother’s movement.
- 4) Chase and dodge movement focuses only on lateral movement. This refers to movement away from the vis-à-vis position toward the side from which the infant has just moved.
- 5) Chase and dodge is present as long as movement by at least one partner continues within 2 secs (e.g. the infant turns his head from side to side). Even if the infant’s head is averted or the mother is in a “chasing” position, chase and dodge is not considered present if there is no movement for 2 seconds or more.
- 6) Chase and dodge is no longer coded when either the mother or the infant are in the vis-à-vis position for 1 sec.
- 7) A minimum of 2 sec duration is required to code chase and dodge.

^aMother Facial Affect coding follows Beebe and Gerstman (1980). Two degrees of mouth widen (MW) were distinguished: MW1 = sideways lip stretch (without zygomaticus retraction); MW2 = lip-corner raise (zygomaticus retraction). Four degrees of mouth open (MO) were distinguished, from lips slightly parted to maximal display of mouth open (“gape”). Reliability was evaluated based on configurations (levels 40 - 90).

^bInfant Facial Affect coding follows Koulomzin et al. (2002) and Marquette (1999). Two degrees of mouth widen and four degrees of mouth open were distinguished, definitions identical to that of *mother facial affect*. Reliability was evaluated based on configurations (levels 1 - 5).

^cInfant Vocal Affect coding follows Demetri-Friedman (2005), adapted from Tronick and Weinberg (1990).

^dInfant Head orientation coding follows Koulomzin et al. (2002) and Marquette (1999).

^eInfant Touch coding follows Koulomzin et al. (2002); see also Hentel et al., (2000); Marquette (1999).

^fMother Spatial Behavior coding follows Kushnick (2002) and Demetriades (2003); Mother Chase – Infant Dodge coding follows Kushnick (2002).

Appendix A, continued.

Mother and Infant Engagement Scales

Note: Our previous versions of mother and infant engagement scales (Beebe & Gerstman, 1980, 1984; Kronen, 1982; Cohn & Beebe, 1990) used mother and infant gaze, face and head orientation. In this study, we also integrated infant vocal quality into the ordinalization of infant gaze, head, and face in the creation of a multimodal engagement scale. Thus the construction of the infant engagement scale underwent extensive revision. The entire data set was run through a series of successive versions of the engagement scale, and frequency analyses were performed to see what percentage of the total seconds of data was accounted for by the engagement categories in each of the versions of the scale. Any engagement levels that accounted for less than 2% of the data were regrouped with other similar levels. Any large proportion of seconds unaccounted for by the existing categories led to the creation of new levels, until 92% (infant) and 94% (mother) of the data set was included in each engagement scale, and no single level of engagement represented less than 2% of the entire data set (with the exception of two levels of infant distress). These percentages can be found in the final column of the engagement scales.

Appendix A, continued.

INFANT ENGAGEMENT SCALE							
ENG	GAZE (On/Off)	HEAD ORIENTATION	FACE	VOCALIZATION	DESCRIPTION	%	
POSITIVE ON							
18	ON (1)	En Face (6)	Hi Positive (85)	Hi(6) / Neut (5) / No Voc(4)	Hi Positive Engagement	3.7	
17	ON (1)	En Face (6)	Mild Positive (70)	Hi(6) / Neut (5) / No Voc(4)	Mild Positive Engagement	6.2	
16	ON (1)	En Face (6)	Neutral (55)	Hi(6) / Neut (5)	Positive/Neutral Engagement	2.1	
15	ON (1)	En Face (6)	Neutral (55)	No Voc (4)	Neutral / Interest	19.9	
NEGATIVE ON							
14	ON (1)	En Face (6)	Neutral (55)	Fuss (3)	Negative Engagement (Voc)	3.4	
14	ON (1)	En Face (6)	Negative (40)	Neut(5)/No Voc(4)/ Fuss(3)	Negative Engagement		
LOOK ANGLED-ESCAPE							
13	ON (1)	Any except En Face (1-5)	Any except Cry (40-85)	Any except Protest or Cry (3-6)	Look Angled for Escape	2.2	
POSITIVE OFF							
12	OFF(0)	Any	Hi Pos (85)/ Mld Pos(70)	Hi(6) / Neut (5) / No Voc(4)	Neutral Face / No Voc	2.2	
11	OFF (0)	Any	Neutral (55)	Hi Pos (6) / Neut Pos (5)	Neutral Face / Pos Voc	3.2	
NEUTRAL OFF							
10	OFF (0)	En Face (6)	Neutral (55)	No Voc (4)	En Face	16.5	
9	OFF (0)	Head Down, vis a vis (5)	Neutral (55)	No Voc (4)	Head Down, vis a vis	3.5	
8	OFF (0)	30-60 Avert (4)	Neutral (55)	No Voc (4)	30-60 Avert	7.8	
7	OFF (0)	30-60 + Head Down (3)	Neutral (55)	No Voc (4)	30-60 + Head Down	4.6	
6	OFF (0)	60-90 (1) / Hd Up & Back (2)	Neutral (55)	No Voc (4)	60-90/Head Up & Back	3.0	
INF GAZE AT OBJECT							
5	Look at Object	Any	Any	Any	Object Engagement	6.2	
NEG OFF/ EN FACE							
4	OFF (0)	En Face (6)	Neutral (55)	Fuss (3)	Off En Face - Negative	2.9	
4	OFF (0)	En Face (6)	Negative (40)	No Voc (4) / Fuss (3)	Off En Face - Negative		
NEG OFF/ AVERT							
3	OFF (0)	Any (except En Face) (1-5)	Neutral (55)	Fuss (3)	Gaze Avert	2.2	
3	OFF (0)	Any (except En Face) (1-5)	Negative (40)	No Voc (4) / Fuss (3)	Gaze Avert		
DISTRESS							
CRY FACE							
2	ON/OFF	Any	Cry Face (20)	No Voc (4) / Fuss (3)	Cry Face	1.6	
ANGRY PROTEST							
2	ON/OFF	Any	Neutral (55) Neg (40) Cry Face (20)	Angry Protest (2)	Angry Protest		
DISCREPANT AFFECT							
2	ON/OFF	Any	Negative (40)	Neutral Positive (5)	Low Discrepancy		
2	ON/OFF	Any	Mild Positive (70)	Fuss (3)	Medium Discrepancy		
2	ON/OFF	Any	Negative (40)	Hi Positive (6)	High Discrepancy		
2	ON/OFF	Any	Hi Positive (85)	Fuss (3)	High Discrepancy		
2	ON/OFF	Any	Cry Face (20)	Hi Positive(6) / Neut Pos (5)	High Discrepancy		
2	ON/OFF	Any	Hi Pos(85)/ Mild Pos(70)	Angry Protest (2)	High Discrepancy		
2	ON/OFF	Any	Hi Pos(85)/ Mild Pos(70)	Cry (1)	High Discrepancy		
CRY							
1	ON/OFF	Any	Neutral (55) Neg (40) Cry Face (20)	Cry (1)	Cry	1.0	

Appendix A. continued.

MOTHER ENGAGEMENT SCALE

	GAZE (On/Off)	FACE	%
	GAZE AT INFANT		
9	ON	Mock Surprise (90)	2.0
8	ON	Smile 3 (hi) (85)	3.2
7	ON	Smile 2 (med) (80)	15.5
6	ON	Smile 1 (lo) (70)	22.7
5	ON	Oh Face (67)	1.1
4	ON	Positive Attention (60)	38.0
3	ON	Neutral (50) / Woe(45) / Negative Attention (40)	2.2
	GAZE OFF INFANT		
2	Positive Off OFF	Oh(67)/Sm1(70)/Sm 2(80)/Sm3(85)/Mock(90)	3.8
1	Neutral / Negative Off OFF	Neg Attn(40)/Woe(45)/Neut(50)/Pos Attn (60)	6.9

Note: For details of Mother face coding and ordinalization, see Appendix A. "Oh Face" = Mouth open midway, no smile; "Positive Attention" = Gaze on with slight mouth widening and / or opening without smile; "Woe Face" = Slight down-turned corners of mouth with pursed out lips; "Negative Attention" = Gaze on, with mouth corners turned down in grimace and / or frown and / or mouth drawn in tightly in "compressed lips".

Appendix B1

Mother Touch Codes

- 00 no touch
 - 01 hold or gently squeezed, rest hand or palm on infant
 - 02 provide hand or finger for infant to hold
 - 03 stroke, caress
 - 04 tap (using one or more fingers), graze
 - 05 caregiving (e.g., reposition infant in infant seat; wipe infant's mouth; adjust infant's clothing; adjust strap in infant seat; etc.). (Code only if caregiving is appropriate; if mother initiates caregiving for no apparent reason, for example pulls infant's socks up and down repeatedly or continuously rubs infant's face with a cloth, code as 'object-mediated touch')
 - 06 kiss, nuzzle
 - 07 self-directed oral touch (e.g., suck on infant's toes or fingers, nibble on part of infant)
 - 08 tickle
 - 09 rub (can be unidirectional or bidirectional, one finger or many)
 - 10 scratch
 - 11 flexion, extension, lift arms or legs, circling motions, and similar large movements
 - 12 rock
 - 13 jiggle, bounce, shake, wiggle
 - 14 infant-directed oral touch (e.g., offer finger for infant to suck, put finger in infant's mouth, put infant's hand in infant's mouth, put infant's toes in infant's mouth)
 - 15 Pull
-

Appendix B1, continued

- 16 push, inhibit/constrain movement, force or control infant's movement (e.g., force infant's foot into infant's face, force infant's hand down)
- 17 pinch
- 18 poke, jab (pressing one or more fingers into the infant's skin) (include maternal use of infant's foot or toe to press into infant's skin if there is a poking-type effect)
- 19 object-mediated touch (e.g., waves cloth in infant's face, dangles toy on infant's chest, manipulates clothing for non-caregiving purpose) (also code if mother mediates her touch with a part of the infant's body, for example mother tap infant's hand against infant's face)
- 20 other (e.g., sniffs, chews, knocks with knuckles)
- 21 pat (implies use of whole hand, if only with finger, code as "tap")
- 99 uncodable (e.g., due to changes of position, camera errors, etc.)
-

Intensity Code: Each code was given an intensity rating (i) mild/moderate, (ii) high intensity (rough, abrupt, intrusive).

These codes were used to construct the ordinalized mother scale (see Appendix B2a)

Note. Mother Touch coding follows Stepakoff (1999; Stepakoff et al., 2007) elaborating on Tronick and Weinberg (1990). Only one type of touch behavior (of the 21 codes) can be coded in any one second. Only those segments of data in which infants were sitting in the infant seat were analyzed (although infants could at times be held on table, on mother's lap, to mother's chest, or in transition). Because mother touch can occur with both hands, occasionally two forms of touch occurred, one with each hand. In this case, one form of touch was coded as "primary" and the other as "secondary." For the purpose of this study, only primary touch was used for data analysis.

Appendix B2a

Ordinalized Maternal Touch Scale: From Affectionate to Intrusive

	SCALE CATEGORY	TYPE	LOCATION	INTENSITY (intense)	%	Cat%
11	Affectionate Touch	(3) stroke, caress (6) kiss, nuzzle (21) pat	(4) hands, arms, (5) feet, legs	(1) mild or moderate	0.8	32.9
10	Static Touch	(1) hold, (2) provide hand or finger for infant to hold	(4) hands, arms, (5) feet, legs	(1) mild or moderate	24.6	
9	Playful Touch	(4) tap, (8) tickle, (9) rub, (11) large movements with arms or legs	(4) hands, arms, (5) feet, legs	(1) mild or moderate	7.5	
8	No Touch	(0) no touch	n.a.	n.a.	38.9	38.9
7	Caregiving	(5) caregiving	(4) hands, arms, (5) feet, legs	(1) mild or moderate	0.4	8.4
6	Jiggle / Bounce	(13) jiggle, bounce	(4) hands, arms, (5) feet, legs	(1) mild or moderate	8.0	
5	Oral Touch	(14) infant-directed oral touch	(1) face, (4) hands, arms, (5) feet, legs	(1) mild or moderate	1.3	
4	Object Mediated	(19) object-mediated touch	(1) face, (2) body, (3) head, neck, (4) hands, arms, (5) feet, legs	(1) mild or moderate	2.7	2.7
3	Centripetal Touch	(1) hold, (3) stroke, (4) tap, (5) caregiving, (6) kiss, nuzzle, (8) tickle, (21) pat	(1) face, (2) body, (3) head, neck	(1) mild or moderate	9.0	9.0
2	Rough Touch	(10) scratch, (15) pull, (16) push, (17) pinch, 18 (poke)	(1) face, (2) body, (3) head, neck, (4) hands, arms, (5) feet, legs	(1) mild or mod	3.0	6.9
1	High Intensity Touch (Intrusive)	any	(1) face, (2) body, (3) head, neck, (4) hands, arms, (5) feet, legs	(2) high intensity	3.9	

Note.

Category = Categories of the scale, from affectionate touch to high intensity intrusive touch.

Type = Numeric entries refer to specific types of touch (taken from Appendix B1: Maternal Touch Codes) defining the category.

Location = Location on Infant's Body: (1) face, (2) body, (3) head, neck, (4) hands, arms, (5) feet, legs.

Intensity = A measure of intensity was assigned to each second of touch contact: 1 = mild/moderate; 2 = high (rapid, abrupt, intrusive).

Appendix B2b: *Ordinalized Maternal Touch Scale Notes*

The Mother Touch Scale is comprised of 11 ordinalized categories of 21 types of touch behaviors, defined in Appendix B1 (Stepakoff, 1999; Stepakoff et al., 2007). Each category describes the type of maternal touch, intensity of touch, and location of maternal touch in relation to the infant's body.

The most intuitively positive mode of touch is "affectionate touch," which occurs less frequently in depressed mothers (Stepakoff, 1999). "Static touch" refers to holding or gently squeezing (legs/feet or arms/hands), resting mother's hand or palm on infant (legs/feet or arms/hands), or providing the mother's hand or finger for the infant to hold (arms/hands). This category of touch is intuitively gentle. "Playful touch" refers to tap/graze, tickle, rub, or flex/extend or lift/circle (legs/feet or arms/hands). This form of touch is more active, and overtly "playful," often involving games. All three of these categories occur exclusively in the location of arms/hands or feet/legs. We followed Stepakoff's hypothesis that touch to the periphery of the body was less stimulating than touch to the center of the body. These three categories account for approximately one third of the data. The category of "no touch", which accounts for 38.9% of the data, is next in the ordinalization. At this point of the scale, almost 72% of the data is accounted for.

The next two categories, "Caregiving", which accounts for very little data, and "Jiggle/Bounce," a substantial category (8%), both occur exclusively in the location of arms/hands or feet/legs. They differ from the first three categories in that they are more active. "Oral touch", a relatively rare code (1.3% of the data), is defined as mother putting her finger in the infant's mouth. "Object mediated touch" (2.7%) involves mother touching the infant with an object in between her body and the infant's body, such as mother dangles toy on infant's chest. Depressed mothers use more "object mediated touch" (Stepakoff, 1999; Stepakoff et al, 2007). "Centripetal touch" (9%) is defined both by central body location (face, body, head and neck, excluding hands, arms, feet and legs) and by mild intensity. Touch to the central body was considered more stimulating (Stepakoff, 1999; Stepakoff et al, 2007). The final two categories can be considered intrusive. "Rough touch" (3%) includes scratch, pull, push, constrain, force, or control infant movement (such as force infant's foot into infant's face, or force infant's hand down), pinch or poke/jab, in any location on the infant's body. The final category "high intensity touch" (3.9%) was by definition intrusive, involving "rapid, abrupt or intrusive touch," irrespective of the type of touch.