

## Original Research

# Dysfunctional schema modes as determinants of psychiatric comorbidities: a study in a cohort of people with epilepsy

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### Abstract

**Introduction and Aims:** Symptomatology of epilepsy and its' associated alteration in brain processes, stigma of experiencing seizures, and adverse sequelae of anti-epileptics have been demonstrated to impact behaviour and exacerbate psychopathology. This study examines the role of dysfunctional schema modes in People with Epilepsy (PWE) and their association with psychiatric symptoms.

**Methods:** Semi-structured interviews were conducted with 108 PWE treated with anti-epileptics for at least one year and with no history or mental disorder or psycho-active substance use. Clinical symptoms were measured utilising the Symptom Checklist-90 (SCL-90) with schema modes measured utilising the Schema Mode Inventory (SMI).

**Results:** Maladaptive coping and child schema modes were significantly higher in individuals from lower socio-economic status group ( $p < 0.01$ ), with several maladaptive schema modes more prevalent in males. Hostility symptoms were increased in individuals from lower socio-economic classes and were more prevalent early in disease course. Several psychological symptoms including somatisation, interpersonal, obsession, depression, paranoia, hostility, phobia, anxiety, and psychoticism, were predicted by various maladaptive schema modes ( $p < 0.001$ ).

**Conclusion:** This study highlights the impact of maladaptive schemas, suggesting that PWE might benefit from the introduction of appropriate psychotherapeutic interventions such as schema-focused therapy, particularly if from lower socio-economic classes or in the early stages of their disease course.

**Keywords:** Dysfunctional schema modes; epilepsy; hostility

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### Introduction

Epilepsy is the fourth most common neurological disorder in the world, with 85% of cases occurring in low and middle-income countries, with epilepsy associated with significant physical and psychological morbidity, as well as a reduced quality of life for many individuals (World Health Organisation, 2004; Ngugi *et al.* 2011). The unpredictable nature of seizure activity can impact individuals' quality of life including their ability to engage in vocational and recreational activities (Schulze-Bonhage & Kühn, 2008). The inter-ictal seizure period has in particular but not exclusively been associated with behavioural and psychological adverse sequelae including irritability, aggressive behaviours emotional lability, anxiety, and mood symptoms including depressive and hypomanic symptoms (Farrell *et al.* 2017). Approximately one-

third of people with epilepsy (PWE) are diagnosed with a mental disorder (Michaelis *et al.* 2021) with temporal lobe epilepsy (a focal seizure disorder), particularly associated with the presence of mental disorders (Gurgu *et al.* 2021). Behavioural and psychological symptoms in PWE may be unrelated to their epilepsy diagnosis and occur secondary to a large array of reasons, including an individual's underlying temperament or personality, a comorbid mental disorder, psycho-active substance abuse or other physical health disorders that impair functionality (Schwartz & Marsh, 2000).

Features of epilepsy associated with increased psychological morbidity additionally include an early age of illness onset, increased duration of active illness, an increased frequency of seizure episodes, perceived or actual stigmatisation due to their epilepsy disorder, and variable treatment adherence resulting in increased periods of active symptomatology (Schwartz & Marsh 2000; Berg *et al.* 2010) Indeed, a perception of stigmatisation relating to either or both physical and mental health disorders is a noted risk factor for suicide, with the rate of suicide for PWE approximately three times that of the general population (Zhao *et al.* 2021). Several other psycho-social factors have been

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implicated in increasing the risk of psychological morbidity in PWE and include a lower socio-economic status, being unemployed and limited family support (Wada *et al.* 2004; McCagh *et al.* 2009). In Pakistan, limited advocacy relating to legal rights, particularly in rural regions, and conventional beliefs pertaining both to mental illness and epilepsy where symptoms are on occasion misattributed to religious or supernatural origins resulting in traditional healers being consulted over illness management have additionally been associated with increased psychological morbidity (Shah & Waller, 2000; Khatria *et al.* 2003; Irshad & Bano, 2006; Tellez-Zenteno *et al.* 2007; Sahar, 2012; Ahmad *et al.* 2017a, 2017b).

Schema modes reflect an individual's current dominant emotional state and include coping techniques that are commonly activated by life situations or scenarios to which people are especially susceptible. In order to deal with emotions, schema modes are activated (Bamber, 2004). The four broad domains of the identified schema are: (1) Child, (2) Dysfunctional Coping, (3) Parent, and (4) Healthy Adult Modes; with these described in detail in Table 1 (Petrocelli *et al.* 2001; Bamber, 2004; Lobbestael *et al.* 2007; Gulum & Soygut, 2022). Schema modes emerge early in childhood, are influenced by selective filtering of incoming experiences, and continue to change throughout a person's life (Lobbestael *et al.* 2007). Except for the Healthy Adult (HA) and Happy Child (HC) schema modes, the other 13 modes are viewed as largely dysfunctional. It is believed that dysfunctional modes evolve from maladaptive schemas and unmet core needs, alluding to innate modes that form when a child's emotional, safety, belongingness, and sustenance needs are not addressed (Lobbestael *et al.* 2005; Farrell *et al.* 2012). Individuals frequently alter schema modes in response to situational changes, resulting in the activation of various schemas modes (Young *et al.* 2003). Most healthy people display a variety of schema modes and frequently switch from one mode to others (Young *et al.* 2005). It has been found that people with a range of mental health disorders are more likely to rigidly cling to one maladaptive schema mode (Arntz *et al.* 2005; Lobbestael *et al.* 2009). This can lead to difficulties using multiple schema modes at the same time (Bamber, 2004), as well as increased engagement in dysfunctional coping behaviours (Arntz *et al.* 2005), and rigid coping styles (Lobbestael *et al.* 2009). Previously, we demonstrated that individuals with a range of mental health disorders utilised dysfunctional schema modes (Khalily *et al.* 2011), with increased use of dysfunctional schema modes also demonstrated in individuals with a range of personality disorders (Lobbestael *et al.* 2008; Lobbestael & Arntz, 2012; Salgo *et al.* 2021).

To date, only one study (from our group) in a small sample ( $n=4$ ) noted that the maladaptive coping schema modes: compliant surrender (CS), detached protector (DP), detached self-soother and bully and attack (BA), and child modes (maladaptive): vulnerable child (VC), undisciplined child (UC), coping modes were frequently used schema modes in patients with frontal lobe and temporal lobe epilepsy (Zaman & Khalily, 2016). No study to date, however, has explored the association between maladaptive schema modes and psychiatric morbidity among PWE. Consequently, the purpose of this study is to ascertain the utilisation of dysfunctional schema modes in PWE and to examine if there are socio-demographic (i.e. gender, socio-economic status) or clinical factors (i.e. duration of epilepsy diagnosis, type of epilepsy) that moderate any such association. Additionally, we wanted to examine if schema modes were associated with particular current psychological symptoms.

**Table 1.** Socio-demographic and clinical characteristics

Variables	<i>n</i>	%
Gender		
Male	50	46.3
Female	58	53.7
Marital status		
Single	68	63.0
Married	40	37.0
Socio-economic status (SEC)		
Lower (I)	30	28.8
Middle (II)	52	48.1
Upper (III)	26	24.1
Education		
Primary school not completed	11	10.2
Primary School completed	30	27.8
Secondary School completed	67	62.0
Occupation		
Unemployed	25	23.1
Government employed	13	12.0
Self-employed	28	25.9
Students	23	21.3
Housewife	19	17.6
Type of epilepsy		
Focal seizure	24	22.2
Generalised seizure	84	77.8
Duration of illness		
1-5 years	39	36.1
6-10 years	37	34.3
11-15 years	32	29.6
Aetiology of epilepsy		
Family history	48	44.4
Head injury	10	9.3
Post-secondary	3	2.8
Unknown	47	43.5
	<b>Mean</b>	<b>SD</b>
Age	24.91	7.42

## Methods

### Participants

Participants included individuals attending neurology departments of various hospitals in Islamabad, Karachi, and Abbottabad in Pakistan. Inclusion criteria included diagnosed patients with epilepsy age 18-65 years, and treated with antiepileptic medications for at least 12 months. Participants were excluded if they had an intellectual disability, dementia, a history of a head injury that resulted in the loss of consciousness lasting more than 3 minutes, fulfilled criteria for a mental disorder (i.e. schizophrenia, recurrent depressive disorder, anxiety disorder with

active symptomatology), fulfilled criteria in the last 12 months for alcohol or psycho-active substance use disorder or could not consent to participate in this study. All participants were referred by their treating consultant neurologist. All responses were anonymised.

### Procedure

Demographic and clinical characteristics were attained from participants' clinical files. Socio-economic status was categorised into three groups as per the guidelines of the Asian Bank Development based on income, education, and employment (Chun, 2010). Clinical data included epilepsy diagnosis, aetiology of epilepsy, antiepileptic and other medications. Semi-structured interviews were utilised to establish data pertaining to clinical variables including the age of onset of epilepsy, the frequency, type, and duration of seizures, family history of epilepsy, and awareness regarding illness and management interventions.

### Assessments

#### Schema mode inventory (SMI)

The schema mode inventory (SMI) (Young *et al.* 2003) is a self-report measure with 124 items scored on a 6-point Likert scale from 'never or hardly ever' to 'always.' It evaluates the utilisation of the 14 schema modes by individuals at the time of interview. The schema modes are divided into four categories (Child ( $n = 6$ ), Maladaptive Coping ( $n = 5$ ), Parent ( $n = 2$ ), and Healthy Adult ( $n = 1$ ); see Supplementary Table 1). The Urdu version of SMI was used for this study. Internal consistency has been demonstrated for all subscales. (Cronbach's  $\alpha$  range from 0.78 to 0.96; Riaz & Khalily, 2013).

#### Symptom checklist-90 (SCL-90)

The symptom check list-90 (SCL-90) is a multidimensional five point Likert scale designed to assess psychopathology and psychological discomfort ranging from 'not at all' to 'extremely'. It encompasses nine primary symptom dimensions and intensities: (1) somatisation, (2) obsessive-compulsive, (3) interpersonal sensitivity, (4) depression, (5) anxiety, (6) hostility, (7) phobic anxiety, (8) paranoid ideation, (9) psychoticism, and a global distress scale (Derogatis *et al.* 1976). The Urdu version of the SCL-90 was utilised and excellent internal consistency has previously been demonstrated for this version (Cronbach's  $\alpha = 0.71-0.86$ ; Shafique *et al.* 2017).

### Statistical analysis

Statistical analysis was conducted using the Statistical Package for Social Sciences for Windows (SPSS Inc., IBM, New York, USA) Version 27.0. Descriptive statistics including frequency, percentages, mean and standard deviation were reported. Analysis of variance was performed to examine the effect of socio-economic status (low, middle and upper), and duration of epilepsy (<5 years, 6–10 years, and >11 years), with independent *t*-tests utilised to examine the effect of gender on the study variables. Post hoc analyses were conducted utilising Tukey's test. In the general linear model, process macro-Model 1 was used to examine how the duration of illness affected the relationship between dysfunctional child modes and hostility. Multiple regression analysis were utilised to determine the predictive value of schema modes in determining symptoms on the SCL-90.

## Results

### Demographic and clinical data

Demographic and clinical data are presented in Table 1, with mean schema mode and psychological symptoms for cohort presented in supplementary data (Table S2). Participants included 108 individuals with a mean age of 24.9 (SD  $\pm$  7.4) years. Of note, 54% of participants were female, with middle socio-economic status most prevalent (48.1%). Generalised seizures were more common (78.0%) than focal seizures with an equal distribution of epilepsy duration (36.1% v. 34.3% v. 29.6%) across the three age categories examined (<5 years, 6–10 years, and  $\geq$ 11 years). The aetiology of epilepsy included individuals with a likely genetic component due to the presence of a first-degree family member diagnosed with epilepsy ( $n = 48$ , 44.4%) and a history of head trauma ( $n = 10$ , 9.9%), with 47 individuals (43.1%) having no identified or putative aetiological factor related to their epilepsy diagnosis.

### Psychometric instrument and demographic data

A significant difference between groups in terms of dysfunctional modes was noted for socio-economic class with mean scores for eight dysfunctional schema modes significantly higher in the lower SEC group compared to middle and upper class [child domains schemas – impulsive child (IC), angry child (AC), undisciplined child (UC), and enraged child (EC); maladaptive coping domains – detached protector (DP), bully and attack (BA), and the parent domain mode of punishing parenting (PP)] (see Table 2). Lower SEC were significantly associated with higher rates of hostility ( $F = 4.28$ ,  $p = 0.02$ ), but with no other clinical symptoms.

Male gender was associated with higher mean scores on dysfunctional schema modes including the child domain schemas IC, and UC, the maladaptive domains schemas; compliant surrender (CS), detached self-soother (DSS) and self-aggrandiser (SA), and the parent schema mode punishing and demanding parent (DP), but also the two functional schema modes of happy child (HC) and happy adult (HA) (see Table 3).

Duration of epilepsy diagnosis was demonstrated to have a moderating effect on the relationship between the dysfunctional child modes and hostility ( $F = 3.23$ ,  $p = 0.04$ ), with duration of illness associated with 3% of the additional variance in this relationship ( $B = 0.01$ ,  $p < 0.05$ ,  $\Delta R^2 = 0.03$ ) (Fig. 1), suggesting that a shorter duration of illness is related to higher levels of hostility.

Seizure type (focal or generalised) was not associated with different mean scores for any schema modes or psychological symptoms.

### Psychological factors associated with epilepsy

Semi-structured interviews demonstrated that stress ( $n = 8$ , 7.4%), fatigue ( $n = 2$ , 1.9%), and poor adherence with anticonvulsant medications ( $n = 9$ , 8.3%) were frequent triggers for seizures, with ( $n = 43$ , 97.2%) unable to determine any precipitants. Concern of experiencing further seizures ( $n = 84$ , 77.8%), interference with daily routine secondary to epilepsy ( $n = 99$ , 92%), and fear of stigma if they informed others in their workplace of their diagnosis ( $n = 73$ , 67.6%) were additionally prevalent factors described by participants. PWE who disclosed their history of epilepsy at work with colleagues showed lower levels of psychopathology across all subscales of SCL-90 as compared to those who could not share ( $p < 0.01$ ).

**Table 2.** Socio-economic class and association with schema modes and clinical symptoms

Variables	Low ( <i>n</i> = 30)		Middle ( <i>n</i> = 52)		Upper ( <i>n</i> = 26)		Statistics			Hochberg's GT2 SEC groups
	Mean	(SD)	Mean	(SD)	Mean	(SD)	<i>F</i>	<i>p</i>	$\eta^2$	
Child domain										
AC	34.05	(8.05)	27.48	(9.73)	26.69	(9.82)	5.89	< 0.01	0.10	1 > 2,3
EC	36.03	(11.30)	26.34	(11.67)	25.42	(11.61)	8.16	< 0.001	0.13	1 > 2,3
IC	32.14	(8.79)	26.64	(9.25)	25.19	(10.08)	4.66	0.01	0.08	1 > 2,3
UC	19.95	(5.79)	17.48	(5.25)	16.38	(4.94)	3.42	0.03	0.06	1 > 2,3
VC	30.49	(10.67)	25.94	(9.60)	25.96	(11.47)	2.07	0.13	0.04	1 > 2,3
HC	37.94	(9.31)	36.97	(9.67)	34.03	(9.42)	1.27	0.28	0.73	1 > 2,3
Maladaptive domain										
CS	23.65	(6.08)	23.23	(6.26)	23.34	(7.16)	0.041	0.96	< 0.01	1 > 2,3
DP	28.92	(10.91)	21.25	(7.50)	21.85	(7.95)	8.07	< 0.01	0.13	1 > 2,3*
DSS	14.48	(4.70)	13.44	(5.19)	11.53	(4.58)	2.54	0.08	0.07	1 > 2,3
SA	34.44	(9.18)	32.48	(9.77)	29.00	(9.05)	2.36	0.09	0.07	1 > 2,3
BA	29.48	(8.94)	24.47	(6.30)	22.23	(7.01)	7.58	< 0.01	0.13	1 > 2,3
Parent domains										
PP	29.38	(10.67)	23.68	(8.84)	23.53	(8.75)	4.08	0.02	0.07	1 > 2,3
DPa	34.52	(8.83)	35.12	(9.94)	33.13	(10.71)	0.35	0.70	0.07	1 > 2,3
Healthy adult	36.78	(10.53)	37.30	(10.19)	35.17	(10.88)	0.36	0.69	0.08	2 > 1,3
Clinical symptoms										
Hostility	12.96	(5.58)	9.82	(5.07)	9.14	(6.03)	4.28	0.02	0.08	1 > 2,3*
Somatisation	21.46	(10.45)	19.21	(9.13)	18.41	(8.57)	0.80	0.45	0.02	1 > 2,3
Interpersonal Sensitivity	17.73	(7.50)	14.61	(7.32)	14.69	(9.47)	1.64	0.20	0.03	1 > 2,3
Obsessive-Compulsive	20.30	(7.32)	17.70	(6.99)	18.82	(8.57)	1.15	0.32	0.02	1 > 2,3
Depression	25.21	(11.27)	20.71	(10.78)	23.50	(14.02)	1.48	0.23	0.03	1 > 2,3
Anxiety	19.24	(9.34)	15.88	(7.93)	16.45	(8.77)	1.49	0.23	0.03	1 > 2,3
Phobias	11.76	(7.75)	8.95	(6.03)	10.08	(5.85)	1.77	0.18	0.03	1 > 2,3
Paranoid	10.83	(5.54)	8.38	(4.97)	9.47	(5.78)	2.01	0.14	0.04	1 > 2,3
Psychoticism	16.69	(9.55)	12.76	(8.17)	13.23	(7.86)	2.15	0.12	0.04	1 > 2,3

\*1 = Lower SEC, 2 = Middle SEC, 3 = Upper SEC.

M = Mean, SD = Standard deviation,  $\eta^2$  = eta squared.

DP = Detached Protector, CS = Compliant Surrender, DSS = Detached Self-soother, SA = Self-aggrandiser, BA = Bully and Attack, VC = Vulnerable child, AC = Angry child, EC = Enraged Child, IC = Impulsive child, UC = Undisciplined child. PP = Punishing Parent, DPa = Demanding Parent, HA = Happy Adult, HC = Happy Child.

$p < 0.05$  indicates statistical significance.

### Schema modes and comorbidity of psychiatric symptoms utilising the SCL-90

Predictive values for schema modes relating to each of the nine symptoms on the SCL-90 are presented in Table 4. DP, VC, and PP were the dominant modes that contributed positively ( $p < 0.01$ ) to the prediction of Somatisation, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, and Paranoid Ideation. HC was found to be the inverse predictor of these schema modes ( $p < 0.05$ ). EC significantly predicted hostility ( $p < 0.001$ ) and BA predicted phobia ( $p < 0.05$ ).

### Discussion

The study examined for the first time in a large cohort the utilisation of dysfunctional schema modes and their association

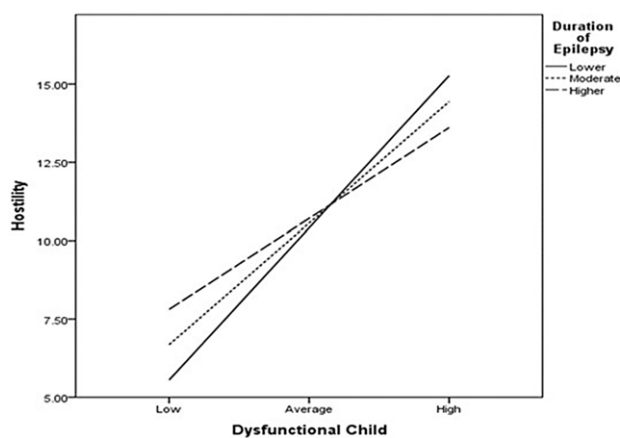
with psychiatric comorbidity among people of PWE. Lower socio-economic class and male gender were associated with increased utilisation of maladaptive schema modes. A shorter duration of illness had a modest impact on the relationship between the utilisation of dysfunctional child modes (in general) and increased hostility. Schema modes contributed significantly to predicting the nine symptoms of the SCL-90, with DP, VC, and PP modes predictive of several symptoms.

Schema modes reflect an individual's current dominant emotional state and are commonly activated by life situations or scenarios with dysfunctional coping modes employed often as protection of self from strong emotions. Of note the presence of punishing or demanding parent modes does not infer any attribution of blame for the utilisation of such schema modes to parents or other parental figures. PWE from lower socio-economic classes were more likely to use several maladaptive coping schemas

**Table 3.** Gender and schema modes

	Males (n = 50)		Females (n = 58)		Statistics			
	Mean	(SD)	Mean	(SD)	t	p	95% CI	Hedges G
<b>Child domain</b>								
AC	30.63	(9.78)	27.82	(9.60)	1.50	0.14	-0.90, 5.51	0.29
EC	31.17	(13.26)	26.78	(11.15)	1.87	0.06	-0.27, 9.05	0.36
IC	30.38	(10.16)	25.63	(8.69)	2.62	<b>0.01</b>	1.15, 8.35	0.50
UC	19.33	(5.41)	16.67	(5.24)	2.59	<b>0.01</b>	0.62, 4.69	0.46
VC	28.77	(10.62)	25.87	(10.26)	1.44	0.15	-1.09, 4.92	0.28
HC	39.34	(10.82)	34.33	(9.51)	2.56	<b>0.01</b>	1.13, 8.88	0.49
<b>Maladaptive domain</b>								
CS	24.90	(6.69)	22.06	(5.85)	2.35	<b>0.02</b>	0.44, 5.22	0.45
DP	25.04	(10.54)	22.22	(7.80)	1.59	0.12	-0.78, 6.41	0.35
DSS	14.83	(5.21)	11.93	(4.41)	3.13	<b>&lt;0.01</b>	1.06, 4.74	0.60
SA	35.07	(9.71)	29.71	(8.78)	3.01	<b>&lt;0.01</b>	1.83, 8.88	0.58
BA	26.39	(8.42)	24.40	(7.01)	1.34	0.12	-0.95, 4.92	0.25
<b>Parent domain</b>								
PP	27.65	(10.99)	23.15	(7.69)	2.48	<b>0.02</b>	0.90, 8.10	0.47
DPa	36.81	(10.28)	32.47	(8.95)	2.34	<b>0.02</b>	0.67, 8.00	0.45
Healthy adult	38.64	(8.64)	34.73	(9.98)	2.16	<b>0.03</b>	0.32, 7.50	0.42
<b>Clinical symptoms</b>								
Hostility	10.75	(5.77)	10.32	(5.52)	0.42	0.67	-1.70, 2.61	0.07
Somatisation	19.12	(9.99)	20.09	(9.38)	-0.51	0.60	-4.67, 2.73	0.10
Interpersonal Sensitivity	15.45	(8.36)	15.53	(7.71)	-0.54	0.95	-3.15, 2.98	0.01
Obsessive-Compulsive	19.31	(7.66)	18.16	(7.38)	0.79	0.43	-1.72, 4.02	0.15
Depression	23.04	(12.01)	22.28	(11.71)	0.33	0.74	-3.78, 5.30	0.06
Anxiety	16.90	(8.95)	16.96	(8.30)	-0.03	0.97	-3.36, 3.25	0.01
Phobias	10.56	(7.28)	9.53	(5.89)	0.81	0.42	-1.49, 3.54	0.15
Paranoid	9.90	(8.83)	5.76	(5.03)	1.03	0.30	-0.98, 3.13	0.57
Psychoticism	14.93	(9.05)	13.13	(8.17)	1.08	0.28	-1.19, 5.08	0.21

DP = Detached Protector, CS = Compliant Surrender, DSS = Detached Self-soother, SA = Self-aggrandiser, BA = Bully and Attack, VC = Vulnerable child, AC = Angry child, EC = Enraged Child, IC = Impulsive child, UC = Undisciplined child. PP = Punishing Parent, DPa = Demanding Parent, HA = Happy Adult, HC = Happy Child.  $p < 0.05$  indicates statistical significance.



Predictors of hostility	B	95% CI
DE	0.02	-0.08, 0.11
DC	0.09**	0.07, 0.11
DC X DE	0.01*	-0.01, 0.03
R <sup>2</sup> = 0.51		
ΔR <sup>2</sup> = 0.03		
F = 36.51***		
ΔF = 5.44		

DE = Duration of Epilepsy, DC = Dysfunctional Child modes

**Figure 1.** Moderating effect of duration of epilepsy on dysfunctional child and hostility.



**Table 4.** Summary of the prediction of psychiatric symptoms from the schema modes

SCL-90	Predictors	$\beta$	$R^2$	$F(df)$
Hostility	Detached protector	0.27**	0.48	15.72 (6, 101)
	Vulnerable child	0.24***	0.53	23.28 (5, 102)
	Enraged child	0.45***	0.53	23.28 (5, 102)
	Punishing child	0.56***	0.28	20.53 (2, 105)
Somatisation	Detached protector	0.40***	0.27	6.39 (6, 101)
	Vulnerable child	0.56***	0.30	8.65 (5,101)
	Punishing parent	0.53***	0.26	19.23 (2,105)
Interpersonal sensitivity	Detached protector	0.36***	0.32	7.83 (6,101)
	Vulnerable child	0.68***	0.45	16.54 (5, 102)
	Punishing parent	0.55***	0.29	20.99 (2, 105)
	Happy child	-0.34*	0.05	2.51 (2,105)
Obsessive-compulsive	Detached protector	0.49**	0.38	10.31 (6,101)
	Vulnerable child	0.67***	0.48	18.88 (5, 102)
	Punishing parent	0.63***	0.39	34.09 (2,105)
Depression	Detached protector	0.36***	0.43	12.75 (6, 100)
	Vulnerable child	0.77***	0.57	27.85 (5, 101)
	Punishing parent	0.61***	0.36	30.34 (2, 104)
Anxiety	Detached protector	0.36***	0.36	9.58 (6, 101)
	Vulnerable child	0.65***	0.46	17.28 (5, 102)
	Punishing parent	0.59***	0.32	24.27 (2, 105)
Phobia	Detached protector	0.38***	0.32	7.90 (6, 101)
	Bully and attack	0.24*	0.32	7.90 (6, 101)
	Vulnerable child	0.69***	0.38	12.54 (5, 102)
	Punishing parent	0.63***	0.35	28.78 (2, 105)
Paranoid ideation	Detached protector	0.34***	0.27	6.39 (6, 101)
	Vulnerable child	0.74***	0.39	3.41 (5, 101)
	Punishing parent	0.55***	0.28	20.08 (2, 105)
Psychoticism	Detached protector	0.41***	0.32	8.01 (6, 101)
	Vulnerable child	0.87***	0.49	19.56 (5, 102)
	Punishing parent	0.64***	0.38	32.44 (2, 105)

$n = 108$ , \*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ .

(DP, BA, AP, AC, EC, and IC) in this study. This finding is consistent with previous research that has demonstrated that PWE from lower socio-economic classes experience more significant psychiatric comorbidities, describe and experience higher levels of stigmatisation and sometimes have inadequate treatment resources (Koch *et al.* 2008; Seo *et al.* 2015).

There has been minimal focus pertaining to the difference in the utilisation of schema modes between genders to date. Here, we

demonstrated that males had increased activation of several maladaptive modes (DSS, SA, CS, IC, UC, DPa) compared to females. The most significant of these was the DSS mode, which has been associated with the utilisation of unhealthy coping styles including excessive use of alcohol, and gambling misuse, both more evident in males (Young *et al.* 2003). One previous study ( $n = 16$ ), noted that males had greater use of the BA schema mode (but not other schema modes), and stated that this might be related to aggression being in general more characteristic of males compared to females or that men more openly display aggressive behaviours (Lobbestael *et al.* 2005), however whilst we demonstrated higher scores in males, our finding was not statistically significant.

Epilepsy duration had a moderating effect pertaining to the use of the dysfunctional child modes and their association with hostility. Early in an illness trajectory, PWE may be more distressed by their diagnosis and the potential implications for their functioning, and symptoms, which often include concerns or the experience of insufficient seizure control, with some PWE experience inter-ictal irritability (Khalily *et al.* 2011). Thus, it is not surprising that a longer duration of illness would be associated with reduced hostility and potentially less use of dysfunctional child schema modes.

In this study, PWE reported that stress, fear, fatigue, and poor adherence were common triggers for seizures. Of particular note, approximately two-thirds of participants were afraid of divulging their illness due to potential stigma from their employers, a finding previously also documented (Khan *et al.* 2004; Aydemir *et al.* 2016). Similarly Rhodes and colleagues' (2008) qualitative study revealed that PWE had concerns regarding discrimination and workplace inequalities if their diagnosis was known and that if it were known that symptoms of epilepsy would not be denoted as a social disability (Rhodes *et al.* 2008). However, when participants shared their epilepsy history with their employers, lower levels of psychopathology across the SCL-90 subscales were demonstrated.

Thus, PWE are more likely to develop psychological symptoms due perceived stigma (Hermann *et al.* 2000), and the stress associated with same increasing the likelihood of utilisation of maladaptive schemas (Camara & Calvete, 2012). Consequently, this study provides preliminary evidence of the benefits of more open-discussion with employers regarding participants' epilepsy diagnosis.

This study has a number of limitations. Most importantly, we were unable to obtain data regarding the frequency of seizures, which prevented us from analysing the utilisation of schema modes across different levels of severity of illness. Secondly, we did not include a control group, to compare the differences in utilisation of schema modes between groups, which we would propose in a future study, where the utilisation of schema modes across genders could be additionally compared in both cohorts. Thirdly, we had minimal information on some potential confounders including psychometric measurements of quality of life, and overall functioning, which we would recommend for inclusion in future studies.

## Conclusions

PWE utilise increased maladaptive schema modes if they are from lower socio-economic classes and if of male gender, with some of these schema modes reflective of feelings of increased frustration (UC), and greater impulsivity (UC). Individuals early in their illness experienced increased hostility and utilised maladaptive schema modes to a greater extent, although this was only a modest

finding, with several maladaptive specific schema modes (PP, CS, VC, AC, and EC) making a robust contribution to the prediction of psychiatric symptoms entailed in SCL-90. In particular, utilisation of schema modes associated with self-doubt (VC), detachment from others (VC) and self-blame (PP) were associated with greater symptomatology. Consequently appropriate supports should be routinely considered for PWE; particularly if individuals are from lower socio-economic class, are male or are early in their disease course with schema-focused therapy one such potential therapeutic option. Engagement in therapy would hopefully enable individuals discuss concerns regarding their illness and attain strategies to manage the hostility and frustration they experience.

**Supplementary material.** For supplementary material accompanying this paper visit <https://doi.org/10.1017/ipm.2023.23>

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## References

- Ahmad I, Khalily MT, Hallahan B (2017b). Reasons associated with treatment non-adherence in schizophrenia in a Pakistan cohort. *Asian Journal of Psychiatry* 30, 39–43.
- Ahmad I, Khalily MT, Hallahan B, Shah I (2017a). Factors associated with psychotic relapse in patients with schizophrenia in a Pakistani cohort. *International Journal of Mental Health Nursing* 26, 384–390.
- Arntz A, Klokman J, Sieswerda S (2005). An experimental test of the schema mode model of borderline personality disorder. *Journal of Behavior Therapy and Experimental Psychiatry* 36, 226–239.
- Aydemir N, Kaya B, Yildiz G, Oztura I, Baklan B (2016). Determinants of felt stigma in epilepsy. *Epilepsy Behaviour* 58, 76–80.
- Bamber M (2004). The good, the bad and defenceless Jimmy—a single case study of Schema Mode Therapy. *Clinical Psychology & Psychotherapy: An International Journal of Theory and Practice* 11, 425–438.
- Berg AT, Berkovic SF, Brodie MJ, Buchhalter J, Cross JH, Van Emde Boas W, Engel E, French J, Glauser TA, Mathern GW, Moshe SL, Nordli D, Plouin P, Scheffer IE (2010). Revised terminology and concepts for organization of seizures and epilepsies: report of the ILAE Commission on Classification and Terminology, 2005–2009. *Epilepsia* 51, 676–685.
- Camara M, Calvete E (2012). Early maladaptive schemas as moderators of the impact of stressful events on anxiety and depression in university students. *Journal of Psychopathology and Behavioral Assessment* 34, 58–68.
- Chun N (2010). Middle class size in the past, present, and future: a description of trends in Asia. Asian Development Bank Economics Working Paper Series No. 217. doi: [10.2139/ssrn.1688710](https://doi.org/10.2139/ssrn.1688710).
- Derogatis LR, Rickels K, Rock AF (1976). The SCL-90 and the MMPI: a step in the validation of a new self-report scale. *The British Journal of Psychiatry* 128, 280–289.
- Farrell JM, Shaw I, Shaw IA (2012). *Group Schema Therapy for Borderline Personality Disorder: A Step-by-Step Treatment Manual with the Patient Workbook*. John Wiley & Sons Ltd.: Chichester.
- Farrell JS, Colangeli R, Wolff MD, Wall AK, Phillips TJ, George A, Federico P, Teskey GC (2017). Postictal hypoperfusion/hypoxia provides the foundation for a unified theory of seizure-induced brain abnormalities and behavioral dysfunction. *Epilepsia* 58, 1493–1501. doi: [10.1111/epi.13827](https://doi.org/10.1111/epi.13827).
- Gulum IV, Soygut G (2022). Dysfunctional parenting and psychological symptomatology: an examination of the mediator roles of anger representations in the context of the schema therapy model. *Psychological Reports* 125, 110–128.
- Gurgu RS, Ciobanu AM, Danasel RI, Panea CA (2021). Psychiatric comorbidities in adult patients with epilepsy (A systematic review). *Experimental and Therapeutic Medicine* 22, 1–25. doi: [10.3892/etm.2021.10341](https://doi.org/10.3892/etm.2021.10341).
- Hermann BP, Seidenberg M, Bell B (2000). Psychiatric comorbidity in chronic epilepsy: identification, consequences, and treatment of major depression. *Epilepsia* 41, S31–S41. doi: [10.1111/j.1528-1157.2000.tb01522.x](https://doi.org/10.1111/j.1528-1157.2000.tb01522.x).
- Irshad E, Bano M (2006). Psychological correlates of epilepsy. *Pakistan Journal of Professional Psychology: Research & Practice* 1, 10–18.
- Khalily MT, Wota AP, Hallahan B (2011). Investigation of schema modes currently activated in patients with psychiatric disorders. *Irish Journal of Psychological Medicine* 28, 76–81.
- Khan A, Huerter V, Sheikh SM, Thiele EA (2004). Treatments and perceptions of epilepsy in Kashmir and the United States: a cross-cultural analysis. *Epilepsy and Behavior* 5, 580–586. doi: [10.1016/j.yebeh.2004.04.014](https://doi.org/10.1016/j.yebeh.2004.04.014).
- Khatra A, Iannaccone ST, Ilyasb MS, Abdullah M, Saleem S (2003). Epidemiology of epilepsy in Pakistan: review of literature. *Journal of Pakistan Medical Association* 53, 594–597.
- Koch CG, Li L, Shishebor M, Nissen S, Sabik J, Starr NJ, Blackstone EH (2008). Socioeconomic status and comorbidity as predictors of preoperative quality of life in cardiac surgery. *The Journal of Thoracic and Cardiovascular Surgery* 136, 665–672.
- Lobbetael J, Arntz A (2012). The state dependency of cognitive schemas in antisocial patients. *Psychiatry Research* 198, 452–456.
- Lobbetael J, Arntz A, Löbbs A, Cima M (2009). A comparative study of patients and therapists' reports of schema modes. *Journal of Behavior Therapy and Experimental Psychiatry* 40, 571–579.
- Lobbetael J, Arntz A, Sieswerda S (2005). Schema modes and childhood abuse in borderline and antisocial personality disorders. *Journal of Behavior Therapy and Experimental Psychiatry* 36, 240–253.
- Lobbetael J, van Vreeswijk M, Arntz A (2007). Shedding light on schema modes: a clarification of the mode concept and its current research status. *Netherlands Journal of Psychology* 63, 69–78. doi: [10.1007/BF03061068](https://doi.org/10.1007/BF03061068).
- Lobbetael J, Van Vreeswijk MF, Arntz A (2008). An empirical test of schema mode conceptualizations in personality disorders. *Behaviour Research and Therapy* 46, 854–860.
- McCagh J, Fisk JE, Baker GA (2009). Epilepsy, psychosocial and cognitive functioning. *Epilepsy Research* 86, 1–14. doi: [10.1016/j.eplepsyres.2009.04.007](https://doi.org/10.1016/j.eplepsyres.2009.04.007).
- Michaelis R, Schlömer S, Lindemann A, Behrens V, Grönheit W, Pertz M, Ramme S, Seidel S, Wehner T, Wellmer J, Schlegel U, Popkirov S (2021). Screening for psychiatric comorbidities and psychotherapeutic assessment in inpatient epilepsy care: preliminary results of an implementation study. *Frontiers in Integrative Neuroscience* 15, 754613. doi: [10.3389/fmint.2021.754613](https://doi.org/10.3389/fmint.2021.754613).
- Ngugi AK, Kariuki SM, Bottomley C, Kleinschmidt I, Sander JW, Newton CR (2011). Incidence of epilepsy: a systematic review and meta-analysis. *Neurology* 77, 1005–1012. doi: [10.1212/WNL.0b013e31822cf90](https://doi.org/10.1212/WNL.0b013e31822cf90).
- Petrocelli JV, Glaser BA, Calhoun GB, Campbell LF (2001). Early maladaptive schemas of personality disorder subtypes. *Journal of Personality Disorders* 15, 546–559.
- Rhodes PJ, Small NA, Ismail H, Wright JP (2008). What really annoys me is people take it like it's a disability, epilepsy, disability and identity among people of Pakistani origin living in the UK. *Ethnicity and Health* 13, 1–21.
- Riaz MN, Khalily T (2013). Translation, adaptation, and cross language validation of short Schema Mode Inventory (SMI). *Pakistan Journal of Psychological Research* 28, 51–64.
- Sahar N (2012). Assessment of psychological distress in epilepsy: perspective from Pakistan. *Epilepsy Research and Treatment* 2012, 171725 (<http://www.hindawi.com/journals/ert/2012/171725/>).

- Salgo E, Bajzat B, Unoka Z** (2021). Schema modes and their association with emotion regulation, mindfulness, and self-compassion among patients with personality disorders. *Borderline Personality Disorder and Emotion Dysregulation* **8**, 19. doi: [10.1186/s40479-021-00160-y](https://doi.org/10.1186/s40479-021-00160-y).
- Schulze-Bonhage A, Kühn A** (2008). Unpredictability of seizures and the burden of epilepsy. In *Seizure Prediction in Epilepsy: From Basic Mechanisms to Clinical Applications*, pp. 1–10. Wiley: Weinheim. doi: [10.1002/9783527625192](https://doi.org/10.1002/9783527625192).
- Schwartz JM, Marsh L** (2000). The psychiatric perspectives of epilepsy. *Psychosomatics* **41**, 31–38.
- Seo JG, Kim JM, Park SP** (2015). Perceived stigma is a critical factor for interictal aggression in people with epilepsy. *Seizure* **26**, 26–31. doi: [10.1016/j.seizure.2015.01.011](https://doi.org/10.1016/j.seizure.2015.01.011).
- Shafique N, Khalily MT, McHugh L** (2017). Translation and validation of Symptom Checklist-90. *Pakistan Journal of Psychological Research* **32**, 545–561.
- Shah R, Waller G** (2000). Parental style and vulnerability to depression: the role of core beliefs. *The Journal of Nervous and Mental Disease* **188**, 19–25.
- Tellez-Zenteno JF, Patten SB, Jette N, Williams J, Wiebe S** (2007). Psychiatric comorbidity in epilepsy: a population-based analysis. *Epilepsia* **48**, 2336–2344.
- Wada K, Iwasa H, Okada M, Kawata Y, Murakami T, Kamata A, Zhu G, Osanai T, Kato T, Kaneko S** (2004). Marital status of patients with epilepsy with special reference to the influence of epileptic seizures on the patient's married life. *Epilepsia* **45**, 33–36. doi: [10.1111/j.0013-9580.2004.458011.x](https://doi.org/10.1111/j.0013-9580.2004.458011.x).
- World Health Organisation** (2004). *Epilepsy in the WHO African Region: Bridging the Gap*. World Health Organization Regional Office for Africa: Brazzaville ([https://www.ecoi.net/en/file/local/1320358/432\\_1198069054\\_epilepsy-in-african-region.pdf](https://www.ecoi.net/en/file/local/1320358/432_1198069054_epilepsy-in-african-region.pdf)). Accessed 12th January 2023.
- Young J, Atkinson T, Arntz A, Weishaar M** (2005). *The young Atkinson Mode Inventory (YAMI-PM, 1B)*. Schema Therapy Institute: New York.
- Young JE, Klosko JS, Weishaar ME** (2003). *Schema Therapy: A Practitioner's Guide*. Guilford Press: New York. doi: [10.1017/S135246580421186](https://doi.org/10.1017/S135246580421186).
- Zaman S, Khalily MT** (2016). Executive functioning and dysfunctional schema modes in individuals with frontal lobe lesion and temporal lobe epilepsy; mega case analysis. *Journal of Psychology & Clinical Psychiatry* **5**, 1–6.
- Zhao Y, Liu X, Xiao Z** (2021). Effects of perceived stigma, unemployment and depression on suicidal risk in people with epilepsy. *Seizure* **91**, 34–39.