

**Note:** The scoring material here is abstracted from Ainsworth, Blehar, Waters & Wall (1978), *Patterns of attachment*. Hillsdale, NJ: Erlbaum. The commentary and the similarity matrix are my own. References to the latter should cite Waters, E. (2002). Comments on Strange Situation Classification. Retrieved on (date) from <http://www.johnbowly.com>.

## The Ainsworth Strange Situation

### Procedure

In order to classify infants observed in the Strange Situation it is necessary that the procedure have been run properly. Strict conformity to ideal procedures and timing are not necessary. For example, mother can well leave her purse with the experimenters rather than leaving it in the room for the first separation (as described in the original instructions). In addition, the instruction to the mother to “get the baby interested in the toys, sit in your chair, don’t initiate play but be responsive if he initiates it” necessarily creates considerable variation in maternal behavior. Most importantly, the length of separations and reunions **MUST** be adjusted adaptively. If after a full minute of crying it is obvious that he will not calm down on his own, you should move on to the next episode. Allowing the baby to become extremely distressed is uninformative and disrupts behavior in subsequent episodes. Similarly, reunion episodes should be extended if necessary to allow reasonable comforting before introducing a second separation. (It may be useful to record beyond the end (3 min.) of the final episode in order to document that the infant eventually recovers and how. But scoring absolutely should not include behavior beyond the end of Episode 8).

### The Video Record

There should *always* be a sound and video record of the Strange Situation procedure. It is not possible to reliably score the procedure by observing it as it occurs. The video record should provide information about the context (when someone enters or leaves, what the adults are doing if it attracts baby’s attention, etc). It should also provide a full view of the infant as often as possible. Focusing on details of facial expression and how toys are manipulated is **NOT** helpful for scoring. Posture and movements of the arms and legs (e.g. kicking, stiffening, pushing or leaning away) are critically important and will be lost if the camera operator is too fond of close-ups. Camera operator briefed on these issues and review tapes with the experimenter until it is clear that scorable records are being obtained.

### Scoring

Although the methods for scoring the Strange Situation presented in *Patterns of attachment* are quite detailed and include considerable commentary to help scorers, experience has taught that at least some direct instruction is needed in order to understand exactly what the *Patterns of attachment* instructions refer to and how best to use them. A number of researchers with wide experience in Strange Situation research offer very effective 2-3 day training clinics in Strange Situation scoring. Others will provide training in their own laboratories in support of research projects that are of particular interest to them. Agreement with experienced coders should be documented in research reports.

Strange Situation classifications are based primarily on “interactive behaviors” toward the mother in the two reunion episodes (Ep. 5 & Ep. 8). The term “interactive behavior” refers to behavior captured on four 7-point scales: Proximity seeking, Contact maintaining, Avoidance of proximity and contact, and Resistance to contact and comforting. Despite the emphasis on reunion episode, scoring should always be based on careful review of the entire procedure. Among other things, one has to have the pre-separation levels of play in mind in order to evaluate whether an infant has fully recovered from being distressed.

The review of the video record, especially of reunion episodes, often involves looking at critical segments (often only 5-10 second long) over and over to make sure that one understands the sequence of events in detail and has looked carefully for alternative interpretations. At first glance, an infant may seem to have pulled away or slapped at the mother, but on close review it turns out that the baby was merely anticipating some behavior signaled by the mother touching, reaching for a toy, or merely adjusting her posture. In real time, these are often missed (or seen in incorrect order). Critical moments should be reviewed closely before scores are assigned.

Traditionally, the interactive behaviors toward mother and Stranger are scored, and crying in each episode timed, before assigning classifications. Scoring Strange Situations can be quite demanding. Scoring the interactive behavior scales and crying are a useful way to insure that each case is studied in detail and well understood before classifications are assigned. In addition, the interactive behavior and crying scores can be useful in themselves. As descriptive information about a sample, as independent and dependent variables, and as input's to discriminant functions that provide continuous scores on security vs. insecurity and avoidance vs. resistance. (see Richters & Waters, 1988, *Child Development*, 59, 512-522.) In any event, the procedure for assigning classifications (i.e., whether interactive behavior was first scored, etc.) should be mentioned in research reports.

## **Scoring System for Interactive Behaviors In The Strange Situation**

### **PROXIMITY- AND CONTACT-SEEKING BEHAVIOR**

This variable deals with the intensity and persistence of the baby's efforts to gain (or to regain) contact with-or, more weakly, proximity to-a person, with the highest scores reserved for behavior in which the baby both takes initiative in achieving contact and is effective in doing so on his own account. If an episode contains several instances of proximity-seeking behavior, the episode will be judged in terms of the instance that qualifies for the highest rating, unless otherwise specified below.

#### *7 Very Active Effort and Initiative in Achieving Physical Contact.*

The baby purposefully approaches the adult, creeping, crawling, or walking. He goes the whole way and actually achieves the contact through his own efforts, by clambering up on or grasping hold of the adult. The cooperation of the adult is not required. Contact is more than momentary; the baby does not turn away to other things within 15 seconds.

*Note:* In Episodes 5, 7, and 8 this top score cannot be used if the initial approach (even though it otherwise meets the above criteria) is delayed substantially (i.e., more than 30 seconds). If, however, there is an initial approach or signal for contact without substantial delay, followed later by another approach meeting the above criteria, the episode may be coded 7, even though the initial bid for contact does not qualify for this coding.

#### *6 Active Effort and Initiative in Achieving Physical Contact.*

This coding will be used for an approach and/or clamber showing initiative and active effort that nearly, but not quite, fulfills the specifications for a coding of 7.

- a. The baby purposefully approaches the adult (i.e., he does not merely happen to approach while pursuing a toy). He goes the whole way and then signals by reaching or equivalent behavior that he wants to be picked up; but he does not clamber up or hold on to make contact entirely on his own initiative. He requires the cooperation of the adult in gaining contact.
- b. The baby purposefully approaches the adult, going the whole way, and signals his desire to be picked up, but the adult does not cooperate; the adult does not pick him up or hold him, and contact is thus not achieved provided that the baby make at least two other active bids for contact within the episode, whether these are successful or not.
- c. In episode 5, 7, or 8 an approach that otherwise would be scored 7, except that it is substantially delayed, is scored 6.
- d. The baby at least three times does a full approach with clamber and/or brief contact (held only 5 to 15 seconds)-any one of these instances being too brief to qualify for a coding of 6 or 7.

- e. The baby does not begin his approach purposefully, but rather approaches in the course of exploration; finding himself close to the adult, he then completes his approach purposefully, and clambers up or holds on, achieving contact (and holding it for more than 15 seconds) on his own initiative.

5 *Some Active Effort to Achieve Physical Contact.*

This score will be given to an active effort to achieve contact that in one way or another does not quite fulfill the specifications of a coding of 6.

- a. The baby approaches purposefully and fully but does not end the approach even with a reach or other signal (except perhaps for a cry), but rather is picked up without any signal beyond the approach itself.
- b. The baby, being held by a stranger, cannot approach his mother through locomotion, but he does the best he can by actively and strongly straining toward her. This straining implies tension involving the whole body and goes beyond mere lifting of arms or a casual reach.
- c. The baby, either because he is at the door already or because he is put down by the stranger close to the mother, is too close to approach, but nevertheless he reaches strongly for the pick-up.
- d. In Episode 5, 7, or 8 the baby, having delayed substantially in making an active effort to regain contact, now makes a full approach ending with a signal that he wishes to be picked up (either a reach or a cry), but requires adult cooperation to achieve contact.
- e. The baby makes at least three active bids for contact (e.g., an approach, a reach, or a "directed cry") at least one of which is a purposeful reach; he may be scored 5 even though he does not complete contact in any of them, presumably because the adult does not cooperate.

4 *Obvious Desire to Achieve Physical Contact, but With Ineffective Effort or Lack of Initiative OR Active Effort to Gain Proximity Without Persisting Toward Contact.*

This middle score, as the heading suggests, is for babies who obviously desire contact but show relatively little active effort or initiative in gaining it, and for babies who are competent and effective in their approach behavior but who are content with minimal contact or with mere proximity.

- a. The baby spontaneously (i.e., before the adult approaches and/or offers her hands or invites him) signals his desire to regain contact by a reach, lean, or "directed cry" as though he expected the adult to pick him up. (A "directed cry" is a signal-like cry—either an isolated cry or a distinct increase of intensity of crying—obviously directed toward the adult; it is to be distinguished from continuous or intermittent crying that expresses distress but does not seem to be emitted as an attempt to communicate to the adult a specific desire to be picked up and to be picked up now.)
- b. The baby begins to approach the adult but goes only part of the distance, and either with or without a further signal waits for the adult, who completes the pick-up. (If, however, the baby goes a substantial part of the distance and presumably would have gone the whole way had he not been approached by the adult simultaneously, this will be counted as a full approach and given a higher score.)
- c. The baby makes repeated full approaches either without completing contact or with only momentary contact.
- d. baby makes a full approach, obviously wanting contact, but the adult does not cooperate and does not pick him up. (See, however, 6b and 5e for specifications of nonreciprocated approaches that may be given higher scores.)
- e. The baby makes a full approach that ends in contact (either on the baby's initiative or with the adult's cooperation), but he does so only after the adult has invited him to do so by offering her hands or by otherwise coaxing him to come.

3 *Weak Effort to Achieve Physical Contact OR Moderately Strong Effort to Gain Proximity*

The baby may display a desire to gain contact but a relatively weak or ineffective effort to implement his desire. Or he may take initiative in approaching the adult in order to interact with her or merely to increase proximity. In the latter case it is quite obvious that the baby does not achieve contact because he does not especially seek it, not because the adult disappoints him by her lack of cooperation.

- a. The baby is distressed, crying, and may be presumed to want contact because he stops crying or at least substantially lulls when he is given contact; but he does not give any specific signal that he wants contact - neither a reach nor an approach nor a "directed cry."
- b. As above the baby is distressed and crying and does reach, lean, or even slightly crawl to indicate his wish for contact-but only after the adult has begun pick-up or has offered her hands, or after a long delay.
- c. The baby makes a spontaneous full approach but neither makes contact nor seems to want to do so. Instead he offers a toy or initiates some other kind of interaction, or he seems content with mere proximity.
- d. The baby makes a spontaneous full approach and either merely touches the adult in an exploratory way or pulls himself into a standing position, giving the clear impression that he is using the adult as he would a chair or other inanimate support and that sustained contact is not the goal. (If, however, the baby remains steadying himself against the adult, he will be assumed to desire contact even though he seems off-hand about it, and will be given a higher score. Category 3d is only for momentary contact of this sort.)
- e. The baby spontaneously and deliberately signals his desire for contact with a reach (and with no cry) but, in the face of lack of response from the adult, he does not persist in his bid for contact. (The absence of the cry implies a relatively weak desire for contact.)
- f. The baby, having been invited by the adult to approach across a distance, makes a full approach, which ends neither in contact nor with a signal indicating a wish for contact.

2 *Minimal Effort to Achieve Physical Contact or Proximity.*

- a. The baby begins to approach (in a sort of intention movement) but stops, having gone only a short way, and does not follow up this beginning with any further signals of a desire for contact.
- b. The baby seems to be making a full approach, but changes direction to approach something else, or passes beyond the adult-for example, to go out the door, to the door, or to explore something beyond the adult, without pause for any kind of interaction en route.
- c. After the adult offers her hands, the baby reaches in an almost automatic gesture. The weakness of desire for contact (with the mother) is underlined by the fact that the baby is not even crying when the invitation is given

1 *No Effort to Achieve Physical Contact or Proximity.*

Episodes will be scored I whenever the baby is occupied with play and exploration-or with desperate crying-and pays little attention to the adult. In addition, episodes will be scored I in which are displayed the following behaviors, which are considered to indicate no effort (and no real desire) to achieve contact proximity.

- a. The baby merely looks, or smiles, or interacts across a distance without any increase of proximity or any signal indicating that contact is desired.
- b. The baby accepts contact, even being picked up, but merely accepts it. He did not indicate his wish for it by a cry, approach, or reach. Even though he had been crying, he shows that he had no particular desire for contact (and this occurs especially with the stranger) by the fact that he neither diminishes his crying nor hugs, clings, nor holds on.
- c. The baby approaches accidentally in the course of exploration or pursuing a rolling toy, and neither makes contact with the adult nor pauses to interact with her when he comes to her.

## CONTACT-MAINTAINING BEHAVIOR

This score deals with the degree of activity and persistence in the baby's efforts to maintain contact with the adult once he has gained it, having either approached her to make contact himself or been picked up either with or without having signaled his desire to be picked up. The relevant episodes for interaction with the mother are 2, 3, 5, and 8. The relevant episodes for the stranger are 3, 4, and 7- and, in a few instances, also 8.

Although the baby's behavior is the focus of attention here, it must be viewed within the context of interaction with the adult. Because the adults, as well as the babies, differ in the extent to which they initiate or accept contact, each of the score points has several alternatives, in an attempt to encompass a variety of contingencies.

### 7 *Very Active and Persistent Effort to Maintain Physical Contact.*

- a. The baby, in the course of contact lasting over 2 minutes, shows at least two instances of active resistance to release or to cessation of contact and indeed these efforts are in part responsible for the long period of contact. These efforts include clinging when the adult shifts his position in her arms or attempts to put him down, turning to clutch the adult or to clamber up on her again soon after being put down, or turning to the adult to make closer contact.
- b. The adult holds the baby for 2 minutes or more, but does not attempt to release him. The baby, meanwhile, embraces the adult, or sinks in, or reclines against her in a relaxed manner, or otherwise clings to her.
- c. The baby initiates contact and remains in contact (e.g., standing holding on to the mother's knee) for over 2 minutes and in addition shows at least two instances of active resistance to cessation of contact.

### 6 *Active and Fairly Persistent Effort to Maintain Physical Contact.*

- a. The baby, in the course of contact lasting between 1 and 2 minutes, shows at least one instance of active resistance to release (e.g., by clinging, clambering up, etc.). For the rest of the period of contact, he may be more passive, but even then he shows his desire for contact by sinking in, holding on, or reclining against the adult.
- b. The baby, having spontaneously approached the adult, sustains contact for longer than 1 minute, and shows at least one active clambering or resisting cessation of contact after the initial behavior that made the contact.
- c. The baby, in the course of contact lasting longer than 2 minutes, clings or, if an attempt is made to release him, actively resists it; but when finally put down, he merely cries and makes no active effort to regain contact.

### 5 *Some Active Effort to Maintain Physical Contact.*

- a. The baby, in the course of contact lasting for less than a minute, shows one marked instance of resistance to release (clinging on attempted release, clambering up after being put down, turning to the adult to make closer contact), which, as it turns out, does result in maintaining contact or at least in delaying the release.
- b. Or, he shows two instances of active behavior of this sort, neither of which results in more than brief contact.
- c. Or, having actively initiated contact by clambering up (or some similarly active behavior), he resists release once even though this may not be a marked instance of resistance.
- d. The baby is held by the mother for more than a minute; the baby may be crying and/or clinging, but he makes no active effort to resist release or to clamber up again after being put down-although he may perhaps reach a little. The point here is that the baby shows his desire for contact by clinging or by diminishing crying, but the adult's response to his behavior (continued holding) gives him no opportunity to demonstrate more active behavior in maintaining physical contact, at least not until after the contact has been long enough for him to be thoroughly comforted.

- e. Or, the baby is held for less than a minute, clinging markedly, and protests strongly when put down, even though he may not actively attempt to clamber up or to clutch at the adult in resistance to release.
- 4 *Obvious Desire to Maintain Physical Contact but Relatively Little Active Effort to Do So.*
- The baby has been held, perhaps clinging a little, perhaps having diminished his crying when picked up; when put down he decisively protests, giving more than a brief cry.
  - The baby was picked up when he was quite distressed; although he seems not to have been truly comforted by the contact, nevertheless he shows his desire to maintain contact by clinging markedly.
  - The baby, having been picked up when crying, quiets, perhaps with some clinging; after being held for *less than 1 minute*, he is put down; he either makes no protest, or the protest is both considerably delayed and minimal. He may, however, signal briefly by reaching that he would like to maintain contact, but he makes no more effective effort than this to do so.
  - The baby, having been held, is released; he resists release briefly, by attempting to hold on or by clinging briefly, but when this is ineffective he accepts the release without protest and without further effort to maintain contact.
- 3 *Some Apparent Desire to Maintain Physical Contact but Relatively Little Active Effort to Do So.*
- The baby initiates contact twice or more during the episode-by approaching and by touching or by clambering up-but each contact is held only briefly and then broken either by the baby himself or by the adult, with no protest or resistance from the baby.
  - The baby initiates contact once during the episode and shows some additional active attachment behavior (beyond that necessary to achieve contact-e.g., clutching, burying the face, reclining against the adult), but does not persist in the contact for more than a few moments, and spontaneously breaks away.
  - The adult initiates the contact, picking the baby up or holding him, with perhaps a signal from the baby (cry or reach); the baby accepts the contact but does not cling; when he is put down he protests briefly with a cry (not merely with an unhappy noise or cry face).
  - The adult initiates the contact, perhaps after a signal from the baby; the contact persists for a minute or more; the baby accepts the contact passively and gives the impression of, liking it; but when he is put down he makes no protest.
- 2 *Physical Contact, but Apparently Little Effort or Desire to Maintain It.*
- The baby initiates contact no more than once during the episode, and either breaks it off himself after a few seconds, or, if the adult makes the break, makes no effort to maintain the contact.
  - The adult initiates contact, and the baby either accepts it briefly and then breaks it or gives a brief, minimal protest (unhappy noise or cry face) when put down.
  - The adult picks up the baby, who is very distressed; the baby accepts the contact, but, although his crying may diminish, he is not really comforted. When he is put down, he cries and may cry more intensely, but this does not seem so much a definite protest against the cessation of contact as a response to the whole distressing situation. The point is, however, that even though he is very distressed, he seems somewhat less distressed when in contact with the adult than when he is not.
- 1 *Either No Physical Contact or No Effort to Maintain It.*
- The baby is not held or touched.
  - Or, if picked up, he neither clings nor holds on, and when he is put down he makes no protest; if he is not put down he may still be coded 1 if he seems indifferent to being held. Furthermore, he has taken no initiative in making the contact in the first place.

## RESISTANT BEHAVIOR

This variable deals with the intensity and frequency or duration of resistant behavior evoked by the person who comes into contact with or proximity to the baby, or who attempts to initiate interaction or to involve him in play. The mood is angry-pouting, petulance, cranky fussing, angry distress, or full blown temper tantrums. The relevant behaviors are: pushing away, throwing away, dropping, batting away, hitting, kicking, squirming to be put down, jerking away, stepping angrily, and resistance to being picked up or moved or restrained. More diffuse manifestations are: angry screaming, throwing self about, throwing self down, kicking the floor, pouting, cranky fussing and petulance. These behaviors may alternate with active efforts to achieve or maintain contact with (or proximity to) the person who is being rejected. If both kinds of behavior are marked, the baby's behavior could be scored high in both variables.

One is reminded of the "weaning tantrums" of infant monkeys. The implication is that the baby rejects his mother, being angry with *her* for having left (rejected, abandoned) him. Often enough it is clear that he rejects toys that are offered to him as a redirection of rejection of or anger toward the person who offers them. It seems likely that the rejection of the stranger is either a redirection of anger at the mother or anger at the stranger because she is not the mother. This latter point raises the question of distinguishing "fear" of strangers from this kind of rejection. For the sake of consistency, all instances of resistance to the stranger have been included in this scale, including clear protest at the entrance of the stranger (in Episode 7), or her approach, or her attempt to make contact. Similar protests at the return or approach of the mother are also included here.

### 7 *Very Intense and Persistent Resistance.*

The baby shows *two or more* of the following behaviors in the episode being coded:

- a. Repeated hitting of the person, or other similar directed aggressive behavior;
- b. Strong resistance to being held, shown by pushing away strongly, struggling, or strongly squirming to be put down;
- c. A full-blown temper tantrum, with angry screaming-the baby either being rigid and stiff or throwing himself about, kicking the floor, batting his hands up and down, and the like;
- d. Angry resistance to attempts of the adult to control the baby's posture, location, or action;
- e. Strong and repeated pushing away, throwing down, or hitting at toys offered to him.

### 6 *Intense and/or Persistent Resistance.*

Any *one* of the following behaviors:

- a. Repeated or persistent temper tantrum, with throwing self about, kicking, and/or rigid, stiff, angry screaming;
- b. Very strong and/or persistent struggle against being held;
- c. Definite and repeated rejection of the person, even in the absence of directed aggression or angry screaming;
- d. Repeated, strong rejection of toys-pushing away, throwing down accompanied by an angry cry or fuss; .
- e. A combination of less intense manifestations of resistance, including squirming to be put down, resistance to interference, refusal of contact, rejection of toys, and petulance.

### 5 *Some Resistance, Either Less Intense, or, if Intense, More Isolated and Less Persistent Than the Above.*

Any one of the following:

- a. Repeated rejection of toys (e.g., dropping or throwing down) but with no strong pushing away or batting away. The rejection does not seem as angry as in scores of 6 or 7. At least *three* such behaviors.
- b. Persistent resistance to the adult when she seeks interaction-but without the intensity of struggling, pushing away, hitting, and so on of the higher scores. An example would be a fuss or increased intensity of crying whenever the adult approaches, offers a toy, and the like.

- c. Resistance to being held by the mother, shown by squirming immediately to be put down, but without the intense struggle implied in the higher scores.
- d. Persistent low-intensity pouting or cranky fussing, with at least *one* other manifestation of rejection, such as protesting interference, rejection of a toy, and the like.

4 *Isolated but Definite Instances of Resistance in the Absence of a Pervasive Angry Mood.*

Any one of the following:

- a. Refusal of contact with the stranger. One definite, initial refusal, but without any implications of intense struggle.
- b. Two refusals of toy, or kicking movements, or resistance to interference, accompanied by a cry, but without any other manifestations of rejection or angry mood.
- c. One strong but isolated behavior, accompanied by a cry—for example, angry stepping when put down, one strong refusal of toy (strong push or batting away), stiff steps when approaching (as though showing bodily resistance), and the like.
- d. One manifestation of resistance to being held by the mother, less definite than above for example, a slight jerk or push away in the context of apparent "wanting to be held," or a definite squirm to be put down after accepting contact for at least 15 seconds.

3 *Slight Resistance.*

Any one of the following:

- a. Two instances of resistant (or aggressive) behavior that is neither intense nor strong and is not accompanied by crying—for example, little kicks of the feet, dropping toys, and the like.
- b. One instance of resistant (or aggressive) behavior if accompanied by a pout or protest, or in itself fairly intense (and yet not covered by higher scoring categories).
- c. A marked pout, not prolonged enough to warrant a score of 5 and not accompanied by other manifestations of resistance or aggression.

2 *Very Slight Resistance.*

Any one of the following, with no other manifestations of resistance:

- a. One isolated instance of nonintense resistance—for example, a little kick of the legs when being picked up.
- b. One brief, slight protest noise when the adult enters, or advances, or picks the baby up.

1 *No Resistance.*

None of the above behaviors. The baby either accepts or is unresponsive to proximity, contact, or interaction offered by the adult or he may merely avoid it. He may be occupied with other things, or he may be crying and not increase the intensity of his cry when approached by the adult. *Note:* Because babies nearly always resist having their noses wiped, such behavior will not be scored as resistant.

## AVOIDANT BEHAVIOR

This variable deals with the intensity, persistence, duration, and promptness of the baby's avoidance of proximity and of interaction even across a distance. The relevant behaviors are: increasing distance between self and the person, whether through locomotion or by leaning away from; turning the back on the person; turning the head away; averting the gaze; avoidance of meeting the person's eyes; hiding the face; or simply ignoring the person. Ignoring the person does not refer, however, to mere exploration of the environment, especially in Epi-



sodes 2 and 3. Ignoring or avoiding the person is most marked when she is trying to gain the attention of the baby or to get a response from him. It also may be considered avoidance if the baby ignores the mother's entrance to the room after an absence, whether or not she seeks a response from him, or if he does not respond to the entrance of the stranger or to her attempt to engage him in play or interaction.

This variable deals chiefly with interaction across a distance, whereas the resistance variable is concerned with interaction in contact or in close proximity. The two sets of behaviors are usually easy to distinguish, because resistance is so frequently tinged with anger or aggressive movement, while avoidance seems either to be neutral in tone or perhaps to reflect apprehension. The more neutral the tone of the avoidance, however, the more likely it seems to be defensive in character—a defense that hides feelings, perhaps including those of resentment.

Although in the case of the other variables, behavior in interaction with mother or stranger could be comprehended in the same categories, in this coding it seems necessary to distinguish between mother and stranger.

7 *Very Marked and Persistent Avoidance.*

*Of mother:* The baby does not greet the mother upon her return in a reunion episode (episode 5 or 8)—neither with a smile nor with a protest. He pays little or no attention to her for an extended period *despite the mother's efforts to attract his attention*. He ignores her, and may turn his back to her. If his mother nevertheless picks him up, he remains unresponsive to her while she holds him, looking around, seemingly interested in other things.

*Of stranger:* The baby repeatedly and persistently avoids the stranger, by some kind of strong behavior, either locomotor withdrawal or hiding the face, perhaps combined with looking away. In Episode 3 the baby may go to his mother in his repeated withdrawals from the stranger.

6 *Marked and Persistent Avoidance.*

*Of mother.* (a) The baby behaves as above, giving the mother no greeting, except perhaps an initial look, and paying little or no attention to her for an extended period; but in this case the mother does not persist in her attempt to gain the baby's attention—she merely greets him and then sits quietly. *Or* (b) the baby greets his mother, perhaps with a smile or a fuss or with a partial approach, and then behaves as above, paying little or no attention to the mother for an extended period, despite the mother's efforts to attract his attention.

*Of stranger:* This score is reserved for an episode in which the end of the episode comes before it is confirmed that the baby's avoidance would have been repeated and persistent. The baby strongly withdraws from the stranger with behavior and in a context that makes it seem very probable that the avoidance would have been persistent had the episode not ended.

5 *Clear-Cut Avoidance But Less Persistent.*

*Of mother:*

- a. The baby may look, but gives the mother no greeting, then looks away, or turns away and ignores the mother for about 30 seconds, during which time the mother makes no special effort to gain his attention; then he looks again and seems more responsive to her, but he does not seek contact and may even avoid it if it is offered.
- b. The baby gives the mother no greeting; the mother strives to gain his attention; after about 15 seconds he gives her his attention but he is fairly unresponsive even then.
- c. The baby greets his mother or starts to approach her, but then he either markedly turns away (or looks away) or tries to go past her out the door; he ignores her efforts to gain his attention for an appreciable time, although he may then respond by approaching, reaching, or accepting a toy.

*Of stranger:* The baby repeatedly and persistently avoids the stranger, but without the intensity of the avoidance implicit in a coding of 7. In Episode 3 the baby may retreat to his mother, but without apparent intense anxiety, and then later show some other clear-cut manifestation of avoidance of the stranger.

Regardless of the episode, the baby clearly does not want to have anything to do with the stranger-neither contact nor interaction-but his efforts to avoid her do not have the frantic persistence of those coded 7.

4 *Brief But Clear-Cut Avoidance OR Persistent Low-Keyed Avoidance.*

*Of mother:*

- a. The baby greets his mother or starts to approach her; he then clearly turns away or looks away as in 5c. In this instance, however, the mother goes to her chair and sits, without making any effort to elicit responsiveness in the baby. The baby goes on playing, perhaps with occasional looks and smiles at the mother; both behave (in a reunion episode) much as the average couple in Episode 2. In view of the mother's lack of participation, one can be justified in counting only the initial avoidance behavior (i.e., that following greeting) as avoidance on the baby's part. It is assumed that he is not ignoring his mother and that he would approach her or respond to her if given a cue.
- b. The baby at first "snubs" the mother by failing to greet her and either by being slow to look at her or by looking away or both (or perhaps by trying to go out the door); but after this initial avoidance behavior, the baby responds by reaching to the mother's outstretched hands and/or by regaining responsiveness after being picked up.
- c. The baby fails to greet his mother and ignores her for a time (15 to 30 seconds) and then takes the initiative in making contact or undertaking interaction, even though the mother has not sought his attention.

*Of stranger:*

- a. The baby shows one clear-cut avoidance or several slight ones, but at least looks at the stranger and at what she is doing for part of the episode, even though there is no positive response to her.
- b. The baby persistently avoids meeting the stranger's eyes with his. He may watch her, but as soon as she looks at him he averts his gaze; but there is no stronger instance of avoidance than this.

3 *Slight, Isolated Avoidance Behavior.*

*Of mother:*

- a. The baby is distressed and is slow either in looking at his mother or in responding to her overtures-but then he does, either crying more loudly or reaching or both.
- b. The baby is not distressed; he looks up at his mother when she arrives, perhaps greeting her, then looks away briefly; then he is responsive, either interacting with her or exchanging looks and smiles in the course of play. He does not, however, take the initiative in seeking contact.

*Of stranger:*

- a. In Episode 3 the baby at one point retreats from the stranger to his mother, but without apparent anxiety. He does not approach the stranger, but on the other hand he does not further avoid the stranger's advances in this episode.
- b. One isolated but clear-cut instance of avoidance of the stranger, by twisting away, turning away, or moving back a little; but for the rest of the-episode the baby accepts the stranger's advances and may be fairly friendly, or, if the episode ends soon, there is no implication that the avoidance will be persistent.

2 *Very Slight Avoidance.*

*Of mother:* The baby may delay very briefly in responding to his mother's return or may give her a brief snub by looking away, but very soon he takes the initiative in seeking contact or interaction with or proximity to her.

*Of stranger:* One slight instance of avoidance of the stranger. The baby who is not distressed (because of separation) may look away coyly or turn away momentarily as the stranger approaches, or perhaps he may seem to avoid her eyes for a while. The baby who is distressed by separation may not be responsive to the

stranger, but he shows only one slight instance of avoidance-looking away or moving his hands away.

*1 No Avoidance.*

*Of mother:* The baby responds appropriately to his mother and to her behavior, neither avoiding her overtures nor ignoring her return after an absence. In Episode 2, however, he may be quite preoccupied with exploration while she sits quietly; and in Episode 3, he may be absorbed either with continuing exploratory play or with staring at the stranger.

*Of stranger:* The baby may be friendly with the stranger. He may be too distressed by his mother's absence to be friendly. He may angrily resist the stranger or the toy she offers. He may continue playing, paying little spontaneous attention to the stranger. But he does not avoid the stranger, and he at least watches her when she tries to interest him in toys.

## **Criteria for Classification In Terms Of Attachment Security Based On The Strange Situation**

Interactive Behavior scores and Strange Situation classifications are built on understanding both the organization and the fine details of behavior. It is difficult to have great confidence in either of these when you have only a brief sample of behavior to work with. In order to avoid making too much out of details that may have been misinterpreted or unrepresentative, it is important that you not base major decisions about scoring or classifications on a single bit of evidence. Especially in assigning classifications, develop a hypothesis during the first reunion and look for *converging evidence* within and across episodes. Remember: The B group is large; the A & C groups are small. In addition to being the modal classification in most samples, the B group isn't much affected if you mistakenly include an A or a C. If you mistakenly call a few B's insecure you introduce a lot of noise and lose a lot of power. It is also important to keep open the option of saying "can't classify", especially if the procedure is somehow disrupted. Sometimes a baby will fall and cry, or a Stranger will hand the baby to the mother instead of putting him down before a reunion. Things happen, people can't be seen in the camera, babies see Daddy or a stroller or other children in the hall. If you don't have the goods, don't assign scores. Finally, every experienced scorer asks for a second opinion from another lab now and then.. They'll understand.

### **Secure (Group B)**

- The baby wants either proximity and contact with his mother or interaction with her, and he actively seeks it, especially in the reunion episodes.
- If he achieves contact, he seeks to maintain it, and either resists release or at least protests if he is put down.
- The baby responds to his mother's return in the reunion episodes with more than a casual greeting-either with a smile or a cry or a tendency to approach.
- Little or no tendency to resist contact or interaction with his mother. -Little or no tendency to avoid his mother in the reunion episodes.
- He may or may not be friendly with the stranger, but he is clearly more interested in interaction and/or contact with his mother than with the stranger.
- He may or may not be distressed during the separation episodes, but if he is distressed this is clearly related to his mother's absence and not merely to being alone. He may be somewhat comforted by the stranger, but it is clear that he wants his mother.

Subgroup B1

- The baby greets his mother, smiling upon her return, and shows strong initiative in interaction with her across a distance, although he does not especially seek proximity to or physical contact with her.
- If picked up, he does not especially seek to maintain contact.
- He may mingle some avoiding behavior (turning away or looking away) with interactive behavior, but he shows little or no resistant behavior and, in general, seems not to have feelings as mixed as an A2 baby.
- He is likely to show little or no distress in the separation episodes.

Subgroup B2

- The baby greets his mother upon reunion, tends to approach her, and seems to want contact with her, but to a lesser extent than a B3 baby. Some B2 babies seek proximity in the pre-separation episodes, but not again until Episode 8, and then perhaps only after some delay.
- The B2 baby may show some proximity avoiding, especially in Episode 5, but this gives way to proximity seeking in Episode 8, thus distinguishing him from the A2 baby.
- Although he accepts contact if he is picked up, he does not cling especially, and does not conspicuously resist release.
- On the other hand, he shows little or no resistance to contact or interaction, and in general shows less sign of mixed feelings than A2 babies.
- He tends to show little distress during the separation episodes.
- He resembles a B, infant, except that he is more likely to seek proximity to his mother.

Subgroup B3

- The baby actively seeks physical contact with his mother, and when he gains it he is conspicuous for attempting to maintain it, actively resisting her attempts to release him. Most B3 babies show their strongest proximity-seeking and contact-maintaining behavior in Episode 8, but some do so in Episode 5 and are so distressed in the second separation episode that they cannot mobilize active proximity seeking and resort to signaling. Occasionally, a baby who seems especially secure in his relationship with his mother will be content with mere interaction with and proximity to her, without seeking to be held.
- At the same time, the B3 baby may be distinguished from other groups and subgroups by the fact that he shows little or no sign of either avoiding or resisting proximity to or contact or interaction with his mother.
- He may or may not be distressed in the separation episodes, but if he shows little distress, he is clearly more active in seeking contact and in resisting release than B1 or B2 babies.
- Although his attachment behavior is heightened in the reunion episodes, he does not seem wholly preoccupied with his mother in the pre-separation episodes.

Subgroup B4

- The baby wants contact, especially in the reunion episodes, and seeks it by approaching, clinging, and resisting release; he is, however, somewhat less active and competent in these behaviors than most B3 babies, especially in Episode 8.
- He seems wholly preoccupied with his mother throughout the strange situation. He gives the impression of feeling anxious throughout, with much crying. In the second separation, particularly, he seems entirely distressed.
- He may show other signs of disturbance, such as inappropriate, stereotyped, repetitive gestures or motions.
- He may show some resistance to his mother, and indeed he may avoid her by drawing back from her or averting his face when held by her. Because he also shows strong contact-seeking behavior, the impression is of some ambivalence, although not as much as is shown by Group-C infants.

### **Insecure Avoidant (Group A)**

- Conspicuous avoidance of proximity to or interaction with the mother in the reunion episodes. Either the baby ignores his mother on her return, greeting her casually if at all, or, if there is approach and/or a less casual greeting, the baby tends to mingle his welcome with avoidance responses. turning away, moving past, averting the gaze, and the like.
- Little or no tendency to seek proximity to or interaction or contact with the mother, even in the reunion episodes.
- If picked up, little or no tendency to cling or to resist being released.
- On the other hand, little or no tendency toward active resistance to contact or interaction with the mother, except for probable squirming to get down if indeed the baby is picked up.
- Tendency to treat the stranger much as the mother is treated, although perhaps with less avoidance.
- Either the baby is not distressed during separation, or the distress seems to be due to being left alone rather than to his mother's absence. For most, distress does not occur when the stranger is present, and any distress upon being left alone tends to be alleviated when the stranger returns.

#### Subgroup A<sub>1</sub>

- Conspicuous avoidance of the mother in the reunion episodes, which is likely to consist of ignoring her altogether, although there may be some pointed looking away, turning away, or moving away. If there is a greeting when the mother enters, it tends to be a mere look or smile.
- Either the baby does not approach his mother upon reunion, or the approach is "abortive" with the baby going past his mother, or it tends to occur only after much coaxing.
- If picked up, the baby shows little or no contact-maintaining behavior. He tends not to cuddle in; he looks away; and he may squirm to get down.

#### Subgroup A<sub>2</sub>

- The baby shows a mixed response to his mother on reunion, with some tendency to greet and to approach, intermingled with a marked tendency to turn or move away from her, move past her, avert the gaze from her, or ignore her. Thus there may be moderate proximity seeking, combined with strong proximity avoiding.
- If he is picked up, the baby may cling momentarily; if he is put down, he may protest or resist momentarily; but there is also a tendency to squirm to be put down, to turn the face away when being held, and other signs of mixed feelings.

### **Insecure Resistant (Group C)**

- The baby displays conspicuous contact- and interaction-resisting behavior, perhaps especially in Episode 8.
- He also shows moderate-to-strong seeking of proximity and contact and seeking to maintain contact once gained, so that he gives the impression of being ambivalent to his mother.
- He shows little or no tendency to ignore his mother in the reunion episodes, or to turn or move away from her, or to avert his gaze.
- He may display generally "maladaptive" behavior in the strange situation. Either he tends to be more angry than infants in other groups, or he may be conspicuously passive.

#### Subgroup C<sub>1</sub>

- Proximity seeking and contact maintaining are strong in the reunion episodes, and are also more likely to occur in the pre-separation episodes, than in the case of Group-B infants.
- Resistant behavior is particularly conspicuous. The mixture of seeking and yet resisting contact and interaction has an unmistakably angry quality and indeed an angry tone may characterize behavior even in the pre-separation episodes.

- Angry, resistant behavior is likely to be shown toward the stranger as well as toward the mother.
- The baby is very likely to be extremely distressed during the separation episodes.

#### Subgroup C<sub>2</sub>

- Perhaps the most conspicuous characteristic of C<sub>2</sub> infants is their passivity. Their exploratory behavior is limited throughout the strange situation, and their interactive behaviors are relatively lacking in active initiative.
- Nevertheless in the reunion episodes they obviously want proximity to and contact with their mothers, even though they tend to use signaling behavior rather than active approach, and protest against being put down rather than actively resist release.
- Resistant behavior tends to be strong, particularly in Episode 8, but in general the C<sub>2</sub> baby is not as conspicuously angry as the C<sub>1</sub> baby.

### **Insecure Disorganized (GROUP D)**

This classification was not included in Ainsworth's original scoring system. It can usually be ignored in research with normal mothers and infants because it is too rare (usually < 5%) to significantly affect results. It is more common when mothers or infants are drawn from a known clinical population. In these cases, the Disorganized classification should be scored, if only in order to see whether secure vs. insecure results are primarily due to infants showing this atypical behavior.

The Disorganized classification has a wide range of correlates. At the same time, it is not yet clear how it should be understood. Just because behavior occurs in the Strange Situation does not make it "attachment behavior". A key to the Disorganized classification is that the behavior is not pervasive in the Strange Situation but is limited to reunion episodes. Nonetheless, it is not yet clear whether this behavior reflects (a) primarily an attachment problem or (b) a developmental problem that leads to difficult interactions and thus to an attachment problem, or (c) odd behavior that is evident in the stress of the Strange Situation but not necessarily associated with secure base behavior at home. Any of these would likely have a wide range of correlates. See Main & Solomon's chapter in Greenberg et al. (1990) *Attachment in the preschool years* for a description of the classification criteria for the Disorganized classification. See the chapters in Solomon & George (1999) *Disorganized attachment* for discussions of the concept, its markers, and correlates.

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## **• The Strange Situation Similarity Matrix: An Aid To Correct Classification**

Everett Waters

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For many who are new to the Strange Situation, the complex set of classification and sub-classification options is a major obstacle to learning the scoring systems and using them reliably. In fact, the task is much simpler than it appears. Experienced scorers use critical information to quickly form an impression of what the subject's classification might be. They then look for further information that either confirms this preliminary classification or points toward an alternative. Experienced scorers know that for any preliminary classification there are really only a few plausible alternatives. The tables below summarize, for each Strange Situation and AAI classification, the alternative classifications that need to be examined closely. They should make both classification systems easier to learn and use reliably.

Also useful is Patterns of attachment, Table 33 (attached). It provides subgroup means and standard deviations from Ainsworth's large Baltimore sample of middle-class home-reared one-year-olds. Because the ns in some sub-

Researchers first learning the Strange Situation classification system are often struck with the impression of overwhelming complexity. In fact, you don't need to keep all the scoring criteria in mind all the time. Experienced coders quickly rule out classifications that are entirely implausible, develop some ideas for one or two most likely classifications, and then go about deciding among them. Even when a classification seems "easy", experienced scorers check the most likely alternative classifications before making a final decision.

In both instances, it is useful to know which classifications are most likely alternatives (or most easily confused with) which other classifications. The most likely alternative to a classification is not necessarily the adjacent categories. That is, the most likely alternative to C1 is not C2 but A2, etc. The Strange Situation Similarity Matrix summarizes the "proximity" among classifications.

To use the Matrix, simply locate the row corresponding to your preliminary classification decision. Read across the row to find the most likely alternative classification (dark blue) and the next most likely classifications. Focus on deciding among these alternatives. This should make the task much easier.

Here's the Matrix. Some commentary of decisions associated with each classification and its alternatives follow.

Possible Alternative Classification

|    | A1 | A2 | B1 | B2 | B3 | B4 | C1 | C2 |
|----|----|----|----|----|----|----|----|----|
| A1 |    |    |    |    |    |    |    |    |
| A2 |    |    |    |    |    |    |    |    |
| B1 |    |    |    |    |    |    |    |    |
| B2 |    |    |    |    |    |    |    |    |
| B3 |    |    |    |    |    |    |    |    |
| B4 |    |    |    |    |    |    |    |    |
| C1 |    |    |    |    |    |    |    |    |
| C2 |    |    |    |    |    |    |    |    |

Most Likely Alternative   
  Next Most Likely Alternative   
  Not Likely

**If Preliminary Classification is:**

**A1:** Consider A2, B1, and B2. A1 is marked by high avoidance - same level or increasing from Ep. 5 to Ep. 8. A2 shows similar avoidance PLUS marked contact resisting and anger. Like A1, B1 shows avoidance but usually to a lesser degree and often less in second reunion. Key difference is that B1 shows a lot of distance interaction with mother in pre-separation and reunion episodes. B2 deserves a look because, like A's, they tend not to cry and they do little proximity seeking and little distance interaction. Sometimes their lack of clear B-like behaviors is

(mistakenly) taken as avoidance. If avoidance is clear, persistent, and/or increases from Ep. 5 to Ep. 8, go with A1. If the child is just uninterested or inactive, go with B2. Although B2's are described as unlikely to cry, it is not an absolute rule.

**A2:** Consider A1 and C1. As described above, both A1 and A2 are very avoidant. The primary difference is that A2 shows marked avoidance AND at least some contact and interaction resisting. This is sometimes accompanied by crying (which is unusual in A1). Consider also C1 and assign this classification if there is crying AND avoidance is less clear than angry resistance.

**B1:** Consider A1 and B2. Neither A1 nor B1 is likely to cry during separation. Both show some avoidance. The differences are (1) A1 is more avoidant, (2) avoidance stays the same or increases from Ep. 5 to Ep. 8 in A1 and is low or decreases in B1, and (3) A1 does little distance interaction, or affective sharing in the reunion episodes. If you know how to score avoidance, the distinction is usually not too difficult. Mistaking a B1 for a B2 is probably not a grave error. They are pooled in most data analyses. The distinguishing feature is usually the active distance interaction in B1; B2 are just there, not quite B3 but not doing anything that suggests A or C.

**B2:** Consider A1, B1, and B3. A1 is very unlikely but could be the correct classification if you have seriously missed avoidance. The distinction is a little more difficult when the child is low-keyed during the reunion episodes and the mother just sits. In such cases, all you can do is hope more happens in the next separation. If you don't get clear active avoidance, it seems prudent to go with B2 rather than speculating on A1. The B1 vs B2 distinction is discussed above under B1; the key is that B1's engage in active distance interaction during reunions, for B2 it is incidental. B3: In Ainsworth's initial studies she had pairs of observers dictating parallel play-by-play onto tape during the Strange Situation. These records were typed and used for classification. In these data B3 was the most common classification, B2 was rare. With the advent of videotape many studies find approximately equal numbers of B2 and B3. This may reflect the fact that narrators have to keep up with the flow of behavior. They may not have time to notice or include qualifying details that jump out of a video record. B3 is usually reserved for (1) full approaches or active greeting plus (2) calming in response to mother's return and/or contact, and (3) return to pre-separation levels of play. B2 may fall short on any of these but does not show more than minimal avoidance or resistance. Crying can occur or not in either group.

**B3:** B3 is difficult to confuse with other classifications. There is no avoidance or resistance. Proximity seeking and/or contact is active and complete. Quantity and or quality of play usually declines during separation and recovers by the end of the reunion episodes. No avoidance; no resistance. May or may not cry. (Note: The occasional child, esp. one with day care experience, will seem not at all bothered by the separation episodes - both mood and play are maintained at pre-separation levels. They are engaging with the stranger and respond to mother's return as if she were moving from room to room at home (i.e. pleasant but little proximity seeking or interaction). It is as if they knew full well that mother would be back in a moment and the separation is nothing to be upset about. In a word, the child seems not to be in the Strange Situation. There would seem to be two approaches to such a situation: (1) classify the child B3 (completely confident in M's availability, responsiveness etc.) or (2) use "Can't classify". Don't consider calling this behavior avoidant unless you have a lot of experience. (Note: It seems reasonable to find out in advance whether subjects have extensive daycare experience. It would be useful for someone to see a sample of such children in the Strange Situation and also observe their secure base behavior at home with the Attachment Q-set. This would tell us whether the Strange Situation ability to predict secure base behavior (i.e. it's validity) applies to daycare samples.)

**B4:** Consider C1 and C2. B4 is a rare classification in most populations. The key features are strong crying during separation, active proximity seeking and contact maintaining, and (most of all) calming and willingness to return to play IF MOTHER ALLOWS HIM/HER TO STAY RIGHT NEXT TO HER OR ON HER LAP. Attempts to put the child down or get him/her to play away from the mother reactivate crying and contact maintaining. Note that the contact maintaining may seem desperate but it is neither disorganized nor angry. The child just wants back up. Once you see a good example of this, it is easy to classify. Like B4, C1 and C2 are likely to cry hard. But C1 displays angry contact resisting (pushing toys away but not following with reach for contact, not sinking in when held, etc). B4's are rarely resistant - what does happen sometimes is that mother tries to push a toy on the child or put him/her down when (s)he is not ready. This predictably elicits an angry response; it is distinguished from resistance by the fact that it is followed by direct, active effort to recover the proximity or contact the child wants. C2 is



not a very likely alternative. They are similar to B4 in their intense crying during separation but their proximity seeking and contact maintaining are very weak. They will sit at mother's feet and cry without reaching to be picked up. And they rarely recover to pre-separation levels of play and good mood. B4's are quite purposeful in seeking contact (unless they are just too upset) and they are very active at clinging and sinking in - and they do get back to play (if Mom lets them play on or next to her).

**C1:** Consider A2 and C2. A2 displays active proximity and interaction avoidance along with some angry contact resistance. If avoidance is clear and resistance is incidental, use A2. If resistance is clear and avoidance is incidental, use C1. To experienced scorers, C1's seem angry; A2's seem avoidant.

**C2:** Consider B4 and C1. All three groups are likely to cry hard during the separation episodes. The classification criterion however is presence or absence of resistance. B4 shows competent contact seeking and maintaining and is effectively comforted by contact. C2 is passive in seeking proximity and contact and difficult to comfort. C2 differs from C1 in two respects (1) C1 is less passive than C2, they don't roll over on their sides and cry when mother return or sit at her feet and cry without reaching (2) C1's typically seem angry, they bat toys away, push off if held, throw things down, treat the mother roughly, cry angrily. C2's just cry hopelessly.

**Remember: Understand critical moments in detail. Look for converging lines of evidence for a classification decision. Keep open the option of saying "Can't classify". If necessary, get a second opinion.**

Reprinted from Ainsworth et al. (1978), *Patterns of attachment*. Hillsdale, NJ: Erlbaum

TABLE 33  
Subgroup Means and Standard Deviations  
for Measures of Interactive Behavior With Mother  
in Each Relevant Strange-Situation Episode

| <i>Subgroup</i>                      | <i>Episode 2</i> |          | <i>Episode 3</i> |          | <i>Episode 5</i> |          | <i>Episode 8</i> |          |
|--------------------------------------|------------------|----------|------------------|----------|------------------|----------|------------------|----------|
|                                      | <i>X</i>         | $\sigma$ | <i>X</i>         | $\sigma$ | <i>X</i>         | $\sigma$ | <i>X</i>         | $\sigma$ |
| <i>Proximity and Contact Seeking</i> |                  |          |                  |          |                  |          |                  |          |
| A1                                   | 1.50             | 1.00     | 2.00             | 1.54     | 1.33             | 0.65     | 1.42             | 0.67     |
| A2                                   | 1.60             | 1.58     | 1.60             | 1.27     | 2.30             | 1.64     | 3.20             | 1.40     |
| B1                                   | 1.80             | 1.03     | 2.25             | 1.46     | 2.40             | 1.71     | 2.90             | 1.79     |
| B2                                   | 1.82             | 1.94     | 1.82             | 1.17     | 2.45             | 2.02     | 5.27             | 1.56     |
| B3                                   | 2.19             | 1.90     | 3.11             | 2.40     | 4.44             | 1.90     | 4.98             | 1.36     |
| B4                                   | 2.50             | 3.00     | 2.75             | 1.26     | 4.25             | 0.50     | 4.00             | 0.82     |
| C1                                   | 2.43             | 2.23     | 4.86             | 2.85     | 3.83             | 1.94     | 4.00             | 1.63     |
| C2                                   | 2.14             | 2.27     | 1.43             | 1.13     | 3.43             | 1.27     | 2.86             | 1.07     |
| <i>Contact Maintaining</i>           |                  |          |                  |          |                  |          |                  |          |
| A1                                   | 1.25             | 0.62     | 1.08             | 0.29     | 1.08             | 0.29     | 1.17             | 0.58     |
| A2                                   | 1.10             | 0.32     | 1.65             | 1.49     | 1.00             | 0        | 3.05             | 1.61     |
| B1                                   | 1.30             | 0.95     | 1.20             | 0.63     | 1.20             | 0.63     | 2.20             | 1.14     |
| B2                                   | 1.73             | 1.62     | 1.36             | 1.21     | 1.36             | 0.81     | 4.50             | 1.53     |
| B3                                   | 1.77             | 1.67     | 2.03             | 1.76     | 3.23             | 2.32     | 5.73             | 1.44     |
| B4                                   | 2.75             | 2.06     | 2.75             | 2.06     | 2.75             | 2.06     | 4.50             | 0.58     |
| C1                                   | 3.00             | 2.65     | 4.29             | 2.56     | 4.29             | 1.80     | 4.29             | 1.89     |
| C2                                   | 1.86             | 2.27     | 1.71             | 1.89     | 3.86             | 1.95     | 4.57             | 1.72     |
| <i>Resistance</i>                    |                  |          |                  |          |                  |          |                  |          |
| A1                                   | 1.00             | 0        | 1.00             | 0        | 1.08             | 0.29     | 1.83             | 1.64     |
| A2                                   | 1.00             | 0        | 1.00             | 0        | 1.08             | 0.29     | 3.23             | 1.65     |
| B1                                   | 1.30             | 0.95     | 1.00             | 0        | 1.20             | 0.42     | 1.60             | 1.08     |
| B2                                   | 1.00             | 0        | 1.00             | 0        | 1.36             | 0.67     | 1.64             | 0.92     |
| B3                                   | 1.00             | 0        | 1.00             | 0        | 1.60             | 1.36     | 1.53             | 1.01     |
| B4                                   | 1.00             | 0        | 1.00             | 0        | 2.25             | 1.89     | 2.38             | 2.43     |
| C1                                   | 2.14             | 2.27     | 1.64             | 1.70     | 4.43             | 2.58     | 4.86             | 1.46     |
| C2                                   | 1.43             | 0.79     | 1.14             | 0.38     | 2.29             | 1.89     | 3.29             | 2.29     |
| <i>Avoidance</i>                     |                  |          |                  |          |                  |          |                  |          |
| A1                                   |                  |          |                  |          | 5.79             | 0.89     | 5.92             | 1.38     |
| A2                                   |                  |          |                  |          | 4.10             | 1.45     | 4.70             | 1.69     |
| B1                                   |                  |          |                  |          | 3.70             | 1.25     | 3.40             | 1.35     |
| B2                                   |                  |          |                  |          | 3.55             | 1.86     | 1.82             | 1.25     |
| B3                                   |                  |          |                  |          | 1.56             | 1.14     | 1.28             | 0.81     |
| B4                                   |                  |          |                  |          | 1.00             | 0        | 2.25             | 1.50     |
| C1                                   |                  |          |                  |          | 2.29             | 1.89     | 3.57             | 2.30     |
| C2                                   |                  |          |                  |          | 1.86             | 1.57     | 2.29             | 1.60     |