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Early childhood attachment stability and change: a meta-analysis

Jessica E. Opie , Jennifer E. McIntosh , Timothy B. Esler , Robbie Duschinsky , Carol George , Allan Schore , Emily J. Kothe , Evelyn S. Tan , Christopher J. Greenwood & Craig A. Olsson

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Early childhood attachment stability and change: a meta-analysis

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ABSTRACT

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ARTICLE HISTORY
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KEYWORDS
Attachment; stability; publication bias; early childhood; meta-analysis

Introduction

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CONTACT Jessica E. Opie jessicaeopie@gmail.com Centre for Social and Early Emotional Development, School of Psychology, Deakin University, Australia

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Two-way organised/disorganised van IJzendoorn et al., 1999	Organised (B+A+C)			Disorganised (D)
Three-way	Secure (B)	Avoidant (A)	Resistant (C)	
Four-way Vice, 2004	Secure (B)	Avoidant (A)	Resistant (C)	Disorganised (D)

Figure 1. Levels of attachment examination. Previous meta-analyses are indicated at relevant levels. The most detailed subclassification level is not shown.

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Data collection

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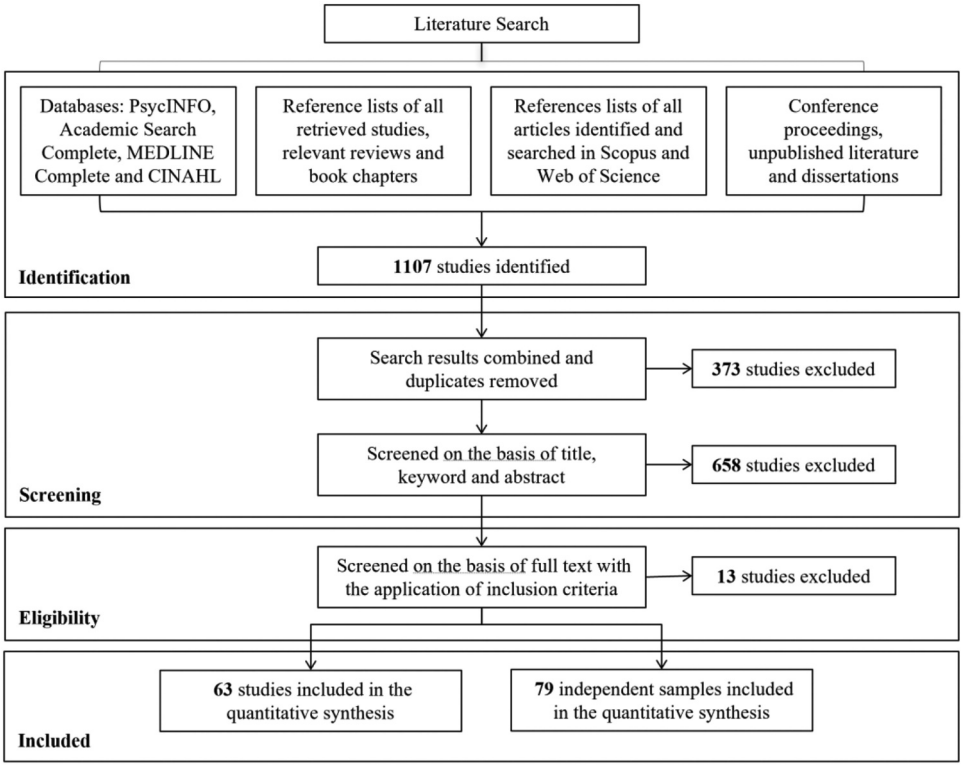

Figure 2. PRISMA diagram of data identification process.

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Concept 1: (*attachment**)

AND

Concept 2: (*child** OR *infant** OR *mother-infant* OR *toddler** *toddler-parent* OR *parent-child* OR *child-caregiver* OR *infant-parent* OR *pre-school** OR *preschool** OR *kindergarten** OR *"school*"*)

AND

Concept 3: (*continuit** OR *discontinu** OR *stability* OR *stable* OR *instability* OR *varia** OR *chang** OR *unstable* OR *consisten** OR *inconsisten** OR *longitudinal**)

AND

Concept 4: ("*strange situation*")

Figure 3. Meta-analytic search criteria for data collection. The use of the wildcard sign (*) at the end of a word enables databases to find words with alternative spelling and/or word variations, while the use of quotation marks ensures that multiple words are searched as a complete phrase and not as the individual words that comprise it. All search concepts, search terms, and databases were selected and developed with the assistance of a specialist health-science librarian.

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Inclusion and exclusion criteria

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Sample characteristics

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Table 1. Descriptive information of included studies (natural history studies).

Study Name (Year)	T1/T2 (mo)	Interval	Coding Method	Social Risk	Medical Risk	Published	Prior Inclusion	Country	IRR (%)	Parent Sex	Data Level	*N*
Ahnert et al. (2004)	15/18	I–I	A-A	No	No	Yes	S/IS	Germany	89	F	2S	56
Aikins et al. (2009)	12/48	I-P	A-CM	No	No	Yes	S/IS	USA	-	M,F	2S	83
Ainsworth et al. (1978)	12/13	I–I	A-A	No	No	Yes	S/IS	USA	-	F	2S,3	23
Ammaniti et al. (2005)	12/64	I-E	A-CM	No	No	Yes	S/IS	Italy	-	F	2S,3	35
Atkinson et al. (1999)	26/42	T-P	A-A	No	Yes	Yes	S/IS	Canada	73	F	2S	53
Bakermans-Kranenburg and van IJzendoorn (1997)	12/14	I–I	A-A	No	No	No	D/O	Netherlands	-	F	2D	81
Bar-Haim et al. (2000)	14/24	I-T	A-A	No	No	Yes	S/IS	USA	82	F	2S,3	42
	24/58	T-P	A-CM	No	No	Yes	S/IS	USA	82	F	2S,3	45
	14/58	I-P	A-CM	No	No	Yes	S/IS	USA	82	F	2S,3	43
Barnett et al. (2006)	25/41	T-P	A/CM-CM	No	Yes	Yes	S/IS	USA	94	F	2S	50
Barnett et al. (1999)	12/24	I-T	A-A	No	No	Yes	S/IS	USA	90	F	2S,4,2D	20
	12/18	I–I	A-A	No	No	Yes	S/IS	USA	87	F	2S,4,2D	21
	18/24	I-T	A-A	No	No	Yes	S/IS	USA	88	F	2S,4,2D	20
	12/24	I-T	A-A	Yes	No	Yes	S/IS	USA	90	F	2S,4,2D	16
	12/18	I–I	A-A	Yes	No	Yes	S/IS	USA	87	F	2S,4,2D	18
	18/24	I-T	A-A	Yes	No	Yes	S/IS	USA	88	F	2S,4,2D	16
Belsky et al. (1996)	13/20	I-T	A-A	No	No	Yes	S/IS	USA	93	M	2S,3	120
	12/18	I–I	A-A	No	No	Yes	S/IS	USA	93	F	2S,3	125
	12/18	I–I	A-A	No	No	Yes	S/IS	USA	96	F	2S,3	90
Cassidy (1988)	74/75	E-E	MC-MC	No	No	Yes	S/IS	USA	84	F	2S	52
Cicchetti and Barnett (1991)	30/48	T-P	CM-CM	Yes	No	Yes	S/IS	USA	75	M,F	2S,4,2D	18
	36/48	T-P	CM-CM	Yes	No	Yes	S/IS	USA	75	M,F	2S,4,2D	25
	30/48	T-P	CM-CM	Yes	No	Yes	S/IS	USA	75	M,F	2S,4,2D	20
	36/48	T-P	CM-CM	Yes	No	Yes	S/IS	USA	75	M,F	2S,4,2D	15
Cicchetti et al. (2006)	12/26	I-T	A-SR	Yes	No	Yes	S/IS	USA	88	F	2S,4,2D	54
	12/26	I-T	A-SR	No	No	Yes	S/IS	USA	88	F	2S,4,2D	44
Connell (1977)	12/18	I–I	A-A	No	No	No	S/IS	USA	94	F	2S,3	47
Easterbrooks (1989)	13/20	I-T	A-A	No	No	Yes	S/IS	USA	-	M	2S	59
	13/20	I-T	A-A	No	No	Yes	S/IS	USA	-	F	2S	57
Edwards et al. (2004)	12/18	I–I	A-A	Yes	No	Yes	S/IS	USA	89	F	2S,4,2D	217
	12/18	I–I	A-A	Yes	No	Yes	S/IS	USA	89	M	2S,4,2D	208
Egeland and Farber (1984)	12/18	I–I	A-A	Yes	No	Yes	S/IS	USA	91	F	2S,3	189
Egeland and Sroufe (1981)	12/18	I–I	A-A	Yes	No	Yes	S/IS	USA	91	F	2S,3	25
	12/18	I–I	A-A	No	No	Yes	S/IS	USA	91	F	2S,3	32
Fagot and Pears (1996)	18/30	I-T	A-CM	No	No	Yes	S/IS	USA	83	F	2S,3	96
Fish (2004)	15/48	I-P	A-CM	Yes	No	Yes	S/IS	USA	77	F	2S,4,2D	82

(*Continued*)

Table 1. (Continued).

Study Name (Year)	T1/T2 (mo)	Interval	Coding Method	Social Risk	Medical Risk	Published	Prior Inclusion	Country	IRR (%)	Parent Sex	Data Level	*N*
Frodi et al. (1985)	12/20	I-T	A-A	No	No	Yes	S/IS	USA	79	F	2S,3	38
Ganiban et al. (2000)	19/27	I-T	A-A	No	Yes	Yes	S/IS	USA	100	F	2S,4,2D	30
Hautamäki et al. (2010)	12/36	I-T	A-CM	No	No	Yes	S/IS	Finland	98	M,F	2S,3	33
Howes and Hamilton (1992)	12/48	I-P	A-CM	No	No	Yes	S/IS	USA	-	F	2S,3	89
T. Jacobsen et al. (1997)	12/72	I-E	A-MC	No	No	Yes	S/IS, D/O	Germany	-	F	2S	32
	18/72	I-E	A-MC	No	No	Yes	S/IS	Germany	-	F	2S	32
H. Jacobsen et al. (2014)	23/36	T-P	A-CM	Yes	No	Yes	-	Norway	82	F	2S	55
	23/36	T-P	CM-CM	No	No	Yes	-	Norway	82	F	2S	40
Korntheuer et al. (2010)	12/24	I-T	A-G	No	No	Yes	S/IS	Germany	-	F	2S	81
Kreppner et al. (2011)	48/72	P-E	CM-CM	No	No	Yes	-	UK	82	F	2S,4,2D	106
	48/72	P-E	CM-CM	Yes	No	Yes	-	Romania	81	F	2S,4,2D	31
Levendosky et al. (2011)	12/48	I-P	A-CM	Yes	No	Yes	S/IS	USA	83	F	2S,4,2D	150
Lounds et al. (2005)	12/60	I-E	A-CM	Yes	No	Yes	S/IS	USA	-	F	2S	78
Lyons-Ruth et al. (1991)	12/18	I–I	A-A	Yes	No	Yes	S/IS, D/O	USA	86	F	2S	46
Main and Cassidy (1988)	12/70	I-E	A-MC	No	No	Yes	S/IS, D/O	USA	83	F	2S,4,2D	40
	12/70	I-E	A-MC	No	No	Yes	S/IS, D/O	USA	77	M	2S,4,2D	40
Main and Weston (1981)	12/20	I-T	A-A	No	No	Yes	S/IS	USA	94	F	2S	15
	12/20	I-T	A-A	No	No	Yes	S/IS	USA	94	M	2S	15
Mangelsdorf et al. (1996)	14/19	I–I	A-A	No	No	Yes	S/IS	USA	90	F	2S	39
	14/19	I–I	A-A	No	Yes	Yes	S/IS	USA	90	F	2S	31
Maris et al. (2000)	12/24	I-T	A-CM	No	Yes	Yes	S/IS	USA	83	F	2S	24
	12/24	I-T	A-CM	No	No	Yes	S/IS	USA	83	F	2S	61
	12/24	I-T	A-CM	No	Yes	Yes	S/IS	USA	83	F	2S	22
Meins et al. (2017)	15/44	I-P	A-CM	No	No	Yes	-	UK	88	F	2S,4,2D	164
	15/51	I-P	A-CM	No	No	Yes	-	UK	87	F	2S,4,2D	128
Milentijevic et al. (1995)	14/42	I-P	A-CM	Yes	No	No	D/O	USA	80	F	2S,4,2D	86
Moss et al. (2005)	44/67	P-E	CM-CM	No	No	Yes	S/IS	Canada	90	F	2S,4,2D	120
NICHD (2001)	15/36	I-T	A-CM	No	No	Yes	S/IS	USA	79	F	2S,4,2D	1,060
Owens et al. (1984)	12/20	I-T	A-A	No	No	Yes	S/IS	USA	95	F	2S,3	59
	12/20	I-T	A-A	No	No	Yes	S/IS	USA	95	M	2S,3	53
Rauh et al. (2000)	12/21	I-T	A-A	No	No	Yes	S/IS, D/O	Germany	94	F	2S,4,2D	75
	12/21	I-T	MC-MC	No	No	Yes	S/IS	Germany	94	F	2S,4,2D	75
	12/21	I-T	MC-A	No	No	Yes	S/IS	Germany	94	F	2S,4,2D	75
	12/21	I-T	A-MC	No	No	Yes	S/IS	Germany	94	F	2S,4,2D	75
	12/21	I-T	MC-C	No	No	Yes	S/IS	Germany	94	F	2S,4,2D	75
	12/21	I-T	A-CM	No	No	Yes	S/IS	Germany	94	F	2S,4,2D	75

(*Continued*)

Table 1. (Continued).

Study Name (Year)	T1/T2 (mo)	Interval	Coding Method	Social Risk	Medical Risk	Published	Prior Inclusion	Country	IRR (%)	Parent Sex	Data Level	*N*
Schneider-Rosen et al. (1985)	12/18	I–I	A-A	No	No	Yes	S/IS	USA	90	M,F	2S,3	17
	12/18	I–I	A-A	No	No	Yes	S/IS	USA	91	M,F	2S,3	23
	12/18	I–I	A-A	Yes	No	Yes	S/IS	USA	90	M,F	2S,3	12
	12/18	I–I	A-A	Yes	No	Yes	S/IS	USA	91	M,F	2S,3	19
Seifer et al. (2004)	18/36	I-T	A-CM	Yes	No	Yes	S/IS	USA	90	F	2S,4,2D	601
Steele et al. (1996)	12/60	I-E	A-CM	No	No	No	D/O	UK	91	F	2S,4,2D	88
	12/72	I-E	A-CM	No	No	No	D/O	UK	91	M	2S,4,2D	68
Stevenson-Hinde and Shouldice (1993)	30/54	T-P	A-CM	No	No	Yes	S/IS	UK	88	F	2S,4,2D	72
Sutton (1994)	12/24	I-T	A-A	No	No	No	-	USA	82	F	2S	44
	12/58	I-P	A-CM	No	No	No	-	USA	82	F	2S	44
	24/58	T-P	A-CM	No	No	No	-	USA	82	F	2S	46
Takahashi (1990)	12/23	I-T	A-A	No	No	Yes	S/IS	Japan	-	F	2S	60
Thompson et al. (1982)	13/20	I-T	A-A	No	No	Yes	S/IS	USA	94	F	2S,3	43
Toth et al. (2006)	20/36	T-P	A-CM	No	No	Yes	-	USA	92	F	2S,4,2D	63
	20/36	T-P	A-CM	Yes	No	Yes	-	USA	92	F	2S,4,2D	54
Touris et al. (1995)	20/25	T-T	A-A	Yes	No	Yes	S/IS	USA	82	F	2S	20
	20/24	T-T	A-A	No	No	Yes	S/IS	USA	82	F	2S	20
B. Vaughn et al. (1979)	12/18	I–I	A-A	Yes	No	Yes	S/IS	USA	91	F	2S,3	100
B. E. Vaughn et al. (1980)	12/18	I–I	A-A	Yes	No	Yes	-	USA	92	F	2S,3	34
	12/18	I–I	A-A	Yes	No	Yes	-	USA	92	F	2S,3	18
	12/18	I–I	A-A	Yes	No	Yes	-	USA	92	F	2S,3	52
Vondra et al. (2001)	12/24	I-T	A-CM	Yes	No	Yes	-	USA	70	F	2S,4,2D	198
	12/18	I–I	A-A	Yes	No	Yes	S/IS	USA	77	F	2S,4,2D	195
Vondra et al. (1999)	12/18	I–I	A-A	Yes	No	Yes	-	USA	80	F	2S,4,2D	90
Wartner et al. (1994)	15/72	I-E	A-MC	No	No	Yes	D/O	Germany	97	F	2S,3,4,2D	39
Waters (1978)	12/18	I–I	A-A	No	No	Yes	S/IS	USA	92	F	2S,3	50
Waters and Valenzuela (1999)	18/28	I-T	A-A	Yes	No	Yes	-	Chile	86	F	2S,4,2D	34
	18/28	I-T	A-A	Yes	Yes	Yes	-	Chile	86	F	2S,4,2D	37
Wijnroks (1994)	12/18	I–I	A-A	No	Yes	No	S/IS	Germany	90	F	2S	35
Xue (2015)	13/42	I-P	A-CM	No	No	No	-	Canada	89	F	2S,4,2D	61
Ziegenhain and Wolff (2000)	12/18	I–I	A-A	No	No	Yes	S/IS	Germany	-	F	2S,4,2D	35

Several studies included multiple non-independent samples. In these cases, descriptions of each non-independent sample are aggregated in the Study Name (Year) column heading. T1/T2 (mo) – Child age in months at time one/time two. Interval – developmental interval. IRR – interrater reliability. F – Female. M – Male. I–I – Infancy-infancy. I-T – Infancy-toddlerhood. I-P – Infancy-preschool. I-E – Infancy-school entry. T-T – Toddlerhood-toddlerhood. T-P – Toddlerhood-preschool. P-E – Preschool-school entry. E-E – School entry-school entry. A – Ainsworth SSP. CM – Cassidy-Marvin SSP. MC – Main-Cassidy SSP. C – Crittenden SSP. G – Grossman SSP. SR – Schneider-Rosen SSP. S/IS (D/O) – Previously included in a two-way secure/insecure (organised/disorganised) meta-analysis. 2S – Two-way secure/insecure classifications. 2D – Two-way organised/disorganised. 3 – Three-way secure/avoidant/ambivalent. 4 – Four-way secure/avoidant/ambivalent/disorganised. *N* – Number of participants in each study.

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Correlational measures of effect

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Proportional measures of effect

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Statistical analysis

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Independence of effect size and variance

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Results

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Table 2. Coding of variables used in meta-analysis.

Variable	Continuous/ Discrete	Example	Description
Publication year	Continuous	2002	
Attachment coding tool employed	Discrete	Ainsworth (time 1), Crittenden (time 2)	
Included in prior meta-analysis	Discrete	Yes/No	
Publication status	**Discrete**	**Published/Not published**	
Country	Discrete	USA/Non-USA	
Social and medical risk	Discrete	Yes/No	Risk status based on factors such as socioeconomic position, race & ethnicity, and medical risk.
Interrater reliability (IRR)	Discrete	<80%/>80%	If both four- and two-way IRR was available, the four-way value was used. If reported for both time points, these values were averaged.

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Attachment stability throughout early childhood

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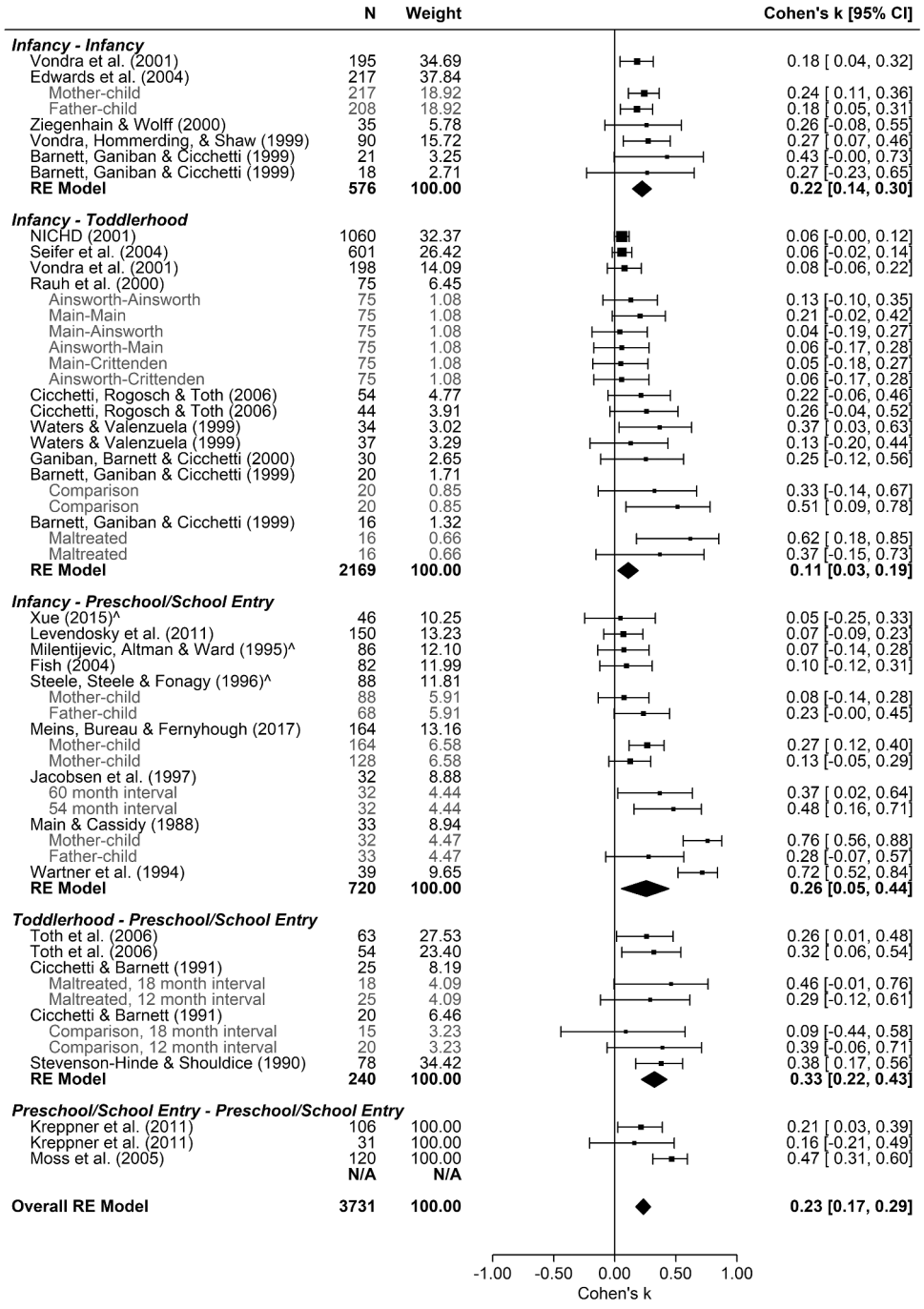

Figure 4. Attachment stability forest plots for the four-way attachment classification for early childhood. Cohen's? Correlations are shown for all included studies and their subsamples. Meta-analytic summaries are presented for each developmental interval and for the early childhood period overall. Summary stability correlations and associated 95% confidence intervals are presented for each group. For studies with multiple dependent samples, descriptions of each different sample are listed in grey below the study name, along with sample sizes and model weights. Where studies provided multiple

Stability of individual attachment patterns

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Comparison of individual attachment patterns

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stability proportion = $\beta_0 + \beta_1 \times$(attachment pattern) + $\beta_2 \times$(expected proportion)

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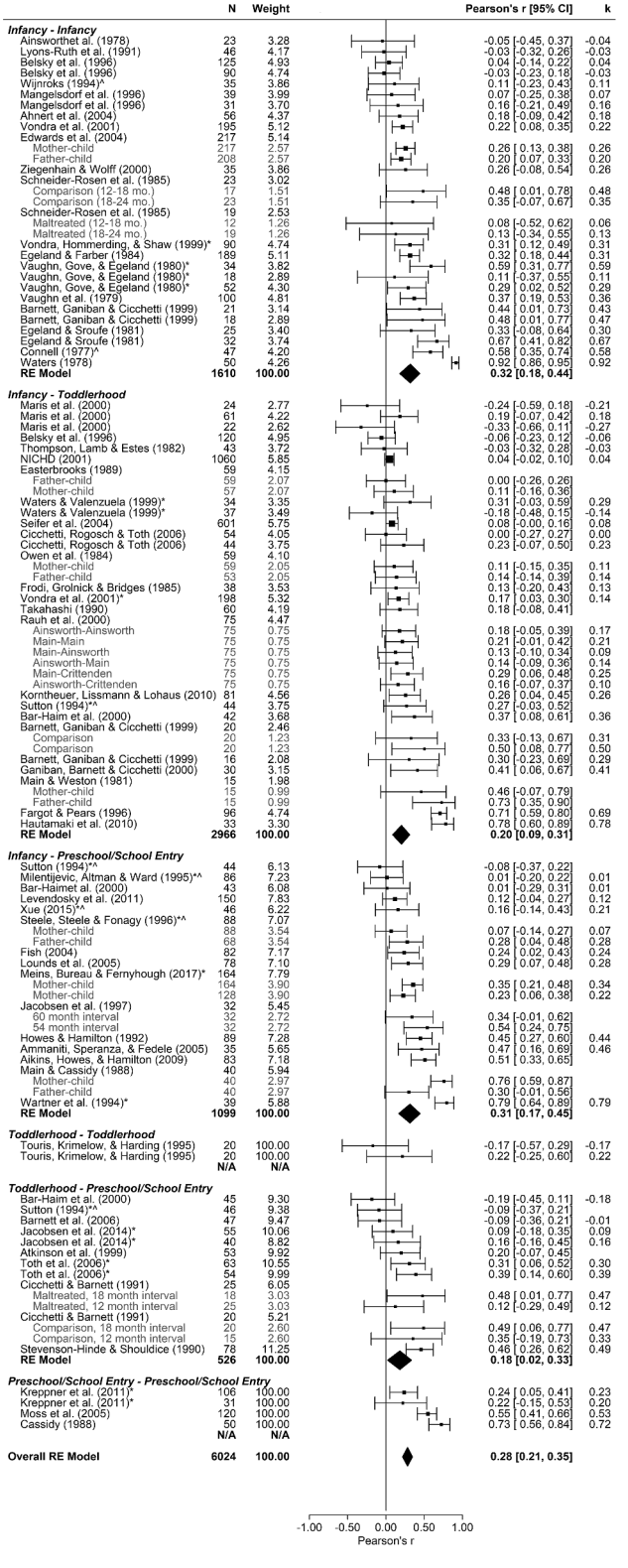
independent samples, these were included separately. In calculating the summary sample size for each random-effects model presented, the largest sample from each set of non-independent samples was used. Due to the small number of studies in in the intra-preschool/school entry interval, a summary effect was not calculated for that interval. Unpublished studies are identified by ^.


N Weight Pearson's r [95% CI] k
Infancy - Infancy
Ainsworthet al. (1978) 23 3.28 -0.05 [-0.45, 0.37] -0.04
Lyons-Ruth et al. (1991) 46 4.17 -0.03 [-0.32, 0.26] -0.03
Belsky et al. (1996) 125 4.93 0.04 [-0.14, 0.22] 0.04
Belsky et al. (1996) 90 4.74 -0.03 [-0.23, 0.18] -0.03
Wijnroks (1994)^ 35 3.86 0.11 [-0.23, 0.43] 0.11
Mangelsdorf et al. (1996) 39 3.99 0.07 [-0.25, 0.38] 0.07
Mangelsdorf et al. (1996) 31 3.70 0.16 [-0.21, 0.49] 0.16
Ahnert et al. (2004) 56 4.37 0.18 [-0.09, 0.42] 0.18
Vondra et al. (2001) 195 5.12 0.22 [0.08, 0.35] 0.22
Edwards et al. (2004) 217 5.14
Mother-child 217 2.57 0.26 [0.13, 0.38] 0.26
Father-child 208 2.57 0.20 [0.07, 0.33] 0.20
Ziegenhain & Wolff (2000) 35 3.86 0.26 [-0.08, 0.54] 0.26
Schneider-Rosen et al. (1985) 23 3.02
Comparison (12-18 mo.) 17 1.51 0.48 [0.01, 0.78] 0.48
Comparison (18-24 mo.) 23 1.51 0.35 [-0.07, 0.67] 0.35
Schneider-Rosen et al. (1985) 19 2.53
Maltreated (12-18 mo.) 12 1.26 0.08 [-0.52, 0.62] 0.06
Maltreated (18-24 mo.) 19 1.26 0.13 [-0.34, 0.55] 0.13
Vondra, Hommerding, & Shaw (1999)* 90 4.74 0.31 [0.12, 0.49] 0.31
Egeland & Farber (1984) 189 5.11 0.32 [0.18, 0.44] 0.31
Vaughn, Gove, & Egeland (1980)* 34 3.82 0.59 [0.31, 0.77] 0.59
Vaughn, Gove, & Egeland (1980)* 18 2.89 0.11 [-0.37, 0.55] 0.11
Vaughn, Gove, & Egeland (1980)* 52 4.30 0.29 [0.02, 0.52] 0.29
Vaughn et al. (1979) 100 4.81 0.37 [0.19, 0.53] 0.36
Barnett, Ganiban & Cicchetti (1999) 21 3.14 0.44 [0.01, 0.73] 0.43
Barnett, Ganiban & Cicchetti (1999) 18 2.89 0.48 [0.01, 0.77] 0.47
Egeland & Sroufe (1981) 25 3.40 0.33 [-0.08, 0.64] 0.30
Egeland & Sroufe (1981) 32 3.74 0.67 [0.41, 0.82] 0.67
Connell (1977)^ 47 4.20 0.58 [0.35, 0.74] 0.58
Waters (1978) 50 4.26 0.92 [0.86, 0.95] 0.92
RE Model 1610 100.00 0.32 [0.18, 0.44]
Infancy - Toddlerhood
Maris et al. (2000) 24 2.77 -0.24 [-0.59, 0.18] -0.21
Maris et al. (2000) 61 4.22 0.19 [-0.07, 0.42] 0.18
Maris et al. (2000) 22 2.62 -0.33 [-0.66, 0.11] -0.27
Belsky et al. (1996) 120 4.95 -0.06 [-0.23, 0.12] -0.06
Thompson, Lamb & Estes (1982) 43 3.72 -0.03 [-0.32, 0.28] -0.03
NICHD (2001) 1060 5.85 0.04 [-0.02, 0.10] 0.04
Easterbrooks (1989) 59 4.15
Father-child 59 2.07 0.00 [-0.26, 0.26]
Mother-child 57 2.07 0.11 [-0.16, 0.36]
Waters & Valenzuela (1999)* 34 3.35 0.31 [-0.03, 0.59] 0.29
Waters & Valenzuela (1999)* 37 3.49 -0.18 [-0.48, 0.15] -0.14
Seifer et al. (2004) 601 5.75 0.08 [-0.00, 0.16] 0.08
Cicchetti, Rogosch & Toth (2006) 54 4.05 0.00 [-0.27, 0.27] 0.00
Cicchetti, Rogosch & Toth (2006) 44 3.75 0.23 [-0.07, 0.50] 0.23
Owen et al. (1984) 59 4.10
Mother-child 59 2.05 0.11 [-0.15, 0.35] 0.11
Father-child 53 2.05 0.14 [-0.14, 0.39] 0.14
Frodi, Grolnick & Bridges (1985) 38 3.53 0.13 [-0.20, 0.43] 0.13
Vondra et al. (2001)* 198 5.32 0.17 [0.03, 0.30] 0.14
Takahashi (1990) 60 4.19 0.18 [-0.08, 0.41]
Rauh et al. (2000) 75 4.47
Ainsworth-Ainsworth 75 0.75 0.18 [-0.05, 0.39] 0.17
Main-Main 75 0.75 0.21 [-0.01, 0.42] 0.21
Main-Ainsworth 75 0.75 0.13 [-0.10, 0.34] 0.09
Ainsworth-Main 75 0.75 0.14 [-0.09, 0.36] 0.14
Main-Crittenden 75 0.75 0.29 [0.06, 0.48] 0.25
Ainsworth-Crittenden 75 0.75 0.16 [-0.07, 0.37] 0.10
Korntheuer, Lissmann & Lohaus (2010) 81 4.56 0.26 [0.04, 0.45] 0.26
Sutton (1994)*^ 44 3.75 0.27 [-0.03, 0.52]
Bar-Haim et al. (2000) 42 3.68 0.37 [0.08, 0.61] 0.36
Barnett, Ganiban & Cicchetti (1999) 20 2.46
Comparison 20 1.23 0.33 [-0.13, 0.67] 0.31
Comparison 20 1.23 0.50 [0.08, 0.77] 0.50
Barnett, Ganiban & Cicchetti (1999) 16 2.08 0.30 [-0.23, 0.69] 0.29
Ganiban, Barnett & Cicchetti (2000) 30 3.15 0.41 [0.06, 0.67] 0.41
Main & Weston (1981) 15 1.98
Mother-child 15 0.99 0.46 [-0.07, 0.79]
Father-child 15 0.99 0.73 [0.35, 0.90]
Fargot & Pears (1996) 96 4.74 0.71 [0.59, 0.80] 0.69
Hautamaki et al. (2010) 33 3.30 0.78 [0.60, 0.89] 0.78
RE Model 2966 100.00 0.20 [0.09, 0.31]
Infancy - Preschool/School Entry
Sutton (1994)*^ 44 6.13 -0.08 [-0.37, 0.22]
Milentijevic, Altman & Ward (1995)*^ 86 7.23 0.01 [-0.20, 0.22] 0.01
Bar-Haimet al. (2000) 43 6.08 0.01 [-0.29, 0.31] 0.01
Levendosky et al. (2011) 150 7.83 0.12 [-0.04, 0.27] 0.12
Xue (2015)*^ 46 6.22 0.16 [-0.14, 0.43] 0.21
Steele, Steele & Fonagy (1996)*^ 88 7.07
Mother-child 88 3.54 0.07 [-0.14, 0.27] 0.07
Father-child 68 3.54 0.28 [0.04, 0.48] 0.28
Fish (2004) 82 7.17 0.24 [0.02, 0.43] 0.24
Lounds et al. (2005) 78 7.10 0.29 [0.07, 0.48] 0.28
Meins, Bureau & Fernyhough (2017)* 164 7.79
Mother-child 164 3.90 0.35 [0.21, 0.48] 0.34
Mother-child 128 3.90 0.23 [0.06, 0.38] 0.22
Jacobsen et al. (1997) 32 5.45
60 month interval 32 2.72 0.34 [-0.01, 0.62]
54 month interval 32 2.72 0.54 [0.24, 0.75]
Howes & Hamilton (1992) 89 7.28 0.45 [0.27, 0.60] 0.44
Ammaniti, Speranza, & Fedele (2005) 35 5.65 0.47 [0.16, 0.69] 0.46
Aikins, Howes, & Hamilton (2009) 83 7.18 0.51 [0.33, 0.65]
Main & Cassidy (1988) 40 5.94
Mother-child 40 2.97 0.76 [0.59, 0.87]
Father-child 40 2.97 0.30 [-0.01, 0.56]
Wartner et al. (1994)* 39 5.88 0.79 [0.64, 0.89] 0.79
RE Model 1099 100.00 0.31 [0.17, 0.45]
Toddlerhood - Toddlerhood
Touris, Krimelow, & Harding (1995) 20 100.00 -0.17 [-0.57, 0.29] -0.17
Touris, Krimelow, & Harding (1995) 20 100.00 0.22 [-0.25, 0.60] 0.22
N/A N/A
Toddlerhood - Preschool/School Entry
Bar-Haim et al. (2000) 45 9.30 -0.19 [-0.45, 0.11] -0.18
Sutton (1994)*^ 46 9.38 -0.09 [-0.37, 0.21]
Barnett et al. (2006) 47 9.47 -0.09 [-0.36, 0.21] -0.01
Jacobsen et al. (2014)* 55 10.06 0.09 [-0.18, 0.35] 0.09
Jacobsen et al. (2014)* 40 8.82 0.16 [-0.16, 0.45] 0.16
Atkinson et al. (1999) 53 9.92 0.20 [-0.07, 0.45]
Toth et al. (2006)* 63 10.55 0.31 [0.06, 0.52] 0.30
Toth et al. (2006)* 54 9.99 0.39 [0.14, 0.60] 0.39
Cicchetti & Barnett (1991) 25 6.05
Maltreated, 18 month interval 18 3.03 0.48 [0.01, 0.77] 0.47
Maltreated, 12 month interval 25 3.03 0.12 [-0.29, 0.49] 0.12
Cicchetti & Barnett (1991) 20 5.21
Comparison, 18 month interval 20 2.60 0.49 [0.06, 0.77] 0.47
Comparison, 12 month interval 15 2.60 0.35 [-0.19, 0.73] 0.33
Stevenson-Hinde & Shouldice (1990) 78 11.25 0.46 [0.26, 0.62] 0.49
RE Model 526 100.00 0.18 [0.02, 0.33]
Preschool/School Entry - Preschool/School Entry
Kreppner et al. (2011)* 106 100.00 0.24 [0.05, 0.41] 0.23
Kreppner et al. (2011)* 31 100.00 0.22 [-0.15, 0.53] 0.20
Moss et al. (2005) 120 100.00 0.55 [0.41, 0.66] 0.53
Cassidy (1988) 50 100.00 0.73 [0.56, 0.84] 0.72
N/A N/A
Overall RE Model 6024 100.00 0.28 [0.21, 0.35]
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Pearson's r

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Evidence for publication bias

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Figure 5. Attachment stability forest plots for the two-way secure/insecure attachment classification for early childhood. Pearson's *r* correlations are shown for all included studies and their subsamples. Meta-analytic summaries are presented for each developmental interval and for the early childhood period overall. Summary stability correlations and associated 95% confidence intervals are presented for each group. For studies with multiple dependent samples, descriptions of each different sample are listed in grey below the study name, along with sample sizes and model weights. Where studies provided multiple independent samples, these were included separately. In calculating the summary sample size for each random-effects model presented, the largest sample from each set of non-independent samples was used. Due to the small number of studies in in the intra-preschool/school entry and intra-toddlerhood intervals, a summary effect was not calculated for those intervals. To facilitate direct comparison with four-way classification analysis, the "Matched Studies" column indicates studies for which both two-way secure/insecure and four-way data was available. The final column, "k", shows Cohen's *κ* effect sizes and summary estimates. Unpublished studies and studies not included in a prior secure/insecure meta-analysis are identified by ^ and *, respectively.

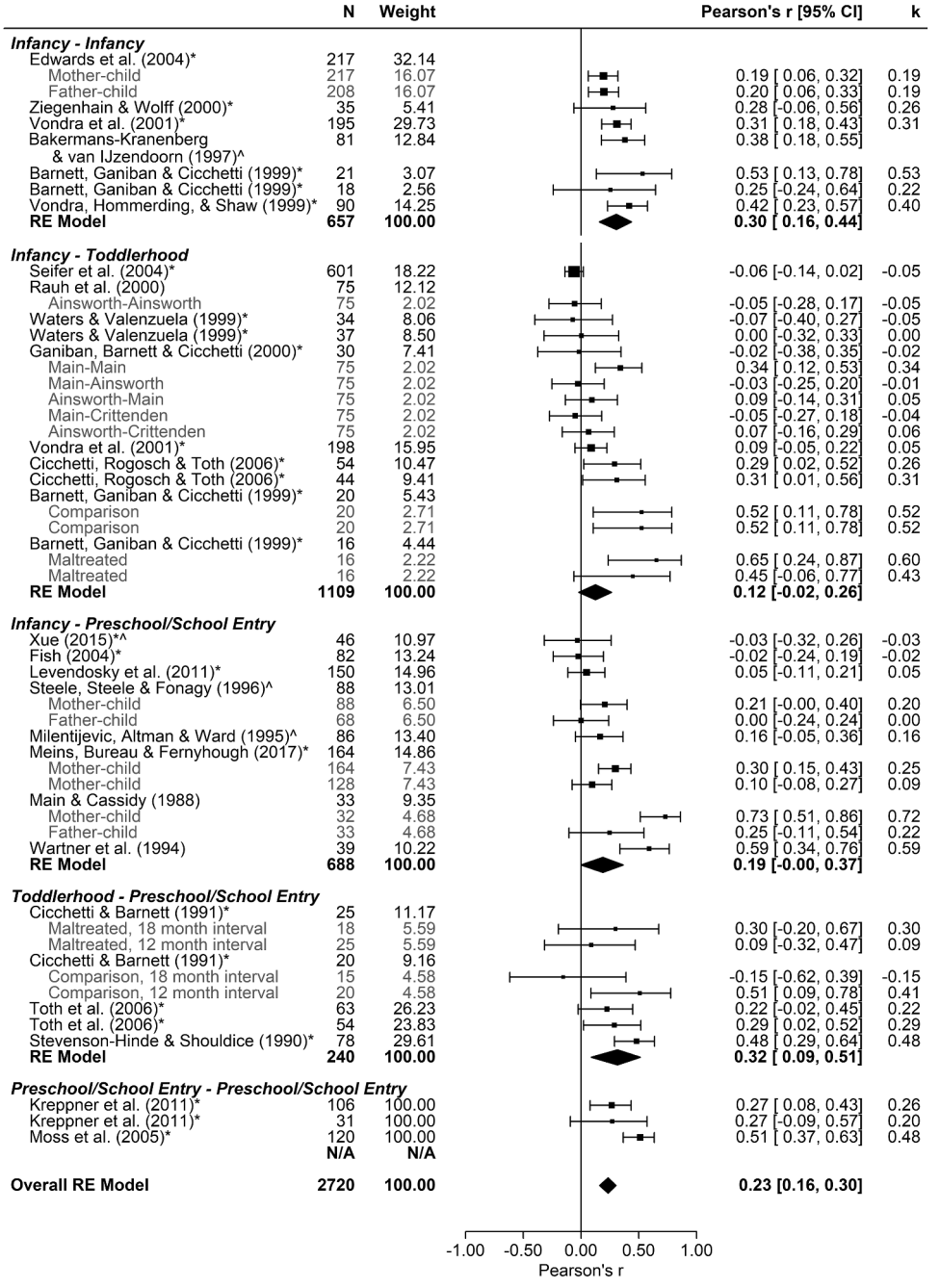

Figure 6. Attachment stability forest plots for the two-way organised/disorganised attachment classification for early childhood. Pearson's *r* correlations are shown for all included studies and their subsamples. Meta-analytic summaries are presented for each developmental interval and for the early childhood period overall. Summary stability correlations and associated 95% confidence intervals are presented for each group. For studies with multiple dependent samples, descriptions of each different sample are listed in grey below the study name, along with sample sizes and model weights. Where studies provided multiple independent samples, these were included separately. In calculating the summary sample size for each random-effects model presented, the largest sample from each set

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Sensitivity and moderator analyses

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Discussion

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Comparison to prior meta-analyses

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211H4 ' & " + & # " ' *'
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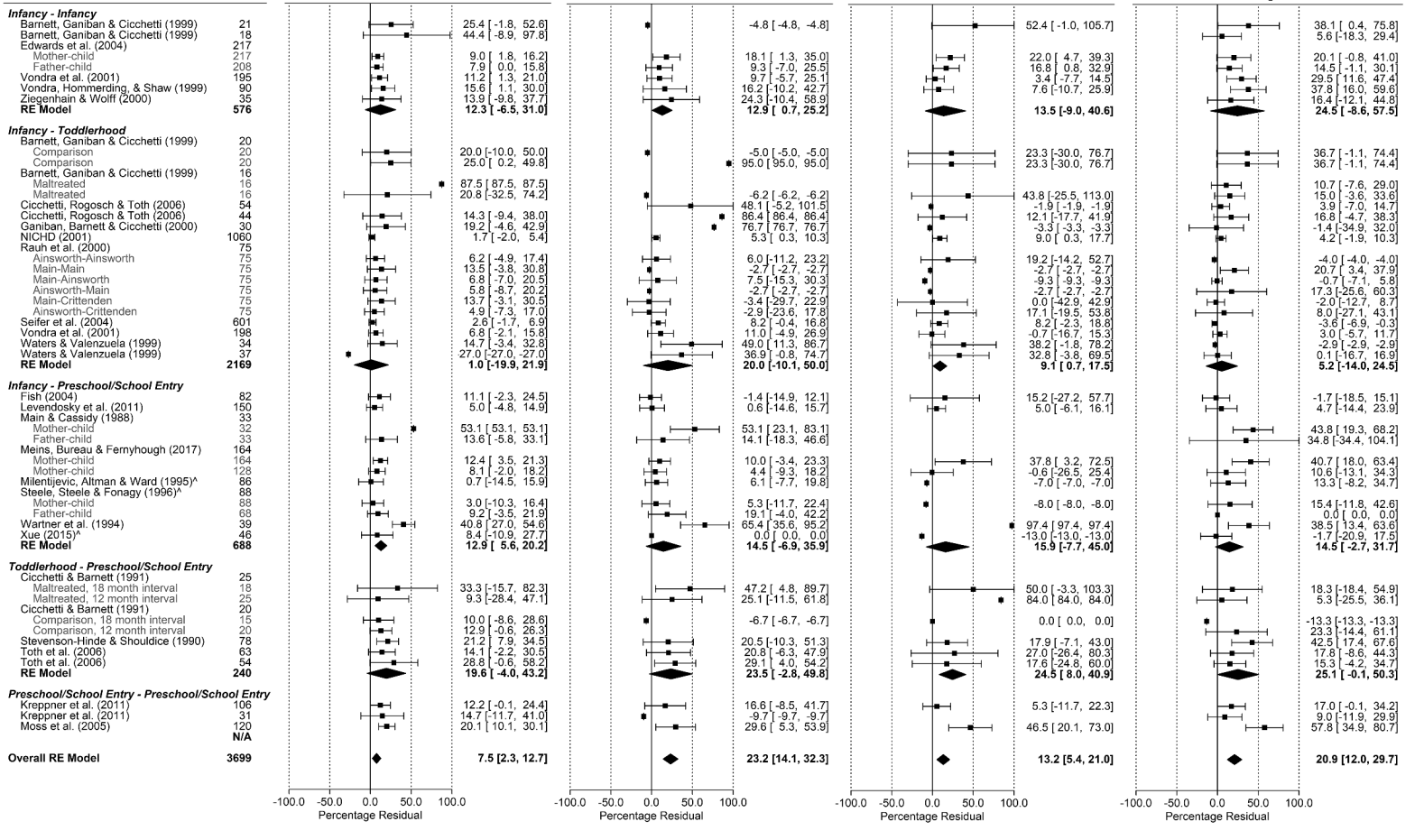
of non-independent samples was used. Due to the small number of studies in in the intra-preschool /school entry interval, a summary effect was not calculated for that interval. Unpublished studies and studies not included in a prior organised/disorganised meta-analysis are identified by ^ and *, respectively.


N
Secure
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Resistant
Disorganised
Infancy - Infancy
Barnett, Ganiban & Cicchetti (1999) 21 25.4 [-1.8, 52.6] -4.8 [-4.8, -4.8] 52.4 [-1.0, 105.7] 38.1 [0.4, 75.8]
Barnett, Ganiban & Cicchetti (1999) 18 44.4 [-8.9, 97.8] 5.6 [-18.3, 29.4]
Edwards et al. (2004) 217
Mother-child 217 9.0 [1.8, 16.2] 18.1 [1.3, 35.0] 22.0 [4.7, 39.3] 20.1 [-0.8, 41.0]
Father-child 208 7.9 [0.0, 15.8] 9.3 [-7.0, 25.5] 16.8 [0.8, 32.9] 14.5 [-1.1, 30.1]
Vondra et al. (2001) 195 11.2 [1.3, 21.0] 9.7 [-5.7, 25.1] 3.4 [-7.7, 14.5] 29.5 [11.6, 47.4]
Vondra, Hommerding, & Shaw (1999) 90 15.6 [1.1, 30.0] 16.2 [-10.2, 42.7] 7.6 [-10.7, 25.9] 37.8 [16.0, 59.6]
Ziegenhain & Wolff (2000) 35 13.9 [-9.8, 37.7] 24.3 [-10.4, 58.9] 16.4 [-12.1, 44.8]
RE Model 576 12.3 [-6.5, 31.0] 12.9 [0.7, 25.2] 13.5 [-9.0, 40.6] 24.5 [-8.6, 57.5]
Infancy - Toddlerhood
Barnett, Ganiban & Cicchetti (1999) 20
Comparison 20 20.0 [-10.0, 50.0] -5.0 [-5.0, -5.0] 23.3 [-30.0, 76.7] 36.7 [-1.1, 74.4]
Comparison 20 25.0 [0.2, 49.8] 95.0 [95.0, 95.0] 23.3 [-30.0, 76.7] 36.7 [-1.1, 74.4]
Barnett, Ganiban & Cicchetti (1999) 16
Maltreated 16 87.5 [87.5, 87.5] 10.7 [-7.6, 29.0]
Maltreated 16 20.8 [-32.5, 74.2] -6.2 [-6.2, -6.2] 43.8 [-25.5, 113.0] 15.0 [-3.6, 33.6]
Cicchetti, Rogosch & Toth (2006) 54 48.1 [-5.2, 101.5] -1.9 [-1.9, -1.9] 3.9 [-7.0, 14.7]
Cicchetti, Rogosch & Toth (2006) 44 14.3 [-9.4, 38.0] 86.4 [86.4, 86.4] 12.1 [-17.7, 41.9] 16.8 [-4.7, 38.3]
Ganiban, Barnett & Cicchetti (2000) 30 19.2 [-4.6, 42.9] 76.7 [76.7, 76.7] -3.3 [-3.3, -3.3] -1.4 [-34.9, 32.0]
NICHD (2001) 1060 1.7 [-2.0, 5.4] 5.3 [0.3, 10.3] 9.0 [0.3, 17.7] 4.2 [-1.9, 10.3]
Rauh et al. (2000) 75
Ainsworth-Ainsworth 75 6.2 [-4.9, 17.4] 6.0 [-11.2, 23.2] 19.2 [-14.2, 52.7] -4.0 [-4.0, -4.0]
Main-Main 75 13.5 [-3.8, 30.8] -2.7 [-2.7, -2.7] -2.7 [-2.7, -2.7] 20.7 [3.4, 37.9]
Main-Ainsworth 75 6.8 [-7.0, 20.5] 7.5 [-15.3, 30.3] -9.3 [-9.3, -9.3] -0.7 [-7.1, 5.8]
Ainsworth-Main 75 5.8 [-8.7, 20.2] -2.7 [-2.7, -2.7] -2.7 [-2.7, -2.7] 17.3 [-25.6, 60.3]
Main-Crittenden 75 13.7 [-3.1, 30.5] -3.4 [-29.7, 22.9] 0.0 [-42.9, 42.9] -2.0 [-12.7, 8.7]
Ainsworth-Crittenden 75 4.9 [-7.3, 17.0] -2.9 [-23.6, 17.8] 17.1 [-19.5, 53.8] 8.0 [-27.1, 43.1]
Seifer et al. (2004) 601 2.6 [-1.7, 6.9] 8.2 [-0.4, 16.8] 8.2 [-2.3, 18.8] -3.6 [-6.9, -0.3]
Vondra et al. (2001) 198 6.8 [-2.1, 15.8] 11.0 [-4.9, 26.9] -0.7 [-16.7, 15.3] 3.0 [-5.7, 11.7]
Waters & Valenzuela (1999) 34 14.7 [-3.4, 32.8] 49.0 [11.3, 86.7] 38.2 [-1.8, 78.2] -2.9 [-2.9, -2.9]
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Fish (2004) 82 11.1 [-2.3, 24.5] -1.4 [-14.9, 12.1] 15.2 [-27.2, 57.7] -1.7 [-18.5, 15.1]
Levendosky et al. (2011) 150 5.0 [-4.8, 14.9] 0.6 [-14.6, 15.7] 5.0 [-6.1, 16.1] 4.7 [-14.4, 23.9]
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Father-child 33 13.6 [-5.8, 33.1] 14.1 [-18.3, 46.6] 34.8 [-34.4, 104.1]
Meins, Bureau & Fernyhough (2017) 164
Mother-child 164 12.4 [3.5, 21.3] 10.0 [-3.4, 23.3] 37.8 [3.2, 72.5] 40.7 [18.0, 63.4]
Mother-child 128 8.1 [-2.0, 18.2] 4.4 [-9.3, 18.2] -0.6 [-26.5, 25.4] 10.6 [-13.1, 34.3]
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Toddlerhood - Preschool/School Entry
Cicchetti & Barnett (1991) 25
Maltreated, 18 month interval 18 33.3 [-15.7, 82.3] 47.2 [4.8, 89.7] 50.0 [-3.3, 103.3] 18.3 [-18.4, 54.9]
Maltreated, 12 month interval 25 9.3 [-28.4, 47.1] 25.1 [-11.5, 61.8] 84.0 [84.0, 84.0] 5.3 [-25.5, 36.1]
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Comparison, 18 month interval 15 10.0 [-8.6, 28.6] -6.7 [-6.7, -6.7] 0.0 [0.0, 0.0] -13.3 [-13.3, -13.3]
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Stevenson-Hinde & Shouldice (1990) 78 21.2 [7.9, 34.5] 20.5 [-10.3, 51.3] 17.9 [-7.1, 43.0] 42.5 [17.4, 67.6]
Toth et al. (2006) 63 14.1 [-2.2, 30.5] 20.8 [-6.3, 47.9] 27.0 [-26.4, 80.3] 17.8 [-8.6, 44.3]
Toth et al. (2006) 54 28.8 [-0.6, 58.2] 29.1 [4.0, 54.2] 17.6 [-24.8, 60.0] 15.3 [-4.2, 34.7]
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Figure 7. Attachment stability forest plots for disaggregated attachment classifications: security, avoidance, resistance, and disorganisation. For each classification, percentage residuals are presented, defined as the difference between the observed stability proportion and the expected value (or the value expected due to chance). Meta-analytic summaries are presented for each developmental interval and for the early childhood period overall. Summary stability percentage residuals and associated 95% confidence intervals are presented for each group. For studies with multiple dependent samples, descriptions of each different sample are listed in grey below the study name, along with sample sizes and model weights. Where studies provided multiple independent samples, these were included separately. In calculating the summary sample size for each random-effects model presented, the largest sample from each set of non-independent samples was used. Due to the small number of studies in in the intra-preschool/school entry interval, a summary effect was not calculated for that interval.

Table 3. Meta-analytic contingency table for early childhood.

		B	A	C	D	Count
B	Count	1401	192	251	248	2092
	Proportion	65.084	13.216	8.948	12.753	
	Expected Proportion	57.571	12.47	13.225	16.734	
	Adj. Stand. Residual	**13.182**	**−6.907**	−2.511	**−9.061**	
A	Count	264	143	58	95	560
	Proportion	36.721	35.673	8.48	19.126	
	Expected Proportion	57.571	12.47	13.225	16.734	
	Adj. Stand. Residual	**−5.419**	**10.158**	−2.175	0.158	
C	Count	181	37	100	44	362
	Proportion	43.964	10.116	26.445	19.475	
	Expected Proportion	57.571	12.47	13.225	16.734	
	Adj. Stand. Residual	**−3.068**	−1.363	**8.514**	−2.457	
D	Count	287	90	81	233	691
	Proportion	36.589	16.093	9.732	37.586	
	Expected Proportion	57.571	12.47	13.225	16.734	
	Adj. Stand. Residual	**−9.457**	0.49	−1.293	**13.262**	
	Count	2133	462	490	620	3705

B, A, C, and D correspond to secure, avoidant, resistant, and disorganised attachments. Proportion represents the proportion of the row total for each individual cell. Expected proportions represent the frequency of dyads expected based on the relative sizes of the B, A, C, and D groups. Cells with significant proportions are indicated by bolded adjusted standardised residuals (adj. stand. residual). Following the Bonferroni correction, the critical significance value for adjusted standardised residuals is approximately 2.95.

Table 4. Comparison of stability between different attachment patterns.

	B vs. A	B vs. C	B vs. D	A vs. C	A vs. D	C vs. D
Meta-regression analysis						
$\beta 1$	0.831	1.592	1.005	0.155	0.077	0.473
df	19.38	19.24	21.49	12.86	24.24	24.51
p-value	0.091	**0.018**	**0.009**	0.652	0.862	0.325
Direction	-	B > C	B > D	-	-	-
Odds ratios						
OR	5.912	5.312	3.985	0.8985	0.6741	0.7503
p-value	**< 0.0001**	**< 0.0001**	**< 0.0001**	0.482	**0.0017**	**0.0437**
Direction	B > A	B > C	B > D	-	D > A	D > C

Meta-regression estimates ($\beta 1$) are chance-adjusted, accounting for the degree of stability expected by chance, whereas odds ratios (*OR*) are not chance-adjusted. B > C indicates that B was found to be significantly more stable than C after adjusting for expected levels of stability.

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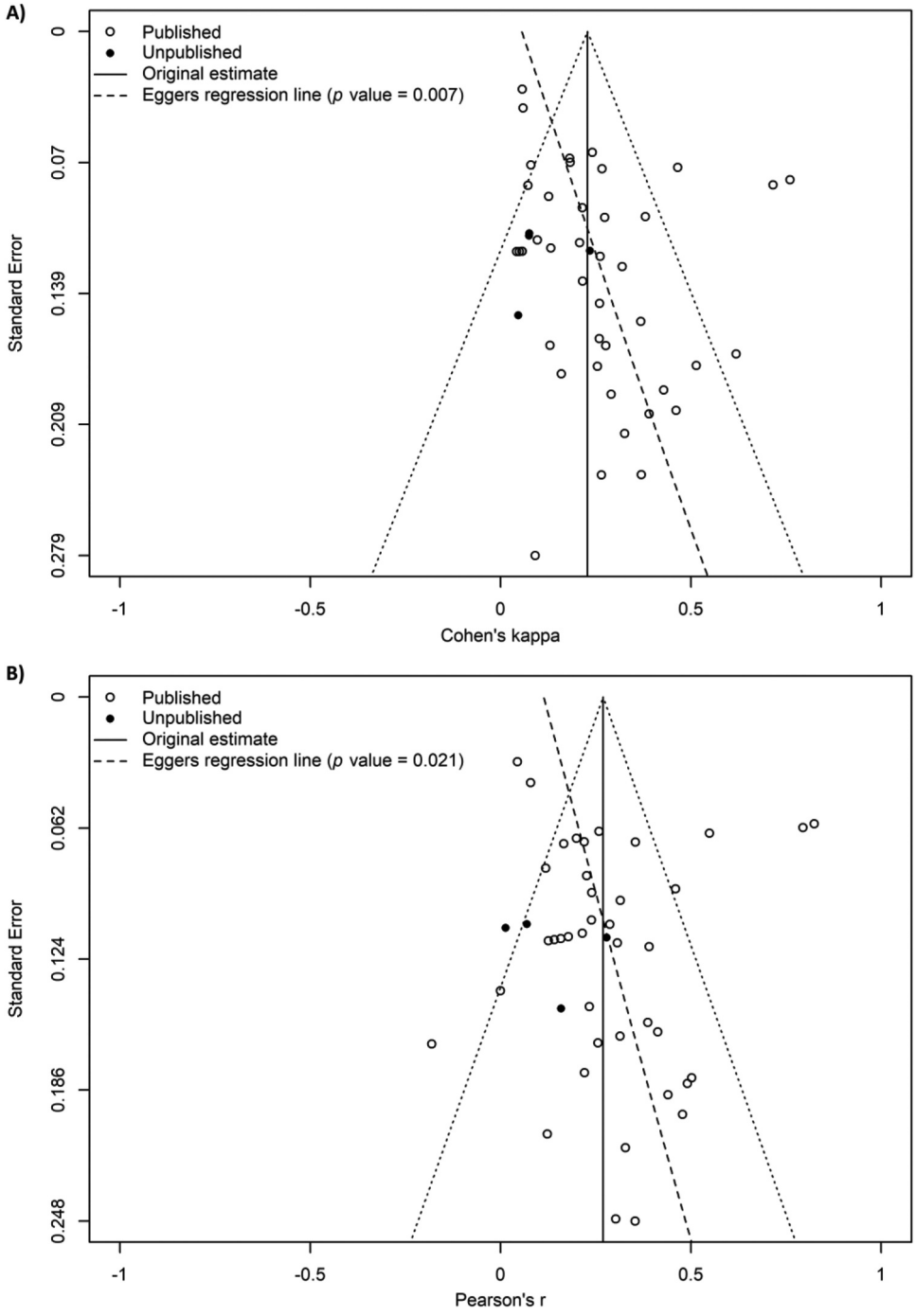

Figure 8. Funnel plots for (a) four-way and (b) two-way secure/insecure attachment stability correlation effect sizes. Published studies are marked by open circles and unpublished studies by filled circles. The Egger's regression line for each plot is indicated by the dashed line, with the associated *p*-value shown in the figure legend. Dotted lines indicate the expected 95% confidence bounds in the absence of publication bias.

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