

Revisiting Mary Ainsworth's conceptualization and assessments of maternal sensitivity-insensitivity

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(Received 10 May 2013; accepted 12 August 2013)

This paper describes the evolution of Ainsworth's construct of maternal sensitivity-insensitivity to infant signals from its beginnings in her research in Uganda to its explicit emergence in the findings from the Baltimore study. It provides an analysis of her bipolar Maternal Care Scales (Sensitivity-Insensitivity, Cooperation-Interference, Acceptance-Rejection, and Accessibility-Ignoring and Neglecting) and associated findings from the Baltimore study, including studies of specific maternal and infant interactive behaviors also rooted in the sensitivity construct. In addition, the four Maternal Care ratings of observed maternal behavior in the home environment are considered in relation to Strange Situation subgroups and Ainsworth's home classifications of infant attachment and exploratory behavior. A brief comparison of Ainsworth's with Bowlby's contributions follows. The paper ends with a discussion of Ainsworth's approach to science.

Keywords: maternal sensitivity; narrative records; home observations; mother–infant interaction; attachment; scientific methods

With the passage of time, constructs once regarded as groundbreaking and for that reason contentious tend to be taken for granted or considerably simplified as they gain general acceptance. Illustrating this effect, the last edition of the *Handbook of Attachment* (Cassidy & Shaver, 2008) references a fair number of studies linking various measures of maternal sensitivity to infant–mother attachment security but does not also include a comprehensive treatment of Mary Ainsworth's construct of maternal sensitivity-insensitivity despite its central role in attachment theory. The centenary of her birth thus provides a fitting occasion to revisit her conception of maternal sensitivity-insensitivity in its full complexity.

In this paper, I will begin by charting the origins of the sensitivity construct as it began to evolve from Ainsworth's observational research in Uganda and became explicit in her subsequent Baltimore study. In addition to published findings, I will pay particular attention to her four Maternal Care Scales (Sensitivity-Insensitivity, Cooperation-Interference, Acceptance-Rejection, Accessibility-Ignoring), three of which have never been published in their entirety, as well as to several of her 22 also never-published scales that she devised for rating aspects of maternal care during infants' first 3 months of life. These scales illuminate the construct of sensitivity beyond the reported summaries in published work. Next, I will review findings from the Baltimore study that link maternal and infant behaviors to maternal sensitivity ratings and the Strange Situation Procedure (SSP). I will also consider Ainsworth's less well known five home classifications as related to the Maternal

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Care Scales and the SSP subgroups. I will then compare her contributions and methods to Bowlby's and end by discussing her approach to science and research.

Beginnings in Uganda

Ainsworth conducted her first observational study of infant–mother interaction during a 2-year (1954–1955) stay at the East African Institute for Social Research in Kampala, Uganda, after an almost 4-year collaboration with John Bowlby and his colleague James Robertson in London. As a member of Bowlby's research team at the Tavistock Institute, Ainsworth had become cognizant of his attempts to introduce ideas from ethology and evolutionary science into his initial formulations of attachment theory. She had also come to admire the work of her team-mate James Robertson who was observing children undergoing long- and short-term separations from their mothers and whose methods she had decided to emulate should she ever have an opportunity to conduct an observational study of her own. This opportunity presented itself when she arrived in Kampala where her husband had obtained a postdoctoral position.

With the help of local chiefs, Ainsworth recruited 26 families with young infants (two with twins) who lived in villages near Kampala. Over a period of 9 months and as regularly as possible she observed mothers, infants, and any family members in their homes during bi-monthly 2-hour visits. She was accompanied by an English-speaking Ganda social worker who served as interpreter and collaborator, but she had also learned a few expressions in the local language, Baganda. Data collection consisted of detailed note-taking, expanded after each visit into a typed report that her interpreter-colleague checked for factual accuracy. The notes included observations of infants' interactions with their mothers and with others present. They also summarized what mothers said in response to Ainsworth's questions about many aspects of infant care in Uganda (Ainsworth, 1963, 1967).

Although Ainsworth initially concentrated on the emergence of infant attachment behavior (e.g., crying, vocalizing, smiling, and postural adjustment) as it became differentially directed to the mother and a few other family members, she soon became particularly intrigued by individual differences in infant–mother relationships. At the end of her 9-month study, she was able to discern three patterns in Ganda infants' use of the mother as a secure base for exploration at home. Attached (vs. non-attached) infants showed age-appropriate discriminating attachment behavior toward the mother. However, secure-attached infants cried little and engaged in exploration when their mother was present while insecure-attached infants were frequently fussy even with mother in the same room. Although Ainsworth was also struck by individual differences in *maternal* behavior and had written detailed and vivid case summaries about each family (see pp. 125–316 in *Infancy in Uganda*), these summaries were not sufficiently detailed for identifying specific maternal behaviors that might be linked to the infant attachment classifications. She tried several simple group comparisons (i.e., sole maternal vs. multiple caregivers, degree of acculturation, demand versus schedule feeding, or maternal warmth) but these failed to distinguish mothers of secure- from those of insecure-attached babies. Only three yielded significant differences: (a) the amount of care provided by the *mother* (not the amount of care an infant received from the totality of caregivers); (b) the mother's excellence as informant; and (c) the mother's enjoyment of breastfeeding. Ainsworth (1967, p. 400) regarded these variables "as mere rough approximations of underlying maternal care variables which are more crucial in determining infant attachment quality," but for which she had not yet developed a name.

The emergence of the sensitivity construct

Ainsworth first mentioned the term maternal “sensitivity to infant signals” in the final chapter of her book on *Infancy in Uganda* (1967). A footnote, citing the work of French clinicians Miriam David and Genevieve Appel, hints at the origin of this somewhat unusual but very fitting label. Based on an exploratory study of routine and individualized care of institutionalized infants, David and Appell (1961, p. 132) had suggested that observing the quality of nurse–infant relationships required that one ask several questions at each moment of interaction. The primary questions were: “Is the nurse *sensitive and responsive to signals* coming from the child or the child’s state? Does the infant take any notice of the caregiver? Does he react to her and how?” The term, “sensitivity and responsiveness to infant signals” may have appealed to Ainsworth because it accorded with the dyadic conception of maternal care for which she was searching.

Next step: the Baltimore study

Although Ainsworth introduced her ideas about maternal sensitivity in the volume *Infancy in Uganda* (1967), she did so in reference to preliminary findings from her, by then completed, second observational study in Baltimore. For that study she had trained three observers (Barbara Wittig, Robert Marvin, and George Allyn) to record maternal and infant behavior in much richer detail than had been possible in Uganda (Ainsworth & Bell, 1969). The observers took running notes, scored by time markers every 5 minutes. The notes included not only detailed behavioral descriptions of infant–mother interactions, but also captured what the mother said to the observer, both casually and during short interviews that were often conducted in the beginning of a visit or when the baby slept. This type of information is usually not available when home observations are brief and not repeated.

Considered less threatening, the observers were instructed not to assume a pure spectator role but to be responsive to overtures by mother and baby, but they assiduously avoided interfering, giving advice, or implying criticism (Ainsworth, 1977a, p. 2). They occasionally initiated interactions with the infants to assess their “cuddliness” when very young (all proved cuddly) and to test their responses to a relatively unfamiliar person. They also performed regular cognitive tests. Ainsworth herself was the regular visitor of five of the families and served as occasional reliability observer for each member of her research team.

The 26 white middle-class mothers who took part in the Baltimore study were recruited via pediatricians, mostly before the baby’s birth, and none dropped out after observations began (Ainsworth, Blehar, Waters, & Wall, 1978). For the first 15 families, 4-hour home visits started at 3 weeks and continued at 3-week intervals until 54 months. For a second group of 11, there were weekly visits during the first month, lasting 2 hours each, but beginning at 6 weeks the schedule of the two sub-samples was identical. Immediately after each visit, the observers translated their notes into audio-recorded narratives.

Ainsworth (1977a, p. 145) had rejected the idea of using checklists to record observations. She felt that checklists cannot fully capture the larger context in which interactions occur and do not allow for the discovery of unanticipated behaviors. However, as she later commented:

[this had] at least one disadvantage. It took years to get the accounts of the home visits transcribed from the tapes that had been dictated after the visits. And it took even longer to

complete the coding of infant and maternal behavior at home. In comparison, it was relatively easy to get the dictated accounts of the strange-situation behavior transcribed. (Ainsworth, 1988, p. 11)

At the end of the infants' first year of life the Strange Situation Procedure (SSP), a 20-minute observational procedure including infant, mother, and a stranger, was conducted in a laboratory playroom. Participants' behavior was recorded by two or more observers who dictated continuous narratives from behind a one-way mirror. The initial goal had been to investigate infants' exploration and responses to a stranger in an unfamiliar environment in the presence and the absence of the mother. However, individual differences in infants' responses to maternal separations and reunions turned out to be so striking that Ainsworth and Wittig (1969) create a provisional SSP classification system. This system preceded the systematic coding of home observations, and was first presented in 1965 at a research meeting organized by Bowlby in London. The definitive SSP classification system included data from a second sample observed by Bell (1970), was completed between 1967–1968, and published in Ainsworth, Bell, and Stayton (1971).

As typed home narratives became available, Ainsworth examined 4th quarter (9–12 months) transcripts in relation to each SSP group and made notes, a procedure she called "back-and-forthing." She stressed that "this type of back-and-forthing between antecedent and outcome can be very productive in pioneer studies" (Ainsworth, 1988, pp. 10–11). From this exploratory exercise emerged the first explicit conceptualization of maternal sensitivity:

- (1) Sensitivity in response to signals implies that signals are *perceived* and *correctly interpreted*, and that the response to signals is *prompt and appropriate*. The signals may be of *need and distress* or they may be *social signals*.
- (2) Sensitivity to signals tends to ensure that the care the mother gives the baby, including her *playful* interaction with him, is *attuned* to the baby's state and mood – at the baby's own *timing*, not the mother's timing.
- (3) Routine care may be undertaken with little interaction. It is *interaction* that seems to be most important, not mere care, and particularly conspicuous in mother–child pairs who have achieved good interaction is *the quality of mutual delight* which characterizes their exchanges. (Ainsworth, 1967, p. 397, italics added)

A major but often unrecognized innovation of Ainsworth's Sensitivity-Insensitivity construct is its dyadic or relational emphasis:

[It] does not consider maternal behavior in any absolute terms. The most important aspect of it, I repeat, was the mother's ability to gear her interactions to infant behavioral cues, so that despite inevitable constitutional differences among infants who later became securely attached, all had had experiences of a good "mesh." (1977b, p. 6)

Instead of interpreting maternal behavior and infant behavior in terms of unidirectional relations between cause (mother) and effect (infant), Ainsworth and Bell contended that:

Whatever role may be played by the baby's constitutional characteristics, it seems quite clear that the mother's contribution to the interaction and the baby's contributions are caught up in an *interacting spiral*. It is because of these spiral effects – some vicious and some virtuous – that the variables are so confounded that it is not possible to distinguish independent from dependent variables. (Ainsworth & Bell, 1969, p. 160, italics added)

Other advances were to interpret all infant and maternal interactive behaviors as having a communicative function (whether so intended or merely expressive) and to propose that the dyadic patterning of these “behavioral conversations” formed the basis for infants’ developing personality structure. Also new was the emphasis on maternal co-regulation or co-determination, achieved through sensitive attunement, pacing, and timing, aspects of mother–infant interaction that became important in subsequent work on mother–child play by Stern (1974) and others during the 1970s.

Whereas Bowlby (1969/1982) had proposed that the predictable outcome of infant signaling is proximity to the mother (implying her responsiveness), Ainsworth pointed out that infant signaling can achieve this outcome only if it activates appropriate caregiving responses in the adult (Ainsworth, Bell, & Stayton, 1974, p. 119). When experiencing sensitive feedback in a fairly consistent way a baby can:

build up a set of expectancies about what his mother will do in each of a variety of sets of commonly occurring circumstances. He gradually builds up a working model of his mother, in representational terms, as someone in whom he can have confidence as being accessible and responsive when he wants or needs her. Therein lies his feeling of security in his relations with her. (Ainsworth, 1977b, p. 6)

Finally, it is often overlooked that Ainsworth applied the notion of maternal sensitivity to infants’ *positive* social overtures as well as to secure base and safe haven behavior.

The four Maternal Care Scales

When infants’ SSP classifications were compared to their mothers’ 4th quarter Sensitivity-Insensitivity ratings, strong differences emerged between mothers of infants classified as secure versus those classified as insecure (avoidant or ambivalent). To differentiate mothers of insecure-avoidant from those of insecure-ambivalent infants, Ainsworth developed three additional scales (Cooperation-Interference, Acceptance-Rejection, and Accessibility-Ignoring). All four scales are summarized in Ainsworth et al. (1971) and are available online (see Ainsworth 1969a), but only the full text of the Sensitivity scale was ever published in Ainsworth et al. (1974).

As Ainsworth stressed, these were not ordinary scales, “drawn up in sketchy fashion in advance of data collection” (Ainsworth et al., 1978, p. 138), but scales based on a careful examination of behaviors described in the narrative records. Each 9-point scale begins with a long preamble (between 2 and 3 single-spaced typed pages) defining the bipolar construct, followed by text drawn from the narrative records that anchors the uneven numbered rating points (9, 7, 5, 3, and 1).

The four scales were applied to the 4th quarter home narratives by five independent judges, three of whom had no other knowledge of project data. Rating schedules were drawn up to avoid halo effects across variables and visits. All interrater correlations were above 0.85. The overall rating for each scale across five visits was agreed upon by conference, and usually turned out to be the median (Ainsworth et al., 1978, p. 143).

Correlations among Sensitivity, Acceptance, and Cooperation scores were above 0.85, but those with Accessibility were a little lower ($r = 0.82, 0.58, \text{ and } 0.72$, respectively). Inspection of scatter diagrams (unpublished) showed that mothers with high Sensitivity ratings also scored highly on Cooperation, Acceptance, and Accessibility, whereas scores of mothers with lower ratings varied by scale. The summaries in Table 1 describe, at the high end: (1) sensitive maternal behavior that is flexibly adapted to a specific infant’s

Table 1. Summary of the four Maternal Care Scales.

Sensitivity-insensitivity to infant signals	Cooperation-interference with infant's ongoing activities	Acceptance-rejection	Accessibility-ignoring
M's prompt and appropriate responsiveness to B's accurately perceived signals and communications	M's attitude to B as an autonomous person. The extent to which M's interventions or initiations of interaction break into, interrupt, or cut cross B's ongoing activity	Balance of M's positive and negative feelings about her particular B. The extent to which M has been able to integrate these conflicting feelings or to resolve the conflict	Degree of M's physical and psychological accessibility to B (acknowledgement of and responsiveness to B)
Sensitive. Able to see things and feel things from B's point of view. Sensitive to idiosyncratic ways of B's signals, behavior, and preferences by responding promptly and appropriately	Cooperative: M gears her behavior to the B's state, goals, and current interests. If she invites play, but B does not respond, she either desists or shifts her approach. Uses mood-setting techniques	Accepting: M cheerfully accepts the responsibility of caring for B. She may occasionally be irritated, but does not make an opponent of B even though B places temporary limitations on her other activities	Accessible: nearly always tuned in to B's signals and communications even when B is in another room. Can attend to B's communications despite distractions by other demands and interests
Insensitive. M gears interventions and initiations almost exclusively to her own wishes, moods, and activities. Interprets B's communications in line with her own wishes or defences, or does not respond to them at all	Interfering: M does not respect B as an autonomous person whose wishes have a validity of their own. Interventions break into or interrupt B's ongoing activity (includes frequency and extent of physical interference or being "at the baby" most of the time, training, eliciting, controlling)	Rejecting. Frequent angry, resentful feelings overwhelm M's positive feelings toward B. M may openly voice rejection, constantly oppose B's wishes or maintain an atmosphere of irritation and scolding	Inaccessible M ignores and thus neglects B. M is so preoccupied with her own concerns that she cannot perceive B's signals. Or she is aware but ignores B deliberately, noticing B only when doing something for B. Cannot sufficiently <i>feel</i> things from B's point of view

signals and communications, (2) cooperation with the baby's ongoing behavior (3) acceptance or a positive balance of feelings regarding the baby and being a mother, and (4) accessibility or attention to the baby's signals. The low scale-points describe mothers who appear preoccupied with themselves and engage in more or less arbitrary behavior. Scale mid-points (ratings of 5) capture maternal inconsistencies (inconsistently sensitive, mildly interfering, ambivalently accepting, and inconsistently accessible).

Aside from the Table 1 definitions, several additional features of the scales bear emphasizing:

Emotion. The scales place considerable stress on affect and emotions (the mother's own and the infant's). High ratings on the Sensitivity scale are given to mothers who have insight into their own mood and its effect on their infant. Over and above mere intellectual awareness of infant signals, Ainsworth (1970) proposed that a mother must empathize with her baby's feelings or "*feel things from his point of view*" before she can respond appropriately. In turn, mothers learn about the appropriateness their responses from infant feedback via emotional signals such as pleasure, relief, or negative responses indicating when to desist. Mothers given low Sensitivity ratings seem predominantly governed by their own needs, feelings, and fantasies, particularly hindering accurate perception of infant signals during the early months when the meaning of signals is often ambiguous.

Ainsworth also considered maternal delight in the baby (including the capacity to express it verbally) to be an important aspect of sensitivity. This delight can be tender and gentle, and is not necessarily intense. It emerges during situations and behavior specific to the baby, and should not to be confused with pride. Delight may be present in some mothers from beginning but may develop in others only gradually.

Opposing positive and negative feelings are addressed in the Acceptance-Rejection scale. At the positive pole, mothers accept that the baby has a will of his or her own and even find the baby's anger worthy of respect. At the rejecting pole, mothers experience the baby as a burden whose needs are seen as unwelcome demands. However, because it is the norm that mothers love their babies, Ainsworth cautions that maternal anger at or about the baby is often likely to be repressed or suppressed, leading some mothers to put on a show of affection or hide their genuine feelings. She also cautions that not too much weight is to be given to momentary outbursts of irritation if embedded in an otherwise positive, warm relationship, but pseudo-accepting mothers who respond to infant signals in a long-suffering manner should receive lower ratings.

In her Ganda study, Ainsworth (1967, p. 394) had noted that emotional warmth (which can be shown without sensitivity) did not distinguish mothers of secure-attached from those of insecure-attached infants. In connection with the Baltimore study, however, she repeatedly highlighted the dyadic affective quality of *harmony*:

Insofar as there is a single, quantifiable dimension of mother–infant interaction implicit in our hypotheses, it is a crude one of harmony–disharmony, with the implication that towards the disharmonious pole qualitative differences are so great that it is difficult to order them magnitudinally, let alone quantify them. (Ainsworth et al., 1971, pp. 49–50)

Relatedly, Stayton, Hogan and Ainsworth (1971, p. 1060) state that the purpose of the Sensitivity, Acceptance, and Cooperation scales was to assess the harmony in the mother–infant relationship.

Cooperation and control. Ainsworth defined sensitive mothers as those who usually give their young babies what they seem to want but respond tactfully when they cannot go along with their baby's wishes (e.g., offering an acceptable alternative). Sensitive mothers

also rely on mood-setting (e.g., slowing down the pace at bedtime) and plan to avoid situations that would require interfering interventions (e.g., by baby-proofing the house to allow safe exploration). Impersonal restraints, such as strapping the baby in a high-chair or placing him or her in a play-pen, are only interfering if the baby does not accept them willingly. In short, Ainsworth regarded maternal cooperation as incompatible with coercion but as compatible with foresightful “nudging.” Finally, she commented that, at the end of first year, there may come a point when parents can show a baby that they are not an instrument of the baby’s will. Sensitivity at that point consists of warmly encouraging infant behaviors that *invite* maternal cooperation.

Defensive operations. As noted, the Baltimore observers – in addition to recording interactive behavior – also noted what the mother said to and about her baby in the course of home visits. This allowed comparisons between what mothers said and did, something not possible during “pure” observations. If discrepancies were noticed, Ainsworth advised coders to give greatest credence to what had been observed.

Consistent with a background in clinical diagnostics and her appreciation of Freud’s ideas about the unconscious, Ainsworth (1969a) attributed mismatches between what mothers said and the observers noticed (e.g. apparent misinterpretations or ignoring of unmistakable signals) to defensive operations such as projection and denial. If the baby’s signals did break through the mother’s defensive barrier, a second line of defense was to somehow remove “from the stimuli emanating from the baby their signal quality.” Ainsworth also referred to the defense mechanism of intellectualization, noting that some mothers can accurately perceive infant signals only if they submerge their own feelings, but in that case their perceptions appear detached.

Relevant in this connection is Ainsworth’s emphasis on mothers’ excellence as informant for which she had already developed a special scale during her Ganda study (1967, p. 45). Mothers with high ratings stick to the topic, volunteer information with much spontaneous detail, and never seem impatient. In the preamble of a scale by the same name (in a collection of 22 unpublished scales on 1st quarter maternal care) Ainsworth clarifies that Excellence as Informant does not mean reporting precise schedules, hours, and dates, but details “about idiosyncracies and sensitive little things that testify to a mother’s interested perception.” Such (nondefensive) mothers make observers feel they had been there. Unless mothers evade requests for information, however, they should not be given lower scores merely because they want occasionally to talk about themselves.

Maternal and infant learning. Ainsworth observed that optimal synchronization may require learning or mutual adaptation by both mother and baby and may therefore take time. However, given that mothers have more control over their behavior than infants, Ainsworth et al. (1978, p. 142) categorized synchronization as a maternal variable. Mother-supported synchrony assists the baby in learning to stabilize his or her rhythms, whereas these natural rhythms may become disorganized if synchronization is not achieved. Synchronization implies that the baby should not be allowed to build up to a state of distressing tension whereas slight delays may nudge the baby towards regularization.

After completing the rating of the five 4th quarter home observation narratives and demonstrating their highly significant associations with the SSP classifications (Ainsworth et al., 1971), Ainsworth and her team initiated a series of meticulous analyses of the narrative records that focused on specific domains of maternal and infant interactive behavior. These, too, were inspired by the sensitivity construct and will be discussed next. As Ainsworth and colleagues (1971, p. 36) commented; “Broader significance can

be attributed to strange-situation behavior ... only if it emerges as consistently related to characteristic behavior in everyday life.”

Home behavior as linked to the Maternal Care Scales and Strange Situation classifications

A subset of publications on mother–infant interactive behavior at home focused entirely on normative age trends and intercorrelations among variables within and across domains (see Bell and Ainsworth, 1972, on infant crying and nonverbal communication; Stayton, Ainsworth, and Main, 1973, on infant and maternal behaviors during brief everyday separations; Ainsworth, Bell, and Stayton, 1972, on close bodily contact; and Main and Stadtman, 1981, on maternal contact aversion and infant anger). Although I will include findings from some of these articles and chapters (which deserve a detailed analysis of their own), my emphasis here is on the corpus of writings linking maternal and infant interactive behaviors to 4th quarter maternal sensitivity ratings as well as to secure (B), avoidant (A), and resistant or ambivalent (C) infant–mother classifications in the Strange Situation. Table 2 provides excerpts from narrative records to demonstrate the detailed

Table 2. Brief Illustrative Excerpts from Baltimore Home Visit Narrative Records.

Boy 1, Visit 14, 33 weeks

M comes back into the room now and B is very excited. M is about 8 feet away from him and she’s coaxing B to come over to her. B is even more excited now as he works his way over to her.

Finally he gets close enough for M to pick him up and she does so. B is still excited as she picks him up.

B is obviously getting tired. He turns around to M now, and M puts him in a face-to-face position, and B opens his mouth and puts it on M’s cheek, giving her a great big slobbery kiss. Now M begins to snuggle B. B rears back and starts exploring M’s face with his hands. He lets out a huge yawn and M decides that it is time to put B to bed.

Boy 2, Visit 19, 48 weeks

Suddenly B loses his balance and topples over and bangs his head on the wheel of the stroller. Then there is a fuss. M pats him without picking him up and asks “where’s your spoon?” [with which B had been playing].

He kneels holding on to this table and reaches for something on the table. It’s a stack of orange coasters. M says no-no repeatedly and B pays no attention to her so M moves them away, not quite before he’s managed to knock the coasters on the floor.

B is still crying. M picks him up and says with a very scornful voice “Oh brother, you’re pitiful.” She carries B out to the kitchen.

Girl, Visit 13, 31 weeks

B gets a little fussy now and she makes a cryish sound, so M picks B up and B quiets. M says she might be wet. M holds B so she can get into the diaper, checks B, and carries B into the bedroom and puts her down on her back on the bed. B rolls over, and M says: “Before too long we’ll have a nap.” M says this in response to my question as to napping. M rolls B on to her back, and B rubs her eyes and sucks on her thumb. She kind of squints her eyes and makes a growling sound. B touches M’s face and I ask M about this. M says “she’ll push and pull on you.” Now M brings her face down close to B’s face and she reaches up and touches M’s face.

M gets out the highchair and B watches. Then she makes a little neutral call, and I would interpret this call as follows: “Hurry up.” I’m really translating from baby talk to adult talk. B is silent right now. Now she makes another call, which I feel signifies to M to hurry up. There’s no cry. B appears very confident that she will get her food. Now she makes a little protest. M goes over and picks B up and B makes a grunt; it’s kind of guttural.

behavior captured in a variety of situations. The behavioral coding was undertaken by trained undergraduates with no knowledge of infants' maternal Sensitivity ratings and SSP classifications.

The voluminous findings from this set of studies are summarized in Tables 3 and 4, together with their sources (chapters, articles, manuscripts, and the book *Patterns of Attachment*). For each domain, maternal behaviors are listed before corresponding infant behaviors, highlighting their complementarity. Correlations with 4th quarter sensitivity are reported when available, and means are listed for the three major SSP classifications.

Table 3 presents 1st quarter (1–3 months) maternal and infant behaviors, showing mean differences between B (secure) and A/C groups combined (avoidant- and ambivalent-insecure) assessed with *t*-tests. Differences between A- and C-dyads were not tested owing to the small group sizes, but will nevertheless be discussed here because they suggested “different forms of mother–infant interaction that tie into different dynamic processes affecting infant development” (Ainsworth et al., 1978, p. 240).

The feeding classifications listed at the top of Table 3 were first reported at a meeting in London in 1967. They appeared in a chapter by Ainsworth and Bell (1969) that illustrates Ainsworth's methods especially well but has, unfortunately, almost “dropped out” of the attachment literature. It focused on feeding practices and their correlates, because feeding takes up much of infants 1st quarter waking time.

As in Uganda, Ainsworth found simplistic categories (schedule vs. demand feeding) useless for evaluating feeding practices and, as in *Infancy in Uganda*, the chapter lists summary descriptions and raw data for each mother so that readers can draw their own conclusions and perform their own computations. Ainsworth and Bell list details of nine maternal patterns, extracted from 1st quarter narrative records and rank-ordered to form a scale. The top-ranked patterns refer to feeding practices that allow a baby to be an active participant and thus provide him or her with a feeling of efficacy. These patterns were characteristic of mothers who synchronized their behavior with the baby's rhythms and pace (neither too fast nor slow) and handled solid food preferences tactfully. Mothers in the middle ranks staved off feedings for prolonged periods, overfed by coaxing, or were impatient and ended feeding too soon. The lowest ranked patterns describe highly arbitrary feedings with unpredictable timing and long delays, force-feeding, and disregard for infant rhythms (i.e., speeding up feeding by enlarging the hole in the nipple of the feeding bottle causing choking). In these groups, feedings were often a battle. Ainsworth and Bell commented that mothers who tried to use forcible methods to influence their baby's feeding behavior usually ended up with the opposite results. The authors' basic assumption was that a good feeding is a happy feeding.

Also reported were ratings based on six of Ainsworth's 22 unpublished 1st quarter Maternal Care Scales that were not concerned with feeding. Ainsworth credited Barbara Wittig for help with scale development and Robert Marvin and George Allyn for independent rating of the 1st quarter narrative records (interrater correlations of 0.86–0.93). Four of these scales pertained to mothers' general attitude (perception of, delight in, and acceptance of the baby as well as mother's excellence as informant). The 5th and 6th scales pertained to variations in specific maternal behaviors (effectiveness in calming a crying infant and amount of physical contact). Maternal scores on these six 9-point scales were highly intercorrelated (0.81–0.94). Table 3 therefore lists the averaged ratings for the six scales.

Clear-cut differences emerged between feeding practices of mothers whose babies were later classified as secure (B) and insecure (A and C combined) with their mothers in

Table 3. Maternal and baby behavior in the 1st quarter: correlations with 4th quarter maternal sensitivity ratings and means for Strange Situation groups at 12 months (Baltimore study data reported in various sources).

Home behaviour 1st quarter	M sensitivity (4th quarter)		Strange Situation groups (12 months)			
	in ^a	<i>r</i>	in ^a	B	A	C
Feeding						
M feeding practices (9 ranked groups)			1	3.1***	7.2	7.7
M feeding synchronized w/B's rhythms (rating)			2	6.4***	2.7	2.4
M lets B determine end of feeding (rating)			2	6.5***	3.2	2.8
M tactful re food preferences (rating)			2	6.7**	3.9	3.8
M synchronizes feeding with B's pace (rating)			2	6.8**	3.4	3.3
Mean of the 4 (above) feeding scales	3	.77***				
1st Quarter Maternal Care Scales						
Mean of 6 scales (see text)			1	6.8***	2.5	2.9
Crying						
Crying episodes ignored by M			2	1.6	3.1	1.6
M unresponsive to crying (mins/hour)			2	3.6**	6.8	9.3
B crying episodes/hour	4	-.61**	2	3.4*	5.4	3.8
B crying minutes/hour	4	-.72**	2	6.9**	13.0	11.8
Holding						
Mean contact episode (minutes)			2	8.7 ⁺	5.2	7.8
M behavior affectionate %			2	16.9*	6.5	8.7
M holding tender careful %			2	55.0***	22.0	2.2
M inept holding %			2	5.0***	28.0	41.0
M appears averse to close bodily contact (rating)			2	2.3**	7.3	1.7
B positive to hold			2	24.8*	6.7	1.8
B negative to hold			2	19.5	16.3	32.5
B positive to put-down			2	11.4	5.3	6.5
B negative to put-down			2	36.0*	46.7	61.2
Face-to-face interaction^b						
M contingent pacing			2	52.9**	20.7	10.9
M silent, unsmiling initiation			2	12.2	28.7	11.3
M routine manner			2	11.0**	29.7	25.5
M unresponsive to B initiation ^c			5	4.6* B3	15.3 (A + C)	
M abrupt			5	.6*** B3	12.0 (A + C)	

(continued)

Table 3. (Continued).

	M sensitivity (4th quarter)		Strange Situation groups (12 months)			
	in ^a	<i>r</i>	in ^a	B	A	C
Home behaviour 1st quarter						
M encourages further interaction			5	25.2*** B3	3.4 (A + C)	
M playfulness			5	18.6 ⁺ B3	8.5 (A + C)	
Liveliness of M stimulation			5	4.9 ⁺ B3	3.7 (A + C)	
Episodes brief			5	35.6** B3	62.5 (A + C)	
B bounce			5	21.3** B3	5.4 (A + C)	
B smile			2	45.3	39.3	26.3
B vocalize			2	23.9	26.7	6.9
B no response to M initiation			2	4.9*	17.7	16.6
B terminates interaction			2	11.4*	26.1	14.7
Affection and Expressiveness						
M kisses B (median frequency) ^d			6	.30	.58	.21
M hugs/cuddles B (median frequency) ^d			6	.17	.03 ⁺	.30*
M lack of facial expressiveness (rating) ^e			2	2.7*	6.2	3.5

Note: ^a Indicates source of information: 1 = Ainsworth and Bell (1969); 2 = Ainsworth et al. (1978, chapter 7 for B variables, chapter 8 for M variables); 3 = Ainsworth and Tracy (1973); 4 = Stayton and Ainsworth (1973); 5 = Blehar, Lieberman, and Ainsworth (1977); 6 = Tracy & Ainsworth, 1981; ^b includes 6–15 week visits; ^c for this and the following 7 variables only the B3 vs. A + C comparison is available; ^d first and second quarter; ^e whole year.

⁺ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed); if asterisk is on B, B is different from A/C combined, if asterisk is on A or C, that mean is different from B.

the SSP at 12 months, but the mean scores of group A- and C-mothers were indistinguishable (Ainsworth & Bell, 1969). This held, also, for the four 9-point feeding scales (from the collection of 22 1st quarter Maternal Care Scales listed in Ainsworth et al., 1978), and the average of the six 1st quarter scales (maternal attitudes, response to crying, and amount of physical contact), computed from Ainsworth and Bell (1969).

The remainder of Table 3 lists maternal and infant behaviors related to infant crying, close bodily contact, face-to-face play, and affection. For almost all of these variable sets, group-B mothers and infants (those later categorized as secure in the SSP) received significantly more favorable scores than A- and C-dyads, but the untested differences between A- and C-dyads also deserve attention (to conserve space, group A, B, and C mothers will henceforth be called A-, B-, and C-mothers).

C-mothers ignored crying most often and delayed their responses longest, but A-infants cried both most frequently and longer per hour. B-mothers held their babies longest, most tenderly, and affectionately, and their babies responded most positively to being held and being put-down (presumably because the mother sensed when they were satisfied). C-mothers most often held their babies ineptly and least often tenderly, and their infants received the lowest scores for positive responses and the highest scores for negative responses to being held. A-mothers, on the other hand, had the lowest percentage of affectionate holding episodes and A-infants responded least positively to being put

down. It is necessary to interject here that many holding episodes were coded as neutral, thus there was no a priori necessity for negative correlations between positive and negative infant and maternal responses.

Face-to-face interactions were examined by Blehar et al. (1977) who compared mothers and infants in the B3 subgroup (optimally secure in the SSP) with A- and C-infants combined (the less optimal B1/B2 group was consistently intermediate on all variables, a point to which I return in the next section). However, for some face-to-face behaviors the A/B/C means were reported in *Patterns of Attachment* (Ainsworth et al., 1978), and are listed this way in the table. Maternal pacing that was attuned to infants' level of arousal characterized B-mothers who were also most playful, and engaged in the longest face-to-face bouts. Reciprocally, B-infants displayed more active pleasure (e.g., bouncing) and smiled most during face-to-face interactions. In contrast, A-mothers most often initiated silent, unsmiling face-to-face episodes, and their babies terminated face-to-face episodes sooner than B- and C-babies. Overall, however, A-babies smiled almost as often and vocalized more often during face-to-face episodes than B-infants. Finally, A-mothers kissed their babies (without engaging in close bodily contact) more frequently than B-mothers during the first half-year, but both C- and B-mothers cuddled their babies considerably more than A-mothers. In fact, at this age C-mothers cuddled their babies most often, but this code did not include the quality of physical contact (Tracy & Ainsworth, 1981).

Table 4 pertains to the 4th quarter home narratives. For most variables, *t*-test showed that B-infants and their mothers differed significantly both from A- and from C-dyads. With respect to feeding, Ainsworth and Tracy (1973) discovered that the four 1st quarter feeding scales were no longer useful in the 4th quarter because many babies had begun to feed themselves (finger foods, holding own bottle). However, happy 4th quarter feedings were strongly associated with concurrent maternal Sensitivity.

Infant crying declined over the first year for the sample as a whole (Bell & Ainsworth, 1972). Nevertheless, maternal Sensitivity ratings were strongly (inversely) correlated with 4th quarter crying variables (Stayton & Ainsworth, 1973). In addition, crying differed by SSP-classification. A-babies still cried slightly more frequently than C-infants during the 4th quarter, but not as long as C-infants overall. B-babies cried least, but used non-crying modes of communication (gestural, vocal, facial) more than the other two groups (rated 1 to 3; see Bell & Ainsworth, 1972).

Total maternal holding time also declined in the course of the first year, mostly because many mothers no longer held their babies during feedings (Ainsworth et al., 1972). B-mothers were still most affectionate and tender-careful while holding their babies, whereas C-mothers had the lowest means for these categories, and the highest percentage of inept holding and routine holding episodes. A-mothers were more abrupt or interfering (20% of the time) while picking their baby up than either B- or C-mothers. B-infants responded most positively and A-infants least positively to being held. A-infants also engaged least in active contact behavior (molding their body to the adult), and "sinking" in. Overall, they responded negatively to being held as much as C-babies. As in the first half year, B-mothers cuddled their infants most during the 3rd and 4th quarters, C-mothers did so half as often, and A-mothers hardly at all, although A-mothers again kissed their babies (absent cuddling) more often than B- and C-mothers (Tracy & Ainsworth, 1981).

As infants became mobile, Stayton and Ainsworth (1973) found that A- and B-infants followed the mother about equally often when she left the room while C-infants did so only half as much. B-infants cried least and C-infants most when the mother left the room, but

Table 4. Maternal and baby behavior in the 4th quarter: correlations with 4th quarter maternal sensitivity ratings and means for Strange Situation groups at 12 months (Baltimore study data reported in various sources).

Home behavior 4th quarter	M sensitivity (4th quarter)		Strange Situation groups (12 months)			
	in ^a	<i>r</i>	in ^a	B	A	C
Feeding						
Feedings rated as happy	3	.83***				
Crying (general)						
M unresponsive to cry min/hour	7	-.58**	2	1.3	3.3***	4.4**
M ignores crying episodes/hour	7	-.41*	2	1.5	2.1	2.3
B frequency crying/hour	9	-.63**	2	3.7	4.7	4.2
B duration crying minutes/hour			2	3.0	5.6**	8.1**
B non-crying communication rating			2	2.6	1.8	1.2*
Holding						
M affectionate episodes %			2	24.0	8.8*	4.0***
M tender careful holding episodes %			2	21.6	8.7	3.0+
M abrupt/interfering pick-up episodes %			2	9.1	20.3**	14.2
M holding time engaged in routines %			2	17.4	21.3	46.2*
M inept holding episodes %			2	3.8	9.8 ⁺	15.0*
B initiates pick-up %			2	22.1	16.2	9.5*
B positive to hold %	9	.71***	2	40.0	14.3**	20.7*
B active contact behavior			2	.40	.02*	.12
B sinks in %			2	.25	.02**	.20
B positive to put-down %	9	.43*	2	68.7	59.8	50.2**
B negative to hold %	9	-.53**	2	6.1	21.2**	23.0
B initiates put-down %	9	-.36	2	2.5	3.5	6.7
Affection and Expressiveness						
M kisses B (median frequency/hr) ^b			6	.47	.66	.19 ⁺
M hugs/cuddles B (median frequency/hr) ^b			6	.66	.02**	.31*
B mood dominated by anger (rating)			2	3.0	7.8***	5.7**
Brief separations/reunions						
M acknowledges B on return (%)	7	.60**	2	34.5	17.8*	23.0 ⁺
M Frequency of leaving room	7	-.29				
B cries when M leaves room (%)	7	-.40*	2	14.1	20.3**	29.0**
B follows when M leaves room (%)	7	.40*	2	55.6	56.3	21.5**
B greets M on return (%)	7	.46*	2	39.0	28.2*	23.0*

(continued)

Table 4. (Continued).

	M sensitivity (4th quarter)		Strange Situation groups (12 months)			
	in ^a	<i>r</i>	in ^a	B	A	C
Home behavior 4th quarter						
B greets M crying/mixed response (%)	7	-.28	2	9.5	12.3	17.2**
Obedience						
M verbal commands frequency	8	-.14	2	2.6	2.4	2.0
M physical interventions frequency	8	-.44*	2	.6	1.3 ⁺	1.3
B complies with M command (%)	8	.63**	2	81.1	54.0**	44.0**
B internalized control	8	.40*				
4th Quarter Maternal Care Scales						
Sensitive-Insensitive	7	1.00	2	6.5	2.4***	2.4***
Acceptance-Rejection	7	.89**	2	7.6	3.7***	5.4**
Cooperation-Interference	7	.86**	2	7.3	3.6***	4.2***
Accessibility-Ignoring	7	.82**	2	6.6	3.8**	3.5**
C Attachment-Exploration Balance						
Ranked groups I – V (I = optimal)			2	1.5	3.3***	4.7***
Other						
Griffiths Scale IQ	8	.46*	2	119	110	107
M grants B floor freedom	8	.07				

Notes: ^aIndicates source of information for maternal sensitivity correlations and Strange Situation groups (sources numbered 1, 4, and 5 are only used in Table 3): 2 = Ainsworth et al. (1978); 3 = Ainsworth and Tracy (1973); 6 = Tracy and Ainsworth (1981); 7 = Stayton and Ainsworth (1973); 8 = Stayton et al. (1971); 9 = unpublished computations by I. Bretherton for Stayton and Ainsworth (1973). ^b3rd and 4th quarter.

⁺ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed); if asterisk is on A or C mean, that mean is different from B.

overall A-infants cried significantly more than B-infants. B-mothers acknowledged their babies most often when re-entering the room whereas A-mothers did so least (here again many responses were neutral). B-infants greeted their mothers most positively (40% of enter-room episodes), A-infants did so less (about 30%), and C-infants least (just over 20%). C-infants most often greeted the mothers with a mixed response that included a fuss.

During the 4th quarter, mothers intervened in their babies' undesirable ongoing behavior either physically by removing them from the source of concern or through verbal requests and commands (Stayton et al., 1971). B-infants cooperated with maternal verbal requests/commands about 80% of the time, but even A-infants complied just over half and C-infants just under half of the time. A few (usually B-infants) manifested the beginnings of internalized control or self-prohibition. As the authors comment: "There is little evidence that obedience is achieved through training or specific schedules of reward

or punishment. Rather, the affectional tie itself seems to foster a willingness to comply with parental signals” (Stayton et al., 1971, p. 1067).

In addition to domains of behavioral interaction, Table 4 presents correlations of maternal Sensitivity with the other three 4th quarter Maternal Care Scales (all *r*s exceeded 0.80) and infant Strange Situation patterns. B-mothers received the highest means, but there were differences in the rank order of A- and C-means that I discuss in the next section.

It is less well known that Ainsworth also constructed a classification system of infant secure base and exploratory behavior at home (see Ainsworth et al., 1971). She identified five groups, labeled with Roman numerals I to V (I being optimal). Table 4 shows that B-infants were placed in optimal home groups significantly more often than A- and C-infants, but a detailed discussion of A/C differences related to this measure is also postponed to the next section.

Finally, 11-month IQ scores obtained with the Griffiths scale were significantly correlated with maternal Sensitivity, but separate comparisons of A- and C-infants' scores with those of B-infants were not significant (Ainsworth et al., 1978, p. 131). Ainsworth and Bell (1974, p. 108) ventured that maternal sensitivity may have a facilitating effect on the infant's exploration of the environment, but permitting more floor freedom was not related to maternal Sensitivity ratings.

In summary, the 1st quarter studies presented in Table 3 reveal that future A-dyads scored less favorably than C-dyads on a few behavioral categories. A-mothers were least expressive of positive emotions (lowest percentage of affectionate holding episodes, silent, unsmiling face-to-face initiations, and routine interactions) while A-infants responded least positively to being put-down and terminated face-to-face interactions more often than C-infants. A larger number of differences emerged during the 4th quarter (see Table 4). Mothers of A-infants were somewhat more often abrupt when picking the baby up, had the highest percentage of brief holding episodes, acknowledged their infants least when re-entering the room, and – as in the 1st quarter – showed affection through kissing rather than cuddling (Tracy & Ainsworth, 1981). A-infants reciprocated by responding least positively to being held, failing to sink in and mold their body to the mother's, but were also least satisfied when put down. C-infants cried longest per hour and cried most often when their mother departed from the room, but A-infants cried somewhat more frequently per hour than C-infants, and cried proportionately more often at home than B-infants when mothers left the room. Possible meanings of differences between the A1/A2 and C1/C2 subgroups will be discussed in the next section.

Strange Situation subgroups in relation to the Maternal Care ratings and infant home classifications

In addition to documenting the mean Maternal Care ratings and infant–mother home classifications as related to the three major SSP classifications, Ainsworth examined these ratings by SSP subgroups (B3, B1/B2, A1, A2, C1, and C2). She reasoned that “a more refined identification of outcome patterns offers more aid to the identification of relevant antecedent variables than does a cruder kind of identification” (Ainsworth et al., 1978, pp. 234–235). Following a method she often used in classification procedures, she had identified the SSP subgroups before creating the three major ABC classifications and predicted that subgroup distinctions would, in time, prove even more useful than placement into the three major groups (Ainsworth et al., 1978, p. 251).

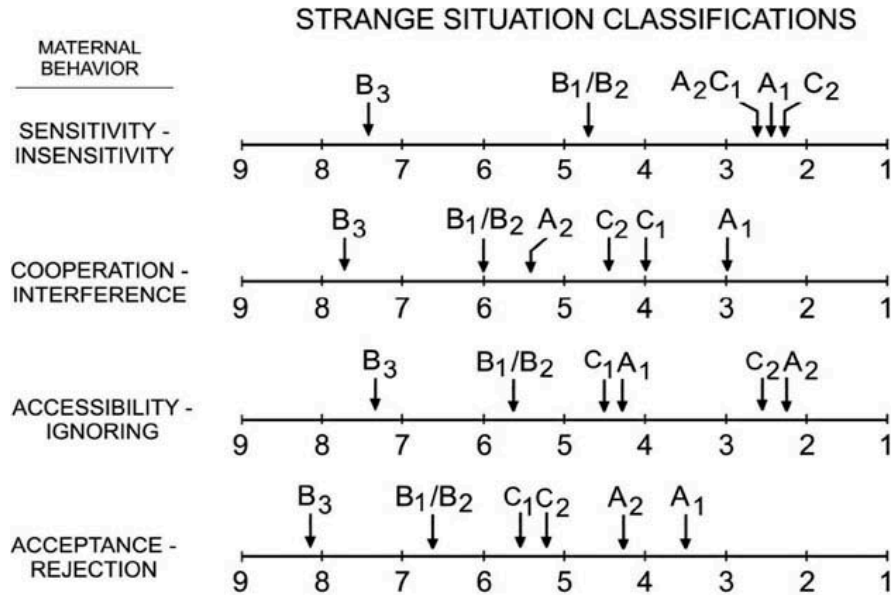


Figure 1. Mean Maternal Care ratings by Strange Situation sub-groups. This graph is adapted from Ainsworth, Bell, and Stayton (1971, p. 43).

Maternal Care ratings and SSP subgroups. Figure 1 (from Ainsworth et al., 1971, p. 43) graphically displays maternal Sensitivity, Acceptance, Cooperation, and Accessibility ratings by SSP subgroup. Consistently, mothers with the highest ratings on the four scales had infants who were classified as B3 (optimally secure) in the SSP but as consistently, the means of B1/B2-mothers on these scales were 1–3 points lower. On Sensitivity B1/B2-mothers actually scored slightly below 5 (inconsistently sensitive). However, on the Acceptance-Rejection scale, the gap with the B3 group shrank, with clearly positive ratings just short of 7 (accepting). On Cooperation, means for B1/B2 mothers were also quite positive (between cooperative and slightly interfering), yet on Accessibility-Ignoring, their means were only just above 5 (inconsistently accessible).

Mothers of infants in the four *insecure* SSP sub-groups had lower means than mothers of the B1/B2 group on every scale. On Sensitivity, all mothers with insecure infants were closely bunched below 3 (insensitive), but on the other three scales their scores diverged. On Acceptance-Rejection C1- and C2-mothers were rated slightly above 5 (i.e., on the positive side of ambivalent) whereas A2- and A1-mothers received the lowest ratings (between ambivalent and rejecting). The negative pole of the Acceptance ratings implies that “anger, resentment, hurt, or irritation conflict conspicuously with and limit positive feelings and result in more or less overt rejection of the baby.” Scale-point 3 (rejecting) reads: “Putting him away from her if he doesn’t do what she wants – or by deliberate ignoring as retaliation”; “long-suffering pseudo-patient compliance with his demands (which are perfunctory compliances and hence not satisfying)”; or constantly dwelling on the baby’s defects, shortcomings, and problems. Even the scale mid-point (ambivalent) describes mothers who react to infant anger or assertion of will as if it revealed the infant’s deep-seated hostility, opposition, or rejection toward the mother, albeit with the proviso that these negative feelings are not dominant.

On the Cooperation-Interference scale, in contrast, the A2-mothers’ means were slightly above the midpoint (mildly interfering) and only one half point below that of B1/B2-mothers. The means for C1- and C2-mothers were one scale-point lower (just

below 5), but it was A1-mothers who received by far the lowest ratings (3 = interfering), described in the manual as “frequent displays of physical interference or restraint, or very frequent mild interference – instructing, eliciting, prohibiting, and commanding,” with the proviso that these maternal behaviors have some rationale (training, scheduling) rather than being completely arbitrary which would deserve a rating of 1.

On Accessibility, A1- and C1-mothers had similar mean scores just below 5 (inconsistently accessible) whereas the also similar means of the A2- and C2-mothers were about two-scale points lower (below 3 = often inaccessible, neglecting, and ignoring). In the manual a score of 3 is described as: “Occasionally seems responsive to B’s behavior and to the signals implicit in it, but ... She may be too preoccupied with her own thoughts or activities to notice him, or she may notice and correctly interpret his signals without being moved to acknowledge them ... Although she frequently ignores him, she is not entirely oblivious. If the baby signals strongly enough or persistently enough, M may respond to him – and in this she differs from mothers with even lower ratings.”

Home classifications, Maternal Care ratings and SSP subgroups. The findings graphed in Figure 1 raise the question whether similar patterns would emerge if Ainsworth’s less well known five home classifications of infant attachment and exploratory behavior were plotted against means of the Maternal Care Scales. Although this information is not directly available, it can be estimated. In what follows I therefore describe each of the five home-classifications in relation to the Maternal Care Scales and the SSP subgroups. I reflect on the phenotypic differences between infant behavior in the home and lab settings, and consider the appropriateness of SSP-labels for patterns of infant attachment and exploratory behavior at home in the context of the four Maternal Care ratings.

Ainsworth found the task of identifying 4th quarter patterns of infant–mother behavior in Baltimore homes considerably more daunting than the home classification of Ganda infants. This is perhaps not surprising, because the Ganda observations were conducted during the traditional afternoon visiting hour (Ainsworth, 1967) and did not include, as in Baltimore, all aspects of infant care.

Although Ainsworth named her home classification manual “Criteria for Classification of One-Year-Olds in Terms of the Balance between Exploratory and Attachment Behavior at Home” (Ainsworth, 1970, summarized in Ainsworth et al., 1971), the classification system focuses not so much on the *balance* of infant attachment and exploratory behavior of each group as on qualitative differences in their *integration* and quality. Classifications are labeled with Roman numerals rather than descriptive names, because Ainsworth was considering a revision that would not be geared primarily to the concept of the attachment-exploration balance (Ainsworth et al., 1978, p. 241). The original plan, to have research assistants independently classify each 4th quarter visit proved unworkable, because infants sometimes behaved quite differently from one visit to the next. Importantly, the variability of infant behavior was therefore incorporated into the classification system, and all classifications, conducted by Ainsworth herself, were based on joint consideration of the complete set of 4th quarter narrative records.

Just as the four Maternal Care Scales require that infant behavior be taken into account in rating maternal behavior, some of the infant home classifications required that aspects of *maternal* responses be considered to classify infants. Infants in Home Group I moved freely away from the mother to engage in locomotor and constructive object exploration while keeping track of the mother’s whereabouts and gravitating back to her from time to time for brief, but satisfying, physical contact. Minor separations at home tended not to distress infants in Group I. All eight were classified as B3 in the SSP

(hence had mothers with the highest maternal Sensitivity, Acceptance, Cooperation, and Accessibility scores; see Figure 1). The label “secure” fit these infants’ home interaction patterns particularly well and was consonant with their ability to use the mother as secure base and safe haven during the initial SSP episode during which they eagerly approached and investigated the attractive set of toys. However, when left with a stranger in an unfamiliar room they responded with distress, and approached and sought contact with the mother on her return. Although they were relatively quickly soothed, their exploratory behavior did not return to its initial level (Ainsworth et al., 1971, p. 31). An observer should expect little distress from these babies at home, however.

Home Group II infants differed from Group I in that they used the mother as a secure base *intermittently*, that is, at times when she was *intermittently* accessible and non-interfering. If Group II mothers picked their babies up in an interfering way, they resisted and even ignored or avoided her. Conversely, when infants approached the mother while she was in an ignoring or rebuffing mood, infants responded with insistent attachment behavior. Three of the four Group II infants were B2/B1 and one was B3 in the SSP. In the SSP, B1/B2 infants did not cry when the mother left, but became distressed when the stranger left and they were completely alone. In contrast to Group I/B3 infants, they interacted with the returning mother more over a distance, and some showed moderate avoidance. Because of the variability of infant and maternal behavior, and the uneven pattern of Maternal Care ratings, the unqualified label “secure” fit the home behavior of Group II less clearly than that of Group I.

Infants placed in home Group III absorbed themselves in independent exploration around the house, often moving out of the mother’s sight. Their mothers, conversely, ignored them for long periods. Although these babies approached the mother rather infrequently, if they did and she failed to respond, they were easily discouraged (in contrast to the more feisty Group II infants who became peremptory under these conditions). The quality of Group III infants’ exploration was (it appears) constructive, but Ainsworth (1970, p. 4) describes them as having a “take-it-or-leave-it attitude” to maternal presence and absence at home. If picked up, Group III infants did not mold to mother’s body, and tended not to protest when put down. In the SSP two of these infants were A2 and one was B2. The A2-infants’ home behavior resembled their SSP exploratory behavior in the mother’s absence. However, in the SSP they did cry when left completely alone, and responded with incomplete or aborted attachment behavior when the mother returned, mildly avoidant behavior that was less evident in the B2 infant. The SSP designation “avoidant” fit the home behavior of Group III reasonably well, although Ainsworth and colleagues, at times, referred to them as “independent” (Ainsworth et al., 1971, p. 38).

Group IV infants behaved very differently at home than Group III. They made active attempts to remain in the vicinity of the mother, and became distressed when losing track of her or she left the room and they could not follow. Yet, they seemed conflicted about close bodily contact, both wanting and resisting it (Ainsworth, 1970). If the mother picked them up when they sought contact they often squirmed to get down again right away, but then protested when released. Ainsworth et al., 1978 (p. 242) labeled them as the “conflicted” group. At home, they explored more briefly and with less focused attention than groups I, II, and III. In the SSP, three Group IV infants were classified as A1, and one as C1. Whereas the C1-infant showed conflicted attachment behavior in both settings, A1-infants anxious home behavior was in stark contrast to their lack of separation distress and proximity- and interaction-seeking during the SSP, even though they searched for the absent mother as much as the other groups (Ainsworth et al., 1978, p. 370). The label

“avoidant” that fit the A1-classified SSP behavior of Group III infants was quite inconsistent with their conflicted home behavior.

Ainsworth initially attributed A1 infants’ avoidant SSP reunion behavior to a severe approach-avoidance conflict engendered by maternal rejection and interference, but suppressed by defensive processes available to these infants under conditions of high stress (Ainsworth et al., 1971). Later she shifted to an ethology-based explanation proposed by Main wherein avoidance is a displacement behavior that allows the infant to remain in the mother’s proximity without showing attachment behavior that the mother might rebuff (cited in Ainsworth et al., 1978, pp. 316–321). In my view, neither these nor subsequent explanations, often couched in terms of minimizing the output of the attachment behavioral system (Main, 1990) or deactivating attachment (Kobak, Cole, Ferenc-Gillies, Fleming, & Gamble, 1993), are entirely satisfactory. Even though their overt behavior obscures it, studies by Sroufe and Waters (1977) and by Spangler and Grossmann (1993) reveal that avoidant infants are as physiologically aroused during separation and reunions as secure infants.

Whatever the explanation for the divergence of A1-infants’ home and SSP behavior, their approach-avoidance conflict at home is hard to overlook, especially with respect to interactions involving close bodily contact. At home, their mood during 4th quarter visits was rated as considerably angrier than that of B- and C-infants, and they showed more instances of aggression toward the mother (for definitions of these behaviors, see Main & Stadtman, 1981). Ainsworth attributed A1-infants’ anger at home to unassuaged attachment behavior, but an additional reason could be that A1-mothers’ pick-ups frequently occurred in the context of interfering with infant exploration (Ainsworth et al., 1972, p. 47). Although facially inexpressive, A1-mothers’ considerable dislike of close bodily contact was evident in the abrupt manner in which they initiated physical contact and the frequency with which they rebuffed bids for contact, behaviors in line with their low scores on the Acceptance-Rejection scale. In short, A1-infants’ conflicted attachment behavior at home was matched by A1-mothers’ conflicted and controlling (interfering) behavior. Hence, the SSP-designation “avoidant” should not be taken to mean that A1 infants rarely cry or fuss at home and fail to show proximity-seeking or separation distress in that context.

Group V infants behaved passively at home, in terms of both attachment and exploratory behaviors. Some were chronically passive and others intermittently so. They seemed anxious about the mother’s whereabouts without signaling this clearly, and while they did not actively seek contact, they were described as accepting it passively when offered. They explored little, except visually, or required their mothers to initiate active behavior. Although of some these infants occasionally undertook independent locomotor explorations (often of forbidden areas), when they were ignored or confined, Group V infants tended to engage in repetitive, stereotyped behavior (e.g., rocking, chewing on objects, hair-pulling). Ainsworth et al., 1971 (p. 44) describe group V mothers as invested in motherhood, but emotionally fragile rather than angry. To hold themselves together, they often tuned the baby out and let it cry for long periods during the early months. The combination of maternal ignoring and interference may have encouraged these infants’ passivity at home. In the SSP, one Group V infant was classified as C1, two as C2, and one as A1. The SSP label “resistant” was chosen to describe both types of C-infants because they signaled for contact during reunions, but then reacted angrily after the mother picked them up and offered toys as a distraction. “Resistant” does not, however, fit their intermittently or consistently passive behavior at home.

In sum, the appellations Ainsworth coined to highlight characteristic aspects of infant behavior in the SSP should *not* be expected to apply in literal fashion to infants' behavior with their mothers at home (the disorganized classification had not yet been identified, and will not be discussed). Despite the very impressive convergence of SSP subgroups with the five home classifications, the home patterns may, in some instances, offer greater insight into the reciprocal fit between maternal sensitivity in relation to infant behavior. Ainsworth expected that additional insecure patterns and associated maternal patterns of care remained to be discovered, citing in that connection Tolstoy's remark "Happy families are all alike; every unhappy family is unhappy in its own way" (cited in Ainsworth, 1977a, p. 19).

Finally, whereas Ainsworth believed that mothers have the most profound initial influence on infants, she did not discount infants' effect on their mothers, and also encouraged closer consideration of attachment figures other than the mother, including fathers, siblings, and daycare providers (Ainsworth et al., 1978, pp. 307–308).

Ainsworth: contrast and relation to Bowlby

Until now I have almost completely refrained from linking Ainsworth's name with Bowlby's. My goal was to clearly highlight her innovative contributions rather than, as is more usual, to evaluate it terms of its roots in and impact on Bowlby's formulation of attachment theory.

It is, of course, undeniable that Ainsworth was much influenced by Bowlby's reliance on ethology and his evolutionary perspective on attachment. It is also undeniable that ethological studies, particular of nonhuman primates, influenced the interactive behaviors Ainsworth chose to study (e.g., greetings) and how she chose to study them. From time to time, too, she adopted Bowlby's control systems language whereby attachment behaviors are switched on and off (activated and terminated) when an infant has gained sufficient proximity to and contact with the attachment figure (Ainsworth et al., 1978, p. 22). Indeed, in many of her theoretical writings she devoted considerably more space to explaining Bowlby's ethologically-oriented attachment theory than to the conceptual and methodological innovations of her own work. No single publication contains a complete description of all aspects of the constructs and methodology derived from the Baltimore home observations. Conversely, Bowlby acknowledged and incorporated Ainsworth's empirical work in Uganda (Bowlby, 1969/1982) and in Baltimore (Bowlby, 1973) into attachment theory, but I believe he underestimated her conceptual influence on attachment theory, especially with respect to individual differences.

I submit that Ainsworth differed from Bowlby in several ways. First, she showed more boldness in the topics she selected for study. Bowlby encouraged his research team to focus on parent–child separation because the effects of relationship disruption were clear-cut, undeniable, and hence easier to document than more subtle variations in parent–child and familial interactions (see Bretherton, 1992). Ainsworth, in contrast, set her mind on what she wanted to study and proceeded to collect relevant naturalistic data. Drawing on techniques of pattern recognition that she had already found fruitful when analyzing her dissertation data (Salter, 1939) she trusted that she would discover an effective way of analyzing her observational records.

Second, whereas Bowlby charted the broader principles of attachment theory and emphasized the infant's side of the relationship, Ainsworth focused on mother–infant relationships and linked attachment to love. Through close perusal of narrative records describing maternal and infant interactive behavior she identified the construct of

sensitivity. She noted how some mothers empathically adapted their behavior to the behavior of their individual infant and, by responding to infant signals appropriately and promptly, engendered a more harmonious relationship. Most likely inspired by ethology, she viewed all maternal and infant interactive behaviors (including postural adjustments) as communicative. Ainsworth and colleagues also demonstrated that maternal attempts to cure an infant of making demands or “show the child who is boss” led to much less satisfying attachment relationships and to less infant cooperation with the mother than when the mother went “with the grain.” Finally, Ainsworth discovered that maternal interference in infants’ ongoing activities affected the quality, not just the amount, of infant exploratory behavior although that aspect of her work is less elaborated. In making these complex judgments about the quality of relationships she never took a mechanical approach.

Third, in addition to being enormously influenced by ethology, Ainsworth’s work was imbued with clinical and diagnostic insights. Like Bowlby she rejected Freudian drive theory and the theory of “cupboard love,” but she appreciated some aspects of Freud’s thinking more than Bowlby did. Although she toned down references to Freud and defense mechanisms in *Patterns of Attachment* (Ainsworth et al., 1978), this was not a change of heart, as demonstrated in her subsequent interview with psychoanalyst Rudnytsky (1997, p. 399) and her autobiographical note (Ainsworth, 1983, p. 212; reprinted in this Special Issue). In the latter, she described her 8-year psychoanalytic experience (undertaken because of a depressive reaction to divorce) as the most important positive influence on her career, that also led her to immerse herself in the psychoanalytic literature, especially Freud. Freud’s views on the unconscious particularly appealed to her, as well as the psychoanalytic focus on inner structure and processes (Ainsworth, 1969b, p. 1016). She thus emphasized that the attachment behavioral system is not to be solely characterized by its outward manifestations, but by an inner organization that is presumably rooted in neurophysiological processes, is subject to developmental change, and requires further study.

Her view on the communicative and relational role of close bodily contact may also have been inspired by psychoanalytic writings. Thus, she cited Freud’s statement that the mother in stroking, kissing, and rocking the baby is fulfilling her task “in teaching him how to love” (Ainsworth, 1969b, p. 972) and referred to Winnicott “who considered physical holding as so ‘basic a form of loving’ that he extended it to cover the total environmental provision” (Ainsworth, 1969b, p. 978). Relatedly, drawing on her Ganda study, she tentatively proposed that, under certain conditions, sucking and rooting are precursor attachment behaviors that may become tied into the attachment relationship when mothers engage in thoroughgoing demand feeding and allow the baby to seek the breast for comfort. If deferred well beyond the first year, Ganda babies responded to the final stage of weaning (withdrawing night-time access) with relatively little disturbance, but for four secure-attached infants final weaning began at the end of the first year and resulted in traumatic relationship disruptions that lasted for weeks (Ainsworth & Tracy, 1973).

Concluding remarks: validity and trustworthiness

A number of developmental psychologists immediately recognized the originality and importance of Ainsworth’s pioneering constructs and her pioneering methodology. Major longitudinal studies replicating and extending her research (e.g., the Grossmanns’ Bielefeld study and the Sroufe-Egeland Minnesota study; summarized in Grossmann,

Grossman, and Waters, 2005) were initiated even before the publication of the definitive book, *Patterns of Attachment* (Ainsworth et al., 1978). However, criticisms of Ainsworth's methods and findings also erupted because she did not hesitate to use her Ganda and Baltimore findings to suggest that parental responsiveness to crying and provision of close bodily contact do not spoil young infants (e.g., Ainsworth, 1967, p. 464). These recommendations went counter to the then prevalent behaviorist Zeitgeist, but have influenced what are now accepted infant caregiving practices. Others questioned her qualitative methods, evaluative variable labels, and post hoc derivation of constructs.

Some critiques of Ainsworth's work, including her reliance on post hoc analyses, are in my view based on misunderstandings of her research philosophy. "Science," she maintained, "is implicit in the way one thinks about problems and approaches to data, rather than being irretrievably vested in the hypothetico-deductive method, experiment, or specific quantitative techniques" (Ainsworth, 1983, p. 204; reprinted in this issue). Although she had had strong training in experimental methods, when exploring new territory from an ethological perspective, she opted for Lewin's (1951) principle of "levels of successive approximation." According to this principle, it is necessary to understand how the behavior in question relates to an animal's total behavioral repertoire in its everyday environment before engaging in hypothesis-guided experimentation (Ainsworth, 1969b, p. 1019).

I would call Ainsworth's approach *spiral theory-building*. In her Ganda study, persuaded by Bowlby ethological notions about social bonds, she became fascinated with qualitative variations in observed mother–infant interactions. Her notes on infant behavior helped her classify patterns of secure base behavior, but were insufficient for detailed assessments of the quality of maternal care. For the study of Baltimore families she therefore devised a context-preserving method of data collection that allowed her and her team to record aspects of individual differences in mother–infant interactions not included in the Ganda findings while also permitting new connections and constructs (including the sensitivity construct) to emerge. Over and beyond what any checklist could provide, the narrative records enabled her not only to discover and define the maternal sensitivity construct but to devise the Maternal Care Scales with descriptive behavioral anchor points. Her identification of interaction patterns and behavioral ratings from post hoc analyses of the narrative records resembles the approach Darwin used when he derived notions about evolution and natural selection from variations in the beaks of finches from various Galapagos Islands – one of the best known examples of his inductive theory-building. In still relatively unexplored research domains precocious armchair theorizing often gives rise to simplistic hypotheses and a priori measures that can preclude the discovery of innovative or theory-changing constructs. What is, of course, required to establish trustworthiness of inductively derived findings are replications. Unfortunately Ainsworth's own proposal to replicate the methods used in the Baltimore study with a new sample was rejected by the NICHD as worthless (Stevenson, 1998).

Ainsworth passed the principle of "levels of successive approximation" on to many of her graduate students. As one of these former students, I frequently find, on completing a project, that I have used a way of analyzing naturalistic or qualitative data that emulates aspects of methods she had invented and successfully used. Her legacy lies not only in the constructs she developed and the findings she reported, but in her way of conducting developmental science.

Acknowledgements

I dedicate this paper to Mary Ainsworth, my challenging and supportive doctoral advisor. I would like to thank Klaus Grossmann and Everett Waters for helpful suggestions and my husband for his sensitive patience while I was writing this article.

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