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PARENTAL REPRESENTATIONS: A SYSTEMATIC REVIEW OF THE WORKING MODEL OF THE CHILD INTERVIEW

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ABSTRACT: This review provides an overview of results that have been obtained in studies using the Working Model of the Child Interview (WMCI). The WMCI is a structured interview that assesses parents' internal working models of the relationship with their young children. From the current infant mental health perspective, evaluating the quality of parents' representations about the infant–parent relationship is the main focus in the assessment and treatment of infants and their parents. Empirical quantitative studies ($N = 24$ articles) in which the WMCI was used for data collection were used for analysis. The distribution of balanced, disengaged, and distorted representations differed among various study populations. Parents' internal representations as reflected in their narratives about their child are affected by various factors such as maternal, child, and demographic characteristics. The WMCI is a valid and useful clinical and research tool that can be used in future studies examining the role of parental representations in infant development.

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From the current infant mental health perspective, evaluating the quality of the infant–parent relationship is the main focus in the assessment and treatment of infants and their parents (Zeanah, 2000). Infant–parent relationships are known to have long-term consequences for the physical and psychological health of infants later in life (DeKleyn & Greenberg, 2008; Lyons-Ruth & Jacobvitz, 2008; Rees, 2005; Sroufe, 2005; Sroufe, Egeland, Carlson, & Collins, 2005; Weinfield, Sroufe, Egeland, & Carlson, 2008). Children who develop a secure relationship with their parents or caregivers in their first years of life are known to have better cognitive outcomes, have better social interactions, display less behavioral problems, and achieve better at school (e.g., Thompson, 2008). The relationship between a parent and an infant, however, consists of more than merely interactions between both of them and can be seen as an open system of four major, interconnected components; that is, the infant's and parent's interactive behaviors and the infant's and parent's internal representations (Stern, 1995). A change in one of these components may have an impact on the other three as well. Therefore, assessment of the quality of the infant–parent relationship should focus on observable interactive behaviors as well as on internal subjective experiences, or internal representations, of the relationship of both parent and child (Zeanah, 2000).

The concept of internal representations was originally introduced by Bowlby (1969) to describe the process of storing daily life experiences of interactions with the primary caregiver as memory templates, which are then used to guide behaviors and expectations within other social relationships such as with one's own children. Recently, research has focused more on this topic by investigating internal representations that parents have of their own children (Rosenblum, Dayton, & Muzik, 2009). To examine these parental representations, researchers have started to systematically study subjective narrative patterns of parents when they describe relationship experiences with their infants (Zeanah, 2000). One of the few instruments that has been developed and that has frequently been used to study these subjective narratives is the Working Model of the Child Interview (WMCI). The WMCI is a structured interview that was designed in the mid 1980s because earlier studies showed that parents' perceptions of their infants are not as objective as previously thought but rather "colored" by the parents' own characteristics and by the expectations that parents had of their children before they were born (Zeanah, Benoit, Hirshberg, Barton, & Regan, 1994). The WMCI focuses on the "meaning" a child has to his or her parent or caregiver by asking the parent about his or her subjective experiences and perceptions of the child, parenting, and the relationship with the child, which subsequently have been

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found to be related to traditional infant attachment classifications (Benoit, Parker, & Zeanah, 1997; Zeanah et al., 1994). The structure and coding of the WMCI was partly based on and influenced by the earlier development of the Adult Attachment Interview (AAI; Main, Kaplan, & Cassidy, 1985), which focuses on parents' representations of their own childhood instead of representations of the child (Zeanah et al., 1994). Questions of the WMCI are directed at parents' perceptions of their infant's personality characteristics and behavior, with parents' thoughts and feelings about their infant in specific situations being elicited. Parents are asked about the current situation as well as their past experiences with the child and expectations that they have for the future. The interview takes approximately 45 min to conduct, but individually varies among parents between approximately 30 and 90 min. The interview can be either audio- or video-recorded. The questions of the WMCI should be strictly followed by the interviewer without elaborating on parents' answers. Parents' answers are coded afterwards by trained and reliable coders according to a specific coding scheme (Zeanah et al., 1994).

The coding process of the WMCI consists of three phases. First, representations are coded using six 5-point qualitative scales or features and two content scales. The six qualitative features are Richness of Perceptions, Openness to Change, Intensity of Involvement, Coherence, Caregiving Sensitivity, and Acceptance. These features are mainly scored according to the coder's judgment of the extent to which the features are present during the interview and, to a smaller extent, according to the content of the representation. The two content scales, Infant Difficulty and Fear for Safety, indicate to what extent the parent perceives the infant's behavior as difficult and to what extent the parent worries about the infant's basic health and safety (Zeanah, Benoit, Barton, & Hirshberg, 1996). Second, the degree to which various affective tones color the caregiver's representation of the infant are scored, such as joy, pride, anger, disappointment, anxiety, guilt, indifference, or other emotions expressed during the interview. Finally, parents' representations are classified into one of three main categories of internal representations: Balanced, Disengaged, or Distorted. Patterns of scores on the aforementioned scales and affective tones are used to determine the type of internal representation that is present. When a parent has a *balanced* representation of the child, the parent seems to be engrossed in the relationship with the child, appreciates the child's subjective experiences, and values the relationship with the child and the child's individuality. These representations also are open to change as new information about the child becomes available. *Disengaged* representations, on the other hand, are characterized by a sense of coolness, indifference, or emotional distance from the child. The parent distances from the child with excessively cognitive and intellectualized descriptions of the child. In extreme cases, substantial aversion to the child is shown. In this case, descriptions of the child and the parent–child relationship are unelaborated, and parents experience the impact of parenting on the child's development as noninfluential. Finally, *distorted* representations are characterized by internal inconsistencies within the representation, which can, for example, be due to the fact that the parent is preoccupied with other concerns, resulting in an inability to focus incisively on characteristics of the infant. Parents with these representations may have either unrealistic expectations of their children or they are very insensitive to the child. Descriptions of their children are often incoherent, confused, contradictory, or even bizarre. The expressed emotions about the child generally lack contextual meaning (Benoit, Parker, & Zeanah, 1997; Zeanah & Benoit, 1995). Disengaged as well as distorted representations are classified as "*non balanced* representations" (Zeanah et al., 1994).

Most published research reports have focused on parents of infants and toddlers, but in clinical practice, the WMCI also has been used with caregivers of children of older ages. Predominantly, the WMCI is administered postnatally, and parents are asked questions about the relationship they currently have with their child. However, the WMCI also has been conducted prenatally, and parents are then asked about their experiences during pregnancy and expectations of the unborn child (Benoit, Parker, & Zeanah, 1997). In the past decades, the WMCI has been proven to be a valuable instrument that can be used both for research purposes and in clinical practice. The interview has been shown to have adequate psychometric properties, and the classifications of the WMCI are strongly related to the traditional classifications of the parent–child attachment relationship as measured in Ainsworth, Blehar, Waters, and Wall's (1978) Strange Situation Procedure (SS). Balanced maternal representations have been found to be related to secure infant attachment, disengaged representations are related to avoidant infant attachment, and distorted representations are related to resistant/ambivalent attachment classifications (Benoit, Parker, & Zeanah, 1997; Zeanah et al., 1994). One significant shortcoming of the original WMCI coding scheme is that the WMCI was first conceptualized and developed when only the three types of organized infant and adult attachment were known (i.e., secure/autonomous, avoidant/dismissing, and resistant/preoccupied). No WMCI classification that corresponds to the disorganized/unresolved attachment classification was developed (Crawford & Benoit, 2009). This is a significant limitation, both from a clinical and a research perspective, because recent research has strongly shown that children with a disorganized attachment relationship have an increased risk for developing psychopathology and adverse socioemotional outcomes (Lyons-Ruth & Jacobvitz, 2008).

The current review provides an overview of results that have been obtained in studies in which the WMCI was used. First, the distribution of balanced, disengaged, and distorted representations in different (clinical vs. nonclinical) study populations will be analyzed. Next, child and parental characteristics which have been found to be related to the distribution of these types of representations in various empirical studies will be discussed. Subsequently, results concerning the relationship between the WMCI and scales of infant and parental attachment and parent–infant interaction will be reviewed. Finally, the use of the WMCI prenatally will be reviewed. and we will present alternative coding methods of the WMCI that were used in several studies.

TABLE 1. *Results of Literature Search*

Database Searched	Keywords (6-23-2010)	No. of Hits	No. of Articles Selected
PsycInfo	"WMCI"	16	17
	"Working model of the child interview"	145	
PubMed	"WMCI"	6	7
	"Working model of the child interview"	18	
ScienceDirect	"WMCI"	37	4
MEDLINE	"WMCI"	6	7
	"Working model of the child interview"	40	
SpringerLink	"WMCI"	6	0
Google Scholar	"WMCI"	385	23
	"Working model of the child interview"	165	

METHODS

A series of literature searches was conducted using the following online databases: PsychInfo, MEDLINE, PubMed, Science Direct, SpringerLink, and Google Scholar. Keywords that were used were "WMCI" and/or "Working Model of the Child (Interview)". Depending on the search specifications available for each database, either one or both of the search terms were used. Table 1 shows how many "hits" were found after each search and how many abstracts were selected for further reading. For several databases, the number of hits was larger than the number of abstracts reviewed because these hits also included books, dissertations, abstracts in foreign languages, citations, and articles on subjects not related to the WMCI.

After reading the abstracts, articles were selected for further analysis according to the following inclusion criteria: (a) empirical quantitative studies (b) in which the WMCI was used for data collection, and (c) which were available in the English language. Some research groups had published more than one article about the same sample, and these articles were later grouped and presented as one study. After eliminating articles that were found more than once from different databases, 24 different articles met the inclusion criteria for further analysis in this review (see Table 2).

RESULTS

Information about the study design and study population used in each study that was selected for this review is presented in Table 3. The articles are listed in alphabetical order of the first author's last name. As can be seen from Table 3, the WMCI was used in studies that had different research questions, study aims, designs, and research methods and that used different sample populations. In the studies that were reviewed, two distinct scoring methods were used: coding from written transcripts of the WMCI and coding from videotaped interviews. Both methods were found reliable and valid approaches for scoring the WMCI, and substantially converged. The distribution of classifications did not vary according to the scoring methods, Cohen's $\kappa = .79$, $p < .001$ (Rosenblum, Zeanah, McDonough, & Muzik, 2004).

In the next section, we focus first on the distribution of the main WMCI classifications in various study populations. Second, relationships between child and parent characteristics and WMCI classifications are described. Next, we elaborate on the relationship between the WMCI and attachment relationships, and the use of the prenatally administered WMCI and alternative coding methods of the WMCI are discussed.

Distribution of Different Types of Representations

In 14 of the selected articles, information is given about the distribution of postnatal balanced, disengaged, and distorted representations among study populations. The size of the populations in these 14 studies varied between 8 and 206 parents per study. Combining the results of these studies offers more insight into the distribution of different types of representations among a larger group of parents.

In total, distributions of 912 representations are reported in 14 studies (Benoit, Parker, & Zeanah, 1997; Benoit, Zeanah, Parker, Nicholson, & Coolbear, 1997; Borghini et al., 2006; Coolbear & Benoit, 1999; Korja et al., 2010; Korja et al., 2009; Minde, Tidmarsh, & Hughes, 2001; Rosenblum, McDonough, Muzik, Miller, & Sameroff, 2002; Schechter et al., 2008; Schechter et al., 2005; Sokolowski, Hans, Bernstein, & Cox, 2007; Theran, Levendosky, Bogat, & Huth-Bocks, 2005; Wood, Hargreaves, & Marks, 2004; Zeanah et al., 1994). When different articles reported information about the same study population, the sample characteristics were included only once in the analysis (Korja et al., 2010; Korja et al., 2009; Schechter et al., 2008; Schechter et al., 2005). In addition, participants with incomplete data (i.e., when the WMCI was not conducted postnatally) were not included in these calculations. The study samples described in the selected papers were divided into groups according to the clinical status of the infant and/or the mother: a nonclinical (comparison) group, a clinical infant group in which infants were diagnosed with a medical or psychiatric problem, and a clinical group of mothers diagnosed with mental health problems. If more than one study population was described in one article (e.g., if representations of mothers of healthy children were compared to those of mothers of children

TABLE 2. *Articles Selected for Review*

First Author	Year of Publication	Journal	Title
Atkinson, L.	2009	*Development and Psychopathology*	Attachment and Selective Attention: Disorganization and Emotional Stroop Reaction Time.
Benoit, D.	1997	*Infant Mental Health*	"Working Model of the Child Interview:" Infant Clinical Status Related to Maternal Perceptions.
Benoit, D.	1997	*Journal of Child Psychology and Psychiatry*	Mothers' Representations of Their Infants Assessed Prenatally: Stability and Association With Infants' Attachment Classifications.
Borghini, A.	2006	*Infant Mental Health*	Mothers' Attachment Representations of Their Premature Infant at 6 and 18 Months After Birth.
Coolbear, J.	1999	*Infant Mental Health*	Failure to Thrive: Risk for Clinical Disturbance of Attachment?
Crawford, A.	2009	*Infant Mental Health*	Caregivers' Disrupted Representations of the Unborn Child Predict Later Infant–Caregiver Disorganized Attachment and Disrupted Interactions.
Dayton, C.J.	2010	*Infant Mental Health*	The Child as Held in the Mind of the Mother: The Influence of Prenatal Maternal Representations on Parenting Behaviors.
Huth-Bocks, A.C.	2004	*Infant Mental Health*	The Impact of Domestic Violence on Mothers' Prenatal Representations of Their Infants.
Huth-Bocks, A.C.	2004	*Child Development*	The Impact of Maternal Characteristics and Contextual Variables on Infant–Mother Attachment.
Korja, R.	2009	*Infant Behavior & Development*	Attachment Representations in Mothers of Preterm Infants.
Korja, R.	2010	*Infant Behavior & Development*	Relations Between Maternal Attachment Representations and the Quality of Mother–Infant Interaction in Preterm and Full-Term Infants.
Minde, K.	2001	*American Academy of Child and Adolescent Psychiatry*	Nurses' and Physicians' Assessment of Mother–Infant Mental Health at the First Postnatal Visit.
Minde, K.	2006	*Infant Mental Health*	Culturally Sensitive Assessment of Attachment in Children Aged 18–40 Months in a South African Township.
Rosenblum, K.	2002	*Child Development*	Maternal Representations of the Infant: Associations With Infant Response to the Still Face.
Rosenblum, K.	2004	*Infant Behavior & Development*	Videotaped Coding of Working Model of the Child Interviews: A Viable and Useful Alternative to Verbatim Transcripts?
Rosenblum, K.	2008	*Infant Mental Health*	Reflection in Thought and Action: Maternal Parenting Reflectivity Predicts Mind–Minded Comments and Interactive Behavior.
Schechter, D.S.	2005	*Attachment and Human Development*	Maternal Mental Representations of the Child in an Inner-City Clinical Sample: Violence-Related Posttraumatic Stress and Reflective Functioning.
Schechter, D.S.	2006	*Infant Mental Health*	Traumatized Mothers Can Change Their Minds About Their Toddlers: Understanding How A Novel Use of Video Feedback Supports Positive Change of Maternal Attributions.
Schechter, D.S.	2008	*Trauma & Dissociation*	Distorted Maternal Mental Representations and Atypical Behavior in a Clinical Sample of Violence-Exposed Mothers and Their Toddlers.
Sokolowski, M.	2007	*Infant Mental Health*	Mothers' Representations of Their Infants and Parenting Behavior: Associations With Personal and Social-Contextual Variables in a High-Risk Sample.
Sprang, G.	2005	*Child Abuse & Neglect*	Factors That Contribute to Child Maltreatment Severity: A Multi-Method and Multidimensional Investigation.
Theran, S.A.	2005	*Attachment & Human Development*	Stability and Change in Mothers' Internal Representations of Their Infants Over Time.
Wood, B.L.	2004	*Reproductive and Infant Psychology*	Using the Working Model of the Child Interview to Assess Postnatally Depressed Mothers' Internal Representations of Their Infants: A Brief Report.
Zeanah, C.H.	1994	*Developmental Issues in Psychiatry and Psychology*	Mothers' Representations of Their Infants Are Concordant With Infant Attachment Classifications.

with a clinical diagnosis), results were analyzed separately for the clinical and nonclinical groups. In the nonclinical group ($n = 513$), 53% of parents' representations were balanced, 21% were disengaged, and 26% were distorted. Three studies were conducted with parents of children at risk due to medical or psychiatric problems, such as children born prematurely, children with Failure to Thrive (FTT), or children with sleep disorders. In this latter group ($n = 170$), 22% of the WMCIs were classified as balanced, 34% as engaged, and 44% as distorted. Finally, when parents were at risk due to having psychiatric disorders or problems or when they had

TABLE 3. *Study Design and Study Population of Selected Articles*

First Author (Year)	Main Instruments Data Collection	Design	Study Population and Demographics
Atkinson (2009)	Prenatal WMCI, AAI, SS, SCL-90, BDI, EPDS, emotional Stroop tasks	Longitudinal	• *Complete sample:* 102 mothers assessed prenatally and their infants assessed at age 12 months • *Subsample:* 47 mothers assessed prenatally and their infants assessed at age of 6 months and 12 months (40.4% male) • 83% Caucasian. *M* age mothers = 31.89 years • Sample was largely middle class.
Benoit (1997) (*Infant Mental Health J*)	WMCI	3 Cross-sectional studies	• 99 mothers from three clinical trials (convenience). 45 mothers had infants and toddlers with clinical problems (failure to thrive, sleep problems, patients of infant psychiatry clinic), 54 mothers had infants without clinical problems. • *M* age mothers = 26.66 years. *M* age children = 18.52 months. • *Study 1:* 24 mothers of hospitalized children with failure to thrive (FTT), 25 mothers of hospitalized children growing normally. Mothers were highly stressed, came from impoverished backgrounds, and 49% had not graduated from high school. • *Study 2:* 37 mothers; 16 had children with sleep disorders and 21 control mothers. *Background:* middle to upper middle class. • *Study 3:* 13 mothers of infants referred to infant psychiatry clinic for variety of problems.
Benoit (1997) (*Journal of Child Psychol Psychiatry*)	Prenatal and postnatal WMCI, SS.	Longitudinal	• 96 mothers in third trimester of pregnancy (convenience sample) (*M* age = 29.17 years, 98% married). 80 for postnatal WMCI; 78 complete datasets were available for analysis. • Mothers who did not complete the study had less years of schooling, were younger, and came from lower socioeconomic backgrounds. No differences on prenatal WMCI classifications with mothers who completed the study.
Borghini (2006)	WMCI, perinatal risk inventory	Experimental, longitudinal	• 50 mothers of premature infants recruited at NICU (24 low medical risk, 26 high medical risk) (48% male), 30 mothers with healthy, full-term controls (43% male) (convenience) • *M* age mothers = 31.1–32.1 for different groups. WMCI administered twice, *M* age of children = 6.2 months and 18.3 months corrected age.
Coolbear (1999)	WMCI, AAI, IFS, IPS	Cross-sectional	• 57 mother–infant dyads; 30 infants with FTT (28 mildly malnourished, 2 moderately malnourished), 27 normally growing infants referred to clinic for other reasons (convenience) (*Age range of children:* 4–36 months)
Crawford (2009)	Prenatal WMCI, AAI, SS, AMBIANCE	Longitudinal	• 35 ($n = 10$ from large metropolitan area, $n = 25$ from smaller city) expectant mothers in third trimester of pregnancy (*M* age = 30.29 years)
Dayton (2010)	Prenatal WMCI, parenting behavior, intimate partner violence	Longitudinal	• 164 expectant mothers in third trimester of pregnancy, with a follow-up when their children were 12 months old
Huth-Bocks (2004) (*Infant Mental Health*)	Prenatal WMCI, SVAWS, CTS	Cross-sectional	• 206 mothers (convenience); incomplete data: $n = 4$ • 63% Caucasian, 25% African American, 5% Latina or Hispanic, 4% biracial, 3% other minority groups • *Marital status:* 50% single (never been married), 40% married, 9% separated or divorced, 1% widowed • *Education:* 45% high-school education or less, 42% some college, 8% bachelor's degree, 5% graduate degree • 44% experienced domestic violence during current pregnancy, 56% did not. Battered women were younger, less educated, and more likely to be single.

(Continued)

TABLE 3. *Continued*

Huth-Bocks (2004) Child Development	Prenatal WMCI, PAAQ, SS	Prospective	• 206 mothers (convenience) • 189 completed all measurements • *M* age = 25.4 years. 63% Caucasian, 25% African American, 5% Latina or Hispanic, 4% biracial, 3% other minority groups • *Marital status:* 50% single (never been married), 40% married, 9% separated or divorced, 1% widowed • *Education:* 45% high-school education or less, 42% some college, 8% bachelor's degree, 5% graduate degree • WMCI administered in third trimester of pregnancy, SS administered when child was 12 to 13 months
Korja (2009)	WMCI, EPDS	Cross-sectional and longitudinal analyses	• 38 preterm infants and 45 healthy, full-term infants, and their mothers. All were firstborn, singleton children of native Finnish-speaking mothers. *M* age mothers = 28.3 and 28.2 years • EPDS administered when infants were 6 months (corrected) age, WMCI conducted when infants were 12 months (corrected) age
Korja (2010)	WMCI, PCERA	Cross-sectional and longitudinal analyses	• 38 preterm infants and 45 healthy, full-term infants, and their mothers. All were firstborn, singleton children of native Finnish-speaking mothers. *M* age mothers = 28.3 and 28.2 years • PCERA administered when infants were 6 and 12 months (corrected) age, WMCI conducted when infants were 12 months (corrected) age
Minde (2001)	WMCI, SCL-90 , EPDS, DIPH, Interview covering relationship with own parents and spouse	Cross-sectional	• 45 mother–infant dyads • *M* age mother = 27.6 years; infants were 4–7 weeks old; 40% of mothers had one or more previous abortion, 14% physical and/or sexual abuse, 25% family history of personal psychiatric contacts
Minde (2006)	WMCI, SCL-90, AQS during observation of mother–child interaction	Cross-sectional	• 46 children (50% male) between 18–40 months and their mothers (convenience sample) • *M* age children = 29.4 months, *M* age mothers = 28.7 years. • All mothers reported financial difficulties, 39% of severe nature. 80% of mothers did not work, 46% reported history of abuse, 35% had been placed away from home for >3 months before age of 5 years
Rosenblum (2002)	Modified version of the WMCI, SPF, CES-D	Cross-sectional	• 100 mother–infant dyads. *M* age mother = 28.7 years • 77% European American, 15% African American, 5% Asian, Latina, biracial, or other. 77% married, 11% unmarried but living with the father, 10% never married, 1% divorced, 1% living with another partner. • 29% employed full-time, 25% part time, 46% at home • Children were seen at 7 months of age; home and laboratory visit.
Rosenblum (2004)	WMCI	Cross-sectional	• 30 mothers (*M* age mother = 30 years) • 83% European American, 14% African American, 3% Asian, Latina, biracial, or other
Rosenblum (2008)	WMCI, RF, CES-D, mother–infant interaction	Cross-sectional	• 95 mothers of 7-month-old infants (*M* age mothers: 29.3 years)
Schechter (2005)	WMCI, RF, PCLS, SCID	Cross-sectional	• 41 mothers of children registered in a hospital-based infant mental health clinic specializing in families at risk for child abuse (referrals) (*M* age mothers = 29 years, *M* age children = 32 months) • *Mothers:* 88% Hispanic and 12% African American; 68% on Public Assistance; 54% less than high-school education; 67% single mothers • All mothers exposed to interpersonal violent trauma in childhood as victim or witness; 71% experienced violent trauma during adulthood

(Continued)

TABLE 3. *Continued*

Schechter (2006)	WMCI, RF, PCLS, SCID, BDI, CAVES, MARS	Longitudinal	• 32 mothers of children registered in a hospital-based infant mental health clinic (referrals) (*M* age mothers = 30 years. *M* age children = 32 months) • 88% Hispanic and 12% African American; 75% on public assistance; 52% less than high-school education; 67% single mothers • All mothers exposed to interpersonal violent trauma in childhood as victim or witness
Schechter (2008)	WMCI, RF, PCLS, SCID, AMBIANCE	Cross-sectional	• 41 mother–toddler dyads registered at a hospital-based mental health clinic for very young children (referrals) (*M* age mothers = 29 years, *M* age children = 32 months) • 88% Hispanic and 12% African American, 68% on Public assistance, 54% less than high-school education, 67% single mothers • 59% of mothers stated their child was one of the three greatest stressors in their lives • All mothers exposed to interpersonal violent trauma in childhood as victim or witness
Sokolowski (2007)	WMCI, CTS, BSI, PCOG	Cross-sectional	• 100 African American mothers and their children (convenience) • 78 mothers lived in public housing, 22 in nearby private-sector housing. 92% of the mothers lived in female-headed households at time of study • *M* age mothers = 24.7 years; *M* age of mothers at time of having first child = 17.8 years. Age range of children: 17–20 months
Sprang (2005)	WMCI, BSI, SCID, CAPI, SASSI, TRS, CBCL, CDI, (REEL/FIRST), FSC, PSI, FACES	Cross-sectional	• 215 parents (44.9% male, 55.1% female), 166 children (47.9% male, 52.1% female) (convenience). • Parents reported by state public child welfare organization for abuse or neglect • *M* age parents = 28.1 years, *M* age children = 6.46 years • Children: 63% Caucasian, 29.4% African American, 2% biracial, 7.1% Hispanic, 1.8% other background • *Severity of maltreatment:* 19.7% extreme, 38.9% severe, 12.5% moderate, 28% mild • 36.1% neglect, 5.3% medical neglect, 46.6% physical abuse, 12% sexual abuse
Theran (2005)	Prenatal WMCI, WMCI, Maternal caregiving (observation), SVAWS, CTS, BDI	Longitudinal	• 206 women, third trimester of pregnancy. Final study sample = 180 (after 1 year) • *Excluded mothers:* economically less off, more children, more nonbalanced in pregnancy • 44% women were physically abused during pregnancy • 63% Caucasian, 24% Black/African American, 4% biracial, 5% Hispanic, 1 % Asian Pacific, 1% Native American, 2 % other • *M* age mother = 25 years • 48% single, 41% married, 11% separated, widowed, or divorced; 44% first-time mother
Wood (2004)	WMCI, SCID	Prospective, cross-sectional	• 8 British mothers at high risk for postnatal depression (convenience) • *M* age = 32.9 years • 6 White, 2 Black • *Socioeconomic status:* largely middle class • *Marital status:* 2 single, 6 married or cohabiting
Zeanah (1994)	WMCI, SS	Cross-sectional	• 45 mother–infant dyads • *M* age mother: 29.9 years • Infants were 12 months old; 57% boys, 43% girls • 43% firstborn, 31% second-born, 26% third-born

AAI = Adult Attachment Interview; AQS = Attachment Q-sort; AMBIANCE = Atypical Maternal Behavior Instrument for Assessment and Classification; BDI = Beck Depression Inventory; BSI = Brief Symptom Inventory; CES-D = Center for Epidemiological Studies-Depression Inventory; CAPI = Child Abuse Potential Inventory; CBCL = Child Behavior Checklist; CDI = Child Depression Inventory; CAVES = Clinician Assisted Video-Feedback Exposure Session; CTS = Conflict Tactics Scale; DIPH = Demographic Information and Psychiatric History; EPDS = Edinburgh Postnatal Depression Scale; FACES = Family Adaptability and Cohesion Evaluation Scale; IFS = Infant Feeding Scale; IPS = Infant Play Scale; FSC = Kempe Family Stress Checklist; MARS = Maternal Attributions Rating Scale; PCERA = Parent–Child Early Relational Assessment; PCOG = Parent–Child Observation Guide; PSI = Parenting Stress Index; PAAQ = Perceptions of Adult Attachment Questionnaire; PCLS = Posttraumatic Stress Symptom Checklist-Short Version; REEL/FIRST = Receptive-Expressive Emergent Language Scale; RF = Reflective Functioning; SVAWS = Severity of Violence Against Women Scales; SPF = Still Face Procedure; SS = Strange Situation; SCID = Structured Clinical Interview for the *DSM-IV*; SASSI = Substance Abuse Subtle Screening Inventory; SCL-90 = Symptom Checklist-90-R; TRS = Trauma Recovery Scale; WMCI = Working Model of the Child Interview.

TABLE 4. *Distribution of Types of Representations Across Different Populations*

Representation	Nonclinical Group *n* (%)	Clinical Group: Infants *n* (%)	Clinical Group: Mothers *n* (%)
Balanced	270 (52.59)	38 (22.33)	77 (33.67)
Disengaged	108 (21.08)	58 (34.20)	53 (23.33)
Distorted	135 (26.33)	74 (43.61)	99 (43.00)
Total *N*	513	170	229

TABLE 5. *Balanced and Nonbalanced Representations Across Different Populations*

Representation	Nonclinical Group *n* (%)	Clinical Group *n* (%)
Balanced	272 (53.02)	115 (28.82)
Nonbalanced	241 (46.98)	284 (71.18)
Total *N*	513	399

a history of abuse (i.e., three studies with $n = 229$), 34% of the representations were coded as balanced, 23% as disengaged, and 43% as distorted.

As can be seen from Table 4, in nonclinical populations, approximately 53% of the mothers have balanced representations while in the clinical groups, most representations are classified as disengaged (23–34%) and distorted (43–44%). The difference in distribution rates between clinical and nonclinical groups is significant, $\chi^2 = 64.00$, $df = 4$, $p < .001$. The difference between the distribution of balanced and nonbalanced representations also remains significant when comparing the nonclinical population to a clinical population where either the child or parent has clinical problems, $\chi^2 = 53.81$, $df = 1$, $p < .001$ (see Table 5).

The aforementioned information describes the distribution of the WMCI classifications in different populations. A limitation in interpreting the results is that the information may be partially incomplete due to the failure of some studies to report the actual distributions of WMCI classifications found in their study samples (Rosenblum, McDonough, Sameroff, & Muzik, 2008; Schechter et al., 2006; Sprang, Clark, & Bass, 2005).

Relationship Between Child Characteristics and WMCI Classifications

Six of the studies described in this review examined the relationship between maternal representations and child characteristics, in which especially representations of mothers of infants in clinical settings were evaluated. Benoit, Zeanah et al. (1997) and Coolbear and Benoit (1999) reported on maternal representations of mothers of infants with FTT. FTT is generally viewed as a syndrome characterized by (a) weight-for-age at or below the fifth percentile on standardized growth charts, (b) weight less than expected for height, and (c) a deceleration in the rate of weight gain from birth to the present (weight decrease of at least 2 *SD*s on growth charts) (Altemeier et al., 1979; Benoit, Zeanah, & Barton, 1989; Drotar & Eckerle, 1989; Gorman, Leifer, & Grossman, 1993). In these studies, groups of mothers of infants diagnosed with FTT were compared to comparison groups. Mothers of children with FTT less often had balanced representations of their children. The difference between mothers of infants with FTT and the comparison group was not statistically significant in Benoit's study while in Coolbear and Benoit's study, mothers of children with FTT showed more nonbalanced representations. Benoit, Zeanah et al. (1997) argued that the lack of significance may be due to the relatively small sample size ($n = 49$). Coolbear and Benoit's sample, however, was only marginally larger ($n = 57$). Note that in Benoit, Zeanah et al. (1997), mothers of infants with FTT are likely to have disengaged representations while in Coolbear and Benoit's study, these mothers showed more distorted representations. The contrasting results suggest that in clinical samples, making a distinction between disengaged and distorted representations may be less meaningful than evaluating specific details of the representation since both disengaged and distorted representations imply that parents react insensitively toward their infants (Coolbear & Benoit, 1999; Zeanah et al., 1997).

Benoit, Zeanah, Parker, Nicholson, & Coolbear (1997) also studied maternal representations among mothers of infants with sleep disorders and infants referred to an infant psychiatric clinic for other developmental problems or risks, including cases of suspected and documented maltreatment (Benoit, Zeanah et al., 1997). Mothers of infants in a clinical setting more often had disengaged and distorted representations than had mothers of infants in the control groups, showing less empathic appreciation of the child and his or her individuality. Since the study had a cross-sectional design, it does not provide information on the direction of the relationship between variables. Hence, the question remains whether nonbalanced maternal representations contribute to, or result from, infant clinical problems.

A specific group of parents who were administered the WMCI are parents of infants who were born prematurely. Prematurity may affect parent–infant attachment processes in various ways; for example, having a premature infant has been found to be associated with higher amounts of stress for parents and higher risks of adverse child development (Pierrehumbert, Nicole, Muller-Nix, Forcada-Guex, & Ansermet, 2003). In two studies by Borghini et al. (2006) and Korja et al. (2009), mothers of premature infants were compared to mothers of healthy, term children. Borghini et al. (2006) compared representations of mothers of low-risk premature infants (<33 weeks gestational age without medical complications), high-risk premature infants (<33 weeks gestational age with medical complications), and healthy, term infants. When their infant was 6 months old, mothers of healthy, term children more often had balanced representations whereas mothers of low-risk premature children more often had disengaged representations, and mothers

of high-risk premature children more often had distorted representations. When their infant was 18 months old, mothers of healthy, term children still had more balanced representations, and mothers of high-risk premature infants more often had balanced representations than did mothers of low-risk premature infants (Borghini et al., 2006). On the other hand, Korja et al. (2009) found that mothers of 12-month-old premature children showed a similar distribution of the types of representations as did the mothers of term children, where both mothers of term infants and mothers of premature infants generally had balanced representations. This difference may be explained by confounding factors such as differences in socioeconomic backgrounds and family structures in the study groups (Korja et al., 2009).

One study concerning child characteristics and WMCI classifications was based on a community sample and examined the relationship between maternal representations and infant emotion regulation using the Still Face Procedure (Rosenblum et al., 2002). This study revealed that children of mothers with balanced representations showed more positive affect, more attention-seeking behavior, and more contact maintenance compared to children whose mothers had disengaged or distorted representations. This association was mediated by parenting behavior, with mothers having balanced representations showing more positive affect and mothers with distorted representations showing more rejecting behavior. Maternal representations, as assessed with the WMCI, uniquely explained variance in infant affect regulation beyond the contribution of maternal depressive symptoms, $R^2 = .35$, $p < .01$.

Relationship Between Parental Characteristics and WMCI Classifications

In addition to child characteristics that may affect maternal representations, it is important to consider maternal characteristics as well. Infant attachment classifications also have been found to be related to psychological well-being of mothers (Coyl, Roggman, & Newland, 2002). For example, a meta-analysis on early maternal depression and infant–mother attachment has shown that children of depressed mothers less often form secure attachment relationships with their mothers and are at risk for disorganized attachment (Martins & Gaffan, 2000). However, as mentioned earlier, when the WMCI was developed, the disorganized type of attachment classification had not been distinguished, and therefore no WMCI classification that corresponds to disorganized attachment was included in the original WMCI coding scheme. To assess the amount of maternal depressive symptoms in relation to maternal representations, mainly self-report measures (i.e., questionnaires) were used. Only Wood et al.'s (2004) study—with a very small sample size ($n = 8$)—involved using a clinical interview for diagnosis of depressive symptoms. Minde et al. (2001) also showed that mothers with higher levels of depressive symptoms more often had nonbalanced than balanced representations of their children. More specifically, Rosenblum et al. (2002), Wood et al., and Korja et al. (2009) showed that mothers with higher levels of depressive symptoms more often had distorted representations. Sokolowski et al. (2007) did not find a similar relationship between depressive symptoms and maternal representations, but found that when mothers reported more general feelings of hostility, they had increased odds of having distorted or disengaged representations. In their narratives, mothers who reported more hostile feelings on the Brief Symptom Inventory (Derogatis & Melisaratos, 1983) generally showed more disappointment, anger, difficulty, and indifference in their narratives. They also portrayed less positive features such as joy, acceptance, sensitivity, and intensity of involvement when they described their children (Sokolowski et al., 2007).

Studies by Schechter et al. (2008; Schechter et al., 2005) specifically focused on the presence of violence-related posttraumatic stress among mothers and its effect on maternal representations, and revealed that the amount of symptoms of posttraumatic stress disorder (PTSD) did not differ between mothers with balanced and nonbalanced representations. However, they found significantly more and severe PTSD symptoms among mothers with distorted representations than among mothers with disengaged representations. In addition, mothers with more severe PTSD symptoms were more likely to maintain a physical and/or psychological distance from their children. This may be due to traumatized mothers having a strong need to protect themselves from further dysregulation, particularly when a child is distressed (Schechter et al., 2008; Schechter et al., 2005).

Few studies have reported data on relationships between demographic characteristics and maternal representations, and found inconsistent results. In two studies, maternal representations were found to be affected by mothers' educational backgrounds (Huth-Bocks, Levendosky, Theran, & Bogat, 2004; Sokolowski et al., 2007) while other studies have not found effects of educational background or socioeconomic status (Korja et al., 2009; Schechter et al., 2008; Schechter et al., 2005). The cultural orientation of mothers was found related to responses on the WMCI and to the way their representations are coded (Minde et al., 2001). Because of the limited studies that have applied the WMCI in cultural groups and because of the small sample size of this study, the roles of demographic and cultural influences on the WMCI need to be interpreted carefully.

Relationship Between WMCI Classifications and Measures of Attachment and Interaction

Past research has shown that a mother's capacity to mentalize about her child is related to her own attachment experiences and attachment history as well as to infant attachment classifications (Fonagy & Target, 2005). As mentioned earlier, the infant–parent relationship can be evaluated according to several interconnected components, including interactive behaviors and internal representations of both the infant and the parent (Zeanah, 2000). In two studies, the concordance between maternal representations and infant attachment quality was examined using the SS procedure (Benoit, Parker, & Zeanah, 1997; Zeanah et al., 1994). The SS is a widely used and recognized procedure to measure the quality of the parent–infant relationship according to the child's

behavior in a structured, stressful experiment (Ainsworth et al., 1978). Benoit, Parker, and Zeanah (1997) and Zeanah et al. (1994) showed that there is substantial overall concordance between balanced representations and secure attachment, between disengaged representations and avoidant attachment, and between distorted representations and resistant/ambivalent attachment, Cohen's $\kappa = .40$, $p < .001$ and Cohen's $\kappa = .50$, $p < .01$, respectively. The association between maternal representations and infant attachment is particularly strong for the balanced–secure relationship and seems to be weakest for the disengaged–avoidant relationship (Benoit, Parker, & Zeanah, 1997; Zeanah et al., 1994). Moreover, mothers with securely attached infants generally had higher scores on the WMCI features Richness of Perceptions, Openness to Change, Coherence, and Sensitivity (Zeanah et al., 1994). These studies did not provide information about the relationship between the WMCI and disorganized child attachment as measured in the SS because of a lack of a disorganized equivalent in the WMCI.

More recently, Korja et al. (2010) showed that maternal representations also are related to the observed quality of mother–infant interactions in both term infants and premature infants. A better quality of infant, maternal, and dyadic interaction at 6 and 12 months of infant's corrected age was related to balanced representations of the mothers when the children were 12 months of age. Distorted maternal representations were more strongly related to nonoptimal mother–infant interaction than were disengaged representations, including less optimal quality of play and attention skills in infants and higher levels of dyadic disorganization and tension (Korja et al., 2010).

Differences in parenting behavior have been observed between mothers with balanced, disengaged, and distorted representations. Mothers with disengaged representations were found to differ from mothers with balanced and distorted representations; the former showing less sensitivity and responsiveness, encouragement, and guidance. They also were more passively withdrawn in interactions (Sokolowski et al., 2007). The frequency of atypical maternal behavior shown during mother–infant observations, including hostile–intrusive behavior and negativity toward the infant, was found to be higher among mothers with distorted representations (Schechter et al., 2008).

Quality of the mother–infant relationship and child attachment classifications also seem to be related to mother's own attachment relationships, particularly toward her own parents (e.g., van IJzendoorn, 1995; Ward & Carlson, 1995). However, contrasting results have been reported when comparing mothers' own relationship histories and the representations they have of their children. Sokolowski et al. (2007), for example, found that mothers who reported having had more relational conflicts with their own mothers on the Conflict Tactics Scale (Straus, 1979) had increased odds of having disengaged or distorted representations of the relationship with their infants as measured with the WMCI. Minde et al. (2001) did not find a relationship between WMCI classifications and mothers' responses to questions about the relationship with their own mother, as assessed by the Demographic Information and Psychiatric History (DIPH; Minde & Minde, 1986). However, Minde et al. (2001) found that mothers with balanced representations reported better relationships with their own fathers and less relational conflicts on the DIPH. Maternal representations of their children may be partially influenced by the relationships in the past that mothers had with their own parents. Because the AAI is generally considered the "gold standard" for classifying the quality of the attachment relationship with one's own parents, the aforementioned results using other and more distal measures of adult attachment need to be interpreted with caution.

Use of the Prenatal Version of the WMCI

The WMCI is mainly used postnatally with parents of children ranging from 4 weeks to 6 years of age. As mentioned earlier, several studies have administered the interview during pregnancy, generally during the third trimester. In studies using both the prenatal and the postnatal WMCI, the main focus is on associations between prenatal and postnatal internal representations, parent–infant interactions, later infant attachment, and parents' own attachment representations. Assessed during pregnancy, a total of 298 representations are reported in five studies. The distribution of prenatal WMCI classifications is 62.0% balanced, 17.5% disengaged, and 20.5% distorted (Benoit, Parker, & Zeanah, 1997; Dayton, Levendosky, Davidson, & Bogat, 2010; Huth-Bocks, Levendosky, Bogat, & von Eye, 2004; Huth-Bocks, Levendosky, Theran, & Bogat, 2004; Theran et al., 2005). The distribution rates are in accordance with those found in postnatal samples. However, among women who had experienced domestic violence during pregnancy ($n = 91$), the distribution of representations showed a somewhat distinct pattern: 33% balanced, 41% disengaged, and 26% distorted. Disengaged and distorted representations are more prevalent among these women. In the interviews, these mothers were less open and less coherent in their narratives, and were less sensitive in the perceptions of their unborn children. Moreover, they tended to see themselves as less competent and showed more negative affect when talking about their children (Huth-Bocks, Levendosky, Theran, & Bogat, 2004).

Concordance between prenatal and postnatal maternal representations is strongest for balanced representations (Benoit, Parker, & Zeanah, 1997; Theran et al., 2005). It appears that women with a lower income, single parents, and women who experience physical abuse during pregnancy are more likely to shift from balanced representations prenatally to nonbalanced representations postnatally. In contrast, mothers who have fewer depressive symptoms, higher incomes, and were married or lived together with the same partner are more likely to shift from nonbalanced prenatal representations to balanced postnatal representations (Theran et al., 2005). Even when maternal representations were measured during pregnancy, later infant attachment could be predicted in 74% of the cases (Benoit, Parker, & Zeanah, 1997).

As with the postnatal version of the WMCI, concordance between prenatally administered interviews and postnatal mother–infant interactions have been examined. With regard to the

relationship between prenatal representations and postnatal outcomes, balanced mothers show higher levels of positive parenting behaviors after birth whereas prenatally disengaged mothers show more controlling behaviors, and distorted mothers show more hostility and anger in interactions (Dayton et al., 2010). More specifically, mothers who had nonbalanced representations during pregnancy and balanced representations after birth show less sensitive behavior, are more disengaged, and show less warmth and affection than do those who had balanced representations at both time periods. In addition, Theran et al.'s (2005) study, with complete data of 180 mothers, showed that women who shift from balanced representations prenatally to nonbalanced representations postnatally show more sensitive and less controlling behavior during observations of mother—infant interactions when infants were 1 year old. They also experience more joy when interacting with their children than did women who had nonbalanced representations at both time periods. Therefore, having a balanced prenatal representation seems to buffer the quality of interaction with the child postnatally (Theran et al., 2005).

When considering relationships between prenatal maternal representations and mothers' own attachment experiences and attachment histories, Huth-Bocks, Levendosky, Bogat, and von Eye (2004) found that when mothers recalled more negative attachment experiences during their own childhood, they generally had less balanced prenatal representations in the narratives of the WMCI. In this study, mothers' attachment experiences were measured with the Perceptions of Adult Attachment Questionnaire (Lichtenstein & Cassidy, 1991), a measure designed to assess attachment dimensions with scales and items that are based on the AAI. The relationship between mothers' own attachment experiences and prenatal representations was confirmed in a study by Atkinson, Leung Goldberg, Benoit (2009), using the AAI; however, this study used an alternative scoring method of the WMCI, which makes it difficult to compare the findings with those found in other studies. Fewer balanced prenatal representations also were found when more prenatal risk factors were present, including low socioeconomic status, low income, single parenthood, and domestic violence (Huth-Bocks, Levendosky, Bogat, & von Eye, 2004). Results from these prenatal studies have indicated that maternal variables, rather than infant characteristics, contribute strongly to the representations mothers have of their children.

Use of Alternative Coding Methods of the WMCI

As described earlier, a coding manual for the WMCI was developed, and training is needed to become a reliable coder. In several studies, the WMCI was used and coded according to alternative methods, making it difficult to compare results of these studies. One study with maltreating parents had used only the qualitative features described in the manual of the WMCI and found that representations of maltreating parents to be generally impoverished in detail, coherence, sensitivity, and acceptance (Sprang et al., 2005). Because of the lack of reporting the three main categories, the results of that study could not be used in this review.

The coding of the WMCI heavily relies on the judgment of the coder about the process of the interview, the meaning of language, and a range of signs and symptoms related to social behavior and interaction in Western countries. One study has examined the effects of a culturally sensitive coding manual to the distribution of different classifications of the WMCI. This study was conducted among mothers living in a Black township of Johannesburg, South Africa. Maternal representations were analyzed according to the original American coding scheme (WMCI-US) and a local coding scheme. Infant observations were conducted in this study, after which observers completed an Attachment Q-Sort (AQS; Waters, 1995) to classify infant attachment behavior. Concordance between the AQS and the WMCI-US coding was substantially lower than that between the AQS and the WMCI-local coding. This implies that scoring the WMCI may require culturally appropriate scoring systems (Minde, Minde, & Vogel, 2006).

In addition to the three original classifications, propositions have been made to add a fourth classification to the coding scheme. Atkinson et al. (2009) used an additional category called "irrational fear for infant's safety" to classify maternal representations. This category reflects a confused, dissociated, and irrationally fearful state during the WMCI. Of the mothers in this sample, 21.57% were classified as showing such irrational fear, which was shown to be related to unresolved maternal attachment on the AAI and to infant disorganized attachment in the SS (Atkinson et al., 2009).

Crawford and Benoit (2009) also added a distinct fourth type of classification to the original coding scheme of the WMCI, labeled *disrupted*. As mentioned earlier, the original balanced, disengaged, and distorted WMCI classifications show concordance with secure, avoidant, and resistant/ambivalent infant attachment, respectively. A (representational) equivalent of disorganized attachment, characterized by the display of contradictory behaviors on the SS, however, is lacking in the original coding scheme. The WMCI-Disrupted (WMCI-D) classification system as proposed by Crawford and Benoit can be used in addition to the original coding scheme, implying that all representations can be classified as either "disrupted" or "not disrupted." This new WMCI-D scale and classification is based on and includes items similar to those identified by Lyons Ruth, Bronfman, and Parsons (1999) using the Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE) which reflect disrupted caregiver behavior, associated with disorganized attachment. It has been shown that atypical or disrupted behavior as assessed with the AMBIANCE is specifically related to infant attachment disorganization whereas general maternal sensitivity has been found to be related to attachment security (Moran, Forbes, Evans, Tarabulsy, & Madigan, 2008). Attachment insecurity and disorganization in particular are linked to negative socioemotional outcomes later in life (Egeland & Carlson, 2004; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). When applied to prenatal maternal representations in the third trimester of pregnancy, the WMCI-D has been proven to give valuable and unique information about representations, which is different from the three original classifications. The WMCI-D also was significantly associated with mothers' presence of unresolved

mourning or trauma on the AAI and with disorganized infant attachment on the SS at the infants' age of 12 months (Crawford & Benoit, 2009).

Finally, the WMCI also has been used to assess a construct called *Reflective Functioning* (RF), another attachment-related factor which represents a parent's ability to think about what the child might be thinking and feeling. To assess RF, several extra probes are added to the original WMCI script to elicit parents' thinking about the child's mental states (Rosenblum et al., 2008; Schechter et al., 2008; Schechter et al., 2005; Schechter et al., 2006). Schechter et al.'s (2005, 2006, 2007) research mainly focused on symptoms of posttraumatic stress following interpersonal violence. When women had higher levels of RF, their representations were four times more likely to be classified as balanced than as nonbalanced. RF was lowest among women with disengaged representations (Schechter et al., 2005). A higher level of RF predicted greater responsivity to a video-feedback intervention to decrease maternal negativity toward her child (Schechter et al., 2006). In Rosenblum et al.'s (2008) study, mothers with higher RF were more sensitive and less rejecting, angry, anxious, and intrusive during interactions with their infants. It is plausible that mothers with different levels of RF create different social environments for infants, corresponding with differences in the ability to help infants make sense of their own internal experiences (Rosenblum et al., 2008).

CONCLUSIONS

With this review, an overview is given of the research that has been conducted with the WMCI to date. The purpose was to gain insight into variables that are associated with parents' internal representations of their children as measured with this interview. Parents' internal representations of their infants, as reflected in narratives obtained by the WMCI, are related to various factors including maternal, child, and demographic characteristics.

In general, balanced representations were more common among nonclinical parent–infant dyads while disengaged and distorted representations were more common when either the infant or the parent was faced with medical or psychiatric problems. Mothers of premature infants, infants with FFT, infants with sleep disorders, and infants seen in an infant psychiatric clinic, but also mothers experiencing domestic violence or a major depressive disorder, more often had nonbalanced representations of their children (Benoit, Parker, & Zeanah, 1997; Benoit, Zeanah et al., 1997; Borghini et al., 2006; Coolbear & Benoit, 1999; Korja et al., 2009; Minde et al., 2001; Rosenblum et al., 2002; Schechter et al., 2008; Schechter et al., 2005; Sokolowski et al., 2007; Theran et al., 2005; Wood et al., 2004; Zeanah et al., 1994). These results highlight that when either the parent or the infant experiences problems, this may put a strain on the parent–infant relationship, as reflected in the parent's internal representation of the child. Therefore, eliciting parental representations of the infant with the WMCI can provide important information that can be used as a starting point for interventions aimed at improving the parent–infant relationship and infant behavior, where nonbalanced representations on the WMCI can be seen as risk conditions for maladaptive developmental trajectories. As mentioned earlier, these results are based on studies that vary in sample size; therefore, one should be careful in generalizing these results.

Our study shows that mothers with distinct representations showed different interactive behaviors toward their children. Overall, mothers with balanced representations had more positive and pleasurable interactions than did mothers with disengaged or distorted representations. The interactions of mothers with disengaged representations were marked by an overall passivity, and mothers with distorted representations were characterized by more intrusiveness, negativity, and rejection of the child (Rosenblum et al., 2002; Schechter et al., 2008). Mothers who were less sensitive did not encourage or stimulate their children and did not guide their children's actions during mother–infant observations (Sokolowski et al., 2007). It also has been shown that general maternal sensitivity is related to organized attachment security and that atypical parenting behavior is related to infant attachment disorganization (Moran et al., 2008). Attachment insecurity and disorganization in turn are linked to more negative socioemotional outcomes later in life (Egeland & Carlson, 2004; van IJzendoorn et al., 1999); therefore, in clinical practice, interventions focused on altering parents' internal representations may be beneficial in improving the way parents approach and interact with their children, hence stimulating a more secure and organized infant attachment.

In studies where the WMCI was administered prenatally, substantial concordance was found between mothers' prenatal and postnatal internal representations and between mothers' prenatal representations and postnatal mother–infant attachment on the SS (Atkinson et al., 2009; Benoit, Zeanah et al., 1997; Huth-Bocks, Levendosky, Bogat, & von Eye, 2004; Theran et al., 2005). This means that when mothers (prenatally) show nonbalanced representations of the fetus, they have a higher chance of developing an insecure relationship with the infant. Postnatal interventions aimed at improving infant attachment are generally more successful at altering parental insensitivity than in changing children's attachment (van IJzendoorn, Juffer, & Duyvesteyn, 1996). However, to date, no attachment-based intervention—aimed at improving parental sensitivity—has been shown to promote secure–organized attachment when applied during pregnancy (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2005). Therefore, it would be interesting to examine whether an intervention specifically focused on modifying the parent's representation during pregnancy would yield better results since it would be aimed at specific beliefs and experiences of the parent during pregnancy. Applying the newly developed WMCI-D (Crawford & Benoit, 2009) may be valuable and promising in this regard as well. A direct focus on disrupted attributions and biases may be sufficient to prevent disorganized attachment and its negative outcomes where traditional attachment-based interventions do not seem to be effective in preventing disorganized attachment (Bakermans-Kranenburg et al., 2005).

Note that further research is needed in several domains concerning the implications of the WMCI. Until now, studies that

have used the WMCI had relatively small sample sizes; therefore, replications of the studies with larger samples are needed. As with studies using the SS, normative data of the distribution of balanced, disengaged, and distorted representations in different populations is badly needed. Moreover, further research is needed to evaluate complementary and promising coding schemes that have been developed in the past years, such as the newly developed WMCI-D scale, and then relating this scale to disorganized attachment on the SS and to unresolved mourning or trauma on the AAI (Crawford & Benoit, 2009). When considering that the classification of maternal representations may depend on parents' cultural backgrounds, it also is important that researchers and clinicians in different countries and with different cultural backgrounds critically examine whether the existing Western classification scheme, which is primarily based on North American samples and populations, is applicable to their study population. Research also has not yet focused on factors that may shape prenatal representations and how these prenatal representations are transmitted to the child after birth. Finally, only one study using the WMCI has included mothers and fathers in their study sample (Sprang et al., 2005). However, the authors refrained from reporting whether paternal representations differed from maternal representations of the child. Since many fathers play an increasing role in the upbringing of children in the first years of life, future research should focus on examining gender differences in parental representations of children at different ages and the impact of fathers' representations on children's socioemotional outcomes.

Although relationships between representations and mother—infant attachment have been found in several studies, and maternal representations significantly predict infant attachment (Atkinson et al., 2009; Benoit, Parker, & Zeanah, 1997; Crawford & Benoit, 2009; Huth-Bocks, Levendosky, Bogat, & von Eye, 2004; Zeanah et al., 1994), more studies are needed to increase evidence in these areas. The influence of mother's own attachment history on the representations of her child also deserves more attention, such as more thoroughly examining the relation between the WMCI and the AAI. In addition, there is a lack of studies that have focused on the relationship between maternal representations and other domains of infant development (i.e., motor or mental development, behavioral problems and infant temperament) and focusing on parents of older children (e.g., school-aged children or adolescents).

The current review is based on studies using the WMCI in a variety of settings and with diverse populations. Many of the areas covered include only one study or a few studies that have examined outcomes, and links with the WMCI classifications are sometimes based on a small sample size. Although we think that the number of studies published using the WMCI is sufficient and warrants this review, we need to be cautious in interpreting the results. Until now, conclusions have been difficult to generalize to large populations due to the small number of studies and sample sizes available. Nevertheless, the WMCI is a valid and useful clinical and research tool that can be used in future studies examining the role of parental representations in infant development.

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