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Getting to the heart of child maltreatment : a multidimensional investigation using an extended family design

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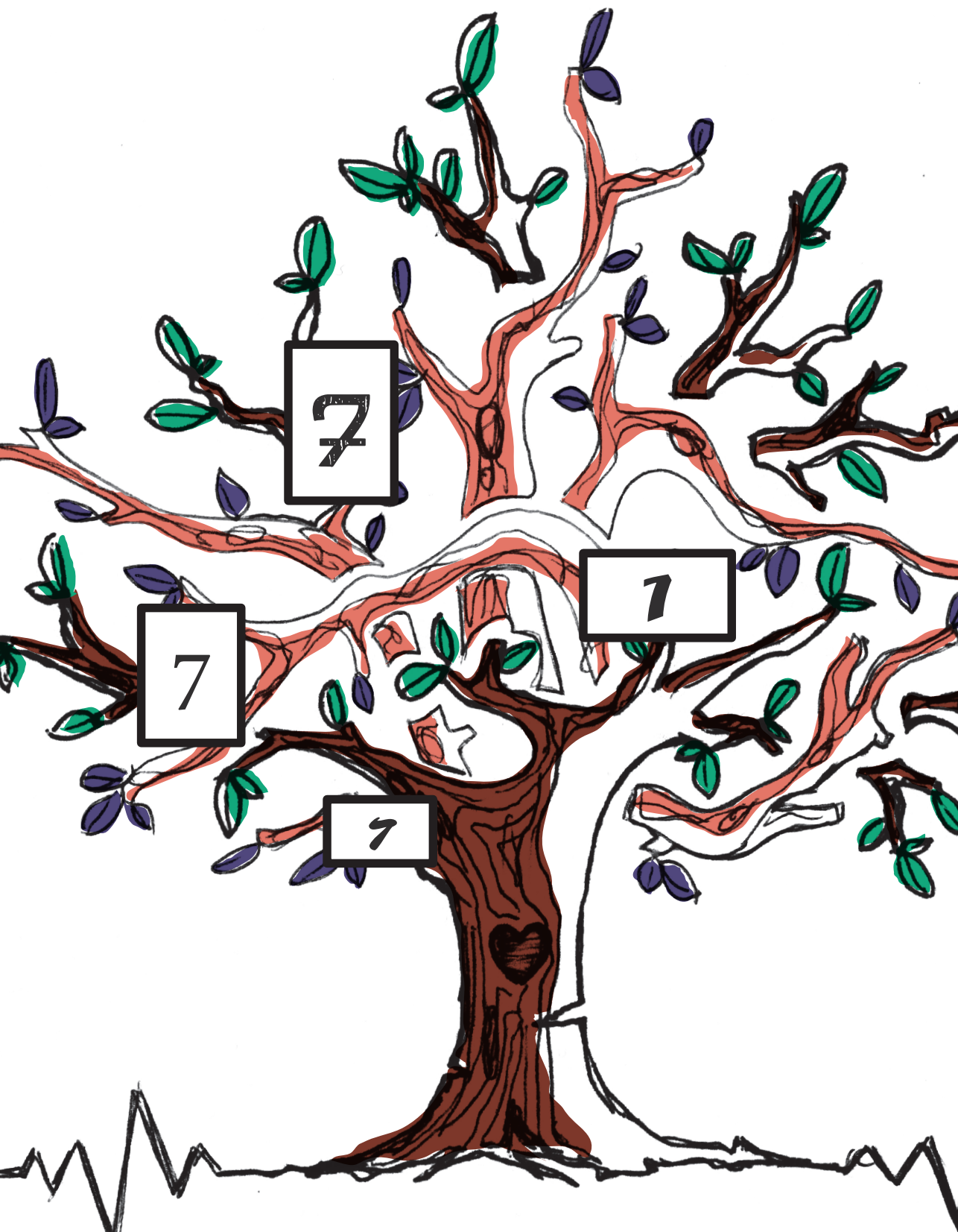


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Chapter 7

Supplementary material



Supplementary material Chapter 2

Table S2.1. Occurrence of self-reported experienced emotional and physical abuse and neglect.^{a, b}

	Never	Once	More than once
Abuse	14 (4%)	11 (3%)	310 (93%)
Physical Abuse	72 (21%)	41 (12%)	222 (66%)
Emotional Abuse	26 (8%)	17 (5%)	292 (87%)
Neglect	12 (4%)	3 (1%)	320 (96%)
Physical Neglect	215 (64%)	24 (7%)	96 (29%)
Emotional Neglect ^c	12 (4%)	3 (1%)	320 (96%)

^a Children reported about mother and father.

^b Occurrences are based on items describing concrete parenting behaviors rather than the overall scales.

^c Note that four of the emotional neglect items were recoded. This means that participants who 'never' experienced emotional neglect, reported that they '(almost) always' felt emotionally supported.

Table S2.2. Occurrence of self-reported perpetrated emotional and physical abuse and neglect^a

	Never	Once	More than once
Abuse	12 (5%)	19 (8%)	219 (88%)
Physical Abuse	19 (8%)	34 (14%)	197 (79%)
Emotional Abuse	61 (25%)	43 (17%)	146 (58%)
Neglect	27 (11%)	31 (12%)	192 (77%)
Physical Neglect	172 (69%)	57 (23%)	21 (8%)
Emotional Neglect ^b	31 (12%)	34 (14%)	185 (74%)

^a Parents reported about up to three children. As the number of children varied across parents, occurrence was based on the highest child score.

^b Note that four of the emotional neglect items were recoded. This means that participants who 'never' experienced emotional neglect, reported that they '(almost) always' felt emotionally supported.

Table S2.3. Summary of Correlations, Means, and Standard Deviations of non-imputed observed variables

	Mean (SD)	Exp. Abuse CR	Exp. Abuse FR	Exp. Abuse MR	Perp. Abuse PR	Perp. Abuse CR	Exp. Neglect CR	Exp. Neglect FR	Exp. Neglect MR	Perp. Neglect PR	Perp. Neglect CR	Gender G2	Age G2
Exp. Abuse CR	1.82 (1.23)												
Exp. Abuse FR	1.36 (0.82)	.37**											
Exp. Abuse MR	1.44 (0.98)	.34**	.31**										
Perp. Abuse PR	1.58 (0.92)	.49**	.21	.25*									
Perp. Abuse CR	1.49 (1.01)	.28**	-.04	.03	.33**								
Exp. Neglect CR	2.58 (1.36)	.53**	.26**	.12	.24**	.17*							
Exp. Neglect FR	1.56 (0.93)	.06	.18*	.20*	-.10	-.13	.25**						
Exp. Neglect MR	1.33 (0.91)	.07	.21*	.35**	-.14	-.27	.11	.38**					
Perp. Neglect PR	1.62 (1.01)	.11	-.09	.03	.32**	.09	.29**	.27	-.01				
Perp. Neglect CR	2.19 (1.08)	.06	.08	-.02	.20**	.29**	-.02	-.02	-.06	.35**			
Gender G2 (% male)	43.9%	.00	-.16*	.04	-.04	.01	.03	.04	-.03	-.21**	-.15		
Age G2	33.46 (16.90)	.28**	-.14	.05-	.10	.08	.33**	-.06	.00	.25**	-.08	.01	
Household SES	0.19 (0.68)	-.03	-.09	.02	-.09	.01	-.09	.01	.17*	.19**	-.12	.01	.06

Note. CR = Child report; FR = Father report; MR = Mother report; PR = Parent report; Exp. = maltreatment experienced by G2; Perp. = maltreatment perpetrated by G2; Sex: male coded as 1, and female coded as 2. Exp. Abuse FR indicate the abuse that was experienced by the child, but was perpetrated and reported by the father. The same applies to Exp. Abuse MR. * $p < .05$; ** $p < .01$

Informant agreement

We examined the absolute agreement between the different informants for experienced abuse and neglect separately by calculating the intraclass correlation coefficients (ICC (3,k), single measures, absolute agreement, see Shrout & Fleiss, 1979). ICC (3,k) was employed with experienced abuse and neglect of each target (i.e., the child) being rated by three reporters (i.e., mother, father, child). Intraclass correlations were computed for father-child, mother-child, and father-mother pairs separately. ICC's were averaged across imputed data sets. As shown in Table S2.4, agreement among all informants was modest (ICCs $\leq .35$). The lowest level of agreement was found between MR and CR for neglect, whereas the highest level of agreement was found between father and mother report for neglect, implying parents reported relatively similar regarding neglectful behavior.

Table S2.4. Concordance between different informants of abuse and neglect

	ICC (3,k)		
	Father-child	Mother-child	Father-mother
Abuse	0.32	0.28	0.31
Neglect	0.14	0.05	0.35

Supplementary material Chapter 3

Comparison of included and excluded participants

Of the 190 participants eligible for the task, 30 participants did not complete the infant vocalizations paradigm and were excluded. Included participants had a significantly lower SES than excluded participants, $t(185) = -2.50$, $p = .01$, and reported significantly more experienced abuse and neglect than excluded participants, $t(55.90) = 3.12$, $p < .01$ and $t(188) = 2.59$, $p = .01$ respectively. Included and excluded participants did not differ on ethnicity, age or gender ($ps > .45$).

A total of 160 participants were included in the perception analysis, 147 participants in the analysis on behavioral responses, and 135 participants in the analyses on autonomic responses. Included and excluded participants for the analysis on behavioral responses did not differ on any of the background variables (ethnicity, socio-economic status (SES), age, gender) or experienced abuse and neglect ($ps > .08$). Participants excluded from the analysis on autonomic responses were older ($t(158) = 4.74$, $p < .001$) and had a higher SES ($t(158) = 3.26$, $p < .01$).

Table S3.1. PEP and self-reported experienced abuse and neglect

	Model 1	Model 2	Model 3	Model 4
Fixed effects	Coef (se)	Coef (se)	Coef (se)	Coef (se)
Intercept	113.90 (2.01)***	109.41(3.09)***	119.89 (6.77)***	114.34 (9.19)***
Age		-0.04(0.21)	-0.05 (0.21)	0.01 (0.22)
Gender		7.64 (4.05)	6.81 (4.04)	7.73 (4.02)
Order			-6.43 (3.96)	-7.87 (3.98)
No sound - Cry			-1.43 (0.51) **	-1.43 (0.51)**
Laughter - Cry			-0.60 (0.51)	-0.61 (0.51)
Exp ^a Abuse				2.37 (1.78)
Exp Neglect				-2.21 (1.67)
Variance components				
Stimulus level Int ^b	17.72 (1.56)	17.72 (1.53)	17.22 (1.48)	17.22 (1.50)
Person level Int	538.24 (66.58)	523.50 (64.54)	507.15 (63.01)	503.55 (63.10)
Deviance	2912.26	2912.70	2908.18	2909.60

Note. Gender coded 0 = male, 1 = female. Order coded 0 = Laughter, 1 = Cry. Episode is dummy-coded in two dummies (No sound, Laughter) with Cry as the reference category. Because of extremely large confidence intervals for the variance at the family level, this level was removed from the analysis. Excluding variance at the family level did not influence the results. ^aExp = experienced, ^bInt = intercept. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table S3.2. Mean (SD) and Pearson correlations between all predictor and outcome variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Age	45.83 (9.97)																
2. Gender (% male)	.13	42															
3. Perception laughter	.28***	-.04															
4. Perception cry	.13	.06	.26**														
5. Handgrip no sound	.04	.04	-.00	.13													
6. Handgrip laughter	-.05	-.05	-.03	.08	.86***												
7. Handgrip cry	-.02	-.02	-.02	.06	.77***	.81***											
8. HR no sound	-.13	.16	.09	-.02	-.02	.02	-.02										
9. HR laughter	-.16	.12	.11	-.04	-.02	.03	-.01	.98***									
10. HR cry	-.13	.16	.11	-.02	-.01	.02	-.01	.98***	.98***								
11. PEP no sound	-.01	.18*	.04	.04	.04	-.01	.00	-.18*	-.18*	-.16							
12. PEP laughter	-.04	.16	-.00	.01	.04	-.00	.02	-.16	-.16	-.14	.97***						
13. PEP cry	-.06	.16*	.04	.01	.05	.00	.02	-.16	-.16	-.13	.97***	.97***					
14. RSA no sound	-.42***	.19*	-.12	-.08	.19*	.22*	.21*	-.44***	-.44***	-.45***	.07	.10	.09				
15. RSA laughter	-.40***	.23**	-.08	-.09	.12	.14	.17	-.46***	-.46***	-.47***	.14	.17	.16	.86***			
16. RSA cry	-.44***	.29**	-.12	-.06	.14	.14	.15	-.39***	-.39***	-.41***	.16	.17	.17	.88***	.88***		
17. Exp abuse	.21**	-.00	.17*	.06	-.07	-.05	.01	.04	.06	.04	.05	.05	.07	-.11	-.02	-.07	
18. Exp neglect	.45***	-.01	.12	.12	-.05	-.07	.06	.11	.10	.12	-.12	-.14	-.10	-.24***	-.24***	-.42***	.42***

Note. Gender coded 0 = male, 1 = female. Perceptions of laughter and crying represent negative perceptions. Values for RSA, experienced abuse and experienced neglect were log-transformed and multiplied by 10 to scale up the variance. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table S3.3. Hierarchical multiple regression analyses predicting resting HR, PEP, RSA from experienced abuse and neglect

Predictor	Autonomic measures					
	HR		PEP		RSA	
	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	0.15**		0.02		0.44***	
Control variables ^a						
Step 2	0.06*		0.02		0.02	
Experienced abuse		0.01 (0.81)		0.14 (2.07)		-0.02 (0.18)
Experienced neglect		0.26 (0.79)**		-0.08 (2.04)		-0.15 (0.18)

Note. Standard errors are in parentheses. Gender coded 0 = male, 1 = female. Values for experienced abuse and experienced neglect were log-transformed. ^aControl variables included gender, age, and significant lifestyle and disease factors: alcohol and exercise for HR, exercise and respiration rate for RSA. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table S3.4. Hierarchical multiple regression analyses predicting perceptions of cry and laughter sounds from experienced abuse and neglect

Predictor	Perceptions			
	Laughter		Cry	
	ΔR^2	β	ΔR^2	β
Step 1	0.09**		0.08**	
Age		0.26 (0.02)**		0.12 (0.03)
Gender		-0.03 (0.37)		0.06 (0.53)
Order		-0.12 (0.36)		-0.26 (0.52)**
Step 2	0.02		0.02	
Experienced abuse		0.15 (0.17)		0.14 (0.25)
Experienced neglect		-0.04 (0.17)		-0.01 (0.25)

Note. Standard errors are in parentheses Gender coded 0 = male, 1 = female. Order coded 0 = Laughter, 1 = Cry.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table S3.5. RSA during infant sounds and experienced abuse and neglect

	Model 1	Model 2	Model 3	Model 4
Fixed effects	Coef (se)	Coef (se)	Coef (se)	Coef (se)
Intercept	15.98 (0.23)***	19.78 (0.80)***	19.46 (1.03)***	19.43 (1.04)***
Age		-0.13 (0.02)***	-0.13 (0.02)***	-0.11 (0.02)***
Gender		1.21 (0.37)**	1.19 (0.37)**	1.16 (0.38)**
Respiration rate		-0.32 (0.04)***	-0.29 (0.04)***	-0.29 (0.04)***
Physical exercise		0.54 (0.21)*	0.55 (0.22)*	0.56 (0.22)*
Order			-0.13 (0.37)	-0.14 (0.38)
Baseline - Cry			0.07 (0.12)	0.07 (0.12)
Laughter - Cry			-0.16 (0.12)	-0.16 (0.12)
Experienced Abuse				-0.01 (1.00)
Experienced Neglect				-0.24 (0.19)
Variance components				
Stimulus level Intercept	1.08 (0.10)	0.90 (0.08)	0.89 (0.08)	0.88 (0.07)
Person level Intercept	6.60 (0.87)	4.14 (0.57)	4.16 (0.56)	4.08 (0.54)
Deviance	1571.73	1466.01	1468.50	1470.38

Note. Standard errors are in parentheses. Gender coded 0 = male, 1 = female. Order coded 0 = Laughter, 1 = Cry. Episode is dummy-coded in two dummies (No sound, Laughter) with Cry as the reference category.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Supplementary material Chapter 5

Family cohesion

Family cohesion was observed during a playful tower building game (Jenga). Nuclear families were asked to collaborate in building a tower as high as possible with the provided wooden parts. They were instructed to work on it for 10 minutes, and to start over should the tower collapse. The tower building was filmed and no other people were in the room. The task was coded with the System for Coding Interactions and Family Functioning (SCIFF; Lindahl, & Malik, 2000). The SCIFF was designed to code family problem discussions but has also been used successfully to code family play interactions (e.g., Shigeto, Mangelsdorf, & Brown, 2014). Although the SCIFF includes multiple scales of family functioning, we focused on the scale Cohesiveness in order to capture how families interact as a whole. Cohesiveness represents the sense of unity, togetherness, and closeness within a family. The degree of cohesiveness in a family represents the extent to which family members are affectionate, respectful, and warm to each other. Cohesiveness was rated on a 5-point scale (1 = very low, 2 = low, 3 = moderate, 4 = high, and 5 = very high). Very highly cohesive families demonstrate a sense of togetherness and closeness. These families show mutual appreciation as they work together toward a common goal.

The tower building task was coded by the first author and a trained research assistant (who did not code the dyadic parent-child interactions, see below). Coders were blind to maltreatment history and maltreatment perpetration. Extensive training in using the coding system was developed by the first, second and last author of the manuscript and was given by the first author. After training, 30 videos were coded to assess reliability. Interrater reliability (ICC; single measures, absolute agreement) between the two observers was .73, indicating good reliability. Subsequently videos were coded individually, and during biweekly meetings videos were discussed to minimize observer drift. Observations of family cohesion were missing for 12 nuclear families due to technical problems and for 6 families because parents and offspring could not attend on the same day.

Table S5.1. Descriptive statistics and correlation of non-imputed observed variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Individual level																
1. P to O Comm	-															
2. O to P Comm	.57**	-														
3. Dyadic A. D.	.30**	-.52**	-													
4. Abuse	-.24**	-.21**	-.07	-												
5. Neglect	-.06	-.13*	.05	.29**	-											
6. Problem	.04	-.18**	.09	.03	.06	-										
7. Supp Role	.03	-.11*	.07	-.04	.04	.27**	-									
8. Age P	-.07	.05	-.04	.11*	.09	-.23**	-.72**	-								
9. Age O	-.08	.09	-.08	.14**	.06	-.26**	-.76**	.93**	--							
10. Gender P	.11*	-.08	.18**	.09	-.13*	.02	-.06	.00	.07	-						
11. Gender O	.15**	.14*	.01	-.06	.04	-.02	-.18*	.10*	.12*	.02	-					
12. SES P	.12*	.06	.01	-.10	-.00	.15**	.26**	-.28**	-.37**	-.09	.05	-				
13. SES O	.08	.11	-.07	.01	.01	-.02	-.08	.16**	.09	-.02	.08	.52**	-			
Family level																
14. Cohesion	.15**	.34**	-.19**	-.05	.06	-.19**	-.19**	.15**	.22**	-.03	.20**	.11	.07	-		
15. Abuse	-.15**	-.18**	-.00	.79**	.23**	-.02	-.06	.14**	-.09	.07	-.09	-.13*	.01	-.07	-	
16. Neglect	.01	-.08	.05	.24**	.76**	.04	.03	.11**	.09	-.02	.00	-.01	.01	.09	-.30**	-
17. Size	-.00	.07	-.06	-.06	.01	-.13*	.11*	-.08	-.08	-.11*	-.10	.18**	-.01	-.10	-.09	-.01
Means	5.47	6.17	0.45	1.39	1.73	0.90	0.60	53.87	24.55	0.55	0.57	-0.05	0.20	3.14	1.39	1.73
SDs	1.38	1.62	1.29	0.81	0.87	0.30	0.49	13.34	13.91	0.50	0.50	0.81	0.66	1.20	0.64	0.66

Note. P = Parent, O = Offspring, Comm = Communication, A = Affective, D = Dissimilarity, Supp. = Supportive. Values for abuse and neglect were log-transformed. Variables 14 and 15 represent abuse and neglect scores aggregated at the nuclear family level. Gender: 0 = male, 1 = female. * $p < .05$; ** $p < .01$.

Table S5.2. Correlations between pooled study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Individual level																
1. P to O Comm	-															
2. O to P Comm	.57**	-														
3. Dyadic A. D.	.30**	-.52**	-													
4. Abuse	-.24**	-.22**	-.06	-												
5. Neglect	-.06	-.13*	.06	.29**	-											
6. Problem	.04	-.17**	.08	.02	.05	-										
7. Supp Role	.04	-.09	.05	-.06	-.00	.27**	-									
8. Age P	-.08	.04	-.03	.11*	.09	-.24**	-.71**	-								
9. Age O	-.09	.07	-.07	.14**	.06	-.26**	-.75**	.93**	-							
10. Gender P	.10	-.07	.17**	.09	-.13*	.03	-.05	.00	.07	-						
11. Gender O	.15**	.12*	.01	-.06	.04	-.01	-.16**	.10*	.12*	.02	-					
12. SES P	.13*	.07	-.01	-.10	-.00	.17**	.30**	-.28**	-.37**	-.09	.05	-				
13. SES O	.08	.10	-.07	.01	.01	-.02	-.06	.16**	.09	-.02	.08	.53**	-			
Family level																
14. Cohesion	.16**	.33**	-.17**	-.05	.06	-.17**	-.15**	.10	.17**	-.01	-.19**	.11	.07	-		
15. Abuse	-.17**	-.20**	.01	.79**	.23**	-.03	-.09	.14**	.17**	.07	-.09	-.13*	.01	-.08	-	
16. Neglect	.00	-.08	.05	.24**	.76**	.02	-.01	.11**	.09	-.02	.00	-.01	.01	.08	.30**	-
17. Family size	.01	.08	-.06	-.06	.01	-.11*	.13*	-.08	-.11	-.11*	-.10	.18**	-.01	-.12*	-.09	-.01

Note. P = Parent, O = Offspring, Comm = Communication, A = Affective, D = Dissimilarity, Supp. = Supportive. Values for abuse and neglect were log-transformed. Variables 14 and 15 represent abuse and neglect scores aggregated at the nuclear family level. Gender: 0 = male, 1 = female. * $p < .05$; ** $p < .01$.

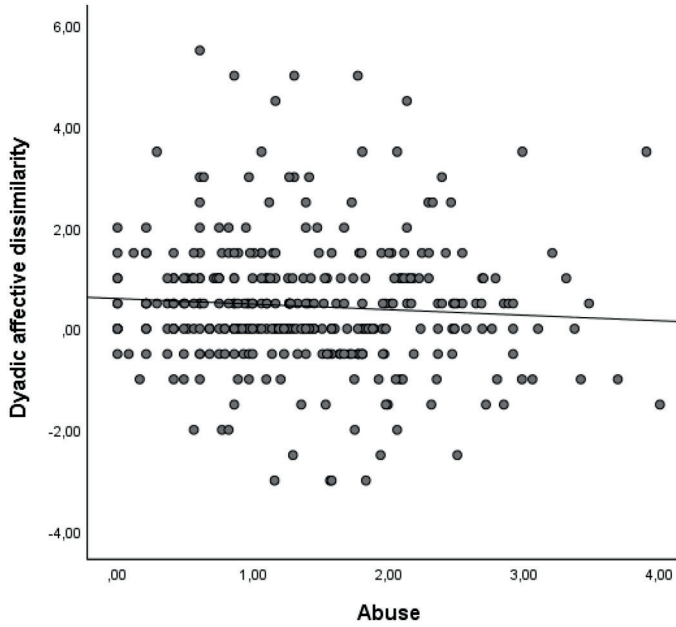


Figure S5.1

Association between abuse and dyadic affective dissimilarity

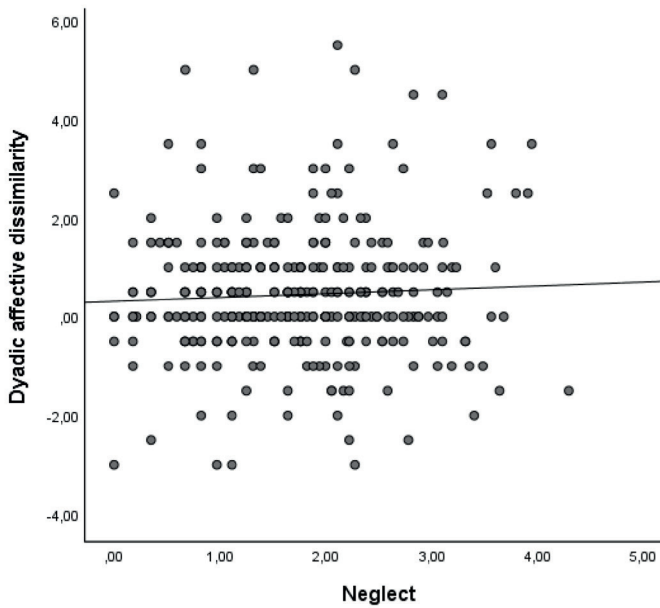


Figure S5.2

Association between neglect and dyadic affective dissimilarity

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