Sequential Latent Structure Analysis of Segregated System Material in the Doll Play of Maltreated Children

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Abstract A range of assessment methodologies pertaining to attachment in children have been developed and validated during the past decades. The present study examined the validity of a sequential, profile-centered approach to the assessment of attachment disorganization using a doll play methodology developed by George and Solomon (1990). The sample was composed of sixty-two children between the age of 5 and 12 who had been removed from their family of origin due to abuse or neglect. Latent Markov Models performed on markers of defensive dysregulation (Frightening, Chaos, Constriction) yielded three distinct states, characterized respectively by themes of fear or chaos, presence of at least partial constriction, and absence of segregated system markers across doll play stories. The states generally showed a high degree of stability across scenarios. The Frightening-Chaotic state was positively associated with sexual abuse, placement in a specialized setting and caregiver-reported externalizing problems whereas the Constricted state was associated with placement in a specialized setting and self-reported hyperactivity and attention problems. These results provide support for the validity and clinical utility of this approach to assessing attachment disorganization on the doll play.

Keywords Assessment · Attachment · Children · Developmental issues · Trauma

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Child abuse and neglect constitute a major social problem with significant costs to the community. Although medical and mental health professionals are likely to encounter suspected and actual cases of child abuse in their practice, many may not feel adequately prepared to confront this problem (Lazenbatt and Freeman 2006; Pietrantonio et al. 2013). Because of the mounting social costs and preoccupation associated with child maltreatment, research has sought to provide evidence regarding the epidemiology, antecedents, correlates and outcomes associated with child abuse and neglect. These efforts have led to greater sophistication in the assessment protocols and interventions used with both offenders and children victims of maltreatment (Chaffin and Friedrich 2004; Gunnar and Fisher 2006; Reynolds et al. 2009).

Attachment Theory (Bowlby 1982) has occupied an important place as a conceptual framework informing clinical assessment and therapeutic programs (Egeland and Sroufe 1981; Hodges et al. 2003; Morton and Browne 1998; Moss et al. 2011). At its core, the construct of attachment emphasizes the affective, relational and inter-subjective dimensions underlying the child-caregiver dyad. Because the child needs to ensure proximity with the primary caregiver(s) to maximize survival and the fulfillment of basic needs, she or he will adapt to experienced patterns of response by parental figures (Bretherton 1991). As such, child-caregiver dyads show variability in their interaction patterns because not all caregivers respond to children's signals in the same way. This variability is at the root of individual differences in attachment. Bowlby (1969) proposed that prototypical interactions between caregiver and child gradually become internalized in the latter's mind as cognitive-affective representations, which he termed *Internal Working Models*. These internal representations are thought to constitute the foundation of personality development and maturation.

Observational research documented distinct types of attachment organization in children, involving the *Secure* and *Insecure* forms of adaptation to the caregiving environment (Ainsworth and Bell 1970). Subsequent research by Main and colleagues (Main and Solomon 1986, 1990) revealed an additional category characterized by behavioral and attentional disorganization when the attachment behavioral system is activated. Children thus identified as Disorganized may show a tendency to freeze, disorientation, confusion, fear or contradictory behaviors or affects in the Separation-Reunion procedure (Hesse and Main 2000). This type of phenomena suggests dysregulation of the attachment behavioral system due to fear-inducing or flooding experiences of interactions with the caregiver. Further research suggested that many children identified as Disorganized later developed ways to control the caregiver's behaviour using either punitive and aggressive, or caregiving and solicitous, behaviour (Liotti 2011; Solomon et al. 1995).

Recent research provided support for the notion that attachment disorganization is found more often in families experiencing social and economic struggles, and this association may be partially mediated by the occurrence of abuse and maltreatment (Cyr et al. 2010). In this sense, failure in the child-caregiver dyad to establish organized, predictable patterns of interactions is rooted in vulnerabilities at the individual (e.g., mother's history), micro- (e.g., single parenthood), meso- (e.g., violence in the community) and macro- (e.g., war, ethnic conflict) systems levels. Not surprisingly, this particular attachment configuration has shown the most consistent link with clinically significant psychopathology in children including dissociative and trauma response syndromes, aggressive and oppositional conduct problems, and difficulties with the regulation of emotions (Carlson 1998; O'Connor et al. 2011; van Ijzendoorn et al. 1999). In light of these findings, attention must be paid to both mediators and moderators of the impact of attachment disorganization on psychosocial adjustment.

From a clinical standpoint, the salience of attachment disorganization has led to efforts towards developing reliable and valid ways to capture this phenomenon that will better inform therapeutic interventions. Whereas the assessment of attachment organization in infancy and preschool age has been grounded in observations of the child-caregiver dyad in the context of successive episodes of separation and reunion, the development of the child's cognitive, social and narrative capacity during the school years open new avenues for alternative methodologies for capturing the construct of attachment and its variations (Ainsworth and Bell 1970). One such methodology relies on the importance of play activity during this period of the child's life. The notion that play activity in children, like dreams, can be used to access their internal world has a long history (Bretherton 1984). Efforts at empirically documenting the psychological, social and emotional significance of child play probably began with anthropological

research conducted during late-19th and the beginning of the twentieth century (Appleton 1910; Babcock 1888; Mead 1930). Shortly thereafter, researchers and academics began to highlight the importance of spontaneous play in the child's cognitive and social development (Erikson 1963; Gesell et al. 1946; Herron and Sutton-Smith 1970; Piaget 1951). Likewise, prominent child psychoanalysts developed therapeutic modalities based on play activities (Freud 1964; Klein 1955; Winnicott 1971). Doll play techniques, in particular, have been used extensively by psychoanalytic and developmental researchers to gain insights on the child's current developmental challenges and salient socio-emotional scripts (Hodges and Steele 2010; Oppenheim 1997; Solomon 1948; Woolgar 1999).

The potential value of symbolic play as an assessment methodology did not escape attachment researchers. Doll play techniques, in particular, have been used extensively with preschool children both as an adjunct and an alternative to observational procedures such as the Strange Situation (Woolgar 1999). When used from an attachment framework, doll play procedures typically involve successive elaborations by the child, using various props and characters, of a series of attachment-specific open-ended scenarios. While the materials used by the child tend to remain similar across procedures, the analysis may emphasize distinct features of the play as representing salient attachment-related concepts. One of the best-known initial attempts at designing a semi-structured assessment procedure using doll play was made by Bretherton et al. (1990), who developed the MacArthur Attachment Story Completion Task (ASCT). This procedure involves a series of five scenarios which are introduced to and require narrative elaboration by the child. Stories are identified as "secure" or "insecure" based on their content (e.g., odd responses) or interference with processing the attachment conflict (Bretherton et al. 1990). The ASCT and its subsequent adaptations for use with older children have shown theoretically-meaningful associations with a wide range of outcomes, including quality of observed parent-child interactions, social adjustment, parent- and teacher-rated behavior problems, and select biological functions (e.g., quality of sleep, electrodermal reactivity) (Bretherton et al. 2013; Bureau and Moss 2010; Gilissen et al. 2008; Kerns et al. 2005). Research evidence to date thus provides support for the use of the ACST as a general measure of attachment security during the preschool years and middle childhood. However, there is less evidence pertaining to the validity of the ACST as a measure of attachment when formulated as a typological construct. Furthermore, the coding system used with the ACST does not allow for a detailed, exhaustive assessment of defensive processes present in the child's narrative, a key feature of Attachment Theory (Bowlby 1982).

Formulations of Attachment Theory from clinical and developmental perspectives (Bowlby 1980; Main et al. 1985)

have emphasized processes of defensive exclusion in guarding the individual against insecurity relative to early caregiving experiences. Bowlby suggested that under conditions of internal or relational conflict involving attachment figures, attachment-relevant information can be kept from conscious processing and awareness. Pervasive and severe use of defensive exclusion is linked to various forms of psychopathology. It is therefore crucial that assessment methods targeting the construct of attachment at a representational level demonstrate the capacity to effectively activate the attachment behavioral system and capture salient features of defensive exclusion in the individual's narrative. Disorganized attachment is characterized by the use of an extreme form of defensive exclusion which splits and isolates attachment-related needs, thoughts, affect and memories from the rest of the psyche because they are experienced as dysregulating or highly conflict-ridden (Main and Morgan 1996; Solomon and George 1999). This type of defensive exclusion, labeled *Segregated Systems*, only provides a brittle and costly form of adaptation that leaves the child vulnerable to breakdown when the activation of the attachment behavioral system is increased. Furthermore, its very purpose suggests that it is not likely to be observed in the individual's functioning until the attachment behavioral system is activated in some manner.

Efforts at refining the assessment of attachment using doll play methodology have paid attention to the notion of defensive exclusion as original conceptualized by Bowlby (1980). Building upon the work conducted by Bretherton and colleagues, Solomon et al. (1995) developed a modified version of the original McArthur procedure, including the use of improved props (e.g., furniture glued to the doll house, lack of walls obstructing the view), selection of play characters by the child, as well as more detailed scoring criteria for processes of defensive exclusion in the various scenarios. This emphasis on defensive functioning, according to the authors, ensures that the procedure captures a key, developmentally-salient dimension of attachment representations, independently of the child's age, the testing environment or the nature of the projective stimuli. The defensive configuration pattern, in other words, is presumed to represent the child's attachment "signature", a stable and typical way of responding to and processing attachment-related conflictual scenarios.

In terms of administration, this version of the doll play, herein referred to as the Doll Play Classification System (DPCS), includes a house with assorted furniture as well as various accessories (family characters, pets, household and food items). The first stage in the procedure involves the selection of the characters in the family. The child is encouraged to first select which character will represent the self and subsequently chooses the other family members. Characters from various ethnic groups are available. A short period of free play follows. The administrator then initiates a warm-up story involving a pet looking for a home, accompanied by the prompt

"*show me what happens next...*". From then on, the procedure consists in taking the child through three main scenarios depicting attachment-related situations. In the first, a child hurts his knee while attempting to climb a rock. The second scenario concerns a child who, after having sent to bed by a caregiver, expresses alarm about a monster being in his room. The final story involves a separation and reunion situation in which the caregivers depart and leave the child in the care of a stranger (babysitter) to return the following day. The presentation sequence of the scenarios is designed to create increasing activation of the attachment behavioral system. The administrator is instructed to carefully record the subject's verbal elaborations as well as play behavior. To this end, targeted probes such as "*did anything else happen?*" or "*what are they doing?*" can be used. The procedure is considered suitable for children aged 4.5 to 12 years.

The coding procedure revolves around the classification of the child's attachment organization based on both content- (themes, identity of the self-identified character) and process-level (management of the attachment scenario by self and the caregiver) elements as observed in the stories. The linkage between content elements of the narratives and behavioral or linguistic markers of defensive exclusion is particularly important in this system. Each story is assessed for presence of mechanisms of flexible integration in addition to three general categories of defensive exclusion, including Deactivation, Cognitive Disconnection, and Defensive Dysregulation. Each narrative is then assigned a classification according to the framework developed by Ainsworth (Ainsworth et al. 1978) and subsequently by Main (Main and Solomon 1990). In the next step, an overall attachment classification is given based on the coding for the individual stories, with emphasis on the Separation-Reunion scenario. The process of assigning classifications for individual scenarios allows for a more refined understanding of how defensive processes are maintained or change with increasing activation of the attachment behavioral system. For instance, evidence of defensive dysregulation may not actually appear until the last scenario, which presumably involves the highest level of activation.

Validation data suggests good levels of inter-rater reliability for the DPCS procedure, with kappa values for the four-group classification ranging from 0.74 to 1.0 (Bureau and Moss 2010; Dubois-Comtois et al. 2011; Solomon et al. 1995; Stacks 2007). Construct validation studies have documented the expected associations between four-way classifications on the doll play and observational assessments of attachment (Bureau and Moss 2010; Dubois-Comtois and Moss 2008; Solomon et al. 1995). In addition, theoretically-consistent links have been found between doll-play attachment classification and externalizing behavior problems for school-aged children (Solomon et al. 1995; Stacks 2007).

Attachment disorganization in doll play is documented via evidence of unresolved or uncontained segregated system

material. In the DPCS framework, defensive dysregulation associated with segregated systems is observed through the presence of at least one of three markers: 1) Fear or Frightening material, 2) Chaos, and 3) Constriction. Occurrences of specific markers in an uncontained form are thought to represent manifestations of a child's failure to mobilize consistent ways to representationally make sense of (or *mentalize*) needs for proximity and security under conditions of activation of the attachment behavioral system (George and Solomon 1990). This emphasis on processes of extreme defensive exclusion makes this approach to the assessment of attachment via doll play potentially useful with child victims of maltreatment because of the conceptual and empirical link between disorganized attachment, experiences of victimization and subsequent psychosocial and developmental difficulties (Hildyard and Wolfe 2002; Sroufe 2005; van Ijzendoorn et al. 1999). From this perspective, attachment disorganization can be thought of as accounting in part for the impact of maltreatment on the child's current and future psychosocial functioning.

Results from studies uncovering distinct developmental pathways associated with attachment disorganization have brought into question its conceptualization as a unitary construct. While the core essence of the concept might be quite distinct from the organized attachment classifications at a representational level, evidence suggests that a substantial number of children identified as disorganized in early childhood come to rely on organizing controlling strategies at later stages whereas others remain disorganized at a behavioral level (Bureau et al. 2009; Hesse and Main 2000; Moss et al. 2004; O'Connor et al. 2011). An important question from a theoretical point of view is whether similar subtypes underlying attachment disorganization can be identified at a representational level in the context of doll play activity. From a more clinical standpoint, since doll play assessment involves multiple scenarios designed to elicit attachment representations, specific patterns of occurrence of segregated system material across stories is a consideration of interest. That is, the presence and stability of markers for defensive dysregulation across scenarios may point to distinct profiles of disorganized attachment, which are likely to be of importance to the clinician practicing from an attachment-informed framework.

The primary aim for the present study was to document patterns of occurrence, stability and transition of segregated system markers on three scenarios involved in the George and Solomon (1990) doll play procedure. A related objective was to examine the links between such patterns, characteristics of maltreatment and behaviour problems. Given that children having experienced maltreatment are at increased risk for developing problematic behaviour patterns and psychopathology (Gilbert et al. 2009; Knutson 1995; Thornberry et al. 2010), the identification of disturbances in attachment representations may allow for a better understanding of the roots and

functions of behaviour problems in the context of maltreatment from an attachment perspective. The following research questions were thus addressed: 1) What specific profiles of children can be identified based on patterns of occurrence and trajectories of segregated system markers in their doll play? 2) What is the incremental validity of these profiles above and beyond the overall Disorganized classification, based on associations with victimology and behaviour problems?

Based on existing literature on the topic, it was expected that three primary, relatively stable, trajectories would be uncovered: one characterized by an absence of segregated system markers, another by the presence of frightening and chaotic scenes, and the last by general constriction, across scenarios. The last two profiles correspond to the Controlling-Punitive and Controlling-Caregiving attachment-based relational patterns identified by Main and Cassidy (1988) and further described at a representational level by Solomon et al. (1995). Furthermore, it was hypothesized that the profiles would show incremental predictive value over the overall Disorganized classification, with profiles characterized with frightening and chaotic themes showing a link with externalizing behaviour problems, and those characterized by constriction showing associations with internalizing problems.

Method

Participants

The study included 62 children between the age of 5 and 12 ($M = 8.7$, $SD = 1.68$). The participants included 36 boys and 26 girls, representing 58.1% and 41.9% of the sample respectively. The sample was ethnically diverse (African-American: $n = 30$, 48.4%; Caucasian: $n = 15$, 24.2%; Hispanic: $n = 7$, 11.3%; Other or mixed: $n = 10$, 16.1%) and most ($n = 58$, 93.5%) participants were living in foster care at the time of the study. The most frequent reason for removal from the family-of-origin was neglect by caregivers ($n = 39$, 62.9%). Cases involving neglect as well as physical or sexual abuse represented an additional 25.8% ($n = 16$) of the sample. Cases involving physical or sexual abuse without clear evidence of neglect constituted 8.1% ($n = 5$) of participants. Information relative to the reason for removal from the primary caregivers was not available for two cases. Number of placements, either in group or foster home, experienced by the child varied widely ($M = 2.7$, $SD = 1.4$) with a significant proportion of participants ($n = 31$, 50%) having experienced at least 3 placements in different settings. Children's age at the time of placement ranged from 0 to 125 months ($M = 61.1$, $SD = 37.8$), with no information available for 9 cases. Length of time in current placement varied from 0 to 107 months ($M = 18.9$, $SD = 25.6$).

A small number ($n = 4$, 6.5%) of children had been reunited with their biological caregivers at the time of data collection.

Procedure

Children participating in the study were seen at a community mental health clinic in the context of a psychological assessment as requested by County Social Services, the local school board or the foster parents. The assessment included various measures of cognitive, personality and social functioning, administered over the course of several sessions. The measures included in the study were all part of the standard evaluation procedure at the clinic. Following an initial meeting in which the foster parents and child were introduced to the study and informed consent was obtained, the assessment proceeded in the usual way. For all child participants, the assessments were administered in the same order, specifically: 1) cognitive testing, 2) Self-report questionnaire, 3) Doll Play, 4) Rorschach Inkblot Method, 5) Interviews with child and foster parent(s). One foster parent and, whenever possible, a school teacher who knew the child well were also provided with questionnaires to complete at home or at work.

Measures

Attachment Defensive dysregulation in participants was assessed using the Doll Play procedure devised by George and Solomon (1990). For this purpose, the segregated system markers Frightening and Chaos were scored in a dichotomous format (Absent/Present) in the three scenarios, while Constriction was scored as None/Minimal, Somewhat/Partial, or Constricted. The Doll Play was administered by the first author in the manner prescribed by the original authors. Verbal content and relevant behaviors observed during the procedure were carefully recorded for the purpose of assigning scenario-specific as well as an overall attachment classification. Fourteen cases were randomly selected and scored by Carol George, one of the developers of the coding system, to establish inter-rater reliability. Although individual estimates for the defense markers were not computed, exact match for overall classification using the usual four-category system was 92.8% (13 out of 14 cases).

Behavior Problems Participants' level of behavior problems were documented via parent-, teacher- and self-report questionnaires. The *Behavior Assessment System for Children version 2* [BASC-2] (Reynolds and Kamphaus 2002) is a well-validated set of instruments designed to assess the presence of a wide variety of adaptive resources and difficulties in psychological and social functioning. The assessment system includes questionnaires completed by the child (Self-Report of Personality; SRP), caregivers (Parent Rating Scales; PRS) and teachers (Teacher Rating Scales; TRS). Each version yields several

adaptive and clinical problems scales, which are aggregated into broader composite scales. The current study made use of the Externalizing/Inattention-Hyperactivity Problems and Internalizing Problems subscales. At the time of analysis, there were not enough questionnaires completed by teachers to justify their inclusion in the analysis, therefore only the self-report and parent rating versions of the BASC-2 were used.

Validation studies using both normative and clinical samples suggest good internal consistency as well as test-retest and inter-rater (PRS) reliability for the BASC-2. Research available to date has also documented substantial correlations between all three versions of the BASC-2 and similar measures of the same constructs (Reynolds and Kamphaus 2002). For the purpose of the current study, only the composite scales mentioned above were used, in order to decrease the number of associations between predictors and outcome, and thus the risk of type-I error.

Data Analysis

The analysis of data for this study proceeded in three stages. First, associations between background (demographic) and outcome variables were examined to identify potential covariates to include in the main analyses. Second, latent profiles underlying the distribution of segregated system markers across scenarios were documented using a Latent Markov Model, an extension of the basic latent class model as described by Langeheine and van de Pol (2002). Model selection was performed on the basis of the Akaike Information Criterion – 3 (Bozdogan 1994) and the sample-adjusted Bayesian Information Criterion (Nylund et al. 2007), with smaller values indicating better fit. Third, posterior probabilities for latent profiles associated with defensive dysregulation were linked with victimological indicators (type of abuse, age of removal from family of origin, type and length of placement, as documented by file data) as well as with behaviour problems composite scales, as reported by the primary caregiver and the child. This was done by way of hierarchical linear or logit multiple regression analysis, with covariates entered first, followed by overall disorganized attachment status (as a dichotomous variable), with probabilities for the disorganized profiles entered in the final step.

Results

Identification of Covariates

Background variables including age, ethnicity and gender were examined for their association with behaviour problems and victimological indicators to identify potential covariates for further analyses. Current age was related to caregiver-reported externalizing problems, $r(62) = .28$, $p < .05$ and age

at removal, $r(62) = .40, p < .01$. Gender (dummy-coded as 0 = boy, 1 = girl) was related to antecedents of sexual abuse, $r(62) = .27, p < .05$ and caregiver-reported internalizing problems, $r(62) = .36, p < .01$. Ethnicity was associated with age at removal in months, $F(3,49) = 4.18, p = .01$, with Caucasian children being removed later ($M = 85.0, SD = 29.0$) than their African-American ($M = 46.2, SD = 38.6$) and Hispanic ($M = 48.0, SD = 25.2$) peers. Caucasian children ($n = 15, 100\%$) were also more likely than their Non-White peers ($n = 37, 78.7\%$) to be placed in family foster care as opposed to a specialized group home setting, $\chi^2(3,62) = 11.56, p < .01$.

Identification of Latent Profiles for Markers of Defensive Dysregulation

Patterns of occurrence, stability and transitions across stories for the three segregated system markers were examined using a series of Latent Markov Models, including the basic as well as an alternative version incorporating gender and age as covariates. Various indices of fit for the basic and alternative models are included in Table 1. Results suggest that a three-state model is the best fit for the data. Table 2 provides values for the latent state prevalence, indicator response probabilities and transition matrix for the states identified. The first state, representing roughly a third of the sample, is characterized primarily by elevated probabilities of frightening content in the Monster story and themes of chaos in the Separation-Reunion scenario. Frightening or chaotic contents may also be present in the Hurt Knee story in this group, but not as frequently. This state is also characterized by relatively high stability across scenarios, transitions to other states being uncommon. The second state includes about 10% of children and differs from the first by a high occurrence of constriction throughout the scenarios, particularly the Monster and Separation-Reunion ones. Its stability is difficult to assess due to the small group size; however, inspection of individual protocols revealed that children who showed significant constriction at the beginning of the procedure (Hurt Knee story) continued to experience marked difficulties developing narratives in the other two scenarios. The remaining state included 50–60% of the sample and was characterized by an absence of

Table 2 Three-state Latent Markov Model: latent state prevalence, indicator response probabilities and transition matrix

		State 1	State 2	State 3
Scenario	Latent state prevalence	Latent state		
Hurt Knee		.34	.08	.58
Monster		.39	.10	.52
Separation		.37	.10	.53
	Indicator-response probability			
Hurt Knee	Frightening	.19	.00	.00
	Chaos	.19	.00	.00
	Constriction	.05	.40	.03
Monster	Frightening	.42	.00	.00
	Chaos	.17	.00	.00
	Constriction	.08	.67	.00
Separation	Frightening	.26	.00	.00
	Chaos	.48	.00	.00
	Constriction	.09	.67	.00
Final latent state				
Probability of transitioning to... conditional on...				
Initial latent state				
	State 1	.83	.08	.09
	State 2	.05	.61	.34
	State 3	.14	.00	.86

Item-response probabilities of .40 and over as well as transition probabilities indicating membership in the same state are indicated in bold

segregated system markers throughout the doll play. This state also showed a high level of stability, although a small number of children ($n = 5$) transitioned to State 1 when exposed to the Monster story. The states were thus labelled “Frightened-Chaotic”, “Constricted” and “Regulated”, respectively.

Analyses were conducted to look at associations between state membership and background variables, including age, gender and ethnic background. No association was found between latent states and gender, $\chi^2(3,62) = 2.90, n.s.$, ethnic background, $\chi^2(9,62) = 10.54, n.s.$, or current age, $F(2, 54) = 2.00, n.s.$

Associations with Victimology and Placement

Results from logistic regression analyses (provided in Table 3) showed several associations between posterior probabilities associated with the Frightening-Chaotic and Constricted latent states and antecedents of abuse, irrespective of overall disorganized attachment status. The Frightening-Chaotic profile was strongly related to antecedents of sexual abuse as well as placement in specialized setting, but negatively related to occurrence of neglect. The Constricted profile was also markedly associated with probability of being placed in a specialized setting, but inversely related to antecedents of neglect.

Table 1 Indices of fit for Latent Markov Models

	Basic Model			Model including covariates		
	LogLik	AIC3	SABIC	LogLik	AIC3	SABIC
One-state	-221.72	464.44	450.31	—	—	—
Two-state	-208.90	465.80	433.49	-207.53	475.06	434.68
Three-state	-190.19	461.38	406.86	-189.36	486.72	414.03
Four-state	-184.49	488.98	408.21	-181.50	531.00	417.93

Best fit values are indicated in bold

Table 3 Logistic regression analyses: antecedents of abuse and type of placement predicted by disorganized status and latent state posterior probabilities ($n = 62$)

Predictors	Neglect			Physical			Sexual			Placement		
	B	Wald	O.R.	B	Wald	O.R.	B	Wald	O.R.	B	Wald	O.R.
Step 1: Covariates												
Gender	–	–	–	–	–	–	2.07	9.98	7.69**	–	–	–
Ethnicity	–	–	–	–	–	–	–	–	–	1.23	10.14	3.45**
Step 2: Disorganized status												
Disorganized	0.25	0.13	1.28	-0.54	1.69	0.58	18.64	0.00	1.00	1.71	6.82	5.51**
Step 3: Latent states												
Frightening-Chaotic	-2.28	6.36	0.10**	0.27	0.32	1.31	2.10	8.09	8.12**	2.22	17.36	9.16***
Constricted	-3.18	7.46	0.04**	-0.08	0.01	0.92	0.38	0.01	1.46	4.61	10.58	10.91***
Total variance explained (McFadden's R^2)	.10			.01			.23			.22		

The following categorical variables were dummy-coded for the analysis: Gender(0 = boy, 1 = girl), Ethnicity(0 = Caucasian, 1 = Other), Placement(0 = Foster home, 1 = Specialized group home)

*** $p < .001$ ** $p < .01$

Overall disorganized attachment status was not associated with antecedents of abuse, but was related to increased probability of placement in a specialized setting.

Associations with age at removal and length of current placement were examined using linear multiple regressions. After controlling for current age and ethnicity, probability of belonging to the Frightening-Chaotic state was inversely associated with age at removal, $B = -21.30$, $SE = 7.28$, $\beta = -.14$, $p < .01$, the model explaining 12% of the variance. By contrast, no significant association was found between latent states and length of current placement.

Associations with Behavior Problems

Associations with caregiver- and self-reported behavior problems were examined using linear multiple regressions (included in Table 4). Disorganized attachment status did not predict any of the outcome variables. After controlling for current age, probability of belonging to the Frightening-Chaotic state moderately predicted externalizing problems as rated by the primary caregiver. By contrast, the Constricted state predicted self-reported hyperactivity or attention problems.

Discussion

This study intended to examine the latent structure underlying markers of defensive dysregulation as observed in the doll play of abused children. A sequential approach was used in which trajectories of occurrence for segregated system markers were documented across scenarios. In congruence with predictions, results provided support for a three-state latent structure in which one state was characterized by the presence of frightening and chaotic themes in the stories,

another involved marked difficulties initiating or completing narratives (constriction) and the remaining state showed an absence of markers for defensive dysregulation. This solution is consistent with Solomon et al.'s (1995) previous research linking forms of controlling strategies in the context of child-caregiver relationships to specific segregated system material on the doll play. In their original study, the majority of children identified as Controlling-Punitive on the basis of separation-reunion behaviour showed frightening or chaotic themes in the Separation-Reunion doll play scenario.

Conversely, most children identified as Controlling-Caregiving showed marked inhibition consistent with constriction in their doll play. Therefore, the results obtained in the current study seem consistent with a basic distinction between hostile-punitive and caregiving forms of control strategies in an attachment context. Although consideration of socialization processes could lead to hypothesizing gender differences in the ways in which children manage attachment-related thoughts, emotions and needs (Chaplin et al. 2005; Ontai and Thompson 2002), such differences were not apparent in the distribution of latent states in this study. This is in line with several other studies failing to find gender differences in manifestations of attachment disorganization in child samples (Bureau et al. 2009; Lecompte and Moss 2014; O'Connor et al. 2011), although there is support for the notion that gender may moderate the impact of attachment disorganization on psychosocial outcomes (Fearon et al. 2010).

While generally speaking the results seem compatible with those described by Solomon et al. (1995), there are notable differences between the two studies. An important distinction is that Solomon and colleagues did not rely on a sequential approach to analysis, instead emphasizing the Separation-Reunion scenario to distinguish between attachment groups. Their study sample consisted of children

Table 4 Linear regression analyses: caregiver- and self-reported behaviour problems predicted by disorganized status and latent state posterior probabilities ($n = 62$)

Predictors	Caregiver Externalizing			Caregiver Internalizing			Self-Inattention/Hyperactivity			Self Internalizing		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
Step 1: Covariates												
Current age	0.01	0.00	.24**	—	—	—	—	—	—	—	—	—
Gender	—	—	—	0.50	0.13	.29***	—	—	—	—	—	—
Step 2: Disorganized status												
Disorganized	-0.15	0.21	-.06	-0.06	0.19	-.02	-0.47	0.28	-.18	0.33	0.29	.11
Step 3: Latent states												
Frightening-Chaotic	0.51	0.22	.20*	0.12	0.19	.05	0.04	0.23	.02	0.10	0.24	.04
Constricted	-0.06	0.35	-.02	-0.04	0.32	-.01	0.79	0.40	.21*	-0.18	0.46	-.04
Total variance explained (R^2)	.04			.04			.02			.01		

The following categorical variables were dummy-coded for the analysis: Gender(0 = boy, 1 = girl)

*** $p < .001$ ** $p < .01$ * $p < .05$

between 5 and 7 years of age recruited from public and private daycares. Thus, the present study extends existing work in this area by documenting the relative stability of defensive dysregulation markers across stories, and their pattern of occurrence in children victims of maltreatment. One possible implication of the findings is that, contrary to the practice of restricting attachment classification to the Separation-Reunion scenario, there is support for the relative stability of latent states across stories, which may point to potential benefits from using all three scenarios sequentially when considering attachment data. In this sample, slight changes were observed in state distribution when progressing through the scenarios. Specifically, the number of individuals in the Regulated state decreased and the proportion of those in the Frightening-Chaotic state increased between the Hurt Knee and Monster stories. Unfortunately, low numbers of participants did not allow for a comparison between children who transitioned between states and those who remained stable. Furthermore, results generally supported the notion according to which the doll play scenarios activate the attachment behavioural system at an increasing level of intensity (George and Solomon 1990). While indicator probability values were relatively moderate on the Hurt Knee story, they tended to significantly increase in the Monster and Separation-Reunion stories. An interesting pattern was observed for the Frightening-Chaotic state, in which frightening markers became prominent on the Monster scenario, only to be replaced by themes of chaos on the Separation-Reunion narrative. These results suggest that specific scenarios activate the attachment behavioural system in distinct ways, which may in turn further reinforce the need to consider information from all three scenarios in a sequential manner when assessing attachment (dis)organization.

Results obtained from linear and logistic regression analyses provide support for the relevance of defensive

dysregulation to better understand the links between experiences of maltreatment and subsequent psychosocial adaptation. The Frightening-Chaotic state was significantly related to antecedents of sexual abuse, placement in a specialized group setting and earlier age at removal from the family of origin. In terms of psychosocial adaptation, this profile was associated with higher levels of externalizing problems as reported by the primary caregiver. These findings suggest that this state may be associated with more severe or insidious forms of abuse which contribute to the creation of an internal representation of parental or caregiving figures, and perhaps the broader social environment, as inherently exploitive and abusive. In this context, aggressive and oppositional behaviour from the child may constitute an attempt at preventing, warding off or acting out against anticipated attacks. This is in keeping with a substantial literature linking attachment disorganization in children with frightening or frightened behaviour observed in the caregiver (Lyons-Ruth et al. 1999; Lyons-Ruth et al. 2005; Lyons-Ruth 2003).

In sexually abused children specifically, the child's experience of a disturbed caregiving system in which the attachment figure is experienced as hostile and personal boundaries are compromised may lead to severe impairment in the capacity to represent one's or the caregiver's behaviour in terms of intentional mental states (Allen et al. 2008). Aggressive or oppositional acting-out may thus be associated with a need to discharge internal conflict and tension while remaining unaware of the subjective significance and meaning associated with the behaviour (Möller et al. 2014). In this context, the presence of disorganized states of mind characterized by unresolved fear and powerlessness may account in part for the presence of externalizing problems in children with a history of severe disruptions in their attachment relationships. In light of research pointing to the importance of consistency and stability

in follow-up care for such children (Gauthier et al. 2004; Smyke et al. 2010), such findings may be of interest to legal and clinical decision-makers.

The second state identified, labelled “Constricted”, predicted placement in specialized settings as well as self-reported hyperactivity and attention problems. The association between attachment disorganization and attention problems is not unexpected given similar results obtained in previous studies (Bohlin et al. 2012; Thorell et al. 2012). The original nature of this finding lies in its linkage of hyperactivity and attention problems to a specific component of defensive dysregulation, namely the child’s inability to engage in meaningful and sustained play activity. This constriction process at the level of attachment representations thus appears to have meaningful behavioural correlates, in the form of non-reflexive, impulsive motor activity. While accounts for this association must remain tentative in the absence of a priori theoretical justification, it is plausible that the impossibility for the child to mentally process attachment-related thoughts, needs and emotions necessitates their rapid discharge through behavioural expression, in line with the concept of *acting-out* (Chasseguet-Smirgel 1990). In such cases, massive repression associated with attachment disorganization, then, could significantly inhibit the development of self-regulation and reflective self-function (Fonagy et al. 2004). The presence of hyperactive, unmodulated behaviour could hypothetically contribute to decisions to place the child in a more structured, but also more constraining, setting.

Two additional findings are worth considering. First, the latent states uncovered in this study proved to be better predictors of both victimology and behaviour problem than overall disorganized attachment classification. This finding appears to be consistent with attachment research pointing to a range of developmental pathways stemming from attachment disorganization, including at least two distinct types of controlling strategies, or alternatively the failure to develop consistent mechanisms to manage dysregulation on a behavioral level (Lecompte and Moss 2014; Moss et al. 2004; Solomon et al. 1995). It could be that greater delineation of similar trajectories in doll play data adds predictive power to the overall construct of attachment disorganization. Future research would likely benefit from incorporating strategies for identifying distinct subtypes of individuals who are classified as disorganized. Second, the latent states were *negatively* associated with a specific form of maltreatment, neglect. Clarifying the meaning of this association will require further research on the topic. However, it is worth noting that the presence of neglect is notoriously difficult to ascertain and tends to be associated with insecure, but not necessarily disorganized, attachment patterns (Baer and Martinez 2006; Egeland and Sroufe 1981; Morton and Browne 1998). It is possible that

the negative association obtained simply points to a positive association with organized insecure attachment configurations, either avoidant or ambivalent-resistant.

Limitations

In terms of limitations, it must be noted that the current study is exploratory in nature and involves a specific clinical sample, making generalization of findings difficult. In addition, the relatively small sample size decreased statistical power for many of the analyses, possibly leading to meaningful associations being left uncovered or to smaller effect sizes than would be the case if more participants had been included. In terms of reliability, there was no inter-rater agreement pertaining to individual defense markers, which in turn puts the validity of the findings into question. Lastly, the complexity inherent to the doll play as an assessment method as well as latent structure (Markov) analysis as an analytical tool contribute to a degree of ambiguity regarding the meanings attributed to the data. As such, elements contained in the discussion are hypothetical and require further confirmation through additional studies.

Conclusion

The present study attempted to examine the latent structure underlying a sequential presentation of scenarios in a doll play procedure, from the perspective of segregated system markers. Findings highlighted three distinct states, characterized respectively by frightening or chaotic themes, constriction or absence of defensive dysregulation across doll play scenarios. Meaningful associations were found between latent states and victimology (antecedents of maltreatment as well as type of placement) and psychosocial adjustment, specifically externalizing behaviours or hyperactivity/attention problems. Results obtained in this study provide support for the validity of the George and Solomon’s (1990) framework for assessing attachment disorganization on the doll play. In addition, they highlight the relevance of a sequential, profile-centered approach to assessing disorganization making use of a series of scenarios designed to activate the attachment behavioural system. The links uncovered between aspects of victimology, features of segregated systems and specific psychosocial difficulties may help clinicians conceptualize externalizing, hyperactivity and attention problems from an attachment perspective. Future studies are needed to clarify the potential role of latent states linked to attachment disorganization in mediating the links between experiences of maltreatment and subsequent psychosocial adjustment.

Compliance with Ethical Standards

Disclosure of Interest Authors Linda Webster and David Joubert declare that they have no conflict to report.

Ethical Standards and Informed Consent All procedures followed were approved by the University of the Pacific's Institutional Research Board and in accordance with the ethical standards of the responsible committee on human experimentation described within the Helsinki Declaration of 1975, as revised in 2000. Informed consent in writing was obtained from all adults participating in the study. Verbal assent was obtained from child participants.

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