The Computerised Manchester Child Attachment Story Task: a novel medium for assessing attachment patterns

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Abstract

The Manchester Child Attachment Story Task (MCAST) is a representational technique for assessing attachment patterns of young school-age children. We have developed a computerised version (the CMCAST) in which story stems are represented on the computer by the movement of simple screen ‘dolls’.

This paper reports on a preliminary validation study of the CMCAST method against the MCAST.

Fifty-five children completed the MCAST and CMCAST six weeks apart in random order. It proved possible to rate the CMCAST if a simplified form of the MCAST coding system was used. Inter-rater reliability was achieved for both versions ($\kappa = 0.93$ for MCAST and $\kappa = 0.91$ for CMCAST). Agreement between the MCAST and CMCAST ratings of attachment security was $\kappa = 0.67$. Costs for the MCAST and CMCAST were comparable.

A school-based feasibility study of 86 children suggested that the CMCAST was acceptable and could be administered with up to five children simultaneously.

This preliminary study suggests that the CMCAST can reliably reproduce a simplified form of MCAST coding. The computer format may be well adapted to some uses such as screening for large-scale epidemiological research. Copyright © 2010 John Wiley & Sons, Ltd.

Introduction

We have previously described, in this journal, the development of a computerised method for understanding children’s relationships using computer-generated story stems (Minnis *et al.*, 2006). From the age of about three, children use stories to make meaning out of events in the past, to think about the future and to communicate this under-

standing with others (Emde, 2007). Story stem narratives (in which the child is given the beginning of a story, often using dolls, and is asked to complete it) have been shown in numerous studies to be a reliable and valid method for finding out how children think and feel about relationships (Robinson, 2007).

One of most important aspects of young children’s relationship functioning is attachment with caregivers.

The attachment patterns of children in middle childhood have proved challenging to assess. Their attachment behaviour is not always played out in direct relationship with caregivers therefore may not be directly observable. In addition, they may not be verbally sophisticated enough to report on attachment-related experiences using interview techniques. Attempts to measure children's attachment patterns have, therefore, tended to depend upon evaluation of children's representations of attachment-related experiences through play (Green *et al.*, 2000). Despite the challenges of using representational techniques, recent work has demonstrated strong associations between attachment indices in story stem measures and psychopathology (Green *et al.*, 2007; Hill *et al.*, 2007; Futh *et al.*, 2008).

The Manchester Child Attachment Story Task (MCAST) is a doll-play story stem technique which measures attachment patterns in middle childhood (Green *et al.*, 2000) and is currently being used in a range of studies internationally. The MCAST has good inter-rater reliability, stability of attachment patterns over time (Green *et al.*, 2000) and shows concurrent validity against other well validated measures of attachment including the Adult Attachment Interview (AAI) and Separation Anxiety Test (Goldwyn *et al.*, 2000).

Insecure attachment in infancy has been shown to be associated with psychopathology in later childhood although the relationship is not straightforward (Green & Goldwyn, 2002). Van Ijzendoorn's meta analysis of 12 studies showed an overall association between disorganisation and externalising behaviour problems ($r = 0.29$), but some studies found no such association (van Ijzendoorn *et al.*, 1999). Disorganisation on the MCAST has been shown to be correlated with attention deficit symptoms and with maternal high expressed emotion (Green *et al.*, 2007).

In the original doll-play MCAST, children between the ages of five and seven are given the beginnings of four stories ('story stems') using a dolls house, each containing an attachment-related theme: the Hurt Knee, Illness, Nightmare and Shopping. For example, a child doll whose mother doll is in the dolls-house is represented as falling and hurting her knee while out in the garden. The interviewer amplifies the intensity of the doll's distress until the child is clearly involved and sympathetically aroused by the predicament shown in the scene. At this point the interviewer hands over to the child saying 'what happens next?' The way the child plays out the story thereafter is subjected to structured coding based on both Strange Situation and AAI codes and the child is assigned an attachment classification (Green *et al.*, 2000).

We have developed a computerised version of the MCAST (the CMCAST) which can be used on any standard personal computer (see Figure 1). Story stems are represented on the computer by the movement of simple two-dimensional screen 'dolls' narrated by a standard voice. Children then take over the controls of the PC and complete each story by speaking into the computer. This produces an audio-visual presentation of the child's story, narrated by the child, which can be downloaded for rating.

The use of computer-based instruments for collecting data in large-scale epidemiological research is already commonplace (West *et al.*, 2003) and various features of the CMCAST may recommend it for this purpose: less intensive involvement of administrators may reduce costs (although coding requires the same training as MCAST), standardisation of delivery is possible and automatic storage of data on computer is likely to reduce the chance of data loss.

We aimed to test and refine the CMAST with the aim of developing a valid, reliable, easily portable and cost-effective instrument for evaluating children's attachment patterns. Our own experience of computerised assessment tools with children and the extant literature suggested that this may be possible. Our hypotheses were that the CMCAST would produce similar ratings to the MCAST, would be able to be delivered in groups of children and would therefore be cheaper to administer.

We wished to answer the following research questions:

- (1) What is the agreement between ratings of children's attachment patterns on the MCAST compared to the CMCAST?
- (2) What are the comparative costs of the two instruments?
- (3) Can the CMAST be used in groups of children in a school setting?

Method

The CMCAST study was nested within a larger study which aimed to develop a standardised assessment package for Reactive Attachment Disorder. This sample was an ideal one in which to begin to validate the CMCAST because it included children from a wide range of demographic groups and of psychological functioning.

Recruitment of the clinic-based sample (see also Figure 2)

Eighty-two children aged 5–8 were originally recruited to the study, half with clinical diagnoses, half without. Forty-one of these children were recruited through child and

Figure 1 CMCAST computer interface.

adolescent mental health service (CAMHS) clinics or through social work departments. Teams were sent information reminding them about the symptoms of reactive attachment disorder (RAD) as described in the International Classification of Diseases, 10th Edition (ICD-10) (World Health Organisation, 1993). Clinicians/social workers were asked to telephone us about any child aged 5–8 who they thought fitted diagnostic criteria for RAD. A psychiatrist or mental health nurse from the research team reviewed the child’s symptoms during the telephone discussion and/or reviewed the child’s casenotes. If we agreed that RAD was likely, the parents or guardians were sent information about the study. The only exclusion criterion was verbal ability low enough to preclude use of the study measures by the child (below a developmental age of four). Forty-seven children were referred, but five were deemed not to be suffering from RAD, therefore 87% of those recruited took part. The other 41 participants were recruited through a family practice clinic.

In recruiting a comparison group, we did not set out to achieve a representative sample of the general population but, rather, to achieve a group of typically developing children group matched on age and gender

Figure 2 Recruitment of the clinic-based sample.

with the RAD group. All 217 children aged 5–8 attending a moderate sized family practice of mixed demographics in Glasgow, Scotland, were identified. Exclusion criteria were: known contact with social work, child protection registration or diagnosis of RAD ($n = 39$ excluded). Parents were sent a letter and information sheet asking if they would like to participate. If they opted in, they were telephoned to organise an appointment. Information packs and consent forms were sent to the 178 eligible families and 54 (30%) contacted agreed to take part. Thirteen families could not be included because the children did not meet matching criteria leaving 41 eligible families (see Figure 2). All participating families were telephoned the day before the appointment to outline the procedure.

Each participating child had full assessment of RAD symptoms including a semi-structured parent-report interview [based on the format of the Child and Adolescent Psychiatric Assessment or CAPA (Angold and Costello, 2000)], a questionnaire for teachers and structured observation of the child. Assessment of comorbid diagnoses including conduct disorder (CD), oppositional-defiant disorder (ODD), attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) was by parent-report semi-structured interview alone: CD, ODD and ADHD using the CAPA and ASD using the Developmental, Dimensional and Diagnostic Interview (3-DI) (Skuse *et al.*, 2004). To remove any order or learning effects children were randomly allocated to participating in the MCAST or CMCAST at their first visit and, on their second visit six weeks later, completed the other version of the measure.

Because a child's story-telling ability would be expected to rely to a certain extent on verbal IQ, each child was asked to complete the British Picture Vocabulary Scale (BPVS). The BPVS is a well-validated measure of verbal IQ which is well correlated with full-scale IQ (Atkinson, 1992). Demographic factors and life events were assessed using relevant questions in the CAPA.

As described in Figure 2, data from 27 children could not be included in the study. Technical problems included a malfunctioning video camera (MCAST) and malfunctions with either collecting or storing data on computer (CMCAST), all of which were dealt with through modifications to the software code or advice on the use of information technology (IT) equipment, by one of the authors (WR). All the children were engaged enough to enable rating of the MCAST while all but three were engaged enough to enable rating of the CMCAST.

Fifty-five children had rateable data for both the MCAST and CMCAST. All participating families gave

informed consent and the study protocol was agreed by the Multicentre Research Ethics Committee for Scotland.

The mean age [standard deviation (SD)] of the participants was 6.8 (1.4) and 33 (66%) were boys. Half of the sample (28) had one or more psychiatric diagnosis, 10 (18%) were known to have experienced physical abuse, two (4%) were known to have experienced sexual abuse and 14 (26%) had been removed from home, at some time in the past, due to neglect. Mean verbal IQ was 96.28 (10.34) in children with RAD and 102.53 (9.83) in the comparison group. The 55 children who had complete data and were included in analyses did not differ significantly on these indices from those who did not.

For the MCAST, a trained research assistant (RA) administered the story stems and for the CMCAST the RA introduced the package to the child and supervised self-completion. Both the MCAST and CMCAST assessments were videotaped, the MCAST using a stand-alone video machine, the CMCAST using a webcam. Ratings of both videotaped MCASTs and computerised CMCASTs were made by RAs trained to reliability on the MCAST system, blind to clinical diagnosis and other MCAST or CMCAST rating. Twenty-three MCASTs (33%) and 16 CMCASTs (27%) were blindly double-coded by a second RA to check inter-rater reliability.

Both MCASTs and CMCASTs were rated so as to produce a standard four-way attachment classification for each of the four stories: (A) insecure-avoidant (where the child-doll tends to resolve the dilemma him/herself without reference to the mummy-doll); (B) secure (where the child represents the parent as helping to resolve the dilemma); (C) insecure resistant/ambivalent (where the mummy-doll is involved in trying to resolve the dilemma, but the stress is poorly assuaged or increases) and (D) insecure disorganised (where the child-doll appears to have no coherent strategy for resolving the dilemma). An overall A, B, C, D classification for the entire four-story package was assigned based on the predominant strategy across the four stories. The MCAST uses detailed subsidiary codes to aid the overall classification for each story. It proved impossible to rate these more subtle codes using the CMCAST. A simplified rating system was therefore developed for the CMCAST based on only four indices (see Appendix, Table A1).

Modification to original CMCAST procedure and coding

Initial experience with CMCAST administration (first 10 participants) led to some modifications of the procedure. It

became clear that children usually required some continued orientation during administration and that some gave inadequate verbal responses or directed their responses towards the administrator rather than towards the computer. Because no changes were made to the rateable stems, the data from these 10 participants was included in the analysis but modifications were made to the software in an attempt to improve the orientation of the child towards the computer and the quality of their verbal responses. These included two new introductory sequences: a 'counting game' in which the computer requested the child to count out loud along with it and a sequence in which the computer asked the child to execute specific moves with the dolls and to tell the computer what was happening, with regular reminders to the child to talk. In addition, a red-bordered screen was introduced to encourage children to sit in front of the webcam. No modifications were made to the attachment-related stories.

Economics

Costs of both tests were estimated by considering the cost of the equipment, training, administrator's time and rating. The equipment cost (sourced via website) per test was calculated assuming the equipment would be used 912 times in its lifetime (based on estimates regarding computer and dolls-house lifetime of four years and one test per working day assuming most clinics would not be using the MCAST with every child). Costs of training in administration for both measures were calculated taking into account salary scales of trainers and trainees and length of time spent training. Costs for administrators time was calculated by establishing the amount of interventions per test and the average length of intervention. A random sample of 19 (34%) of videotaped MCAST/CMCASTs were examined and any instruction, verbal response or physical action by the administrator was recorded, taking into account the typical salary scale for a RA. Cost of rating was estimated by interviewing each RA independently regarding the length of time it takes her to rate an MCAST or CMCAST and results were averaged.

A sensitivity analysis was carried out in which costs were estimated for administering one, five and 10 CMCASTs simultaneously with a view to using the CMCAST in large epidemiological studies.

Feasibility of group assessment using the CMCAST – school-based sample

A separate sample of 86 children aged 5–8 were recruited from local schools (three state and one private). In two of

the state schools, all children age 5–8 were asked to participate and 40% agreed. In the other two schools (recruited later) sampling was purposive: the head teachers distributed consent forms only to children from certain classes as, by that stage, we were only interested in recruiting seven year old children in groups of five. An iterative process of testing increasing numbers of children using the CMCAST at the same time (up to five simultaneously as suggested by the sensitivity analysis) was instituted. At each stage, researchers tested enough children to satisfy themselves that testing of that number simultaneously seemed feasible, by ensuring that children were able to navigate through all stories, before moving on to a larger number of children. Hence, four pairs, four groups of three, four groups of four and 10 groups of five were tested. We noticed early in the study that younger children had more difficulty concentrating on the CMCAST in larger groups, therefore latter groups of five children only included children aged seven or over. Fourteen (16%) of CMCASTs were lost due to technical problems (e.g. difficulties in setting up software on school hardware or computer 'crashes' during use) and a further 14 (16%) could not be rated due to the child being insufficiently engaged or lack of speech or action. Fifty-eight CMCASTs were rated in this part of the study. Thirteen (22%) were re-rated by a second researcher blind to the initial rating. Each child was asked brief questions at the end of the procedure including 'How did you find the game?' and 'Would you do it again?'. Researchers for both samples had undertaken the full three-day MCAST training and were therefore experienced in both administration and rating of the MCAST. They received an additional (half day) training in administration and rating of the CMCAST.

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Statistical analysis

All reliability results used categorical variables therefore unweighted kappa statistics were employed following Landis and Koch (1977).

Results

Inter-rater reliability of clinic-based sample

Inter-rater agreement for the four-way (A, B, C, D) attachment classification for both the MCAST and CMCAST was similar: MCAST kappa = 0.93 [95% confidence interval (CI) 0.80–1] – 96% of classifications by independent raters were in agreement; CMCAST kappa = 0.91 (95% CI 0.82–1) – 94% of classifications by independent raters were in agreement.

Table 1 MCAST overall strategy versus CMCAST overall strategy

	MCAST overall strategy				
	A	B	C	D	Total
CMCAST overall strategy	A	8	3	1	13
	B	1	26	0	27
	C	0	2	5	7
	D	2	2	1	3
Total	11	33	7	4	55

Note: A, B, C, D agreement 76%: kappa = 0.63 (0.46–0.79). Security versus insecurity agreement 84%: kappa = 0.67 (0.48–0.87).

MCAST-CMCAST agreement (clinic-based sample)

Agreement between the MCAST and CMCAST for the four-way (A, B, C, D) attachment classification was: kappa = 0.63 (95% CI 0.46–0.79) – 76% classifications were in agreement (see Table 1). Agreement between the MCAST and CMCAST for attachment security versus insecurity was: kappa = 0.67 (95% CI 0.48–0.87) – 84% of classifications were in agreement.

Costs

Comparative costs of equipment, training, administration and rating are presented in Table 2. We estimated that costs/administration for the two measures were £14.05 for the MCAST and £14.54 for the CMCAST.

Sensitivity analysis

As the average time spent on intervention during the CMCAST was nearly two minutes/test (39.2 interventions at three seconds each = 111.6 seconds) and the average length of a CMCAST was 22.1 minutes, consideration was given to the possibility that up to 10 tests could be run simultaneously. In the best case scenario of 10 tests simultaneously, and assuming 10 tests per working day, 2280 tests could be done per year as compared to the worst case scenario of only one test at a time. A midway scenario of five tests simultaneously would mean 1140 tests/year. Comparative costs estimated using these assumptions are presented in Table 3. These show that if only one CMCAST is done at a time, the two measures are comparable in cost (£14.54 versus £14.05) whereas if five CMCASTs were done simultaneously, it is considerably cheaper (£10.38 versus

£14.05). There would only be slight additional benefit (£10.38 versus £9.87), in terms of cost, of doing more than five CMCASTs simultaneously.

Simultaneous assessment of groups (school-based sample)

The mean age (SD) of the school sample was 7.46 (0.99) and the gender distribution was 48 (56%) boys and 38 (44%) girls. The distribution of attachment patterns from the school-based sample was as follows: 73% secure; 7% avoidant, 14% ambivalent and 7% disorganised. There was 85% agreement between raters (kappa = 0.44). All children said that they enjoyed taking part and would be happy to take part in the CMCAST again.

Discussion

The good inter-rater reliability of the CMCAST and its good agreement with the MCAST gives an initial indication that it may be a useful instrument for evaluating attachment patterns in young school-age children. The level of agreement with the MCAST compares well with the test–retest reliability of the MCAST itself (Green *et al.*, 2000) and with agreement between the MCAST and other measures of attachment (Goldwyn *et al.*, 2000).

The costs of the two versions are similar when children are tested one-to-one, but simultaneous administration brings the costs of the CMCAST down considerably and the costs of IT equipment are falling rapidly. Should the CMCAST be used in a school setting in future research, desktop computers would be perfectly adequate and would bring down costs considerably. It may also be of interest to attempt more complex simulations of economic indices in future studies.

There were various technical problems with the CMCAST in the initial stages of data collection with both samples which caused us to lose data, but in general these were ironed out in the course of the study and careful notes of these issues will be passed to future software developers. Because the child's face is videotaped via the webcam, a clear visual image and audio recording of the child is possible with the CMCAST so we did not encounter any greater difficulties in understanding children compared to the MCAST. Children in our study did not report difficulties in understanding the standardised voice in the CMCAST, but further research with more detailed user feedback may reveal the need for further developments of the software. Although the CMCAST ratings agree well with MCAST ratings in the clinic-based sample, our study design does not allow us to comment on the concurrent

Table 2 Comparative costs for MCAST and CMCAST

	CMCAST	MCAST
Equipment	Dolls house, furniture and dolls; camcorder and tapes; tripod, micropone, television for playback $\pounds 551/912 = \pounds 0.60$ per test	Laptop, webcam, children's mouse $\pounds 555/912 = \pounds 0.61$ per test
Training	19.5 min training time @ $\pounds 14/\text{hour} \times 2$ (trainer and trainee) = $\pounds 4.55 \times 2 = \pounds 9.10$ Effects of training estimated to last one year i.e. for 228 tests Cost per test for CMCAST = $\pounds 9.10/228 = \pounds 0.04$ per test	Time to train administrators of the MCAST was 1.5 hours (7%) of a 22 hour training course costing $\pounds 450/\text{person}$ therefore costing $\pounds 30.68$ Cost for test for MCAST = $\pounds 30.68/228 = \pounds 0.13$ per test
Administration	Cost per test for administration of the CMCAST = average length of test $\times$ midpoint salary hourly rate of research assistant: 22.1 minutes @ $\pounds 14/\text{hour} = \pounds 5.16$ per test	Cost per test for administration of the MCAST = average length of test $\times$ midpoint salary hourly rate of research assistant: 17.1 minutes @ $\pounds 14/\text{hour} = \pounds 3.98$ per test
Rating	Cost for rating a CMCAST: 37.5 minutes @ $\pounds 14/\text{hour} = \pounds 8.74$ per test	Cost for rating an MCAST: 40 minutes @ $\pounds 14/\text{hour} = \pounds 9.33$ per test
Total cost per test	$\pounds 14.65$	$\pounds 14.05$

Table 3 Sensitivity analysis – cost in $\pounds$

Cost per test	MCAST	One CMCAST at a time	Five CMCASTs at a time	Ten CMCASTs at a time
Training	0.13	0.04	0.01	<0.01
Equipment	0.61	0.60	0.60	0.60
Administration	3.98	5.16	1.03	0.52
Rating	9.33	8.74	8.74	8.74
Total	14.05	14.54	10.38	9.87

validity of the CMCAST with other measures of attachment, nor to examine the stability of CMCAST ratings over time. It will be an important task of future research to establish the extent to which this computerised measure of attachment patterns can be validated against other attachment measures and the extent to which these representations predict future social and emotional development.

Our study is also limited by possible biases in the selection of the samples. The true prevalence of RAD is unknown therefore we do not know to what extent our clinic sample is selected. Because the community and school samples had relatively low recruitment rates, they are likely to be better functioning than the general population. However, because this study did not set out to determine population prevalence of attachment patterns but, rather, to compare two instruments in a sample crossing the full range from normality to severe psychopathology,

these issues are unlikely to undermine the key findings. An important next step will be to establish general population norms for the CMCAST in representative samples. Our sample size was fairly small and hence the CIs for our reliability statistics are fairly large, however our results suggest that reliability was good and ranged from moderate to very good (Landis and Koch, 1977). It would be useful to replicate these findings in larger and more representative samples in future research.

There is currently no satisfactory way of measuring attachment patterns in large-scale research. Attempts to develop screening questionnaires for attachment have shown only modest correlations with the gold standard attachment measures: the Strange Situation procedure in infants (Ainsworth, 1979), Story Stem measures in middle childhood (Green *et al.*, 2000) and the AAI from adolescence onwards (Goldberg, 2000; Main and Hesse, 1990).

These gold-standard measures are all expensive to administer and the size of the largest cohorts examining attachment patterns are generally of the order of one or two hundred children (Sroufe *et al.*, 1993). The impressive associations in these modest cohorts between attachment patterns and behavioural problems (van Ijzendoorn *et al.*, 1999) suggest that the measurement of attachment should not be left out of studies which attempt to understand the aetiology of child and adolescent psychopathology. So far, in large epidemiological studies such as the Avon Longitudinal Study of Parents and Children (<http://www.alspac.bris.ac.uk/welcome/index.shtml>) and the Twins Early Development Study (Trouton *et al.*, 2002), it has not been possible to include attachment as a variable except in fairly small sub-samples.

Our school-based feasibility study suggests that it may be possible to make an assessment of the distribution of attachment patterns of groups of children in a school setting, although these findings are preliminary. Our school-based sample was slightly older than the clinic-based sample and our feasibility study suggested that group administration may be particularly effective with children aged seven or older. Because of the low response-rate to this part of the study, findings may not be generalisable to the population at large and further studies in more representative samples will be required to confirm this. The higher proportion of children who failed to engage, or who failed to produce a rateable output in the school setting will also need to be addressed. Previous data collection using computers in schools has tended to use 'exam conditions' (West *et al.*, 2003) and further research in schools using such conditions is warranted. Certain story stem researchers have suggested that the relationship between the administrator and the child is an important aspect of the assessment (Emde, 2007) and clearly a meaningful relationship between researcher and child does not develop during computer administration. Our fairly typical distribution of attachment patterns in the school sample would suggest that, if this is an important issue for some children, it is not resulting in major systematic bias, but future studies comparing whole-class or group CMCAST administration with individual MCAST administration would help answer this question.

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One drawback of the CMCAST is that the rating scheme we developed for the study does not contain some of the more detailed MCAST codes, in particular the detailed and continuous measures of disorganisation which are available for the MCAST. Disorganisation rating of the CMCAST was made by researchers trained in the full system on the basis of the extent of 'bizarreness' in the represented story. This is a measure used by other story stem researchers (Solomon & George, 1999) as equivalent to Attachment Disorganisation. In MCAST research ratings of high bizarreness do in many cases correlate with formal MCAST coding of disorganisation. Disorganisation is emerging as an important correlate of psychopathology (van Ijzendoorn & Bakermans-Kranenburg, 2003) and good assessment of it would be crucial for epidemiology. One model for use of the two versions in epidemiological research might be a two-stage process in which the CMCAST is used as an initial screen for insecurity and the MCAST is used to examine subgroups for disorganisation and other more subtle indices.

Conclusions

The CMCAST agrees well with the MCAST original in assessing children's overall attachment patterns, costs are comparable and lower for the CMCAST when it is administered in a group situation which seems feasible. Costs of the CMCAST may reduce through time due to reducing IT costs and it may prove an important and cost-effective tool for measuring attachment patterns in large-scale research.

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Declaration of interest statement

The authors have no competing interests.

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Appendix

Table A1 Comparative ratings systems between MCAST and CMCAST

MCAST	CMCAST
Engagement – nine point scale	Engagement – yes/no
Quality of arousal – nine point scale	
Proximity seeking, child to mother – nine point scale	Proximity-seeking – yes/no
Proximity seeking, mother to child – nine point scale	
Self-care behaviour – nine point scale	
Reversal patterns – nine point scale	
Angry resistance/motivational conflict – nine point scale	
Physical responsiveness and sensitivity – nine point scale	Caregiving – yes/no
Warmth – nine point scale	
Intrusiveness/control – nine point scale	
Assuagement (child report) – nine point scale	Assuagement – yes/no
Assuagement (rated by observer) – nine point scale	
Exploratory play – three point scale	
Bizarre themes – nine point scale	Bizarre or completely disorganised narrative – yes/no
Overall strategy (for each story)	Overall strategy (for each story)
Narrative coherence – quality – nine point scale	
Narrative coherence – quantity – nine point scale	
Narrative coherence – relevance – nine point scale	
Narrative coherence - manner– nine point scale	
Mentalising, child of self - three point scale	
Mentalising, description of mother – three point scale	
Episodic disorganisation – nine point scale	
Overall coding of interview	Overall coding of interview