Web Basic Model Tables

Introduction to Basic Model Tables

The SAS PROC MIXED program (Littell, Miliken, Stoup, & Wolfinger, 1996; McArdle & Bell, 2000; Singer, 1998) was used to estimate "random" (individual differences) and "fixed" (common model) effects on patterns of self- and interactive behavior over 150 s. The models examined nine pairings of communication modalities, including one, mother gaze-infant gaze (on/off gaze), in which the dependent variable is dichotomous and therefore analyzed by SAS GLIMMIX (Cohen et al., 2000; Goldstein, Healy, & Rasbash, 1994; Littell et al., 1996). For details of statistical models, see Chen and Cohen (2006).

Table A. in each of the 9 sets of tables uses demographic variables to predict mother and infant behaviors (e.g. in Table 1-A mother gaze, infant gaze). "Random effects" assesses the variance component of 132 intercepts and 132 slopes, addressing individual differences. "Fixed effects" indicate average effects over the full sample so that it is possible to estimate the extent to which a single overall model accounts for the individual differences reflected in the "random" model. Table 1-A also shows that demographic variables (ethnicity [Black vs. White, Hispanic vs. White], infant gender, mother education and age) are evaluated for significance in predicting mother gaze and infant gaze.

Tables B. and C. in each of the 9 sets of tables present the "basic models" for mother and infant respectively, on which all further analyses are based. These tables include self- and interactive contingency as predictors in the model, and in interaction with demographic variables. Demographic variables found to be significant in the basic models are then controlled for in all subsequent models. Self- and interactive contingency, their possible conditional relationships, and the demographic variables are evaluated for significance in predicting mother and infant behavior.

Table 1: Mother Gaze v. Infant Gaze (Pairing 1)

Table 1-A
Using Demographic Variables to Predict Mother Gaze and Infant Gaze Data Across 150 seconds. N=132

	Mother gaze			Infant gaze		
Variable	B	SE B	*p*	B	SE B	*p*
Random effects						
Intercept	1.738 ***	.291	<.001	5.278 ***	.783	<.001
Slope	.0001***	.00002	<.001	.0003***	.00005	<.001
Intercept / slope	-.010 ***	.002	<.001	-.029 ***	.005	<.001
Residual	.873 ***	.009	<.001	.978 ***	.009	<.001
Fixed effects						
Intercept	2.746	.535	<.001	-.385	.866	.658
Time	-.0005	.0006	.386	-.003	.0004	<.001
Black	.387	.271	.157	-.099	.439	.821
Hispanic	-.216	.242	.375	-.230	.397	.563
Gender	-.027	.169	.875	.551	.276	.048
Mother education	-.513	.239	.034	-.528	.392	.180
Mother age	-.002	.018	.910	.015	.029	.611

Note: 1. Estimated fixed effects of demographic variables from the multilevel logistic regression analyses of mother gaze, and infant gaze data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS GLIMMIX Macro
3. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 1-B

Using M Gaze Lag and I Gaze Lag to Predict Mother Gaze Data Across 150 seconds. N=132

Variable	Mother Gaze		
	B	SE B	*p*
Random effects			
Intercept	.702 ***	.153	<.001
Slope	.00003***	.00001	<.001
Intercept / slope	-.004 ***	.001	<.001
Residual	.878 ***	.009	<.001
Fixed effects			
Intercept	2.376	.091	<.001
Time	-.0003	.001	.589
M gaze lag (M → M)	2.477	.114	<.001
I gaze lag (I → M)	.582	.074	<.001
Gender	.025	.114	.828
Black	.601	.160	<.001
M → M / Gender	.405	.153	.008
I → M / Black	.652	.229	.004

Note: 1. Estimated fixed effects of the "basic model" from multilevel logistic regression analyses of mother gaze data across 150 seconds. N=132

2. All parameter entries are maximum likelihood estimates fitted using SAS GLIMMIX Macro

3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).

4. M gaze lag (3) predicting M gaze (M → M) = mother gaze self-contingency;
I gaze lag (2) predicting M gaze (I → M) = mother gaze interactive contingency with infant gaze.
Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.

5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 1-C
Using I Gaze Lag and M Gaze Lag to Predict Infant Gaze Data Across 150 seconds. N=132

Variable	Infant Gaze		
	B	SE B	*p*
Random effects			
Intercept	1.242 ***	.231	<.001
Slope	.00006***	.00001	<.001
Intercept / slope	-0.006 ***	.002	<.001
Residual	.908 ***	.010	<.001
Fixed effects			
Intercept	-.518	.111	<.001
Time	-.001	.0005	.007
I gaze lag (I → I)	3.587	.050	<.001
M gaze lag (M → I)	.614	.112	<.001
Gender	.290	.144	.046

Note: 1. Estimated fixed effects of the basic model from multilevel logistic regression analyses of infant gaze data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS GLIMMIX Macro
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. Infant gaze lag (3) predicting I gaze (I → I) = infant gaze self-contingency;
M gaze lag (6) predicting I gaze (M → I) = infant gaze interactive contingency with mother gaze.
Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 2: Mother Facial Affect v. Infant Facial Affect (Pairing 2)

Table 2-A.
Using Demographic Variables to Predict Mother Facial Affect and Infant Facial Affect Data Across 150 seconds. N=132

	Mother Facial Affect			Infant Facial Affect		
Variable	B	SE B	*p*	B	SE B	*p*
Random effects						
Intercept	20.873	3.498	<.001	24.993	4.285	<.001
Slope	.0007	.0002	.001	.003	.006	<.001
Intercept / slope	-.069	.022	.002	-.063	.036	.078
Autoregressive error (AR(1))	.588	.006	<.001	.640	.006	<.001
Residual	71.684	1.098	<.001	8.565	1.365	<.001
Fixed effects						
Intercept (time=0)	68.639	2.430	<.001	56.537	3.221	<.001
Time	-.024	.004	<.001	-0.027	.006	<.001
Black	.274	1.088	.802	-2.387	1.451	.103
Hispanic	-.328	1.046	.754	.821	1.395	.557
Gender	1.241	.714	.085	.461	.953	.629
Mother education	.437	.486	.371	-.297	.648	.647
Mother age	-.063	.081	.435	.076	.108	.480

Note: 1. Estimated covariance and fixed effects of demographic variables from the best two-level linear models of mother facial affect, and infant facial affect data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 2-B

Using M Facial Affect Lag and I Facial Affect Lag to Predict Mother Facial Affect Data Across 150 seconds. N=132

	Mother Facial Affect		
Variable	B	SE B	*p*
Random effects			
Intercept	3.717	.701	<.001
Slope	-.010	.004	.020
Intercept / slope	.00008	.00004	.020
Autoregressive error (AR(1))	.041	.013	.002
Residual	45.924	.495	<.001
Fixed effects			
Intercept (time=0)	67.799	.201	<.001
Time	-.007	.001	<.001
M facial affect lag (M → M)	.555	.007	<.001
I facial affect lag (I → M)	.133	.007	<.001

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of mother facial affect data across 150 seconds. N=132

2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED

3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).

4. M facial affect lag (3) predicting M facial affect data (M → M) = mother facial affect self-contingency; I facial affect lag (3) predicting M facial affect data (I → M) = mother facial affect interactive contingency with infant facial affect.
Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.

5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 2-C

Using I Facial Affect Lag and M Facial Affect Lag to Predict Infant Facial Affect Data Across 150 seconds. N=132

Variable	Infant Facial Affect		
	B	SE B	p
Random effects			
Intercept	4.310	.854	<.001
Slope	.0003	.00007	<.001
Intercept / slope	-.015	.006	.014
Autoregressive error (AR(1))	.086	.012	<.001
Residual	46.454	.507	<.001
Fixed effects			
Intercept (time=0)	56.713	.288	<.001
Time	-.008	.002	<.001
I facial affect lag (I → I)	.634	.016	<.001
M facial affect lag (M → I)	.051	.008	<.001
Gender	.068	.358	.851
Black	-1.067	.466	.024
I → I / Gender	-.031	.014	.024
I → I / Black	-.069	.017	<.001

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of infant facial affect data across 150 seconds. N=132

2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED

3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).

4. I facial affect lag (3) predicting I facial affect data (I → I) = infant facial affect self-contingency;
M facial affect lag (5) predicting I facial affect data (M → I) = infant facial affect interactive contingency with mother facial affect.
Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.

5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 3: Mother Facial Affect v. Infant Vocal Affect (Pairing 3)

Table 3-A
Using Demographic Variables to Predict Mother Facial Affect and Infant Vocal Affect Data Across 150 seconds. N=132

Variable	Mother Facial Affect			Infant Vocal Affect		
	B	SE B	*p*	B	SE B	*p*
Random effects						
Intercept	20.873	3.498	<.001	.061	.011	<.001
Slope	.0007	0.0002	<.001	.00002	.000003	<.001
Intercept / slope	-.069	0.022	.002	-.0004	.0001	.006
Autoregressive error (AR(1))	.588	0.006	<.001	.590	.006	<.001
Residual	71.684	1.098	<.001	.251	.004	<.001
Fixed effects						
Intercept (time=0)	68.639	2.430	<.001	4.161	.167	<.001
Time	-.025	.004	<.001	-.002	.0004	<.001
Black	.274	1.088	.802	-.185	.074	.014
Hispanic	-.328	1.046	.754	.030	.071	.674
Gender	1.241†	.714	.085	-.013	.049	.815
Mother education	.437	.486	.371	.014	.032	.652
Mother age	-.063	.081	.435	-.004	.005	.464

Note: 1. Estimated covariance and fixed effects of demographic variables from the best two-level linear models of mother facial affect, and infant vocal affect data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 3-B

Using M Facial Affect Lag and I Vocal Affect Lag to Predict Mother Facial Affect Data Across 150 seconds. N=132

Variable	Mother Facial Affect		
	B	SE B	*p*
Random effects			
Intercept	2.600	.560	<.001
Slope	.00007	.00003	.028
Intercept / slope	-.008	.004	.028
Autoregressive error (AR(1))	.007	.012	.570
Residual	45.768	.499	<.001
Fixed effects			
Intercept (time=0)	67.648	.570	<.001
Time	-.006	.002	<.001
M facial affect lag (M → M)	.700	.029	<.001
I vocal affect lag (I → M)	1.421	.136	<.001
Hispanic	-.290	.326	.375
Mother education	.009	.135	.948
Gender	.363	.266	.176
M → M / I → M	-.079	.031	.010
M → M / Gender	-.029	.013	.032
M → M / Mother education	-.015	.007	.038
M → M / Hispanic	-.035	.017	.037

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of mother facial affect data across 150 seconds. N=132

2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED

3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).

4. M facial affect lag (3) predicting M facial affect data (M → M) = mother facial affect self-contingency; I vocal affect lag (3) predicting M facial affect data (I → M) = mother facial affect interactive contingency with infant vocal affect. Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.

5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 3-C

Using I Vocal Affect Lag and M Facial Affect Lag to Predict Infant Vocal Affect Data Across 150 seconds. N=132

Variable	Infant Vocal Affect		
	B	SE B	*p*
Random effects			
Intercept	.005	.001	<.001
Slope	.000001	.000	---
Intercept / slope	-.00001	.00001	.233
Autoregressive error (AR(1))	-.003	.011	.755
Residual	.135	.002	<.001
Fixed effects			
Intercept (time=0)	2.863	.029	<.001
Time	-.0005	.0001	<.001
I vocal affect lag (I → I)	1.024	.046	<.001
M facial affect lag (M → I)	.002	.0004	<.001
Gender	.001	.015	.949
Black	-.056	.020	.006
I → I / Gender	-.058	.015	<.001

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of infant vocal affect data across 150 seconds. N=132

2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. I vocal affect lag (4) predicting I vocal affect (I → I) = I vocal affect self-contingency;
   M facial affect lag (3) predicting I vocal affect (M → I) = I vocal affect interactive contingency with mother facial affect.
   Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
   Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 4: Mother Engagement v. Infant Engagement (Pairing 4)

Table 4-A
Using Demographic Variables to Predict Mother Engagement and Infant Engagement Data Across 150 seconds. N=132

	Mother Engagement			Infant Engagement		
Variable	B	SE B	*p*	B	SE	*p*
Random effects						
Intercept	.681	.112	<.001	8.709	1.295	<.001
Slope	.00004	.000008	<.001	.0005	.00009	.001
Intercept / slope	-.003	.009	<.001	-.027	.008	.002
Autoregressive error (AR(1))	.471	.007	<.001	.639	.006	<.001
Residual	2.994	.040	<.001	11.644	.197	<.001
Fixed effects						
Intercept (time=0)	5.262	.420	<.001	12.790	1.622	<.001
Time	-.004	.008	<.001	-.011	.002	<.001
Black	.205	.191	.284	-.826	.755	.276
Hispanic	-.050	.183	.784	-.528	.713	.461
Gender	.176	.125	.164	.665	.496	.183
Mother education	.033	.084	.694	-.140	.330	.672
Mother age	-.011	.014	.427	-.030	.054	.577

Note: 1. Estimated covariance and fixed effects of demographic variables from the best two-level linear models of mother engagement, and infant engagement data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 4-B

Using M Engagement Lag and I Engagement Lag to Predict Mother Engagement Data Across 150 Seconds. N=132.

Variable	Mother Engagement		
	B	SE B	*p*
Random effects			
Intercept	.188	.037	<.001
Slope	.000005	.000002	.007
Intercept / slope	-.0006	.0002	.011
Autoregressive error (AR(1))	.068	.013	<.001
Residual	2.272	.025	<.001
Fixed effects			
Intercept (time=0)	4.974	.058	<.001
Time	-.0009	.0004	.016
M engagement lag (M → M)	.467	.009	<.001
I engagement lag (I → M)	.063	.005	<.001
Gender	.050	.069	.470
Black	.163	.089	.069
M → M / I → M	.004	.001	.001
I → M / Gender	.023	.008	.005
M → M / Black	.050	.023	.031

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of mother engagement data across 150 seconds. N=132

2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED

3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).

4. M engagement lag (3) predicting M engagement (M → M) = mother engagement self-contingency; I engagement lag (3) predicting M engagement (I → M) = mother engagement interactive contingency with infant engagement. Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.

5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 4-C

Using I Engagement Lag and M Engagement Lag to Predict Infant Engagement Data Across 150 seconds. N=132

Variable	Infant Engagement		
	B	SE B	*p*
Random effects			
Intercept	.790	.141	<.001
Slope	.00005	.00001	<.001
Intercept / slope	-.003	.001	.005
Autoregressive error (AR(1))	-.016	.011	.156
Residual	6.839	.076	<.001
Fixed effects			
Intercept (time=0)	11.173	.089	<.001
Time	-.004	.001	<.001
I engagement lag (I → I)	.680	.006	<.001
M engagement lag (M → I)	.069	.016	<.001

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of infant engagement data across 150 seconds. N=132

2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. Infant engagement lag (5) predicting I engagement (I → I) = infant engagement self-contingency; M engagement lag (3) predicting I engagement (M → I) = infant engagement interactive contingency with mother engagement. Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 5: Mother Touch v. Infant Engagement

Table 5-A
Using Demographic Variables to Predict Mother Touch and Infant Engagement Data Across 150 seconds. N=132

Variable	Mother Touch			Infant Engagement		
	B	SE B	*p*	B	SE B	*p*
Random effects						
Intercept	1.777	.312	<.001	8.709	1.295	<.001
Slope	.0001	.00003	<.001	.0005	.00009	<.001
Intercept / slope	-.006	.002	.015	-.027	.008	.002
Autoregressive error (AR(1))	.702	.006	<.001	.639	.006	<.001
Residual	4.997	.096	<.001	11.644	.197	<.001
Fixed effects						
Intercept (time=0)	6.523	.726	<.001	12.790	1.622	<.001
Time	-.002	.001	.191	-.011	.002	<.001
Black	-.068	.365	.853	-.826	.755	.276
Hispanic	-.379	.332	.255	-.528	.713	.461
Gender	.161	.232	.489	.665	.496	.183
Mother education	.468	.327	.154	-.140	.330	.672
Mother age	.024	.024	.321	-.030	.054	.577

Note: 1. Estimated covariance and fixed effects of demographic variables from the best two-level linear models of mother touch, and infant engagement data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 5-B
Using Ṃ Touch Lag and I Engagement Lag to Predict Mother Touch Data Across 150 seconds. N=132

Variable	Mother Touch		
	B	SE B	*p*
Random effects			
Intercept	.121	.026	<.001
Slope	.000004	.000002	.011
Intercept / slope	-.0002	.0002	.162
Autoregressive error (AR(1))	-.055	.011	<.001
Residual	2.511	.028	<.001
Fixed effects			
Intercept (time=0)	7.321	.069	<.001
Time	-.0004	.0003	.224
M touch lag (M → M)	.738	.008	<.001
I engagement lag (I → M)	.010	.004	.019
Mother education	.192	.069	.006
Gender	.037	.065	.568
Hispanic	-.015	.076	.058
M → M / Gender	.026	.011	.018
M → M / Hispanic	-.028	.011	.014
I → M / Hispanic	-.021	.008	.009

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of mother touch data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. M touch lag (2) predicting M touch (M → M) = mother touch self-contingency;
I engagement lag (2) predicting M touch (I → M) = mother touch interactive contingency with infant engagement. Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 5-C
Using I Engagement Lag and M Touch Lag to Predict Infant Engagement Data Across 150 seconds. N=132

Variable	Infant Engagement		
	B	SE B	*p*
Random effects			
Intercept	.727	.132	<.001
Slope	.00005	.00001	<.001
Intercept / slope	-.002	.001	.007
Autoregressive error (AR(1))	-.020	.011	.076
Residual	6.683	.075	<.001
Fixed effects			
Intercept (time=0)	11.199	.087	<.001
Time	-.004	.001	<.001
I engagement lag (I → I)	.692	.006	<.001
M touch lag (M → I)	.012	.010	.256

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of infant engagement data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. Infant engagement lag (5) predicting I engagement (I → I) = infant engagement self-contingency; M touch lag (2) predicting I engagement (M → I) = infant engagement interactive contingency with mother touch. Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 6: Mother Touch v. Infant Vocal Affect

Table 6-A
Using Demographic Variables to Predict Mother Touch and Infant Vocal Affect Data Across 150 seconds. N=132

	Mother Touch			Infant Vocal Affect		
Variable	B	SE B	*p*	B	SE B	*p*
Random effects						
Intercept	1.777	.312	<.001	.061	.011	<.001
Slope	.0001	.00003	<.001	.00002	.000003	<.001
Intercept / slope	-.006	.002	.015	-.0004	.0001	.006
Autoregressive error (AR(1))	.702	.006	<.001	.590	.006	<.001
Residual	4.997	.096	<.001	.251	.004	<.001
Fixed effects						
Intercept (time=0)	6.523	.726	<.001	4.161	.167	<.001
Time	-.002	.001	.191	-.002	.0004	<.001
Black	-.068	.365	.853	-.185	.074	.014
Hispanic	-.379	.332	.255	.030	.071	.674
Gender	.161	.232	.489	-.012	.049	.815
Mother education	.468	.327	.154	.014	.032	.652
Mother age	.024	.024	.321	-.004	.005	.464

Note: 1. Estimated covariance and fixed effects of demographic variables from the best two-level linear models of mother touch, and infant vocal affect data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 6-B
Using M Touch Lag and I Vocal Affect Lag to Predict Mother Touch Data Across 150 seconds. N=132

Variable	Mother Touch		
	B	SE	*p*
Random effects			
Intercept	.133	.028	<.001
Slope	.000006	.000002	.003
Intercept / slope	-.0003	.0002	.090
Autoregressive error (AR(1))	-.053	.010	<.001
Residual	2.545	.028	<.001
Fixed effects			
Intercept (time=0)	7.250	.057	<.001
Time	-.0004	.0004	.310
M touch lag (M → M)	.738	.005	<.001
I vocal affect lag (I → M)	.072	.027	.007
Mother education	.231	.067	<.001

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of mother touch data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. M touch lag (2) predicting M touch (M → M) = mother touch self-contingency;
I vocal affect lag (2) predicting M touch (I → M) = mother touch interactive contingency with infant vocal affect. Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 6-C
Using I Vocal Affect Lag and M Touch Lag to Predict Infant Vocal Affect Data Across 150 seconds. N=132

	Infant Vocal Affect		
Variable	B	SE B	*p*
Random effects			
Intercept	.004	.001	<.001
Slope	.000001	.0000	---
Intercept / slope	-.000009	.00001	.462
Autoregressive error (AR(1))	-.023	.011	.031
Residual	.134	.002	<.001
Fixed effects			
Intercept (time=0)	3.009	.015	<.001
Time	-.0006	.0001	<.001
I vocal affect lag (I → I)	.684	.012	<.001
M touch lag (M → I)	.002	.001	.109
Gender	-.006	.015	.693
Black	-.051	.020	.014
Mother education	-.003	.015	.839
I → I / Gender	-.048	.015	.001
I → I / Mother education	-.042	.014	.003

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of infant vocal affect data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. Infant vocal affect lag (4) predicting I vocal affect (I→ I) = infant vocal affect self-contingency; M touch lag (2) predicting I vocal affect (M → I) = infant vocal affect interactive contingency with mother touch. Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 7: Mother Touch v. Infant Touch

Table 7-A
Using Demographic Variables to Predict Mother Touch and Infant Touch Data Across 150 seconds. N=132

	Mother Touch			Infant Touch		
Variable	B	SE B	*p*	B	SE B	*p*
Random effects						
Intercept	1.777	.312	<.001	.080	.0153	<.001
Slope	.00010	.00003	<.001	.000007	.000002	<.001
Intercept / slope	-.006	.002	.015	-.0005	.0001	<.001
Autoregressive error (AR(1))	.702	.006	<.001	.764	.005	<.001
Residual	4.997	.096	<.001	.228	.005	
Fixed effects						
Intercept (time=0)	6.523	.726	<.001	1.589	.142	<.001
Time	-.002	.001	.191	.0002	.0003	.480
Black	-.068	.365	.853	-.011	.070	.887
Hispanic	-.379	.332	.255	.013	.064	.837
Gender	.161	.232	.489	-.061	.044	.170
Mother education	.470	.327	.154	.028	.062	.652
Mother age	.024	.024	.321	.004	.005	.450

Note: 1. Estimated covariance and fixed effects of demographic variables from the best two-level linear models of mother touch, and infant touch data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 7-B
Using M Touch Lag and I Touch Lag to Predict Mother Touch Data Across 150 seconds. N=132

	Mother Touch		
Variable	B	SE B	*p*
Random effects			
Intercept	.128	.027	<.001
Slope	.000003	.000002	.030
Intercept / slope	-.0002	.0002	.365
Autoregressive error (AR(1))	-.051	.010	<.001
Residual	2.569	.028	<.001
Fixed effects			
Intercept (time=0)	7.042	.190	<.001
Time	-.0004	.0003	.219
M Touch lag (M → M)	.843	.030	<.001
I Touch lag (I → M)	.179	.035	<.001
Mother age	.013	.006	.033
Gender	.054	.068	.432
Hispanic	-.130	.086	.132
M → M / Gender	.029	.011	.008
I → M / Gender	-.202	.055	<.001
M → M / Mother age	-.004	.0009	<.001
M → M / Hispanic	-.055	.014	<.001

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of mother touch data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. M touch lag (2) predicting M touch (M → M) = mother touch self-contingency;
I touch lag (2) predicting M touch (I → M) = mother touch interactive contingency with infant touch.
Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 7-C
Using I Touch Lag and M Touch Lag to Predict Infant Touch Data Across 150 seconds. N=132

	Infant Touch		
Variable	B	SE B	p
Random effects			
Intercept	.005	.001	<.001
Slope	.0000005	.000	---
Intercept / slope	-.00003	.00001	.001
Autoregressive error (AR(1))	-.038	.010	<.001
Residual	.094	.001	<.001
Fixed effects			
Intercept (time=0)	1.684	.035	<.001
Time	.0001	.00008	.226
I Touch lag (I → I)	.715	.024	<.001
M touch lag (M → I)	-.001	.002	.433
Mother age	.0005	.001	.636
Black	-.008	.016	.626
Hispanic	-.006	.015	.712
I → I / Mother age	.002	.0008	.005
M → I / Black	.014	.003	<.001
M → I / Hispanic	.008	.003	.003

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of infant touch data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. Infant touch lag (2) predicting I touch (I → I) = touch self-contingency;
M touch lag (2) predicting I touch (M → I) = infant touch interactive contingency with mother touch.
Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 8: Infant Head Orientation v. Mother Spatial Orientation

Table 8-A
Using Demographic Variables to Predict Infant Head Orientation and Mother Spatial Orientation
Data Across 150 seconds. N=132

	Infant Head			Mother Spatial		
Variable	B	SE B	*p*	B	SE B	*p*
Random effects						
Intercept	.047	.075	<.001	.323	.051	<.001
Slope	-.001	.0006	.018	-.001	.0003	<.001
Intercept / slope	.00004	6.747E-6	<.001	.00001	2.003E-6	<.001
Autoregressive error (AR(1))	.642	.006	<.001	.700	.006	<.001
Residual	1.169	.019	<.001	.188	.004	<.001
Fixed effects						
Intercept (time=0)	4.616	.398	<.001	1.952	.300	<.001
Time	-.002	.0006	.014	.0001	.0004	.747
Black	.158	.194	.416	-.005	.151	.972
Hispanic	.203	.179	.259	.128	.135	.344
Gender	.234	.123	.058	.101	.097	.302
Mother education	-.253	.177	.156	-.191	.132	.150
Mother age	.023	.014	.099	.010	.010	.300

Note: 1. Estimated covariance and fixed effects of demographic variables from the best two-level linear models of infant vocal affect, and infant touch data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 8-B
Using I Head Lag and M Spatial Lag to Predict Mother Spatial Orientation Data Across 150 seconds. N=132

Variable	Mother Spatial Orientation		
	B	SE B	*p*
Random effects			
Intercept	.018	.003	<.001
Slope	-.00005	.00002	.003
Intercept / slope	6.144E-7	0	
Autoregressive error (AR(1))	-.063	.011	<.001
Residual	.094	.001	<.001
Fixed effects			
Intercept (time=0)	2.208	.059	<.001
Time	.00006	.0001	.552
I head lag (I → M)	-.008	.003	.002
M spatial lag (M → M)	.793	.029	<.001
Gender	.037	.024	.134
Age	-.0006	.002	.759
M Sptl → M Sptl / Gender	.070	.012	<.001
M Sptl → M Sptl / Age	-.002	.0009	.015

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of infant vocal affect data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. Infant head lag (2) predicting M spatial orientation (I → M) = mother spatial orientation interactive contingency with infant head orientation;
M spatial orientation lag (2) predicting M spatial orientation (M → M) =mother spatial orientation interactive contingency with M spatial orientation.
Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 8-C
Using I Head Lag and M Spatial Lag to Predict Infant Head Data Across 150 seconds. N=132

	Infant Head		
Variable	B	SE B	*p*
Random effects			
Intercept	.045	.009	<.001
Slope	-.0001	.00007	.111
Intercept / slope	4.042E-6	0	
Autoregressive error (AR(1))	-.029	.012	.019
Residual	.651	.008	<.001
Fixed effects			
Intercept (time=0)	5.239	.060	<.001
Time	-.0006	.0003	.018
I head lag (I → I)	.661	.009	<.001
M spatial lag (M → I)	.099	.027	<.001
Hispanic	.011	.058	.849
Gender	.093	.045	.041
Black	.011	.069	.876
Mother education	-.035	.055	.520
I Head → I Head / M Sptl → I Head	.023	.009	.008
I Head → I Head / Black	.047	.016	.003
I Head → I Head / Hispanic	.040	.017	.020
I Head → I Head / Gender	-.057	.014	<.001
M Sptl → I Head / Mother education	-.128	.032	<.001

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of infant touch data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. I head lag (1) predicting I head (I→ I) = infant head self-contingency;
M spatial orientation lag (0) predicting I head (M → I) = infant head interactive contingency with M spatial orientation.
Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 9: Infant Vocal Affect v. Infant Touch

Table 9-A
Using Demographic Variables to Predict Infant Vocal Affect and Infant Touch Data Across 150 seconds. N=132

	Infant Touch			Infant Vocal Affect		
Variable	B	SE B	*p*	B	SE B	*p*
Random effects						
Intercept	.080	.015	<.001	.061	.011	<.001
Slope	.000007	.000002	<.001	.00002	.000003	<.001
Intercept / slope	-.0005	.0001	<.001	-.0004	.0001	.006
Autoregressive error (AR(1))	.764	.005	<.001	.590	.006	<.001
Residual	.228	.005	<.001	.251	.004	<.001
Fixed effects						
Intercept (time=0)	1.589	.142	<.001	4.161	.167	<.001
Time	.0002	.0003	.480	-.002	.0004	<.001
Black	-.011	.070	.887	-.185	.074	.014
Hispanic	.013	.064	.837	.030	.071	.674
Gender	-.061	.044	.170	-.012	.049	.815
Mother education	.028	.062	.652	.014	.032	.652
Mother age	.004	.005	.450	-.004	.005	.464

Note: 1. Estimated covariance and fixed effects of demographic variables from the best two-level linear models of infant vocal affect, and infant touch data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic; Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 9-B
Using I Touch Lag and I Vocal Affect Lag to Predict Infant Touch Data Across 150 seconds. N=132

	Infant Touch		
Variable	B	SE B	*p*
Random effects			
Intercept	.005	.001	<.001
Slope	.0000004	.0000	---
Intercept / slope	-.00003	.000009	.002
Autoregressive error (AR(1))	-.030	.010	.002
Residual	.096	.001	<.001
Fixed effects			
Intercept (time=0)	1.685	.029	<.001
Time	.00010	.00008	.238
I touch lag (ITch → ITch)	.715	.020	<.001
I vocal affect lag (IVcA → ITch)	.082	.025	.001
Hispanic	.0006	.017	.971
Black	-.013	.015	.418
Mother education	.003	.006	.679
I Tch → I Tch / I VcA → I Tch	-.003	.0009	.006
I Tch → I Tch / Black	.032	.014	.018
I VcA → I Tch / Hispanic	-.033	.014	.021
I Tch → I Tch / Mother education	.016	.005	.002
I VcA → I Tch / Mother education	-.013	.006	.043

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of infant touch data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. I touch lag (2) predicting I touch (I → I) = infant touch self-contingency; I vocal affect lag (3) predicting I touch (I → I) = infant touch interactive contingency with infant vocal affect; VcA= Vocal Affect, Tch= Touch.
Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low

Table 9-C
Using I Vocal Affect Lag and I Touch Lag to Predict Infant Vocal Affect Data Across 150 seconds. N=132

	Infant Vocal Affect		
Variable	B	SE B	*p*
Random effects			
Intercept	.005	.001	<.001
Slope	.000001	.0000	---
Intercept / slope	-.00001	.00001	.391
Autoregressive error (AR(1))	-.020	.017	.057
Residual	.133	.002	<.001
Fixed effects			
Intercept (time=0)	3.007	.012	<.001
Time	-.0006	.0001	<.001
I vocal affect lag (IVcA → IVcA)	.656	.009	<.001
I touch lag (ITch → IVcA)	.017	.006	.007
Gender	-.004	.016	.779
Black	-.056	.021	.008
I VcA → I VcA / Gender	-.052	.015	<.001

Note: 1. Estimated covariance and fixed effects of the "basic model" from best two-level linear models of infant vocal affect data across 150 seconds. N=132
2. All parameter entries are maximum likelihood estimates fitted using SAS PROC MIXED
3. "Lag" computed as weighted average of the prior seconds (up to 3: AR2, AR3) based on multilevel models (see method).
4. Infant vocal affect lag (4) predicting I vocal affect (I → I) = infant vocal affect self-contingency;
I touch lag (2) predicting I vocal affect (I → I) = infant vocal affect interactive contingency with infant touch;
VcA= Vocal Affect, Tch= Touch.
Number of lags in parentheses indicates number of lags significant, prior to computing weighted averages.
5. Black coded 1= Black, 0= non-Black; Hispanic coded 1= Hispanic, 0= non-Hispanic;
Gender coded 1 = Female, 0 = Male; Mother education coded 1=high, 0=low.