Factor Structure of the Essen Climate Evaluation Schema (EssenCES) measure of social climate in a UK medium-security setting.

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ABSTRACT

Background

Social climate has an important role within a number of treatment-related factors; including service users' behaviour, staff morale and treatment outcomes. Reliable assessment of social climate is, therefore, beneficial within forensic mental health settings. The EssenCES has been validated in forensic mental health services in the UK and Germany. Preliminary normative data has been produced for UK high-secure NHS services and German medium- and high-secure services.

Aims

To validate the use of the EssenCES scale (English version) and provide preliminary normative data in UK medium-security settings.

Method

The EssenCES scale was completed in a medium-security mental health service as part of a service-wide audit. A total of 89 patients and 112 staff completed the EssenCES.

Results

The three-factor structure of the EssenCES and the internal construct validity were maintained within the sample. Scores from this medium-security sample were significantly higher than the high-secure data from previous studies, with three exceptions.

Conclusions

Data support the use of the EssenCES scale as a valid measure for assessing social climate within medium-security settings. Significant differences between the means of high- and medium-secure samples imply that the degree of security is a relevant factor affecting the ward climate.

Keywords: essences, social climate, medium security, forensic, factor analysis

Introduction

The interaction between an individual and his environment has long been recognised to be an important and influential relationship (Lemke and Moos, 1987). When applied to healthcare settings, this relationship has often been conceptualised as the 'social climate' of a ward or psychiatric unit. Schalast & Redies (2005, p15) define social climate as "the interaction of aspects of the material, social and emotional conditions of a ward, which may – over time – influence the mood, behaviour and self-concept of the persons involved". Subsequent research has found that there is a significant relationship between social climate and individuals' behaviour, service users' well-being, staff morale and treatment outcomes (Schalast, 1997; Schalast, 2000; Schalast et al., 2008).

The measurement and monitoring of social climate may support the development and maintenance of a safe and therapeutic atmosphere for patients and a supportive one for staff within mental health services. Through the process of discussing and interpreting measures of the social climate in relation to incidents and ward dynamics, patients and staff may gain insight into means of improving social climate and therefore promote effective treatment and engagement. The UK Department of Health recognised this imperative by including measurement of social climate in their Commissioning for Quality and Innovation framework (CQUIN: Department of Health, 2008), a payment-by-results framework for healthcare bodies, data from which form part of this study; the Royal College of Psychiatrists have included routine measurement of the social climate as a standard for therapeutic communities (Royal College of Psychiatrists, 2008).

Many different measures of social climate have been developed, most notably the Ward Atmosphere Scale (WAS: Moos, 1997), completed by both staff and patients. With 100 items over 10 subscales, however, the WAS can be cumbersome, likely to have a lower completion rate and higher attrition for repeated use than a more brief scale might (Middelboe et al., 2001; Schalast, et al., 2008). In 2008, Schalast et al. developed and validated the Essen Climate Evaluation Schema (EssenCES); this is a shorter, 15-item scale, with two additional non-scored items at the beginning and end, completed by patients and staff in medium- and high-security settings in Germany.

This scale assesses climate over a three-factor structure with subscales of patients' cohesion, experienced safety and therapeutic hold (described in more detail in the method section). The questionnaire can be obtained at www.forensik-essen.de. The validation study also provided normative data for both patient and staff scores on the subscales. There have since been two validation studies conducted in UK services: Howells et al. (2009) used a sample of patients in three high-secure settings in specialist personality disorder services and one women's service (n=324) and provided preliminary normative data; Tonkin et al. (2012) used a sample from high- and medium-secure NHS hospitals and Category A and B prisons (n=714). The findings of both studies supported the three-factor structure for the EssenCES as proposed by Schalast et al. (2008).

Two recent studies reviewing the applicability of the EssenCES to specialist forensic services looked specifically at:

> i) the variation in scores in women's secure mental health services in the UK according to level of security, patient motivation, therapeutic alliance and levels of disturbance (Fox et al., 2010). They found variations in the constructs of social climate measured by EssenCES varied according to levels of motivation and security level; and
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> ii) using Item Response Theory (IRT) to investigate the interval-scale properties of the measure with patients in a forensic neurorehabilitation ward (Alderman & Groucott, 2012). They concluded that the EssenCES may not be suitable for use with people with cognitive impairment.

To date there have been no studies evaluating the validity and reliability of the EssenCES using only medium-security patients and staff. This is particularly pertinent given the inclusion of EssenCES in the CQUIN targets; it is therefore being used in many medium-secure services without sufficient evidence to support its use in this setting. We sought to assess the construct validity of the EssenCES as a measure of social climate within a medium-security population and to ascertain whether the norms for this population are distinct from those of high-security.

Aims and Objectives

In light of current research and the use of the EssenCES scale in inpatient mental health services, our aims of this research were to:

- provide preliminary construct validation of the EssenCES in a UK medium-secure setting using exploratory and confirmatory factor analysis;

- assess internal validity of the three subscales of the EssenCES;

- provide preliminary normative data for EssenCES subscales in a medium-security mental health setting; and

- compare the means between medium- and high-security mental health settings.

Method

Sample and Participants

EssenCES data were collected as part of a regular service audit from staff and patients across 12 wards in the John Howard Centre, a medium-security mental health service in East London, UK. Two different datasets were used for the exploratory and confirmatory factor analyses; Sample One was a cross-sectional set of 201 responses collected in July 2010; and Sample Two was a longitudinal set of 431 responses collected in six further administrations of the questionnaire between September 2010 and April 2011.

Both samples were purposive, as participants were required to have knowledge and experience of the social climate within the wards on which they either reside or work. This requirement was met through participants' status as either patient or staff member. Multidisciplinary staff from a range of professions including forensic psychiatrists, occupational therapists, nurses, social workers and psychologists completed the questionnaire. The questionnaire was completed by those working on the days the audit was carried out, and all staff responding were clinical employees and would be expected to have a good knowledge of the ward climate. Throughput of patients within the service is, as with other secure services, gradual (Centre for Mental Health, 2011) with average length of stay over 3 years; therefore the patient group would be expected to know their wards of residence well. A psychiatric PICU, comprising many new admissions and acutely unwell patients, was also included in the study for comparative purposes.

Questionnaires were completed anonymously by staff and patients, with only their status as staff or patient and the ward on which they resided or worked being recorded with responses; as a consequence, it is not possible to precisely identify the representation of professions among the staff group.

One of the 12 wards was a specialist women's service, the remainder were all male wards. Only 3.4% of patients and 1.2% of staff were from the women's service. Table 1 depicts the clinical areas in the sample and the number of staff and patients who participated from each clinical area. The samples represented 75% of patients and 45% of staff eligible to participate.

<table 1 here>

Instruments

The EssenCES is a 15 item, 5-point Likert scale, with the items divided equally into three subscales:

- patients' cohesion – whether mutual support among the patients is typically present
- experienced safety – the level of perceived tension and threat of aggression or violence
- therapeutic hold – the extent to which the climate is perceived as supportive of patients' therapeutic needs

Statistical analysis of the data was carried out using SPSS/PASW for Windows v18 and v19 software; confirmatory factory analysis was performed using LISREL v8.80 for Windows and the `sem` package for R version 2.13.2 for Windows (Fox, 2006).

Ethics

The EssenCES scale was completed as part of a routine audit in response to commissioning requirements. All participants, both staff and patients, completed the EssenCES scale anonymously. Prior to each administration it was made clear that completion of the scale was not compulsory, therefore, tacit consent was inferred

through the completion of the questionnaires. Both this rationale and the project were scrutinised and accepted by the Ethics Sub-Committee of the Trust.

Method of Data Collection

All willing patients and staff members on shift were approached to complete the EssenCES on the audit day for that ward. Questionnaires were marked with either 'patients' or 'staff' and given to the corresponding participants. The questionnaires were returned to the researchers on the same day, without a name or other identifiable information on them. Data were collected on different days for each of the 12 wards, but all staff and patients on a specific ward completed the questionnaire on the same day for that ward.

Method of Data Analysis

Data were first analysed to assess the psychometric properties of the EssenCES scale. Cronbach's Alpha coefficient (α) and Corrected Item-Total Correlations (CITC) were calculated to assess internal validity of the three subscales of the EssenCES. Cronbach alpha scores $\geq.70$ and item-total correlations $\geq.20$ (as recommended by Helmstadter, 1964) were taken as being indicative of a meaningful underlying scale and significant item contribution to the scale, respectively. Normality of the data was assessed using Shapiro-Wilk tests for normality. Comparison of the means from data from the present study and a high-security sample (Howells et al., 2009) was carried out using independent samples t-tests with Bonferroni correction ($\alpha = .0042$)

Factor structure was assessed using the "exploratory-confirmatory" approach (Jöreskog and Sörbom, 1979). Firstly, using sample 1 (n=201), a principal components analysis with promax rotation was conducted from which a hypothesised 'best fit' model was extracted based on eigenvalues greater than 1 and comparison with scree plots.. This model was then subjected to a confirmatory factor analysis using sample 2, the longitudinal dataset (n=453), from the same wards but on different occasions. The confirmatory factor analysis was developed using LISREL and cross-checked using the sem package in R for Windows 2.11.1 (R Development Core Team, 2011) to control for inconsistencies in the implementation of the structural-equation modelling software. Fit indices considered were the Comparative

Fit Index (CFI), Root-Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR)

Results

Internal Consistency

In order to assess the internal scale consistency of the three subscales of the EssenCES and the overall scale, Cronbach's Alpha (α) and Corrected Item-Total Correlation (CITC) coefficients were calculated (see Table 2).

<table 2 here>

The CITC values for the EssenCES subscales with both samples combined ranged from 0.37 to 0.74 (mean = 0.57). The CITC values for the total EssenCES scale with both samples combined ranged from 0.15 to 0.61 (mean = 0.40). The two items with scores below 0.20 in the total EssenCES scale were both within the Experienced Safety subscale (ES1: *'Really threatening situations can occur here'* and ES5: *'Some patients are so excitable that one deals very cautiously with them'*). Removal of either or both items, however, would not have a significant impact on the overall internal consistency for either the EssenCES total, or the Experienced Safety subscale.

Factor Structure: Exploratory Factor Analysis

In order to ascertain whether the original three-factor structure proposed by Schalast et al. (2008), since confirmed by Howells et al. (2009) and Tonkin et al. (2012) had been retained within this sample, exploratory factor analysis was performed using a principal components analysis with promax rotation with Kaiser normalisation (Kaiser-Meyer-Olkin = 0.809, Bartlett's Test of Sphericity, p<.001). A cumulative total of 56.93% of the variance was provided by three components with eigenvalues above 1 (Component 1 = 4.23, 28.22%; Component 2 = 2.58, 17.22%; Component 3 = 1.73, 11.50%).

All items attained loadings of at least 0.55 within the original factor and subscale structures proposed by Schalast et al. (2008). See Table 3 for the rotated factor

loadings using the combined staff and patient samples. Loadings below 0.40 are not presented in the table.

<table 3 here>

Factor Structure: Confirmatory Factor Analysis

Using Sample Two, derived from same medium-security setting, a confirmatory factor analysis was conducted to examine the three-factor oblique model proposed in the exploratory factor analysis. The initial model was validated in LISREL and showed poor-to-unacceptable fit statistics (NFI=0.91, CFI=0.97, SRMR=0.070, RMSEA=0.054); based on a review of factor loadings, a revised model with a cross-loading of ES13 ("Often, staff seem not to care whether or not patients succeed or fail in treatment") was therefore proposed (see Fig 1). The resulting model showed improved fit to the data (NFI=0.97, CFI=0.99, SRMR=0.038, RMSEA=0.035).

<fig 1 here>

Normative Data

Preliminary normative data for patients, staff and combined samples in a medium-secure setting are presented in Table 4. Staff ratings of 'therapeutic hold' were significantly higher than patients (t=4.80, p<.001), whereas patients' ratings of 'experienced safety' were significantly higher than staff (t=3.08, p<.01); however there were no significant differences between staff and patient ratings of 'patients' cohesion' or the EssenCES total score.

Overall mean scores within the medium-secure setting – summed across services – were found to be significantly higher at the p<.01 level than those within high-secure settings as reported by Howells et al. (2009), with the exception of three comparisons: 'patients cohesion' among the patient sample (p=.470), 'therapeutic hold' in the staff sample (p=.073), and 'therapeutic hold' in the total sample (p=.172).

<table 4 here>

Variation of means by treatment population

We carried out a one-way ANOVA to explore variance in the subscale scores by treatment population with the sample. Significant differences were found between all eight populations in the current sample (see Table 1) for all subscales: patient cohesion ($F_{(7, 181)} = 2.70$, $p=.011$), experienced safety ($F_{(7,181)}=6.00$, $p<.001$) and therapeutic hold ($F_{(7,180)}=3.23$, $p=.003$) and the total EssenCES score ($F_{(7, 162)}=3.23$, $p=.003$).

Discussion

With this medium-secure sample, the EssenCES has been found to have high internal consistency and a three-factor structure that supports findings of previous research (Schalast et al., 2008; Howells et al., 2009; Tonkin et al., 2012). All previous studies also provided evidence of the construct validity of the EssenCES.

The factor loadings and structure of the EssenCES scale as proposed by Schalast et al. (2008) in the original validation study of the measure in a German sample were supported in this study, with one modification, with a different cross-loaded item present: question TH4 (*'Often, staff seems not to care if patients succeed or fail in treatment.'*), loaded on both 'therapeutic hold' and 'experienced safety'. This could reflect the notion that feeling cared for can also equate to a feeling of safety; or, similarly, that perceived staff apathy undermines the experience of a safe ward.

Howells et al. (2009) found that item PC3 (*'Most patients don't care about their fellow patients' problems')* loaded onto the 'experienced safety' scale in the factor analysis, rather than the hypothesised 'patient cohesion'. This item was subsequently revised and reworded and the improved revision was in use in the present study. This may account for the difference in our findings; PC3 was strongly inter-correlated with the other items within the 'patient cohesion' subscale, as proposed by Schalast et al. (2008).

The internal validity of the EssenCES scale within this study was satisfactory overall. The α coefficients for the combined sample and almost all patient and staff samples were high; however, α for 'experienced safety' among patients and 'therapeutic hold'

among staff were below Helmstadter's (1964) threshold. These findings may reflect a tendency for each group to respond homogeneously. The findings of this research appear to provide further evidence that the notion and concepts of social climate as measured by the EssenCES, translate to a UK forensic setting.

Social climate is a dynamic construct, which can be influenced by many different factors, for example, aggression, mental state, changes in patient or staff mix or time of year. For this reason, the preliminary normative data should be interpreted with caution. Our findings that staff rate 'therapeutic hold' than patients and patients rate 'experienced safety' higher than staff, are consistent with those of Schalast, et al. (2008). Although significant differences are found between the groups in other studies, however, the direction and location of the group differences vary (Howells et al. 2009; Day et al. 2011). As Howells et al. (2009) discuss, the EssenCES may provide a helpful measure of how social climate is affected by organisational changes or interventions. Day et al. (2011) comment on the need for further consideration to be given to the discrepancies between staff and patient perceptions of social climate. Our findings give further support to the need for future research to focus on this area.

The sample within this medium-security setting is heterogeneous, with significant variance across the different treatment populations. Due to sample size constraints, it is not within the remit of this paper or the overall sample to assess the specific contrasts between all eight of the different treatment populations, however, this would be an interesting focus for future research, perhaps particularly in personality disorder, women's or learning disability services. It is important to note that this sample included patients on a learning disability ward. Although their inclusion has not affected the results of this study, the EssenCES was not designed for use with patients with learning disabilities. Furthermore, given the recent research by Alderman & Groucott (2012), future research should be cautious about including such patients in validation research with heterogeneous samples.

Despite the heterogeneity of this sample, comparison of the means of the medium- and high-secure samples does provide evidence that there are two distinct populations and the means from this sample may be of benefit in providing normative data for use in other medium-security settings. With the exception of three scales, all means in the

medium-security sample were significantly higher than those of the high-security sample as reported by Howells et al. (2009); a finding consistent with previous work both on EssenCES (Fox et al., 2010; Long et al., 2010; Tonkin et al., 2012) and social climate in secure settings more generally (Langdon et al., 2004, 2006; Moos & Schaefer, 1987).

Differences in the configuration of security measures for each level of security may partially explain the disparity in social climates between the two security settings; all UK secure mental health services use a combination of physical, procedural and relational security (Department of Health, 2010) but the emphasis on each differs depending on the level of security. Through necessity, high-secure services have a greater emphasis on physical security than medium-secure services. Higher security settings are, in general, more averse to high degrees of patient interaction and place physical and procedural security over therapeutic hold (Hinton, 1998). Equally, patients may paradoxically feel 'less safe' in high security care because of the presence of more 'high risk' fellow patients and/or as a reaction to the more intrusive security features. One concern mitigates this finding: a modified different version of the EssenCES was used in our study to that used by Howells et al, in that item PC3 had been reworded in our version; this may have impacted upon the validity of the statistical comparisons for the 'patients' cohesion' factor.

Data were not collected relating to potential correlates for social climate, such as job satisfaction, treatment motivation. Future studies may consider this as it may shed more light on the mechanisms by which social climate is affected. One potential limitation of this study is that no exclusion criteria were applied relating to the length of time patients had resided on each ward. Given that the EssenCES was completed anonymously and primarily as part of the CQUIN audit rather than for research purposes, it was not possible to retrospectively exclude patients who had only been on the ward for less than a specified amount of time. Only clinical staff, who would be able to realistically estimate the ward atmosphere, completed the EssenCES.

Future research may benefit from exploring the use of the EssenCES and looking for differences across more specialist services. In particular, it would be interesting to

identify whether the EssenCES is suitable for use in settings for those with cognitive impairment and to explore any differences in male and female services.

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Table 1: Frequencies of participants by sample, group and ward type

Clinical Area	No. Wards	No. Participants (Sample 1)			No. Participants (Sample 2)		
		Patients	Staff	Total	Patients	Staff	Total
Acute	3	30	18	48	56	40	96
Personality Disorder	2	18	28	46	46	97	143
Established Treatment	2	17	12	29	48	40	88
Psychiatric Intensive Care Unit (PICU)	1	3	20	23	10	33	43
Learning Difficulty	1	7	15	22	7	15	22
High secure step-down	1	5	9	14	8	17	25
Long-stay	1	6	8	14	17	12	29
Women	1	3	2	5	4	6	10
Totals	12	89	112	201	188	243	431

Table 2: Cronbach α values for the EssenCES subscale and total scale.

Scale	Patients	Staff	Combined
Patients' Cohesion	0.86 (n = 83)	0.86 (n = 106)	0.86 (n = 189)
Experienced Safety	0.66 (n = 81)	0.79 (n = 108)	0.74 (n = 189)
Therapeutic Hold	0.75 (n = 79)	0.69 (n = 109)	0.76 (n = 188)
EssenCES Total	0.79 (n = 69)	0.81 (n = 101)	0.79 (n = 170)

Table 3: Factor loadings following principal components analysis using varimax rotation with Kaiser normalization.

Item	Subscale	Component		
		1 Patient Cohesion (PC)	2 Therapeutic Hold (TH)	3 Experienced Safety (ES)
Even the weakest patient finds support from his fellow patients.	PC2	0.82	0.40	
There is good peer support among patients.	PC5	0.81		
When a patient has a genuine concern, he finds support from his fellow patients.	PC4	0.80		
Patients care about their fellow patients' problems.	PC3	0.80		
The patients care for each other.	PC1	0.72	0.41	
Staff take a personal interest in the progress of patients.	TH2		0.82	
On this ward, patients can openly talk to staff about all their problems.	TH1		0.76	
Staff know patients and their personal histories very well.	TH5		0.72	
Often, staffs seem not to care if patients succeed or fail in treatment.	TH4*		0.63	0.42
Staff members take a lot of time to deal with patients.	TH3		0.58	
At times, members of staff are afraid of some of the patients	ES4*			0.78
There are some really aggressive patients on this ward.	ES2*			0.73
Some patients are afraid of other patients	ES3*			0.69
Some patients are so excitable that one deals very cautiously with them.	ES5*			0.68
Really threatening situations can occur here.	ES1*			0.55

*items are reverse scored

Table 4: Normative data for EssenCES in an English medium-security hospital setting, compared with preliminary normative data for high-security settings (Howells et al., 2009)

EssenCES subscales	Current Sample – Medium Secure n=201							High Secure Sample (Howells et al., 2009) n=324					
	Patient		Staff		Total			Patient		Staff		Total	
	M	SD	M	SD	M	SD		M	SD	M	SD	M	SD
Patients' Cohesion	9.90	5.05	9.72*	3.48	9.80*	4.23		9.32	4.84	8.05	3.85	8.67	4.26
Experienced Safety	11.69*	4.16	† 9.95*	3.92	10.70*	4.11		8.89	4.20	8.53	3.10	8.62	3.39
Therapeutic Hold	11.96*	4.60	† 14.85	3.23	13.64	4.11		9.81	3.97	14.17	3.29	13.13	3.99
EssenCES Total	33.83*	9.62	34.57*	7.62	34.27*	8.47		28.29	8.23	30.96	7.06	30.28	7.68

* medium-security mean is significantly higher than high-security mean at $p < .0042$

† staff and patient means differ within medium secure sample by $p < .05$

Fig 1: Factor Structure of the EssenCES following CFA