III. Profile and Prevalence of the Brain Fag Syndrome: Psychiatric Morbidity in School Populations in Africa

E. A. GUINNESS

The profile and prevalence of a syndrome of somaticised anxiety associated with education in Africa was explored by survey of 2040 senior secondary school students in different types of school: rural, urban, and elite. Response to two different screening methods, an open question to elicit symptoms spontaneously, and the SRQ–24, was compared. Symptom prevalence was higher in rural schools, 34%, than periurban, 22%, and elite, 6%, but the central urban school serving a shanty town was also high at 35%. Three categories of the culturally relevant symptoms were identified – somatic, cognitive and 'spiritual' – with affective symptoms sparsely represented in the cultural idiom. The SRQ–24 items screening for psychosis were associated with a range of spontaneous symptoms representing anxiety. This 'spiritual' expression of neurosis reflects the world views and beliefs of the culture. Intensification under stress could produce the picture of transient reactive psychosis.

Education is accorded high priority in African societies, and rightly so since it is the key to social and financial advancement. Yet there are indications that it is associated with a degree of psychiatric morbidity. A widespread low-grade stress syndrome characterised by somatic and cognitive features of anxiety was first described by Prince (1962) in Nigeria, and subsequently in many parts of Africa (Mbanefo, 1966; German & Arya, 1969) and also New Guinea (Anumonye, 1973). Prince described five symptom types: head symptoms (aching, burning, crawling sensations), eye symptoms (blurring, watering, aching), difficulty in grasping the meaning of spoken or printed words, poor retentivity, and sleepiness on studying. He adopted the Nigerian students' name for it: Brain Fag.

Community sampling by active case-finding focusing on older school populations (paper I of this supplement) suggests that this prevailing anxiety state can coexist with salient episodes, such as panic and hysteria, sometimes in epidemic form (Kagwa, 1964; Muhangi, 1973), also with frank depression at failure of expectations. Anxious students are at risk of brief reactive psychosis at crisis events such as exams, or at exacerbations of the psychosocial factors related to the underlying anxiety (Harris, 1981).

Furthermore, study of the demographic features of the functional psychoses in a developing country where there is a difference across the generations in educational level, suggests that educated status is overrepresented in acute schizophrenic syndromes as compared with both the general population and the major psychoses (paper II, this supplement).

What is the extent, nature and aetiology of this psychiatric morbidity associated with education in Africa? Is it related to the educational process itself or to wider social changes of which education is an index? Nigerian studies show that factors related to the individual are of less importance. Minde (1974) and Morakinyo (1983) showed that intelligence level and academic ability were not related to the brain fag syndrome. Morakinyo (1980) also refuted the hypothesis that brain fag might be due to a different personality structure in Africans (Prince, 1962). Using personality inventories he compared brain fag sufferers with healthy controls, Nigerian and British. The only significant variable was a higher neuroticism score. Udofot (1975), using EMG and electrodermal studies, showed a higher level of arousal.

In order to test other possible aetiological factors of which a range of psychosocial variables were identified in clinical studies (paper I, this supplement) it is necessary to find a valid measure of prevalence of this morbidity.

Very high levels of symptom prevalence, 50–90% have been found in Nigeria (Ebigbo, 1982; Jegede, 1983). This cannot, however, be equated with established psychiatric morbidity since direct questions were used in instruments not calibrated against psychiatric cases.

Nevertheless, epidemiological studies are very difficult in developing countries because of lack of resources and infrastructure together with heavy service commitments. Because brain fag affects an accessible population which is literate, use of self-report questionnaires does offer a feasible method to test whether the social correlates of adolescent psychiatric disorder identified in Western industrialised countries also apply in Africa and which distinctive features of modern African society might be relevant.

However, there are a number of problems in the choice of screening instruments. Multinational studies designed by the World Health Organization

(WHO) to screen primary health care clinics for psychiatric morbidity (Harding *et al*, 1980) have developed a standardised self-report questionnaire (SRQ–24). Although this was based on instruments developed in Western cultural settings it provided comparable results when calibrated in several developing countries. Nevertheless, the validity of the SRQ–24 has been questioned, both in terms of cultural concepts of mental distress, and whether it detects psychiatric disorder or illness behaviour (Kortman & Ten Horn, 1988). An alternative method would be to use an open question to elicit symptoms. This would avoid the overall response set described by Goldberg (1972), which may have inflated levels of symptom prevalence in previous estimates. It would allow students to express their distress in their own terms, and thus avoid suggesting to them symptoms they might have, or imposing cultural assumptions upon them. However, interpretation and comparability would be difficult.

Age may be another problem in interpreting self-report questionnaires. It is likely that different age groups would respond in different ways due to varying sophistication. In African schools there is a very wide age range. Because education is neither universal nor free there may be delay in starting school because of farming commitments or lack of school fees. A boy may have to wait to start schooling until an older brother is earning or a younger one can take over the cattle herding. Thus the senior classes of secondary schools surveyed in this study included both young adolescents and young adults. This provided an opportunity to assess the effect of age in response to questionnaires.

Other factors influencing prevalence could be the type of school and the psychosocial characteristics of the local community. Therefore a range of schools was selected: rural, periurban and elite.

The aims of the study were to estimate both the prevalence and the expression of psychiatric morbidity in school populations using both instruments, the standardised SRQ–24 and the open question.

Method

The subjects of the questionnaire survey of schools were 2040 students from the top three classes of secondary school. Some students were approaching the Junior Certificate leaving exam taken at 16 + years; the rest were preparing for the Cambridge Overseas Certificate (equivalent to 'O' level in UK) taken at 18 + years, i.e. all students were expecting to sit public exams. All schools were English medium and coeducational.

A cross-section of schools was chosen, remote rural schools, periurban, and elite. The latter were multiracial schools in the capital. They charged higher fees and had better facilities. Their racial components were approximately Swazi 65%, mixed race ('coloured') 15%, European or American expatriate 12.5%, Asian 7.5%. The other schools were almost entirely Swazi.

The study was conducted in two parts, using the two different screening instruments separately, in May of consecutive years (1984 and 1985). It was important to control for the time of year on the school calendar and to select a period of least anxiety removed from exams in November and payment of fees in February. Headmasters were approached by letter asking if the entire class could complete the questionnaire at one sitting. These were issued either by teachers, psychiatric nurses or the psychiatrist and were completed by the students in English. Since whole classes were surveyed, prevalence could be expressed as a percentage of the sample. The students were most diligent and cooperative in filling the questionnaires, but one rural school was excluded because it was thought that the visit of the psychiatric nurse had attracted anxious students from other classes and resulted in overselection. Altogether, 51 classes were surveyed.

The first sample, screened by using only the open question to elicit symptoms, was 1335 students from nine schools – three rural, three periurban, one central urban and the two elite schools. The sex ratio, boys : girls was 51% : 49%. The age range was 14–24 years; 14 years, 2.7%; 15 years, 13.5%; 16 years, 23.4%; 17 years, 27%; 18 years, 17.8%; 19 years, 8.6%; 20 years, 4.6%; >20 years, 2.4%.

The second sample, screened a year later by the SRQ–24, was 705 students from three rural and four periurban schools. Unfortunately it was not possible to include the elite schools in the SRQ sample. The sex ratio boys : girls was 58% : 42%. The average age (range also 14–24 years) was rather older because the sample lacked the elite schools which tended to follow the age structure of British schools, (i.e. 'O' level taken at 16 + years). Age groups were 14 years, 1.3%; 15 years, 6.7%; 16 years, 17.3%; 17 years, 28.7%; 18 years, 20.2%; 19 years, 14.2%; 20 years, 7.3%; >20 years, 4.1%. One primary school was surveyed in the top two classes (77 pupils) for comparison of age response only. Age range was 10–19 years.

An opportunity arose five years later (1990) to repeat the SRQ–24 survey using a Siswati translation (prepared by repeated back translation with the CPNs). A total of 276 students were tested in two rural schools, one elite and the one central urban school serving a shanty town. Rates were not strictly comparable because it was November, exam time.

The screening instruments

(a) *Open question method*. Symptoms were elicited by a simple open question in English, "Do you have any problems with your health at school?". Students were also asked what made their problem worse and in which class it had started. Students volunteered a variety of physical and mental symptoms. For calculation of prevalence, and correlation of psychosocial factors, only those symptoms possibly related to anxiety were counted – the previously identified brain fag symptoms (paper I, this supplement). Specific medical symptoms such as toothache, joint pains,

period pains, flu, and skin complaints were discounted. Non-specific physical complaints such as various bodily aches and pains mostly in the stomach and chest were included and regarded as somatic symptoms, but if these were multiple they were only scored once. In order to assess prevalence of different degrees of severity of school anxiety, six groups of students were defined: those having no symptoms, those with one, two, three, four and five symptoms. Students with three or more symptoms were arbitrarily defined as brain fag, and this level of morbidity was used in subsequent analysis. There was limited opportunity to validate this by clinical examination of students who attended the clinics after their schools had been surveyed. Random testing was not possible.

(b) *Standardised self report questionnaire (SRQ)*. The second instrument was the SRQ–24 used by Harding *et al* (1980). It was calibrated for Swaziland by administering it to ostensibly normal people such as staff in the hospital and passers-by in the street. Their scores were compared with those of out-patients diagnosed as anxious or depressed. A cut-off score of 11 was determined as indicating possible psychiatric disorder. This was equivalent to the highest used by Harding *et al* and was a conservative estimate. For comparison of prevalence and for psychosocial correlation (paper IV, this supplement) by the two methods, the SRQ score of 11 was equated with three symptoms elicited by open question. A score of 0–5 was equated with the healthy group offering no symptoms, and the intermediate group scoring 6–10 with those volunteering one or two symptoms.

Since the SRQ–24 was added to the original questionnaire, students were required to respond in both ways. This afforded a direct comparison of open question and SRQ response in the same student. The Kappa coefficient (Bartko & Carpenter, 1976) was used to test the overall correlation. However, for prevalence estimates, the independent open question rates collected in the first survey were compared with the SRQ–24 rates collected the next year.

Open-question volunteered symptoms were compared directly with SRQ items using χ^2 association and kappa correlation in an attempt to gauge cultural validity of the SRQ.

Results

The distribution of symptom prevalence showed higher rates in rural schools than periurban, and very low in elite. The profile of the defined degrees of anxiety was similar by the two different screening methods (Fig. 1). In rural schools, 36% of students volunteered three or more symptoms and 33% scored above the cut off score of 11 by SRQ, compared with 18% and 27% respectively in periurban, and 2% and 10% in elite. Fig. 2 shows the range of prevalence in different types of schools. Rural schools had rates of 25–45%, and periurban between 8% and 30%. The one central urban school serving a shanty town area scored as high as the rural schools (27% by open question) and higher than the periurban (8–18% by open question). When the survey was repeated five years later, albeit using a Siswati version of the SRQ–24, and at exam time, the rates were
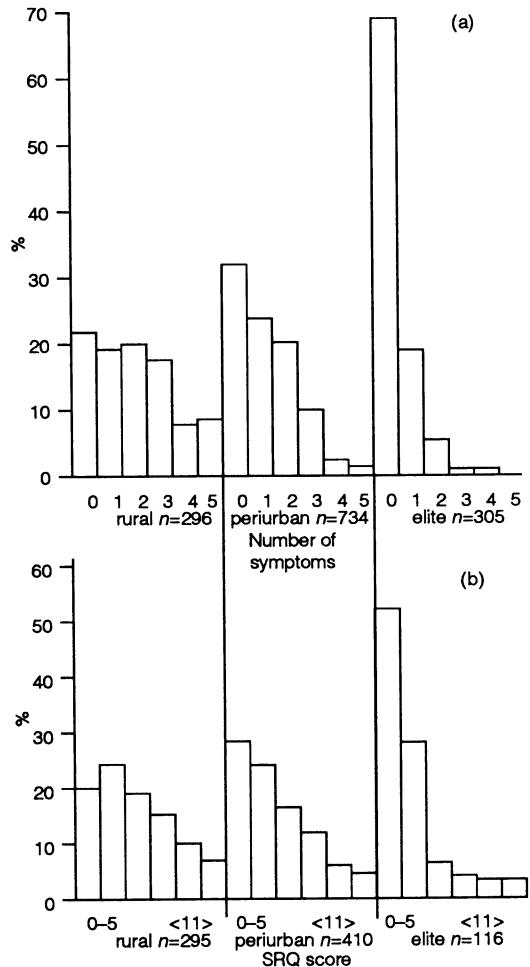

Fig. 1 Symptom prevalence of the brain fag syndrome in different types of schools by two different screening methods: (a) open question, (b) Self Report Questionnaire. A cut off score of 11 by SRQ was identified as indicating possible psychiatric disorder and equated with 3 volunteered symptoms. Comparison of this and the healthy group was significantly different between rural and urban schools, $P < 0.001$ by SRQ and $P < 0.0001$ by open question.

consistent with the earlier findings in rural schools (18–31%) and elite (10%) but high in the central urban school (41%). During this time there had been a noticeable increase in mud shacks in the shanty town.

There is more variability for rates elicited by open question. Three schools were surveyed by both methods on consecutive years. The discrepancy between their rates is consistent with underestimation by open question. The initial SRQ–24 sample was more homogeneous; prevalence rates were more consistent between schools, averaging 30%.
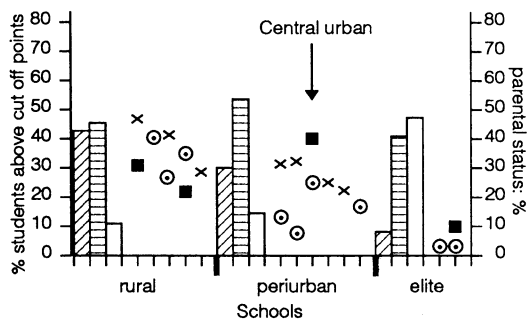
Fig. 2 The patronage of different types of schools and the range of symptom prevalence by the two methods. × = SRQ, ⊙ = open question, ■ = SRQ 5 years later. Parental status ▨ = peasant parents, ▤ = artisan parents, ▢ = professional parents.

This sample showed less difference between rural and urban schools, possibly because the SRQ survey included more provincial periurban schools having a more rural catchment area, whereas the open question survey covered more schools around the capital. Figure 2 also shows the patronage of the schools as defined by parental social status. The elite schools with 50% professional parents are clearly an atypical privileged minority.

Correlation of prevalence by the two methods

The SRQ sample of 705 students responded to both screening methods at the one sitting. Use of a kappa coefficient shows a modest but significant correlation 0.26 (Table 1).

The distribution of scores in Table 1 suggests that either students may be over-reporting on the SRQ or under-reporting by open question. Unfortunately it was not possible to make a planned random psychiatric examination of students who completed questionnaires in order to assess the validity of the latter in detecting psychiatric disorder. However, after each school was surveyed, several students would present at the clinic with typical clinical brain fag. Many of these had volunteered several symptoms, especially girls, whereas some boys had offered only one symptom. Possibly girls were showing the histrionic response set (Goldberg, 1972) or boys were under reporting (see paper IV, this supplement).

Table 1
Correlation of two screening methods – SRQ and open question – in 705 students

SRQ	Symptoms elicited by open question		
	0	1 + 2	3
0–5	**113**	66	2
6–10	95	**173**	44
>11	33	97	**82**

Kappa coefficient = 0.260, s.d. kappa = 0.029, z = 8.96, significant at $P < 0.001$.

Another source of the discrepancy could be the method of counting the open-question response. Non-specific aches and pains were minimised as somatic symptoms by scoring them only once per student although many offered multiple symptoms. This was to avoid inclusion of genuine physical symptoms. Yet Harding et al (1980) showed that the more multiple the somatic symptoms, the more likely there was to be psychiatric disorder. However, inclusion of all the multiple complaints did not improve the correlation (kappa coefficient 0.209).

Contrast of content of response by open question and SRQ

Use of the open question to elicit symptoms served to demonstrate the brain fag syndrome in school populations (Table 2). Previously identified symptoms found in clinical studies of anxious students represented three-quarters of all responses, although many of these were relatively non-specific somatic complaints. In contrast, specific medical symptoms comprised only one-quarter (toothache 7%, flu, colds, coughs, nose bleeds, tonsils 6.8%, joint sprains 3%, period pain 2.6%, skin complaints – pimples and ringworm 1.8%, genito-urinary 0.98%, earache 0.9%, tuberculosis 0.73%, bilharzia 0.65%, fits 0.24%). Practical complaints such as negligent teachers, poor facilities at school, and too far to walk to school were registered by 9.6%, and hunger by 3.8%.

Table 2 shows volunteered symptoms, grouped into six categories and compared with equivalent groupings of SRQ items. Replication of the open-question survey on two consecutive years (1984 and 1985) yielded very similar profiles. Inevitably, direct questioning magnifies symptom prevalence. Thus 36% of students volunteered headache while 65% admitted to it when it was suggested to them.

The validity of comparing volunteered symptoms with SRQ items can be gauged in three ways: firstly by examining the cultural bias in symptom formation illustrated both by the relative proportions of different symptom types, together with the students' use of Siswati words to complement their descriptions in English; secondly, by the statistical association between individual symptoms and SRQ items; and, thirdly, by the correlation between the two methods in eliciting them (Table 3).

Somatic symptoms clearly predominated by both methods, as Table 2 shows. There were variations on the theme. A few students complained of "high blood pressure". This was interpreted in the light of findings in primary care clinics. A common constellation of symptoms in the general population – palpitations, headaches, fatigue, and insomnia – was being diagnosed by nurse practitioners as hypertension although psychiatric examination more often revealed anxiety/depression. The students, unlikely to be hypertensive, were probably identifying with this popular adult concept.

Siswati words illustrated the cultural bias. Emahlaba meant 'needles in the heart' and amplified the complaint of chest pain. Kucubuka meant 'bubbles in the body' (possibly equivalent to 'butterflies in the stomach', an English idiom for autonomic anxiety). Possibly more autonomic symptoms should be included in the SRQ. To

Table 2
Comparison of symptom profile elicited by open question and by SRQ

Response to open question			SRQ item		
	1984 n = 1222	1985 n = 705	English version of SRQ n = 705	Siswati version of SRQ n = 276	
	%	%	%	%	
Somatic symptoms					
Headache	34	38	65	59	1. Headache
Stomach and chest pains	29	25	54**	67	19. Stomach uncomfortable
Other physical complaints	28	27	21	18	7. Poor digestion
Palpitations, dizziness, fainting			26***	14	5. Hands shaking
trembling	4.8	5	37**	27	20. Heart pounding
Always tired	4.2	3	18	22	18. Feel tired always
Eyes aching, watering, blurred	19	16			
Biological symptoms					
Poor appetite	0.5	1.6	28	29	2. Poor appetite
"Sleepless nights"	0.5	1.1	22	19	3. Sleeping badly
Cognitive symptoms					
Difficulty understanding and remembering, "mind going blank"	5.4	4.4	47*	39	8. Trouble thinking clearly
Poor concentration, "lazy to study", "day dreaming"	4.6	5			
Sleepiness in class	4.4	9			
Anxiety symptoms					
"Thinking too much, frustration imagination, powerlessness or tiredness of mind"	9	7	41	36	6. Nervous, tense and worried
Fearful, irritable, angry, "frightened for nothing, short temper"	2.8	3.3	41*	34	4. Easily frightened
Depressive symptoms			49****	33	9. Feel unhappy
Lonely, feeling like crying			11****	26	10. Cry more often
despair, unhappy	1.2	2.1	37***	25	11. Difficult to enjoy things
			38	36	12. Difficulty making decisions
			24	29	13. Daily work suffering
			33****	14	14. Unable to play useful part in life
			36**	27	15. Losing interest in things
			24	28	16. Feeling worthless
			35	29	17. Thinking of ending life
'Psychotic' symptoms					
Confusion imposed from outside;			25	21	21. Feel someone is harming you
textbooks bewitched	0.5		30	31	22. Feel more important than others think you are
"Running mad"	0.7	1.1	37**	27	23. Interference with thinking
			23	18	24. Hearing voices
Practical complaints					
Hunger	3.8	7.2			
Teachers not attending classes, poor facilities at school, too far to walk to school	9.6	10.2			

*Significant difference between response to English and Siswati versions of SRQ. ****$P < 0.0001$, ***$P < 0.001$, **$P < 0.01$, *$P < 0.05$.

illustrate this, the duplicated item 20 (Do you tire easily? same as item 1) was omitted and "Does your heart pound?" substituted.

Table 3 shows that somatic symptoms are more strongly associated and correlate more reliably with SRQ items than any other type of symptom.

A proportion of the eye symptoms might be due to refractive errors but their increase in parallel with psychological symptoms in the more anxious students (the 3-plus symptom group) suggests a functional component of conversion type. Moreover, eye symptoms were associated ($P < 0.01$) with SRQ item 6 representing anxiety or worry.

Table 3
Positive associations and correlations between symptoms elicited by SRQ and by open question

SRQ Item	Spontaneous symptom	Symptom association χ^2	Correlation between methods	
			kappa	Z Score
Somatic				
1. Headache	Headache	172 ****	0.428	13.2 ****
19. Stomach uncomfortable	Chest and stomach ache	74 ****	0.271	7.7 ****
18. Always tired	Fatigue	16 ****	0.3	6.78****
20. Heart pounding	Palpitation, dizzy	8.2 ***	0.059	1.25
Biological				
2. Poor appetite	Poor appetite	15 ****	0.057	0.98
3. Sleeping badly	Sleepless nights	7.3 ***	–	–
Anxious				
4. Easily frightened	Irritable, fearful	0.8	–	–
6. Nervous, tense worried	Thinking too much	6.2 **	0.056	1.29
	Sleeps in class	4 *	–	–
	Eye symptoms	5.8 **	–	–
Cognitive				
8. Trouble thinking clearly	Poor retentivity	5.7 **	0.028	0.7
	Poor concentration	7.0 **	0.045	1.15
	Sleepy in class	3.8 *	–	–
	Thinking too much	4.9 *	–	–
Depressive				
9. Unhappy	Lonely, despair	1.8	–	–
17. Thinking of ending life	Lonely, despair	0.2	–	–
	Irritable, fearful	4.9 *	–	–
'Psychotic'				
21. Someone harming you	'Running mad'	1.2	–	–
	Sleepy in class	7.4 ***	0.16	2.88 *
	Eye symptoms	4.2 *		
	Thinking too much	3.8 *		
	Fear of envy[1]	74 ****	0.299	7.88****
23. Interference with thinking	Running mad	1.2	–	–
	Sleepy in class	7.4 ***	0.07	1.56
	Poor concentration	6.0 **		
	Poor retentivity	4.2 *		
24. Hearing voices	Running mad	4.5 *	–	–
	Sleepy in class	6.3 **	0.08	–

1. Response to direct question "Do you fear someone is jealous of you?".
****$P<0.0001$, ***$P<0.001$, **$P<0.01$, *$P<0.05$.

Cognitive symptoms are also an important cultural concept. *Siyeti* meant "Getting lost in the mind; mind going away". It seemed to be a subjective feeling of confusion, a combination of dizziness, forgetfulness and inability to concentrate, which is found to be a form of presentation of anxiety and depression in the general population (paper I, this supplement). *Kwetela* meant "drowsiness on thinking" and is one of the characteristic brain fag symptoms, "falling asleep in class". Association with equivalent SRQ items (Table 3) suggests that this symptom means more than simple boredom but includes feelings represented by item 6 (nervous, tense and worried), item 8 (trouble thinking clearly); item 23 (interference with thinking) and also item 21 (feeling someone is trying to harm you).

This touches upon an important discrepancy with the SRQ. Items 21–24 were designed to screen for psychosis, yet the validity of this is very dubious in this cultural context. Table 3 indicates how item 23 represents a cognitive symptom to the students denoting poor concentration and poor retentivity. Nevertheless, several students expressed fears that their feelings of disturbed thinking were imposed from without, *insangana*, or that "someone took my books to bewitch them, to put spells in the pages to enter my eyes as I read". These are better regarded as 'spiritual' symptoms, certainly not psychotic. Likewise, item 21 (Do you feel anyone is trying to harm you?) is associated with a wide range of volunteered symptoms – headache, sleepiness, eye symptoms, and overt worries.

Indeed, the whole issue of bewitchment is very important in this society. The extent to which it is a symptom or an objective stress will be further explored in paper IV of this supplement. There is strong correlation between item 21 and the direct question eliciting fears of jealousy and bewitchment.

Item 22 (Do you feel more important than others think you are?) was found by Kortman & Ten Horn (1988) to have the least concept validity on the SRQ. In this study it is not associated nor correlated with any volunteered

symptoms. Possibly it represents an ego syntonic affirmation rather than a symptom.

Only item 24 (Do you hear voices?) is associated ($P<0.05$) with the students' own complaints of 'running mad'. Syndromes well recognised by traditional healers were volunteered by 1% of students. These have been identified by Wessels (1984) who worked closely with Zulu healers and correlated their classifications with Western syndromes. (Zulus and Swazis are closely related in culture and language.) Thus *Lihabiya* represents simple hysterical dissociation while *ufufunyane* is the more prolonged state of hysterical psychosis equivalent to the transient psychosis or "frenzied anxiety" described by Lambo (1962). The relationship between anxiety at school and transient psychosis is reported in paper I (this supplement).

This student self-report would suggest a rough estimate of 0.7–1% prevalence for these syndromes. The prevalence is higher in the older age groups (2%) which could be because they are approaching the key precipitant, final exams.

Another area of discrepancy with SRQ concerns affective symptoms. These were sparsely volunteered by students, and no equivalent Siswati words offered. "Thinking too much" is the best translation of anxiety. Indeed most of the spontaneous affective symptoms were couched in this vein, as worries rather than frank anxiety. They were variations on the theme: "thinking too much . . . until my head aches . . . without reaching a conclusion . . . about chronic problems, my future, my education, the exams, how to get money for fees and books, quarrels at home". This is associated ($P<0.01$) with item 6 (nervous, tense and worried) but not with item 4 (easily frightened). Nor is item 4 associated with spontaneous complaints of anxiety (irritability or 'frightened for nothing').

How are we to interpret the depressive items 9–17 since only 2% of students volunteered any sort of sad feeling? Yet item 10 "feeling unhappy" was scored as high (49%) as the common somatic symptoms (Table 2). Item 17 (thinking of ending life) is unequivocal and was scored by 35% of students. Unfortunately, it was not possible to do mental state examinations and explore the meaning of these SRQ items for the students, nor to assess whether they corresponded with depressive mood states.

When the SRQ–24 was translated into Siswati, the most difficulty was with the depressive items, 9–16. Several back translations and revisions were required before the equivalent meaning was conveyed in both languages. Even so, the chief difference between the responses to the English and Siswati versions is in the depressive items, i.e. where concepts are most divergent (Table 2). The difference in the somatic items indicates a greater emphasis on the common symptom, abdominal pain, and less on autonomic symptoms. The Siswati SRQ–24 elicited a similar profile – i.e. the key features of the brain fag syndrome. The minor differences in the response to cognitive items disappear when the predominantly symptom-free elite school is excluded.

Headache can be regarded as the key spontaneous symptom in anxious students. Being numerically greater, it is statistically associated and correlated with many items. The relative strength of this could be used as a means of assessing cultural relevance of SRQ items (Table 4). Thus, unequivocal depressive items such as 17 (thinking of ending life) and 2 (poor appetite), and also frank anxiety (item 4) have the strongest correlation – which is consistent with the somatic expression of anxiety and depression. Depressive items 9, 11, 15 and 16 correlate with headache but 10, 12, 13 and 14 do not, which could indicate their relative cultural relevance.

Table 4
Association and correlation between SRQ items and the key volunteered symptom – headache

SRQ item	Association with headache χ^2		Correlation with headache	
			kappa	Z score
4. Easily frightened	22	****	0.179***	4.67
17. Thinking of ending life	16.2	****	0.151 **	3.82
2. Poor appetite	17.9	****	0.155 **	3.81
8. Trouble thinking clearly	11.8	***	0.127 **	3.36
15. Losing interest in things	11.8	***	0.129 **	3.26
6. Nervous, tense and worried	8.7	***	0.107 *	2.75
23. Interference with thinking	7.8	***	0.106 *	2.67
3. Poor sleep	8.6	***	0.103 *	2.45
21. Someone harming you	7.5	**	0.098 *	2.35
9. Unhappy	6.3	**	0.092 *	2.45
16. Feeling worthless	6.2	**	0.089 *	2.13
11. Difficult to enjoy things	5.5	*	0.089 *	2.25
24. Hearing voices	5.6	*	0.084 *	1.99
10. Crying more often	2.4		–	–
12. Difficulty in making decisions	0.53		–	–
13. Daily work suffering	1.12		–	–
14. Unable to play useful part in life	2.9		–	–
22. Feeling more important than others think you are	0.14		–	–

Significance ****$P<0.0001$, ***$P<0.001$, **$P<0.01$, *$P<0.05$.

It seems reasonable to conclude that when the SRQ is using the same idiom as the cultural expression, then volunteered symptoms are significantly related to SRQ items. This is strongest with somatic symptoms, weak but consistent with cognitive symptoms, but inconsistent with affective. Instead, some affective items are strongly correlated with somatic symptoms although others appear culturally irrelevant. The pattern of association of 'psychotic' SRQ items with volunteered symptoms seems to suggest that such concepts are a cultural expression of neurosis and do not necessarily indicate psychosis, but nor are they irrelevant.

Factors influencing symptom formation

Other factors which appeared to influence students' spontaneous expression of symptoms were age, educational sophistication, and response set.

Among the younger adolescents, somatic symptoms predominated significantly ($P<0.001$) and cognitive symptoms marginally ($P<0.05$), whereas young adults were more likely to offer affective symptoms ($P<0.001$) and much more likely to complain about their schools ($P<0.0001$).

In the primary-school sample, symptoms were 100% somatic, regardless of age (range 12–19 years) suggesting that limited literacy and command of English were also operating.

This age effect might be expected to influence response to SRQ with its high proportion of psychological items. However, there was only a marginal effect in the cognitive, anxiety and depressive categories ($P<0.05$).

The cadre of the person administering the questionnaires could be said to influence the response set. It significantly influenced the proportion of symptom types. For instance, in the schools where the questionnaires were administered by the doctor, more somatic symptoms were volunteered (89% somatic, 5.6% cognitive, 4.5% affective and 0.6% practical); teachers elicited more cognitive symptoms and practical complaints (52% somatic, 22% cognitive, 17% affective and 8% practical); psychiatric nurses seemed to obtain a more even balance (73% somatic, 12% cognitive, 12% affective and 1.7% practical).

Factors exacerbating symptoms as reported by students were, studying in 26%, sporting activities in 27%, heat or bright sunlight in 11%, noise in 3% and excessive domestic work in 7%.

Duration of symptoms illustrates not only their long-standing nature but the relationship with impending exams. Many students dated the onset to the class in which they were approaching public exams. Thus 34% had had symptoms for over four years since the Primary Leaving Certificate at 13 + , a further 31% for 2–3 years since the approach of Junior Certificate at 16 + , 19% for one year and 4% for only six months as they prepared for the Cambridge Overseas Certificate at 18 + .

Discussion

The use of two different screening instruments to assess mental ill health in secondary school populations has yielded similar patterns of symptom prevalence with adequate correlation between the methods, more so with symptoms expressed in the cultural idiom. Rates were highest in rural areas in schools serving largely peasant populations where 34% of students on average scored above the cut off points, compared with 22% in periurban schools and only 6% in schools patronised by the professional elite.

The chief limitation of this study was that it was not possible to use the two-stage process to establish psychiatric morbidity rather than simple symptom prevalence rates. However, the studies combining the SRQ-24 with standardised interview schedules have repeatedly established a sensitivity and specificity around 80% (Mari & Williams, 1986). Their aim was to screen adult populations who claimed the sick role by presenting in primary care clinics. Harding *et al* (1980) estimated 14% suffered psychiatric disorder, Ndetei *et al* (1979) 20%, Dhadphale (1983) 31%, de Jong *et al* (1986) 12%. A rough comparison can be made with this study by taking 80% of the rate scoring above the cut-off point which in the SRQ sample was 30% overall. Therefore 80% of 30 = 24%. Since this sample was selected not for the sick role but for secondary education, it does suggest that education is seriously associated with anxiety. Against this must be set Kortman & Ten Horn's (1988) finding that the SRQ also elicits help-seeking behaviour in the face of intolerable psychosocial situations. Clinical studies suggest that African students do perceive an excessive burden invested in their education. The effect of response set on volunteered symptoms indicates some degree of illness behaviour rather than psychiatric morbidity.

Different methods make it difficult to compare prevalence rates. Prince's (1962) original estimate for the brain fag syndrome in Nigeria using simple uncalibrated symptom prevalence showed a similar area difference, 32–64%, with highest levels in schools patronised by illiterate parents. German (1969), studying an older and possibly more privileged population of university students in Uganda, found rates of established psychiatric disorder, as opposed to symptom prevalence, comparable with British universities, 10–11%. Of these, 85% had a neurotic picture in which brain fag symptoms and study stress were prominent. Rutter *et al* (1976) reviewed the evidence for considering adolescence a period of increased risk for psychiatric disorder. He makes the distinction between subjective measures of 'inner turmoil' accruing from self-report questionnaires at 20–25% and established psychiatric morbidity at 12–13%. Possibly the findings in this study reflect this distinction. Prevalence of the brain fag syndrome

in African adolescents in terms of definite psychiatric disorder remains to be established.

It is interesting to compare studies showing rural urban differences in distribution of psychiatric morbidity in developed and developing societies. Minde (1975) in Uganda assessed rates of disorder in primary school children using teacher questionnaires for screening followed by psychiatric and family interviews. The school serving a fully urbanised working class population in the capital had the highest level, 24%, the remote rural school, 19%, and the rural school within easy reach of the city the lowest, 10%. In contrast to this is the relative distribution found by Shen *et al* (1985) in China. They compared classroom behaviour, using standardised measures of attention deficit, impulsivity and hyperactivity in children from three different areas. Schools in urban areas (which had the best standard of living, health, and educational facilities) had a lower rate, 3%, than the suburban fringe at 7.8% and remoter mountain communities, 7%. This Swazi study, using adolescent self-report, showed higher rates in remote rural schools than those near to towns, but there was an indication that the one school serving an urban shanty area also had high rates. Studies in Western industrialised societies consistently show levels of child and adolescent disorder twice as high in inner city areas as in 'rural' areas (Rutter *et al*, 1975 in the UK, Lavik, 1977 in Norway).

It is important, of course, to define the social characteristics of these areas in different types of society. Swaziland is at an early stage in the process of urbanisation. It has no class of landless urban poor and no inner city environment as yet, although urban shanty development is increasing rapidly. The largest town has only 50 000 inhabitants. The periurban environment is equivalent to the European 'rural' area of small towns and open countryside. The Swazi rural areas represent remote, harsh, arid, subsistence-farming communities with few roads, no water supplies and long distances to walk to school.

Do these differences simply reflect the difficulties inherent to measurement of psychiatric disorder in diverse cultures or do they indicate the complex effects of urbanisation? Does urbanisation increase mental ill health or merely alter its distribution? Is it city living *per se* which operates, or the destabilising process of change?

Cederblad (1968) and Rahim & Cederblad (1984) studied the effects of urbanisation using a longitudinal design, in contrast to the cross-sectional studies cited above. By using exactly replicated methods after a 15-year interval, they demonstrated that rapid urbanisation of three outlying villages near Khartoum was associated with an increase in the psychiatric morbidity in the child population. This could be related to the marked increase in the extent of schooling. Furthermore, the symptom types which had increased most dramatically were psychogenic headache and conversion hysteria, which is consistent with the profile of disorder associated with education identified in Swaziland (paper I, this supplement). Hyperactivity had also increased (or been 'revealed' by schooling). Nevertheless, in spite of these increased rates there was still less child psychiatric disorder than in an equivalent study in Sweden (Cederblad & Höök, 1978).

The hypothesis that preliterate societies living as harmonious human ecosystems might have low rates of mental disorder has little factual basis (German, 1987). Nevertheless, Fortes & Mayer (1969) made some interesting observations on changes occurring in a remote Ghanaian tribe between 1930 and 1960. They found more mental illness in 1960 which they attributed to the disruptive effects of Western acculturation. However, there are very few intact traditional societies left in Africa upon which the hypothesis may be tested. Most have been depleted by the drift to the towns of the young and able-bodied, leaving a disproportionate accumulation of the old, the very young, and the handicapped in rural areas (Low, 1977; Prinz & Rosen-Prinz, 1980). Indeed, community studies of adult psychiatric disorder in Africa have found higher rates than in Western communities. Thus Orley & Wing (1979) and Bebbington *et al* (1981), using comparable methods, demonstrated twice as much disorder among Ugandan villagers as inner-city Londoners. One factor among the many which must be considered in interpreting this is the evolution of urbanisation in any particular society. Rural depopulation, often leading to rural decay and stagnation, represents the initial impact and could compare in terms of deprivation, poverty and mental ill health with areas of inner city decay which are the late effects. In this Swazi study, students from rural areas had a disproportionate degree of psychosocial adversity (see paper IV, this supplement). Features of family functioning indicated the effects of rural depopulation, e.g. migrant labour by the father was related to unstable parental union. The custom of sending preschool children to be reared by the grandmother in the rural homestead while younger parents seek work in the towns epitomises rural depopulation. It is an independent risk factor predisposing to anxiety in adolescents (paper IV, this supplement). Preliminary findings during service development further indicate selective factors. Handicapped or disabled children are more likely to be sent to the rural homestead.

Lesotho is a comparable society to Swaziland except that over 50%, as opposed to only 12%, of the adult male workforce go as migrant labourers to South Africa. It has rural community prevalence rates of anxiety and depression four times those in the USA (Hollifield *et al*, 1990). On the other hand, a study in Nigeria which did look at rural/urban differences in mental ill health (Leighton *et al*, 1963) found higher rates in the city than rural areas. However, urbanisation has proceeded much further in Nigeria, where large cities having an established class of landless urban poor living in slum conditions have long been a feature.

Symptom profile

This study sought to find a valid measure of student psychiatric morbidity to use in testing aetiology. The SRQ yielded more consistent prevalence rates, is comparable with other international studies, was least affected by age (Mari & Williams, 1986 found no effect, this study a minimal effect) and so would be preferable to the open-question method. In fact paper IV shows that both methods yielded similar patterns of aetiological relationships. To what extent is it justified to use the spontaneous symptom profile as a check on the cultural validity of the SRQ? There are a range of factors other than cultural constructs which affect symptom formation. Thus, several studies have found an inverse relationship between somatisation and educational and linguistic sophistication, using age, extent of schooling and social class as parameters (Crandwell & Dohwenrend, 1967; Derogatis *et al*, 1971). There is also the effect of illness behaviour, defined as a coping response to stress taking a socially acceptable form. This study illustrates Leff's (1980) point that in the communication of distress people offer the type of symptom they consider most relevant to the potential source of help. Thus, the doctor elicited more somatic symptoms and the teacher more cognitive. One could speculate that a traditional healer would have elicited a different pattern.

Garralda & Bailey's (1987) studies in the UK on somatisation and hysteria in children and adolescents indicate yet more influences on symptom formation. Previous experience of physical illness, and also high expectations of achievement both in the student and his family, are related to the presentation of somatic and conversion symptoms. This is very relevant to school populations in Africa who have more physical morbidity and also considerable over-expectations of education. Minde (1974) in Uganda, in a controlled trial of treatment for brain fag by relaxation techniques and group discussion, demonstrated the resistance to psychological interpretations, and also that sufferers reported significantly more prior experience of physical illness.

Nevertheless, exploration of cross association between the two methods indicated three categories of culturally relevant symptoms: somatic, cognitive, and 'spiritual', with affective symptoms having poor representation in the cultural idiom. Somatic symptoms are clearly a mutual idiom and correlate strongly. They are the predominant phenomena and have received the most attention. Several studies on anxiety/depression in Africa have focused upon the rich variety of somatic symptoms, particularly those based upon autonomic disturbances and muscle tension (Anumonye, 1980; Jegede, 1983). Culture-specific screening instruments using somatic complaints have been developed for different ethnic groups (Ebigbo, 1982; Mumford, 1991). Nevertheless these somatic symptoms do correlate with the affective items on the SRQ. Orley & Wing (1979) in their careful study using the PSE demonstrated that a wide range of psychological symptoms could be elicited from Ugandan villagers. This suggests that people in Africa experience such symptoms but do not formulate them as relevant. Rwegellera (1981) has suggested that the brain fag syndrome is a form of masked depression. 'Masked' because the depressive features are not articulated in recognised Western psychological terms.

Cognitive symptoms have received less attention. Impaired concentration, difficulty in remembering, and feelings of inefficient thinking all feature on Western inventories for anxiety and depression (Hamilton, 1960; Beck *et al*, 1961), but possibly this type of symptom assumes more importance in other cultures. An example is the characteristic brain fag symptom "falling asleep when studying" which seems to carry a range of other meanings than a Westerner would attribute to it, such as threat and worry.

The work of Littlewood & Lipsedge (1982) on the meaning of 'psychotic' symptoms in Afro-Caribbean minorities in Britain is relevant to the third category of symptoms offered by the students – the 'spiritual' symptoms such as feelings that someone was trying to harm them (bewitchment) or that their thinking capacity was being disturbed by outside influence. Kortman & Ten Horn (1988) assessed the concept validity of the SRQ by having a team of investigators ask respondents to exemplify their yes answers. They found least validity for the 'psychotic' items, i.e. these were not screening for psychotic experiences as intended in the design.

Approximately 0.7–1% of the Swazi students reported syndromes well recognised by traditional

healers and identified by Wessels (1984) as hysterical dissociative states or transient psychosis. Only one 'psychotic' item was associated with this, 'hearing voices'. Of the others, 'thought interference' was associated with the cognitive symptoms, while 'feeling harmed' correlated with a range of volunteered symptoms representing anxiety. This suggested that these items do have a validity but this differs from Western concepts. Clinical experience indicates that the symptom 'hearing voices' in the non-psychotic patient refers to vivid disturbing dreams which are interpreted as communications from the ancestors, usually malign, and which preoccupy the waking thoughts, thus increasing anxiety. These patients are, however, quite clear that such 'voices' are dreams experienced in sleep, *not* alien voices heard in the waking state.

Many reasons for this difference in phenomenology between Western and non-Western cultures have been put forward. Kleinman (1977) points out how culture shapes not only the form of illness but the way it is conceived; different vehicles of thought produce different symptoms. Littlewood (1985, 1990) emphasises the importance of taking into account the local indigenous conceptualisation of depression in determining relevant symptom profiles. Binitie (1983, Nigeria) has described how cultural beliefs in bewitchment may colour the presentation of depression with more paranoid ideas than guilt or suicide. He attributed this to the predominant projective defence of African cultures as opposed to introjective defence in Western cultures.

Anthropologists have noted the tendency for religious and cultural beliefs to become intensified during rapid social change (Last, 1987). Many instances could be cited in different cultures. For instance, in Swaziland since Independence, the belief in bewitchment has become exaggerated and extrapolated in the face of acculturative stress to produce frightening practices. This principle is of more than anthropological interest. If we say that the symptoms of mental illness can be shaped by cultural conceptualisation and that these may represent predominant underlying defence mechanisms, what would be the effect upon symptoms of distortion and intensification of such conceptualisations? This may help in understanding how dissociated states and

transient psychosis can be possible sequelae of the brain fag syndrome (paper I, this supplement).

Looking at it in another way, what would one expect in a people experiencing affective distress but expressing it in somatic or 'spiritual' terms when that distress becomes intolerable? The mechanisms of hysteria would suggest that because the affective symptoms cannot be expressed directly they are subconsciously converted into a representation of the patient's concept of illness. This may be a conversion reaction mimicking a physical illness, but more commonly is a dissociative or psychotic reaction eminently suitable for presentation to the traditional healer. Paper II of this study indicates that transient reactive psychosis manifests very few unequivocal psychotic phenomena. Instead it is characterised by "overvalued cultural ideas" and by visual and auditory hallucinations experienced in the dissociative state. These phenomena could be understood as intensifications under stress of the original 'spiritual' symptoms representing anxiety and depression.

Jilek (1970) suggests that this is not peculiar to Africa but is still reported from Europe among isolated rural groups living traditional life styles. Jaquel (1960) from NW France and Risso & Boker (1964) among migrant Italian workers, report acute hallucinatory states with frenzied excitement and delusions of bewitchment having a good prognosis and associated with magical–archaic thinking.

Leff (1980) suggests that a wider more historical perspective be taken in understanding the varying expression of mental illness. He traced the development of the language of the emotions, the growth of a popular introspective psychology, in parallel with a decline in somatisation and hysteria in association with the social changes of industrialisation in Western cultures. The findings in this study of somatic anxiety with hysterical features occurring in a population in the early stages of urbanisation are consistent with this view. Moreover, this urbanisation can be seen to influence the distribution of psychiatric morbidity and even to contribute to its aetiology. This is explored in paper IV of this supplement by analysis of the psychosocial factors related to the symptoms elicited by the two complementary screening methods.

For references see pp. 69–72.