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Intergenerational transmission of somatization behaviour: 2. Observations of joint attention and bids for attention

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ABSTRACT

Background. Somatoform disorders may have their roots in childhood through processes that involve an enhanced parental focus on health. The aim of this study was to test the hypothesis that somatizing mothers will show less joint involvement than other mothers during play but greater responsiveness when this play involves a 'medical' theme.

Method. Cross-sectional observational study of 42 chronic somatizers, 44 organically ill and 50 healthy mothers and their 4–8 year-old children during structured play and a meal. Tasks comprised boxes containing tea-set items, 'medical' items and a light snack.

Results. Somatizing mothers were emotionally flatter and showed lower rates of joint attention than other mothers during both play tasks. While the three groups had similar rate of bids for attention, somatizing mothers were more responsive to their child's bids during play with the medical box than at other times. In contrast, the children of somatizing mothers ignored a greater proportion of their mother's bids during play with the medical box than did children of other mothers or during play with a non-medical theme.

Conclusion. The study has demonstrated tentative evidence in support of the hypothesis.

INTRODUCTION

Somatoform disorders, defined as the repeated presentation of physical symptoms and requests for medical attention despite negative investigations and reassurance occur in most medical care settings and are responsible for high rates of consultation, investigation and costly procedures (Andersen *et al*. 1977; McFarland *et al*. 1985; Barsky *et al*. 1986). Depression and anxiety are frequently present, to the extent that some authorities view mood disorder as lying at the heart of the problem, the experience of distress being conveyed through an idiom of medical help-seeking (e.g. Lipowski, 1988).

That children frequently present with medically unexplained symptoms is also well established. Common complaints include aches and pains, tiredness and dizziness with as many as 11% of girls and 4% of boys suffering in this way (Offord *et al*. 1987). More recently there has been a recognition of a 1·1% point prevalence of somatization disorder among 11–16 year-olds (Garber *et al*. 1991) and a 10% life prevalence in the same age group (Benjamin & Eminson, 1992).

While the aetiology of somatization remains poorly understood an important link with childhood experience has emerged from several studies. First, some children with somatization disorders continue to experience these problems in adulthood. For example, in one longitudinal follow-up study, a third of children with unexplained recurrent abdominal pain went on to

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experience identical symptoms in adult life and two-thirds continued to suffer from a variety of functional complaints (Apley, 1975). Secondly, early exposure to illness in a close family member particularly if associated with adverse experiences of parental care, seem to be linked to medically unexplained symptoms and higher consultation rates later in life (Craig *et al.* 1993; Reilly *et al.* 1999; Hotopf *et al.* 2000). Thirdly, somatizing children have been seen to share a variety of complaints with other family members (e.g. Kriechman, 1987; Campo & Fritsch, 1994; Aaromaa *et al.* 1998).

Of the many processes that lie behind these associations, the child–parent relationship may have a pivotal mediating role. For example, it seems that the quality of interaction with the primary caregiver (usually the mother) plays a critical role in the development of emotional regulation in young children (Cole *et al.* 1994; Field, 1994). Factors such as maternal depression that impair this interaction have far reaching effects on play behaviour, socialization, affect and other regulating functions such as eating and toileting, which can persist from infancy to pre-school age while the mother remains depressed (Cohn *et al.* 1990; Field, 1994, 1995; Field *et al.* 1996). For somatization disorder, the core mechanisms might involve family modelling with reinforcement of illness behaviour and an enhanced parental health focus against the background of anxiety and other psychological morbidity in the family (Garralda, 1996). Thus, there might be encouragement and reward for illness behaviour, such as increased attention and special privileges (Walker *et al.* 1993) and discouragement of coping behaviour (Dunn-Geier *et al.* 1986). There is some support for these notions. Studies of children with recurrent abdominal pain have found that their mothers were more anxious, reported more somatization themselves and were more encouraging of illness behaviour in their children than were mothers of healthy children or those with emotional disorder (Garber *et al.* 1990; Walker & Helfinger, 1998). Increased closeness around health issues against a background of general emotional distance in family relationships has also been observed (Roy, 1982). Although other family members may be influential in the intergenerational transmission of psychopathology, mothers are usually the main caregivers, and for this reason the mother–child relationship has most often been explored when looking for psychosocial means of transmission.

The present study set out to pursue these themes through an examination of domains of interaction between mother and child that might be important in the future development of somatization in the child. The hypotheses under investigation in this report were as follows.

(*a*) That the presence of a somatization disorder in a mother would be associated with a reduction in overall mutual responsiveness similar to that seen in other maternal psychiatric disorders (e.g. depression). We hypothesized that this would be reflected in global reductions in emotional expressiveness, involvement and praise and in lower frequency of joint attention during standardized play tasks and during a meal.

(*b*) That where the mother has a somatization disorder, her parenting behaviour will also show a number of specific features reflecting differential reinforcement of illness behaviour in the child. These will be observable in standardized play tasks as increased bidding for attention and increased responsiveness to child bids for attention confined to play involving a 'medical' theme.

METHOD

Details of the study design and methods have been published elsewhere (Craig *et al.* 2002). Briefly, the study was designed as a cross-sectional comparison of three groups of mothers and their children of 4–8 years-of-age. The main study group comprised mothers suffering from physical symptoms of at least 2 years duration and for which there had been no adequate medical explanation. These 'somatizing mothers' were compared with: (*a*) 'organically ill' mothers suffering from a similarly chronic physical illness of known organic aetiology; and (*b*) 'healthy' mothers without significant physical or psychiatric disorder in the previous 2 years.

Sampling followed a three-stage process starting with a preliminary trawl of patient records at three general practices and at a number of hospital out-patient clinics in order to identify women aged 18–40 with a chronic medical

condition. Each woman was then approached by letter from their family doctor informing them about the study and inviting participation in a study about health and its impact on family relationships. Women were asked to indicate consent on a reply-paid form which included brief details on their general health and the ages of any children. Non-replies were pursued by two further letters and by door-to-door visits. With the help of the patient's doctor and information in the medical record, each consenting woman was assigned provisionally to one of the three diagnostic groups of interest. All women meeting our criteria of chronic illness were invited to take part in the main study as were a random sample of the remaining 'healthy' mothers. These women were then approached to complete detailed assessments including videotape recorded observations of structured play tasks and meal. The research assessments were conducted over three sessions. The first dealt with the mother's account of her childhood and her illness history (past and current), the second covered aspects of the index child's development, emotional and physical health and the third session involved assessments of the child on their own and with their mother during a play and meal task. Different researchers conducted the first two interviews, one focusing on the mother and the other on the child. Ratings of the mother–child observational tasks were made by researchers who were blind to the mothers' group status.

Measures

Diagnostic confirmation and personal history schedules

Initial assessments dealt with current household arrangements, maternal and paternal health and quality of relationships with partner. Current and lifetime psychiatric disorder was assessed with the Schedules for Clinical Assessment in Neuropsychiatry (SCAN) (Wing *et al.* 1990), which together with the woman's medical records were used to confirm group allocation (i.e. to somatizer, chronic organic illness or healthy).

Health and emotional well-being of the child

The Modified Isle of Wight Interview (Graham & Rutter, 1968; Rutter *et al.* 1970) was used to assess general aspects of the child's health including early development, school history and recent health (last 3 months). Questions concerning emotional or physical ill health covered aspects of frequency, impairment, specificity (whether the symptom is pervasive or limited to one or two situations) and consultation with the GP. Symptoms were rated as 'problematical' where they were associated with impairment (being off school, going to bed, avoidance of social activities), and occurred at least weekly during the 3-month period prior to the interview.

Mother–child interaction

The mother and child were videotaped carrying out a series of structured play tasks. These tasks were based on a procedure previously adapted by us for studies of mother–child interaction (Dowdney *et al.* 1984; Puckering *et al.* 1994, 1996). Two play boxes and a light snack were brought in to the room one at a time by a researcher at 5-min intervals. The first play box contained a toy tea-set with plastic crockery and cutlery as well as some plastic food items. The second box had a medical theme containing a 'medical set' with toy ambulance, nurse, doctor and members of the public. The boxes were chosen to facilitate imaginative play and turn taking in interaction. The meal, comprising sandwiches and tea or soft drink was chosen as it is task oriented, requires provision of care and facilitation by the parent. It provides potential opportunities for conflict and distress, but also for mutual enjoyment. The first 10 min of each meal were recorded. Detailed ratings of mother–child interaction for the meal were carried out in the second 5 min as the first 5 min were allowed for setting up, food serving and preparation.

These video-recordings were assessed by two researchers (I.B. and S.H.) who were blind to the mothers' group membership. Ratings were based on the principles used by Puckering *et al.* (1994, 1996) and Cox *et al.* (1990), focusing on responsivity and control. In this earlier work, inter-rater reliability was high for measures of maternal warmth, negative affect and mother–child linking/following behaviours with exact correspondence between pairs of raters on 10 of the 15 scale items (Cox *et al.* 1990). For the present study, in addition to global impressions, detailed ratings were made of the occurrence

of clearly defined interaction behaviours within sequential 10-second intervals across each of the three 5-min recordings (i.e. tea-set, medical box and second 5 min of the meal). Ratings comprised the following elements.

Global impressions

Global impressions of the overall style of each 5-min interaction, were assessed as: (*i*) maternal emotional expressiveness, initially rated on a 5-point scale ranging from very flat, through average to very expressive; (*ii*) maternal involvement in the task, rated as high, average or low; and (*iii*) criticism and praise, a simple count of the frequency of either occurrence.

Specific aspects

Specific aspects of interaction were recorded sequentially within intervals of 10 s across each of the three 5-min recordings as: (*i*) joint attention, where mother and child were jointly focused and attending to an object, activity or subject (a three point scale was used where 2 = joint attention present for the full 10 s, 1 = joint attention for only some of the 10 s, 0 = no joint attention); (*ii*) bids for attention, i.e. attempts to gain attention (this measure relates to the introduction of a new object of potential joint attention e.g. initiation of a new: type of play; focus of play; topic of conversation – all necessitate an initiation of joint attention or breaking and re-focusing of attention). A new bid was distinguishable from 'linking': exchanges or actions that move play or interactions on smoothly and do not introduce new content or interrupt joint attention. Bids were rated separately as generated by mother or by child and coded according to the response: 2 = bid acknowledged/successful (requires a triadic response, the gaze shifting from the new focus of attention to the person who made the bid); 1 = bid responded to but minimally (the response involves glancing at the object only, or a minimal vocalization or gesture without a shift in attention, the response to the bid is almost an involuntary reaction to a stimulus and does not involve the acknowledgment of the bidder or the bid); 0 = bid ignored.

Rating guidelines with examples of each rating were developed and are available on request from the authors.

Reliability

A total of 26 tapes (selected at random from each of the three groups of mothers at the start and half-way through the coding procedure) were checked for inter-rater reliability. Weighted kappa (kw) was used to assess inter-rater reliability of the categorical global variables. Agreement between raters was satisfactory (kw: maternal affective expressiveness 0·92; involvement 0·88; criticism 0·91 praise 1·0). For agreement on the ratings of joint attention and mother/child bids we examined the correlation between the two raters recording of the number of 10-s blocks spent in each category of interest: full joint attention (0·88) partial (0·77) absent (0·78); mother bids for attention (0·78) child bids for attention (0·87), maternal response to child bid (0·88), child response to maternal bid (0·80).

Analysis

Comparisons between somatizers, organic and healthy mothers on categorical variables were assessed using chi-square and odds ratio statistics. As maternal dysphoria (anxiety and depression) was considered likely to have a significant impact on the mother–child relationship, it was included in subsequent logistic regression analyses and associations reported in terms of weighted odds ratios and 95% confidence intervals.

RESULTS

Sample characteristics

A total of 1149 women with children aged 4 to 8 years were sent initial screening letters. Of these, 92 (8%) were returned as 'unknown at postal address' and 198 (17%) declined to take part in the study. Of the remaining women ($N = 859$), 61 reported suffering from medically unexplained symptoms for at least 2 years and 60 reported equally chronic conditions of known 'organic' cause. A random sample of 60 of the remaining 'healthy' women were also invited to take part. A total of 151 women (83% of those who returned screening questionnaires) consented to the research interview (48 somatizers, 51 organic and 52 healthy women). However, a number of women subsequently withdrew from the observational arm of the study ($N = 9$) and

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some ratings were incomplete because of faulty recording equipment ($N=11$), or because either mother or child moved out of view of the camera ($N=12$). Complete recordings of the play tasks were obtained from 136 mothers and children (42 somatizers, 44 organic and 50 healthy) and for the meal from 118 mothers and children (35 somatizers, 37 organic and 46 healthy).

Details of the sample and maternal illness have been reported elsewhere (Craig *et al.* 2002). The three groups of women were similar in terms of maternal age, social class, marital status, educational background and current living circumstances Somatizers complained of multiple cardiovascular, gastrointestinal and neurological symptoms and met DSM-IV criteria for either undifferentiated somatoform disorder or somatoform pain disorder. The most common disorders among the organically ill women were painful conditions such as arthritis ($N=15$), diabetes with secondary complications ($N=10$), asthma ($N=5$), and poorly controlled epilepsy ($N=8$). Both chronically ill groups had been ill for an average of 5 years and most reported that their condition was either unchanged or somewhat worse compared with a year previously. Forty per cent (19/48) of somatizing mothers met DSM-IV criteria for depression or anxiety disorders present during the month of interview compared with 10% (5/51) of those suffering from chronic organic illness and 8% (4/52) of healthy mothers (somatizers *v.* other women $\chi^2=20{\cdot}624$, df$=1$, $P<0{\cdot}001$). There was a modest association between the severity of somatization and of dysphoric symptoms. For example, the total score of the Illness Attitude Scale (Kellner *et al.* 1987) was correlated with the total score of tension, anxiety and depression items in the SCAN (Pearson's $r=0{\cdot}48$, $P<0{\cdot}01$).

Global observational measures

The global measures of emotional expressiveness, degree of involvement, criticism and praise are shown in Table 1. The original five-point rating of emotional expressiveness was re-coded to a binary variable (very flat/flat *v.* average or above) as there were only nine women rated as 'very flat' and seven rated as above average. Similarly, the original three-point scale of involvement was collapsed to a binary measure contrasting 'low' with average or above as there were only a handful of women with above average involvement.

Table 1. *Characteristics of maternal interaction in two play boxes and meal*†*: global ratings*

	Healthy (H) ($N=50$)	Organic (O) ($N=44$)	Somatizer (S) ($N=42$)	Contrast
Emotion, % flat				
Tea-set	20	27	48	S *v.* O&H**
Medical box	16	16	33	S *v.* O&H*
Meal	20	24	23	S *v.* O&H
Involvement, % low				
Tea-set	14	25	36	S *v.* O&H*
Medical box	16	11	19	S *v.* O&H
Meal	20	19	23	S *v.* O&H
Criticism, % present				
Tea-set	6	7	5	S *v.* O&H
Medical box	10	14	7	S *v.* O&H
Meal	20	7	2	H *v.* S&O**
Praise, % present				
Tea-set	26	22	7	S *v.* O&H*
Medical box	38	21	19	S&O *v.* H
Meal	31	24	15	S *v.* O&H

† Numbers for meal were: Healthy $N=46$; Organic $N=37$ and Somatizer $N=35$.
* $P<0{\cdot}05$; ** $P<0{\cdot}01$.

Differences between groups on these global measures were largely confined to the play tasks and broadly supported our hypothesis. Significantly more somatizing mothers were emotionally flat throughout both play tasks. This difference remained even when account was taken of current symptoms of anxiety and depression. They were also less involved in play though this was statistically significant only with the tea-set. Fewer somatizing than other mothers offered praise in play with the tea-set. Criticism occurred at least once in significantly more of the healthy mothers but it was relatively rare. Neither praise nor criticism was associated with maternal anxiety or depression. In contrast to these observations of the play task, there were few differences between groups during the meal.

Joint attention

Scores are reported in terms of the numbers of 10-second blocks occupied by full joint activity. Although there were minor variations

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Table 2. *Average number of* 10-*s blocks spent in full joint attention during two play tasks and a meal*

	Healthy (H)		Organic (O)		Somatizer (S)		ANOVA			
	Mean	(S.D.)	Mean	(S.D.)	Mean	(S.D.)	*F*	df	Contrast	*t*
Tea-set box	22·6	(5·8)	22·3	(6·6)	18·7	(8·5)	4·08	2,133*	S *v.* H	−2·67**
									S *v.* O	−2·37*
Medical box	18·7	(6·9)	17·6	(8·0)	13·9	(8·9)	4·52	2,133*	S *v.* H	−2·52**
									S *v.* O	−2·05*
Meal	11·8	(8·8)	9·8	(8·9)	12·9	(9·2)	0·32	2,115		

* $P<0·05$; ** $P<0·01$.

in the overall length of time mother and child played with the contents of each box, these differences were not statistically significant (mean number of 10-s slots: tea-set = 29·2 (1·9); medical box = 29·5 (3·6); and meal = 28·8 (3·9)).

Table 2 shows the average amount of full joint attention spent by mother and child during the play tasks and meal. It is apparent that less time is spent in full joint attention with the medical box than with the tea-set, possibly reflecting differences in the demands of the two tasks (tea-set, mean = 21·3 (7·1); medical box, mean = 17·1 (8·03), paired sample *t* test $t = -6·01$, df = 135, $P<0·001$). However, there are also differences between somatizers and other mothers within each box with somatizers spending significantly less time fully engaged in joint activity (Table 2).

Mothers who had reported symptoms of depression or anxiety at the initial SCAN interview also spent less time in full joint attention than those who reported normal mood (dysphoric mothers 15·8 (9·1) *v.* non-dysphoric 19·7 (7·5); $t = 2·816$, df = 270, $P<0·05$). Furthermore, it appears that it is this dysphoria that largely explains the reduced joint attention observed among the somatizers as a mixed design ANOVA that includes dysphoria, maternal somatization status and play task shows a main effect for dysphoria ($F = 3·79$, df = 1,264, $P = 0·05$) and play task ($F = 9·76$, df = 1,264, $P<0·01$) only.

There were no differences in rates of joint attention by maternal age, marital status or social class. Similarly, there were no differences in overall rates of joint attention by gender of child (boys, 18·4 (8·2); girls, 19·8 (7·4); $t = 1·46$, df = 268, NS) or when differences by gender were examined in the separate boxes. A weak correlation of joint attention with age of child was not significant ($r = 0·024$, NS). There was no association found between joint attention and the child's psychiatric status both overall and separately in each of the boxes.

Table 3. *Average number* (*S.D.*) *of mother and child bids for attention during three* 5-*min play tasks and meal*

	Mother bids			Child bids		
Box	Healthy	Organic	Somatizer	Healthy	Organic	Somatizer
Tea-set	4·5 (3·8)	4·4 (3·2)	5·1 (3·9)	4·5 (3·8)	4·4 (3·7)	5·5 (4·6)
Medical	7·3 (4·5)	7·4 (4·8)	7·5 (4·6)	6·7 (3·9)	6·7 (4·0)	8·1 (4·9)
Meal	5·4 (4·6)	6·7 (4·4)	5·6 (3·7)	6·9 (4·3)	6·5 (4·2)	6·3 (4·5)

Once again, in contrast to these findings for the play tasks, there were no statistically significant differences between groups in the frequency of joint attention for the meal.

Bids for attention

These were rated separately when made by the mother or by the child. There were four mothers who made no bids for attention at all (three healthy mothers and one organically ill mother). There were also seven children who made no bids for attention (three had healthy mothers, four had organically ill mothers and one had a somatizing mother). In two of four mothers who made no bids, the child had made a bid for attention. In five of seven children who made no bids, the mothers made a bid for attention. In the remaining two mother–child dyads where no bids were made by either party, joint attention was rated as 'full' throughout, that is, no bids for attention were required as the dyad stayed in joint attention.

Table 3 shows the total number of bids made by the mothers and the children separately

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(i.e. regardless of the response obtained). While there were no significant differences between the three groups of mothers, it is immediately apparent that the medical box generated more bids from all mothers and this is statistically significant (Wilcoxon tests for related groups: healthy mothers, $z = -3{\cdot}52$, $P < 0{\cdot}001$; organic mothers, $z = -3{\cdot}52$, $P < 0{\cdot}001$; somatizers $z = -2{\cdot}67$, $P < 0{\cdot}001$).

Similarly, while there was no difference between groups in the number of child bids, the medical box generates significantly more bids from all children (children of healthy mothers, $z = -3{\cdot}41$, $P < 0{\cdot}001$; children of organically ill mothers, $z = -3{\cdot}17$, $P < 0{\cdot}001$; children of somatizers, $z = -2{\cdot}98$, $P < 0{\cdot}01$).

Mother and child bidding rates were highly correlated (Pearson's $r = 0{\cdot}71$, $P < 0{\cdot}0001$). Rates of bidding were not related to maternal age, education, social class, marital status, or whether or not she was currently cohabiting. Women with dysphoric symptoms at interview had lower total mean bidding scores than non-dysphoric women (means 5·9 (4·4) *v.* 6·3 (4·1)) but this fell short of statistical significance. Mothers with male children had somewhat higher average bidding scores than mothers with girls (boys 6·7 (4·7) *v.* girls 5·4 (3·9) Mann–Whitney $U = 7665$, $z = -2{\cdot}399$, $P = 0{\cdot}02$), though there was no difference in the bidding rates of the children themselves (boys 6·3 (4·6) *v.* girls 5·6 (4·1)). Bidding rates were not related to the age of the child, nor to the presence of somatic or psychiatric symptoms in the child.

While there were no differences in the rate of mother or child bidding between groups, there were marked differences in response that were confined to the medical box. The children of somatizing mothers ignored, on average, about a quarter of their mother's bids for attention during play with the medical box compared to fewer than 10% during play with the tea-set – a rate similar to that of the children of other mothers across both play tasks. This suggestion of an interaction between task and diagnostic group was explored through logistic regression analysis, which confirmed a significant interaction between maternal somatization status and play in the medical box (Table 4). In short, the children of somatizers were some four times more likely than other children to ignore their mother's bids for attention when these were made during play with the medical box (somatizers *v.* organic OR 3·6 (95% CI 1·2–10·5); somatizers *v.* healthy 3·7 (95% CI 1·6–8·5)). This difference was not accounted for by maternal dysphoria. There did not appear to be any difference in the qualitative nature of bids that the child ignored during the medical task as opposed to the tea-set, the impression was of a general reduction in responsiveness, the child 'blanking' the mothers efforts with no obvious emotional display. In contrast, somatizing mothers were more responsive to their

Table 4. *Logistic regression showing effects of play task, maternal dysphoria and somatization status on the child's tendency to ignore maternal bids for attention*

Factor	OR	95% CI
Model 1: main effects		
Maternal dysphoria	0·6	0·3–1·2
Play task†	1·6	1·1–2·5*
Organic‡	0·4	0·2–0·7**
Healthy‡	0·4	0·2–0·8**
Model 2: interaction		
Maternal dysphoria	0·6	0·3–1·1
Play task†	3·4	2·0–5·8**
Organic‡	0·9	0·4–1·9
Healthy‡	1·1	0·4–2·5
Organic × Play task	0·3	0·1–0·8*
Healthy × Play task	0·3	0·1–0·6**

† Tea-set is reference play task.
‡ Somatizer is reference maternal group.
* $P < 0{\cdot}05$; ** $P < 0{\cdot}01$.

Table 5. *Logistic regression showing effects of play task, maternal dysphoria and somatization status on the mother's tendency to ignore child bids for attention*

Factor	OR	95% CI
Model 1: main effects		
Maternal dysphoria	1·2	0·6–2·2
Play task†	0·9	0·7–1·5
Organic‡	1·7	1·1–2·7*
Healthy‡	1·5	1·1–2·3*
Model 2: interaction		
Maternal dysphoria	1·3	0·7–2·3
Play task†	0·4	0·2–0·8*
Organic‡	0·8	0·4–1·6
Healthy‡	0·6	0·3–1·3
Organic × Play task	3·9	1·4–11·0**
Healthy × Play task	4·7	1·7–13·4**

† Tea-set is reference play task.
‡ Somatizer is reference maternal group.
* $P < 0{\cdot}05$; ** $P < 0{\cdot}01$.

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child's bids from the medical box and a significant interaction was again confirmed in a logistic regression (Table 5). As in the earlier analysis, this difference was not related to maternal dysphoria.

DISCUSSION

In our earlier report we commented on a number of indicators of the transmission of somatization behaviour between mother and child, including higher consultation rates with medical services and the greater frequency of symptoms of unexplained origin in their children (Craig *et al*. 2002) though we cautioned that these findings were reliant upon maternal report which, particularly in depressed mothers, can be inaccurate (Chilcoat & Breslau, 1997; Garber & Van Slyke, 1998). The observational approach reported in this paper is one attempt to minimize this risk. In the absence of previous studies of mother–child interaction in somatization disorder, we adapted measures that have proven informative in studies of depression and anxiety. For these disorders, important dimensions include involvement, synchrony (as in joint attention to a task) and affective expression (Field, 1995; Rosenblum *et al*. 1997). So, for example, anxious mothers have been found to be less warm and positive, less granting of autonomy and more critical than controls (Whaley *et al*. 1999). Similarly, depressed mothers appear preoccupied and inattentive to their children (Weissman *et al*. 1972; Gelfand & Teti, 1990), and have less shared attention and enjoyment during play tasks (Cox *et al*. 1987; Goldsmith & Rogoff, 1997). There is also some evidence that depressed mothers have two interaction styles. They can be withdrawn and passive or anxious and intrusive. These styles of interaction have differential negative effects on their children related to inadequate stimulation or inappropriate arousal modulation (Field, 1995; Rosenblum *et al*. 1997). It is possible that somatizing mothers style of interaction is hetrogenous, but we were unable to explore this with the relatively small numbers of participants in our study. It is also possible that some of the mothers in our study were not the child's main carer or primary attachment figure, for example, due to the severity of illness or full time employment.

In the current study, the presence of a general reduction in responsiveness and mutual enjoyment was seen at several levels. In terms of the global measures made across the entire play task, somatizing mothers were less expressive, less involved and praised their children less often during play. This lack of involvement was also seen in the detailed rating of joint attention, the somatizing mothers maintaining shorter periods of full joint attention than did healthy or organically ill mothers. While these findings were generally in line with our hypotheses concerning non-specific effects due to associated dysphoria, we did not observe the hypothesized increase in joint attention during play with the medical box. Instead, there was a decrease in joint attention across all subject groups, paralleled by an increase in bidding by both mother and child during play in this box. One possible explanation for this difference may lie in the greater need for mother and child to build a 'story' to play effectively with the assorted items in the medical box than is required for the more stereotypical feeding ritual inherent in the tea-set. This need to develop the story therefore resulting in more bids from each party as the theme unfolds with correspondingly shorter periods of shared attention. Another explanation would be that this box mirrored the situation the mothers found themselves in. Whatever the explanation, it draws attention to the need in future studies to take into greater account the inherent demands of different tasks. The meal had even less joined attention, but that was to be expected given that much of the rating period chosen for this analysis necessarily involves a solitary activity (eating).

A specific effect involving maternal reinforcement of health concerns was also observed during play with the medical box. Here, the somatizing mothers appeared to be more responsive than other mothers to their child's bids during play with the medical box while the children of somatizers were less responsive to their mothers bids but only during play with the medical box. This reduced responsiveness on the part of the children was an unexpected finding. Several explanations are possible. For example, somatizing mothers communication about medical matters may be associated with greater maternal expression of anxiety, or more

insistent attempts to influence the child's thought or activity related to this topic. In this context, ignoring bids may be the child's way of coping. It should be noted that although the finding of reduced child responsiveness to maternal bids was not associated with maternal dysphoria, as independently assessed, there was no observational rating of maternal anxiety during play. The higher rate of maternal responsiveness to child bids in this context could have been experienced by the child as maternal anxiety or emotional pressure to follow her interest. Alternatively, their lower responsiveness may reflect habituation to their mother's health interest. Finally, since the play tasks and meal were always conducted in the same order, there is the possibility of order effects with group differences only emerging as the session proceeded. However, while we cannot rule out such order effects, it seems an unlikely explanation for the specific differences for the somatizing mothers group on the medical task.

In reflecting upon these results, it is important to bear in mind a number of limitations in the design and execution of the study. First, the study population represents a narrow subset of somatization disorder, focusing mainly on chronic disorder and excluding the milder but more common presentations in general practice. The small size of the sample and the impact of refusal, dropout and technical difficulties with the recordings also limit statistical power and our capacity to undertake more comprehensive multivariate analysis. These limitations were particularly problematical for the meal where a fifth of potential subjects did not complete the observational measures and in this light it is perhaps best to say that the effect of somatization on behaviour during a shared meal remains unknown. Secondly, a small number of recordings were carried out in the home rather than in the controlled environment of the research clinic. While this may have provided a more naturalistic setting, it also offered distractions to the children; both mother and child probably behave differently in a home-setting and it also accounted for the majority of failed and spoiled recordings. Consideration was given to including setting as a covariate in the analysis but there were too few home recordings included in the final dataset to make this a feasible adjustment. Thirdly, the cross sectional design cannot address the stability of the observed behaviour across time or deal with the possibility that the most interesting behaviour may well have occurred outside of the studied period. Fourthly, the play tasks were selected as possibly offering an opportunity for interaction with varied themes but were somewhat artificial and contrived and the tea-set and meal may have been a rather repetitive theme. The meal presented its own problems with varied expectations and uncertainty by some subjects as to how and when to proceed, in spite of clear explanation by the researchers. In ideal circumstances, meals are social occasions with a table acting as a focus for sitting and chatting while eating. By describing the meal as a 'snack' and having no furniture to support eating together we may have inadvertently discouraged the social interaction we hoped to capture. Finally, the observation method carries its own unavoidable biases. Observers see the subjects only in a limited set of circumstances and they also make attributions about behaviour without access to the subjects beliefs or explanations (Munton *et al*. 1999).

Despite these limitations, we believe our study also has some strengths. There is some literature supporting the notion of the transmission of risk across generations (Serbin & Stack, 1998; Brook *et al*. 1999) but the mechanisms of such transmission are poorly understood and not previously been studied for somatoform disorder. Our study represents a first attempt to use observational assessments of mother–child interaction in order to explore possible mechanisms for the intergenerational transmission of abnormal health beliefs. Measures with reasonable inter-rater reliability have been developed that successfully distinguish the responses of somatizers from those of healthy or organically ill mothers and their children. The findings broadly support our hypothesis that compared to organically ill or healthy mothers, somatizers display a general reduction in emotional expression, involvement and joint participation during play with their children. Furthermore, some evidence for a specific effects has emerged with differences in maternal and child responsiveness to bids for attention that suggest that somatizing mothers are differentially responsive to bids for attention from their children where these are prompted by a medical

play task. It seems likely that these 'snapshots' of mother–child interaction reflect other shared beliefs and behaviours that may be important for the genesis of somatization.

In conclusion, our study opens up the field for further studies into the complex ways in which maternal child-rearing behaviours affect child development and the emergence of psychopathology.

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