Regular Article

Correlates of the categories of adolescent attachment styles: Perceived rearing, family function, early life events, and personality

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Aims: To identify the psychosocial correlates of adolescents.

Methods: Unmarried university students ($n = 4226$) aged 18–23 years were examined in a questionnaire survey.

Results: Four clusters of people (indifferent, secure, fearful, and preoccupied) identified by cluster analysis were plotted in 2-D using discriminant function analysis with the first function (father's and mother's Care, Cooperativeness, and family Cohesion on the positive end and Harm Avoidance and father's and mother's Overprotection on the negative end) representing the Self-model and the second function (Reward Dependence and experience of Peer Victimization on the positive end and Self-directedness on the negative end) representing the Other model.

Conclusions: These findings partially support Bartholomew's notion that adult attachment is based on the good versus bad representations of the self and the other and that it is influenced by psychosocial environments experienced over the course of development.

Key words: adult attachment style, family function, perceived rearing, personality.

ACCORDING TO ATTACHMENT theory as proposed by Bowlby, mental representations of self and other emerge from early relationships with caregivers – usually but not necessarily the mother – and act as a guide for subsequent close or intimate relationships.[1–3] Empirical support for the classifications of child attachment styles was provided by Ainsworth *et al.*[4] Recently, researchers have applied the concept of attachment to the relationship of adolescents and young adults.[5–10] Studies using measures of adult attachment have found similar attachment styles in adult relationships.

Few studies have investigated how the adult attachment styles are formed. Because the original concept of attachment of infants emphasized the importance of the mother–child relationship, such studies on the correlates of adult attachment styles also focused on parental rearing of the person as a child as a main determinant of their later adult attachment style.[11] Thus many researchers reported that secure adult attachment was associated with warm parental attitudes towards the person as a child.[7,9,12–14]

Candidates for determinants of adult attachment are not limited to the parent–child relationship, which may be suggested from a retrospective assessment of caregivers' attitudes to the child, but also to

other intrafamilial and extrafamilial variables. An example of an intrafamilial variable is family function. An example of extrafamilial variables is early life events. Family function has recently been studied for its relationship to adult attachment.[15–21] Life events experienced as a child may affect the formation of adult attachment. Matsuoka *et al.* reported that women's adult attachment was predicted by Top Star experiences (e.g. being elected a class leader) and fewer relocation experiences (e.g. moving and changing schools).[22] Because attachment theory indicates that attachment is a determinant of relating patterns in adulthood, attachment style may also be associated with personality. For example, Diehl *et al.* studied such associations and reported that people with a secure attachment style scored higher on personality variables indicative of self-confidence, psychological well-being, and functioning in the social world.[16]

Of clinical as well as research importance is the question of the categorization of adult attachment styles. Bartholomew and Horowitz divided adult attachment styles into four types (secure, preoccupied, fearful, and dismissing) and two models (self vs other) based on theoretical consideration and empiric data.[6] In those types the secure attachment is characterized by good self model and good other model; the preoccupied attachment by poor self model and good other model; the fearful attachment by poor self model and poor other model; and the dismissing attachment by good self model and poor other model. This resulted in the development of their Relationship Questionnaire (RQ). Matsuoka *et al.* performed a factor analysis of the questionnaire using the same data set as the present study and found that only one factor was extracted.[22] Matsuoka *et al.* support a bipolarity of adult attachment styles: the attachment may be secure or insecure.[22] However, there still remains the possibility that insecure attachment consists of different types, for two reasons. First, the RQ measures adult attachment using only four items, each representing a different attachment style. The small number of items may result in a single-factor model. Second, insecure attachment styles may be distinct but strongly correlated with each other; thus, they are amalgamated as a single factor when factor-analyzed with the secure attachment item. Therefore, we performed a cluster analysis of the RQ with the number of the clusters set at four, reflecting the theory proposed by Bartholomew and Horowitz.[6] The psychosocial determinants of adult attachment were examined using the groupings of people based on a cluster analysis. This may provide us with a better understanding of the psychological characteristics of attachment style. Furthermore, we expected that if, as suggested by Bartholomew and Horowitz,[6] the four clusters were derived from the combination of two models – Self and Other –, the location of the four clusters could be mapped on a 2-D space. The scrutiny of the determinants of these two dimensions should suggest how the concepts of self and other are developed.

METHODS

Participants

We sent an invitation letter to the presidents of all 615 universities in Japan and solicited their cooperation in a survey of the sex and contraceptive behaviors of Japanese adolescents. A positive response was returned by 110 presidents (responsible for 33 779 students). Due to the impracticality of distributing the questionnaire to all university students, each university was given discretion as to how to distribute the questionnaires. Nevertheless, the questionnaires were distributed to students in a specified setting in order to avoid selection bias to the greatest possible extent. Questionnaires were distributed to students in classrooms, students' sections, at annual medical check-ups or at campus festivals. Alternatively, questionnaires were handed to all the students visiting the university's health counseling center during a given time period. Questionnaires were completed anonymously and returned by stamp-added envelope directly to us.

A total of 4226 students (12.5%) returned questionnaires including 1330 men (mean age, 20.5 ± 2.0 years) and 2896 women (mean age, 20.2 ± 1.7 years). In order to study the relationship between adolescents' and young adults' attachment styles and the quality of their early experiences, we selected students who were unmarried and younger than 24. This procedure resulted in a total of 3912 students (1149 men and 2763 women). Their mean ages were 20.1 ± 1.40 years for male students and 20.0 ± 1.31 years for female students. Of these, 3811 (1107 men and 2704 women) filled in the RQ section that was then used for further analysis.

Measures

Relationship Questionnaire

The RQ (Bartholomew & Horowitz, 1991)[6] was used in order to measure four categories of adult attachment: Secure, Fearful, Preoccupied, and Dismissing. The last three categories were grouped as insecure attachment styles. The RQ consists of four paragraphs with a 7-point scale (from 1, 'Does not apply to me at all' to 7, 'Applies to me very much') that describe each attachment style. The participant was asked to rate how each description would correspond to his/her relationship with his/her partner. For those participants with no definite partner, the questionnaire requested them to imagine a close opposite-sex person. The psychometric properties have been reported in married couples, romantic partners and undergraduate students in Canada.[23,24] After obtaining permission from Dr Bartholomew, T.K. translated the RQ into Japanese.

Parental Bonding Instrument

The Parental Bonding Instrument (PBI) is a self-report measure of perceived parenting when the participant was aged ≤15.[25] It contains 12 Care and 13 Overprotection items with a 4-point scale, each of which describes a parental attitude toward the subject. Higher scores indicate higher Care or higher Protection experiences. Good test–retest reliability and split-half reliability for this instrument have been reported.[26] Validity was also reported. The Japanese version of the PBI was retranslated back into English to check that the translation was correspondent with the meaning of the original instrument.[27] In the present study population the internal reliability of the PBI subscales was good (Cronbach's[28] alpha coefficients: maternal Care, 0.89; maternal Overprotection, 0.86; paternal Care, 0.90; and paternal Overprotection, 0.83).

Family Adaptability and Cohesion Evaluation Scale

The Family Adaptability and Cohesion Evaluation Scale (FACES-III) consists of 20 items with a 5-point scale and is designed to measure the circumplex model of family functioning based on two dimensions: Adaptability and Cohesion.[29] Olson defined Adaptability as the ability of a marital or family system to change its power structure, role relation-

ships, and relationship rules in response to situational and developmental stress.[30] He also defined Cohesion as the emotional bonding that family members have towards each other. The FACES-III has been reported as reliable and valid.[31] Since its development the FACES-III has been used by many clinicians and researchers.[32] The Japanese version of FACES-III is available.[33] Hasui *et al.* reported the factor structure of the Japanese version with a confirmatory factor analysis and presented items for Adaptability (three items) and Cohesion (nine items).[34]

Early life experiences

We used an ad hoc list of early life events. If the participants reported having experienced any of the events, further inquiries were made as to how many times they experienced the event and their age at the time the event occurred.

Because events are likely to be associated (e.g. changing schools may follow relocation), a factor analysis was conducted to elicit the factors of this list of life events. An event was excluded from the factor analysis if <10% of the participants reported having experienced it at least once in their lifetime. The analysis yielded five factors interpreted as Top Star (e.g. 'first prize in art, calligraphy, music etc.', 'first prize in athletic games', and 'elected as a class leader'), Relocation (e.g. 'relocation' and 'changed school'), Self-Disease (e.g. 'hospitalization'), Family Disease (e.g. 'serious disease or injury of a family member' and 'death of a relative'), Peer Victimization (e.g. 'was bullied' and 'was betrayed by a close friend'). The subscale of event frequencies was calculated by adding the frequencies of events with factor loadings of ≥0.4 for each factor divided by the number of events included in the factor.

Temperament and Character Inventory

As a personality measure the Temperament and Character Inventory (TCI) measures four temperament dimensions (Novelty Seeking, Harm Avoidance, Reward Dependence, and Persistence) and three character dimensions (Self-directedness, Cooperativeness, and Self-transcendence).[35] The original TCI was a true–false questionnaire of 240 items but Kijima *et al.* reported better internal consistency using a 4-point scale than a dichotomous scale.[36] We used the 4-point scale in the present study. Each item can range between 1 (strongly disagree) and 4

(strongly agree). Because of the space constraints of a single booklet, we reduced the number of items to 20. These are the items with the highest item-total subscale score from the previous study.[36] The Japanese version of the TCI is available.[36]

Data analysis

First, in order to examine the characteristics of each attachment style score, we correlated each of the four RQ items with the independent variables: personality, family function, perceived rearing, and early life events. Because the central purpose of this study was to group people based on adult attachment profiles, a cluster analysis was performed using the four RQ items. These four RQ items were entered into the QUICK CLUSTER program of SPSS (SPSS, Chicago, IL, USA). The number of clusters was set at four because Bartholomew noted that four types of attachment styles could be identified based on theoretical considerations.[5] These four clusters were compared in terms of variables in personality, family function, perceived rearing, and early life events. Finally, we conducted a discriminant functional analysis of the four clusters with the number of the functions set at two, reflecting the hypothesis of Bartholomew that states that the four attachment styles were based on two models: Self and Other.[5] This was to examine whether the Bartholomew (1990) two-model hypothesis had an empiric support and to search psychosocial correlates of the Self and Other representations.

SPSS 10.0 was used for statistical analysis. Because of the large number of participants and multiple comparisons we adopted $P < 0.001$ as the alpha level in Pearson product-moment correlations.

RESULTS

Attachment ratings and variables of perceived rearing, family function, early life event, and personality

The results of each of the four questionnaire items are listed in Table 1. To examine the relationships between participants' continuous ratings for each of the four attachment styles and the personality, family function, perceived rearing, and early life event variables, we calculated Pearson product-moment correlations (Table 2). The scores of the Secure attachment style were correlated with Novelty Seeking, low Harm

Table 1. Relationship Questionnaire items

Relationship Questionnaire items	Minimum	Maximum	Mean	SD
Secure	1	7	3.7	1.7
Fearful	1	7	3.3	1.9
Preoccupied	1	7	3.5	1.8
Dismissing	1	7	2.2	1.6

Avoidance, Reward Dependence, Persistence, Cooperativeness, Self-transcendence, family Cohesion, father's and mother's Care, and father's and mother's low Overprotection. The three insecure attachment styles – Fearful, Preoccupied, and Dismissing – had slightly different correlational patterns. Thus three of them were correlated with Harm Avoidance, low Cooperativeness, low family Cohesion, father's and mother's low Care, and mother's Overprotection. The scores for Fearful and Preoccupied attachment styles that would represent the poor Self image were correlated with parental Overprotection, low Self-directedness and past experiences of peer victimization whereas the scores of Dismissing attachment style were correlated with fewer Top Star experiences. The scores for Fearful and Dismissing attachment styles that represent poor Other image were correlated with low Reward Dependence while those for Preoccupied attachment style were correlated with high Reward Dependence.

Cluster analysis based on the attachment ratings

All the four attachment style scores were intercorrelated (Secure vs Fearful, $r = -0.244$; Secure vs Preoccupied, $r = -0.206$; Secure vs Dismissing, $r = -0.173$; Fearful vs Preoccupied, $r = 0.301$; Fearful vs Dismissing, $r = 0.302$; Preoccupied vs Dismissing, $r = 0.114$, all Ps < 0.001). Because we were interested in possible groupings of individuals based on the patterns of the attachment style scores, we performed a cluster analysis of the participants using the four RQ items. We assumed that the participants could be grouped into four considering the theory of adult attachment. As seen in Table 3, the four clusters forced to emerge had substantially clear patterns of attachment style scores. Thus, 925 individuals categorized in the first cluster were scored low in all the four RQ items. These individuals may have low interest in relating to

Table 2. Correlations between each of the four attachment styles and correlates

Variables	Mean	SD	Secure	Fearful	Preoccupied	Dismissing
Gender	–	–	−0.04*	0.04*	−0.05**	−0.14***
Father's Care	24.5	7.3	0.11***	−0.14***	−0.12***	−0.16***
Father's Overprotection	11.2	6.4	−0.06***	0.12***	0.12***	0.05**
Mother's Care	29.1	6.0	0.112***	−0.14***	−0.12***	−0.15***
Mother's overprotection	11.6	7.2	−0.06***	0.14***	0.16***	0.07***
Cohesion	20.2	8.5	0.11***	−0.11***	−0.08***	−0.09***
Adaptability	4.7	2.8	0.05**	−0.01	−0.04**	−0.02
Top Star	0.76	0.89	0.06**	−0.02	−0.02	−0.08***
Relocation	0.51	0.86	−0.03	0.05**	0.02	0.01
Self-Disease	0.21	0.47	−0.00	0.00	−0.00	−0.03*
Family Disease	0.30	0.44	−0.03	0.05**	0.00	−0.05**
Peer Victimization	0.32	0.57	−0.03	0.09***	0.10***	−0.01
Novelty Seeking	4.3	2.0	0.08***	−0.05**	0.00	0.00
Harm Avoidance	5.7	1.7	−0.17***	0.15***	0.19***	−0.06***
Reward Dependence	6.2	1.8	0.12***	−0.06***	0.09***	−0.24***
Persistence	3.4	1.4	0.07***	−0.01	−0.02	−0.01
Self-directedness	3.4	2.1	−0.01	−0.12***	−0.20***	−0.03
Cooperativeness	5.6	1.5	0.09***	−0.13***	−0.12***	−0.17***
Self-transcendence	3.3	1.7	0.18***	−0.05**	−0.04*	−0.03

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

other people. The low score of the Secure attachment style was not accompanied by high scores of any of the three insecure attachment style scores. The paragraph describing the Dismissing pattern includes 'it is very important to me to feel independent and self-sufficient'. The individuals belonging to this cluster may not maintain strong avoidance of others but may still feel comfortable in being alone. We termed this cluster 'Indifferent'. The second cluster, consisting of 863 individuals, was characterized by high scores in the Secure attachment item and low scores of all the three insecure items. These may be individuals characterized by secure attachment to significant others. Thus, we termed this cluster 'Secure'. The third cluster that contained the largest number of individuals was characterized by high scores on the

Fearful attachment style item. We thus called this cluster 'Fearful'. The final cluster, consisting of 874 individuals, was characterized by high scores on the Preoccupied attachment item. Thus, we called this cluster 'Preoccupied'. We therefore obtained four clusters of individuals based on the pattern of the RQ item scores: Indifferent, Secure, Fearful, and Preoccupied. These are the clusters of participants rather than the groupings of RQ items.

Characteristics of groups of participants based on cluster analysis

When all the four groups (clusters) of people based on the cluster analyses were compared, the Secure cluster (cluster 2) was characterized by low Harm

Table 3. Cluster analysis based on Relationship Questionnaire scores

RQ items	Cluster 1 ($n = 925$) Indifferent	Cluster 2 ($n = 863$) Secure	Cluster 3 ($n = 1149$) Fearful	Cluster 4 ($n = 874$) Preoccupied
Secure	2.9 ± 1.0	5.9 ± 0.8	2.9 ± 1.4	3.4 ± 1.5
Fearful	2.2 ± 1.1	2.4 ± 1.3	5.6 ± 1.1	2.4 ± 1.1
Preoccupied	1.9 ± 0.7	2.3 ± 1.1	4.3 ± 1.6	5.2 ± 1.1
Dismissing	1.9 ± 1.3	1.7 ± 1.2	3.3 ± 1.8	1.8 ± 1.2

Table 4. Cluster characteristics based on Relationship Questionnaire scores

Variables	Cluster 1 (*n* = 925) Indifferent	Cluster 2 (*n* = 863) Secure	Cluster 3 (*n* = 1149) Fearful	Cluster 4 (*n* = 874) Preoccupied	F	Post hoc comparison (Scheffé's)
Gender (% female)	22.6	27.7	27.5	22.2	chi² = 1.7	
Father's Care	25.1 (7.1)	25.8 (6.7)	23.1 (7.6)	24.4 (7.3)	25.0***	2,1 > 3 2,3 > 4
Father's Overprotection	10.7 (6.3)	10.1 (5.9)	12.0 (6.6)	11.7 (6.4)	17.8***	3,4 > 1,2
Mother's Care	29.7 (5.5)	30.2 (5.3)	27.8 (6.6)	29.1 (5.9)	30.9***	1 > 3 2 > 4 > 3
Mother's Overprotection	10.5 (6.7)	10.7 (7.2)	12.7 (7.3)	12.1 (7.3)	21.8***	3,4 > 2,1
Cohesion	20.6 (8.2)	21.4 (8.3)	19.0 (8.7)	20.2 (8.6)	14.7***	1 > 3 2 > 3 > 4
Adaptability	4.7 (2.7)	5.0 (2.8)	4.7 (2.8)	4.5 (2.7)	3.9**	2 > 4
Top Star	0.74 (0.92)	0.85 (0.92)	0.70 (0.86)	0.77 (0.88)	4.3**	2 > 3
Relocation	0.51 (0.86)	0.45 (0.79)	0.56 (0.90)	0.49 (0.86)	2.9*	3 > 2
Self Disease	0.21 (0.48)	0.23 (0.52)	0.21 (0.47)	0.21 (0.41)	0.5	–
Family Disease	0.31 (0.44)	0.27 (0.41)	0.32 (0.46)	0.28 (0.42)	2.2	–
Peer Victimization	0.24 (0.46)	0.29 (0.54)	0.38 (0.64)	0.35 (0.60)	12.1***	3,4 > 1 4 > 2
Novelty Seeking	4.2 (1.9)	4.5 (2.0)	4.2 (2.0)	4.4 (2.0)	3.9**	2 > 1,3
Harm Avoidance	5.5 (1.7)	5.2 (1.8)	5.9 (1.7)	5.9 (1.7)	37.0***	3,4 > 1 > 2
Reward Dependence	6.0 (1.8)	6.5 (1.7)	5.9 (1.9)	6.5 (1.7)	29.9***	2,4 > 1 2 > 3 4 > 3
Persistence	3.4 (1.3)	3.6 (1.4)	3.4 (1.4)	3.4 (1.4)	3.2*	–
Self-directedness	3.9 (2.1)	3.5 (2.2)	3.2 (2.1)	3.2 (2.1)	25.7***	1 > 2 > 3,4
Cooperativeness	5.8 (1.5)	5.9 (1.6)	5.3 (1.6)	5.6 (1.5)	31.4***	1 > 3 2 > 4 > 3
Self-transcendence	3.3 (1.6)	3.7 (1.8)	3.2 (1.6)	3.3 (1.6)	21.0***	2 > 1,4,3

*P < 0.05; **P < 0.01; ***P < 0.001; Numbers in parentheses are SD.

Avoidance, high Reward Dependence, high Cooperativeness, high Self-transcendence, high family Cohesion, father's and mother's high Care and low Overprotection, and few experiences of Peer Victimization (Table 4). The associations of the Indifferent cluster with these variables were similar to those of the Secure cluster. This cluster scored even higher in Self-directedness and even lowers in mother's Overprotection and Peer Victimization. The remaining two clusters, the Fearful cluster in particular, indicated opposite associations with respect to these variables.

Discrimination of attachment styles based on cluster-analysis-derived groups

The final portion of analysis was a discriminant function analysis of the four clusters of students (Table 5). From the analysis 368 students' data were excluded because of missing data for at least one variable. The eigenvalues of the two functions were 0.11 and 0.03. They together explained 90% of the variance. Of the students, 38% of them were correctly classified by this discriminant function analysis.

Table 5. Discriminating variables and canonical discriminant functions (function structure matrix)

Variables	Function 1	Function 2
Harm Avoidance	−0.50	0.11
Cooperativeness	0.48	0.01
Mother's Care	0.47	−0.02
Father's Care	0.43	0.03
Mother's Overprotection	−0.37	0.27
Self-transcendence	0.34	0.29
Father's Overprotection	−0.33	0.10
Cohesion	0.33	0.09
Relocation	−0.14	−0.11
Adaptability	0.10	0.02
Reward Dependence	0.26	0.70
Self-directedness	0.31	−0.62
Peer Victimization	−0.26	0.31
Novelty Seeking	0.13	0.22
Top Star	0.14	0.16
Family Disease	−0.13	−0.15
Gender	0.04	−0.11
Persistence	0.09	0.10
Self Disease	0.03	0.05

The group centroids of the Indifferent cluster were 0.19 for the first function and −0.28 for the second function; the group centroids of the Secure cluster were 0.43 and 0.13 for the first and second functions, respectively; the group centroids for the Fearful were −0.43 and −0.02 for the first and second functions, respectively; and the group centroids for the Preoccupied cluster were −0.08 and 0.19 for the first and second functions, respectively. Therefore the centroids of the four clusters were scattered. The first function separates participants with a positive self-model (i.e. Secure and Indifferent) from participants with a negative self-model (i.e. Preoccupied and Fearful). In contrast, the second function separates participants with a good other-model (i.e. Preoccupied and Secure clusters) from participants with a negative other-model (i.e. Fearful and Indifferent clusters).

The first function was a bipole and was represented by Cooperativeness, father's and mother's Care, and family Cohesion on the positive end and Harm Avoidance and father's and mother's Overprotection on the negative end. The second function was also a bipole, represented by Reward Dependence and experience of Peer Victimization on the positive end, and Self-directedness on the negative end.

DISCUSSION

Bivariate analyses have suggested that of the four types of adult attachment styles the Secure Attachment score was unique in its associations with the psychosocial variables. In the personality domain, those with the secure attachment style were affectionate (Reward Dependence) and relaxed and energetic (low Harm Avoidance) but impulsive and outgoing (Novelty Seeking). They continued what they started (Persistence). They were less revengeful and more altruistic (Cooperativeness) and felt strong ties with spiritual powers (Self-Transcendence). In intrafamilial domains, they came from a harmonious family and caring parents who respected the children's autonomous decisions. People with either of the three insecure attachment styles were similar to each other in these variables in which all of the three insecure attachment styles were placed in the opposite direction towards the secure attachment style. People with the Fearful and Preoccupied (having a poor other model) groups were characterized by wishful thinking such as a powerful position among their peers (low Self-directedness) while they had more experiences of being bullied at school. These findings are consistent with attachment theory in that the interactions with others in the family context progressively create a guide to healthy attachment with people in social situations. The internal working model of a good attachment style is reflected in personality characteristics.

Our interest was whether the participants could be divided into four clusters reflecting what could be expected from the theory of Bartholomew and Horowitz.[6] Cluster analysis with the number of the clusters set at four yielded clusters named Indifferent, Secure, Fearful, and Preoccupied. The latter three clusters showed expected profiles of the RQ scores. The first cluster Indifferent scored low in all four of the RQ items. The students belonging to this cluster had little interest in interpersonal relationships. They were not anxious in approaching others. Nor did they avoid contacting others. Moreover, they showed little interest in intimate relationships. Because the score of the item representing the dismissing style was lower than those of the other three items and because there appeared no cluster scoring high in this item, we considered this cluster to be a variant of the dismissing group in the present population of Japanese university students.

As in the bivariate analyses, although with slight differences, the participants belonging to the Secure cluster were characterized by a more stable temperament, more mature character, more optimal parenting received, and fewer past traumatic experiences. The profiles of psychosocial correlates were similar between the Fearful and Preoccupied clusters and between the Secure and Indifferent clusters. In the discriminant function analysis, Fearful was located away from the other three clusters. The centroid of the Indifferent cluster was located between the Secure cluster and the two other insecure clusters.

We interpreted the two main functions of the discriminant function analysis as representing the Self and Other models. This is because the Secure and Indifferent clusters scored high in the first function, while the Fearful and Preoccupied clusters scored low in the first function. In the second function, the Secure and Preoccupied clusters scored high, while the Fearful and Indifferent clusters scored low. These links are compatible with the theory that the four adult attachment styles are based on a combination of the Self and Other models. One of the aims of the present study was to search for psychosocial determinants of these two models. How do people develop representation of self and other during the early years of life?

The first function of the discriminant function analysis was characterized by low Harm Avoidance, Cooperativeness, parental Care and allowance of children's autonomy, and family Cohesion. Low Harm Avoidance and high Cooperativeness may be personality traits related to self-esteem, self-efficacy, positive interpersonal relationship, and psychological well-being. High Care and low Overprotection are often regarded as determinants of many aspects of better mental health and psychological adjustment.[37–39]

Family Cohesion is also thought to be a robust determinant of psychological adjustment. In contrast, the family Adaptability lost its significance in predicting either of the functions. Why is family cohesion more important than family adaptability in the development of adult attachment? Rothbaum *et al.* argued that extremely close ties between a mother and child in a Japanese population are perceived as adaptive, and are more common, and that children experience fewer aversive effects from such relationships than do children in the West.[15] The cultural influence should be taken into account in future studies on this topic.

According to the object relation theory, the good self as an internal object is a potent factor of maintaining healthy relationships with others in the social context. The representation of self may gradually develop through a variety of experiences beginning in the early stages of life and later interactions with the family members.[40,41] The present results may be, although not conclusive, at least in line with this theory.

The second function of the discriminant function analysis was characterized by Reward Dependence and low Self-directedness, and Peer Victimization. It is contrary to expectation that better other model is linked to low Self-directedness and more Peer Victimization experiences because Self-directedness reflects personality maturation in the 'you and me' relationship, and peer victimization[42] was reported as a determinant of later development of psychopathology.[43–46] Scrutiny of Table 4 suggests that the Self-directedness score was the highest in the Indifferent cluster. People in this cluster may be less interested in relating to others and, as a defense, engage in more wishful thinking. Therefore high scores of Self-directedness in the present study may be a defensive response of people who had poorer models of others. As noted, we used a very short version of the TCI. The aforementioned speculation

should be examined in future studies using the full version of the TCI. Again, the association between Peer Victimization and a better Other model may be explained by the fact that the people in the Indifferent cluster scored the lowest in this life event. People in the Fearful and Preoccupied clusters scored higher than those in the Secure cluster in terms of Peer Victimization. Students who had little interest in socialization may avoid peer contact and thus be less likely to become a target of peer victimization.

Limitations of the present study should also be noted. Because the present study is a cross-sectional one, caution should be exercised when making conclusions about causal relationships. While the study suggested that parental styles influence the development of adult attachment, parental style may be determined by better children's attachment with their parents. For example, Belsky and Rovine noted that mothers of infants with secure attachment described them as easier to care for.[47] Children's attachment to their peers may also be determined by the occurrence of a variety of events that were not investigated in the present study. Many factors may intervene between parental style and early life events and adult attachment. Future studies should focus on these issues using a longitudinal design. Finally, the present study was based on the assumption that attachment styles were determined by psychosocial factors. However, this does not exclude possible contributions of biological factors such as genetic transmission of adult attachment styles. It has been noted that infants' attachments were due largely or in part to endogenous temperamental variation.[48] This may also be the case for adults.

Taken together, the present study has demonstrated that a variety of psychosocial variables are potent determinants of adult attachment. They include intrafamilial and extrafamilial variables: variables that date back to the early days of life and those that are current. Therefore the present study suggests that adult attachment is created over the course of development and echoes Blatt in that the introjection of outer world objects into the human psyche needs an epigenetic course in order for the representation to gain accuracy, articulation, and complexity.[40]

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Psychiatric and Neurological Diseases and Mental Health).

REFERENCES

1 Bowlby J. *Attachment and Loss*, Vol. 2: *Separation: Anxiety and Anger*. Basic Books, New York, 1973.

2 Bowlby J. *Attachment and Loss*, Vol. 3: *Loss: Sadness and Depression*. Basic Books, New York, 1980.

3 Bowlby J. Developmental psychiatry comes of age. *Am. J. Psychiatry* 1988; **145**: 1–10.

4 Ainsworth MDS, Blehar MC, Waters E, Wall S (eds). *Patterns of Attachment: A Study of the Strange Situation*. Erlbaum, Hillsdale, NJ, 1978.

5 Bartholomew K. Avoidance of intimacy: An attachment perspective. *J. Soc. Pers. Relat.* 1990; **7**: 147–178.

6 Bartholomew K, Horowitz LM. Attachment styles among young adults: A test of four-category model. *J. Pers. Soc. Psychol.* 1991; **61**: 226–244.

7 Collins NR, Read SJ. Adult attachment, working models, and relationship quality in dating couples. *J. Pers. Soc. Psychol.* 1990; **58**: 644–663.

8 George C, Kaplan N, Main M. *The Berkeley Adult Attachment Interview*. University of California, Berkeley, CA, 1985.

9 Hazan C, Shaver P. Romantic love conceptualized as an attachment process. *J. Pers. Soc. Psychol.* 1987; **52**: 511–524.

10 Main M, Kaplan N, Cassidy J. Security in infancy, childhood and adulthood: A move to the level of representation. **In**: Bretherton I, Waters E (eds). *Growing Points of Attachment Theory and Research*. Monographs of the Society for Research in Child Development. 50 (1–2, Series no. 209). 1985; 66–104.

11 Van Ijzendoorn MH. Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the Adult Attachment Interview. *Psychol. Bull.* 1995; **177**: 387–403.

12 Carnelley KB, Pietromonaco PR, Jaffe K. Depression, working models of others, and relationship function. *J. Pers. Soc. Psychol.* 1994; **66**: 127–140.

13 Levy KN, Blatt SJ, Shaver PR. Attachment styles and parental representations. *J. Pers. Soc. Psychol.* 1998; **74**: 407–419.

14 Mickelson KD, Kessler RC, Shaver PR. Adult attachment in a nationally representative sample. *J. Pers. Soc. Psychol.* 1997; **73**: 1092–1106.

15 Rothbaum F, Rosen K, Ujiie T, Uchida N. Family systems theory, attachment theory, and culture. *Fam. Process* 2002; **41**: 328–350.

16 Diehl M, Elnick AB, Bourbeau LS, Labouvie-Vief G. Adult attachment styles: Their relationships to family context and personality. *J. Pers. Soc. Psychol.* 1998; **74**: 1656–1669.

17 Pfaller J, Kiselica M, Gerstein L. Attachment style and family dynamics in young adults. *J. Couns. Psychol.* 1998; **45**: 353–357.

18 Ryan NE, Solberg VS, Brown SD. Family dysfunction, parental attachment, and career search self-efficacy among community college students. *J. Couns. Psychol.* 1996; **43**: 84–89. [Errata *J. Couns. Psychol.* **43** : 364].

19 Mothersead PK, Kivlighan DM, Wynkoop TF. Attachment, family dysfunction, parental alcoholism, and interpersonal distress in late adolescence: A structural model. *J. Couns. Psychol.* 1998; **45**: 196–203.

20 Swanson B, Mallinckrodt B. Family environment, love withdrawal, childhood sexual abuse, and adult attachment. *Psychother. Res.* 2001; **11**: 455–472.

21 Brennan KA, Shaver PR. Attachment styles and parental divorce. *J. Divorce Remarriage* 1993; **21**: 161–175.

22 Matsuoka N, Uji M, Hiramura H *et al.* Adolescents' attachment style and early experiences: A gender difference. *Arch. Womens Ment. Health* 2006; **9**: 23–29.

23 Griffin DW, Bartholomew K. The metaphysics of measurement: The case of adult attachment. **In**: Bartholomew K, Perlman D (eds). *Advances in Personality Relationship*, Vol. 5. *Attachment Processes in Adulthood*. Jessica Kingsley, London, 1994; 17–52.

24 Scharfe E, Bartholomew K. Reliability and stability of adult attachment patterns. *Pers. Relat.* 1994; **1**: 23–43.

25 Parker G, Tupling H, Brown LB. A parental bonding instrument. *Br. J. Med. Psychol.* 1979; **52**: 1–10.

26 Parker GB. *Parental overprotection: A risk factor in psychosocial developmental*. Grune and Stratton, New York, 1983.

27 Kitamura T, Suzuki T. A validation study of the Parental Bonding Instrument in a Japanese population. *Jpn. J. Psychiatry Neurol.* 1993; **47**: 29–36.

28 Cronbach LJ. Coefficient alpha and internal structure of tests. *Psychometrika* 1951; **16**: 297–334.

29 Olson DHPJ, Lavee Y. *FACES-III*. Family Science, University of Minnesota, St Paul, MN, 1985.

30 Olson DH. Commentary: Three-dimensional (3-D) circumplex model and revised scoring of FACES III. *Fam. Process* 1991; **30**: 74–79.

31 Grotevant HD, Carlson CI. *Family Assessment. A Guide to Methods and Measures*. Guilford Press, New York, 1989.

32 Cluff RB, Hicks MW, Madsen CH. Beyond the circumplex model: I: A moratorium on curvilinearity. *Fam. Process* 1994; **33**: 455–470.

33 Sadaki T, Kayano J. Enkan moderu ni yoru kaoku kino no asesumento [The assessment of family functioning based on the Circumplex Model of marital and family system: A study of clinical usefulness of FSCES scales]. *Arch. Psychiatr. Diagn. Clin. Eval.* 1997; **8**: 125–135 (in Japanese).

34 Hasui C, Kishida Y, Kitamura T. Factor structure of the FACES-III in Japanese University students. *Fam. Process* 2004; **43**: 133–140.

35 Cloninger CR, Svrakic DM, Przybeck TR. A psychological model of temperament and character. *Arch. Gen. Psychiatry* 1993; **50**: 975–990.

36 Kijima N, Tanaka E, Suzuki N, Higuchi H, Kitamura T. Reliability and validity of the Japanese version of the

Temperament and Character Inventory. *Psychol. Rep.* 2000; **86**:1050–1058.

37 Kitamura T, Kijima N, Watanabe K, Takezaki Y, Tanaka E, Takehara S. Precedents of perceived social support: Personality and early life experiences. *Psychiatry Clin. Neurosci.* 1999; **53**: 649–654.

38 Kitamura T, Watanabe M, Aoki M, Fujino M, Ura C, Fujihara S. Factorial structure and correlates of marital adjustment in a Japanese population. *J. Comm. Psychol.* 1995; **23**: 117–126.

39 Parker GB, Barrett EA, Hickie IB. From nurture to network: Examining links between perceptions of parenting received in childhood and social bonds in adulthood. *Am. J. Psychiatry* 1992; **149**: 877–885.

40 Blatt SJ. Levels of object representation in anaclitic and introjective depression. *Psychoanal. Study Child* 1974; **29**: 107–157.

41 Smith Behrends R, Blatt SJ. Internalization and psychological development throughout the life cycle. *Psychoanal. Study Child* 1985; **40**: 11–39.

42 Olweus D. *Bullying at School*. Blackwell, Oxford, 1993.

43 Hodges EVE, Malone MJ, Perry DG. Individual risk and social risk as interacting determinants of victimization in the peer group. *Dev. Psychol.* 1997; **33**: 1032–1039.

44 Kitamura T, Kawakami N, Fujihara S. Effect of peer victimization on adult onset of depression. *Depression Anxiety* 2007 (in press).

45 Nansel TR, Overpeck M, Pilla RS, Ruan WJ, Simons-Morton B, Scheidt P. Bullying behaviour among US youth: Prevalence and association with psychosocial adjustment. *J. Am. Med. Assoc.* 2001; **258**: 2094–2100.

46 Natvig GK, Albrektsen G, Qvarnström U. Psychosomatic symptoms among victims of school bullying. *J. Health Psychol.* 2001; **6**: 365–377.

47 Belsky J, Rovine M. Temperament and attachment security in the strange situation: An empirical rapprochement. *Child Dev.* 1987; **58**: 787–795.

48 Sroufe LA. Attachment classification from the perspective of infant-caregiver relationships and infant temperament. *Child Dev.* 1985; **56**: 1–14.