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An international comparative study on the reliability and validity of the attitudes towards aggression scale

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Abstract

One of the factors known to be associated with the management of patient aggression is the attitude of staff members towards the aggressive behaviour of patients. The construct validity of an instrument measuring the attitudes of staff towards inpatient aggression in psychiatry was evaluated in this international multi-centre study. Factor analysis and simultaneous component analysis were performed with data from a convenience sample of 1769 psychiatric nurses working in psychiatric hospitals and student nurses from nursing schools. The samples were recruited by fellow researchers in their home country. The original 32-item version (POAS) was reduced to 18 items comprising five attitude scales with solid psychometric properties. The types of attitudes were labelled offensive, communicative, destructive, protective and intrusive. The format of the correlations between the types of attitudes suggested the existence of two basic underlying divergent domains in the scale. The ‘communication’ and ‘protection’ scale components on the one hand, and the ‘offence’, ‘destruction’ and ‘intrusion’ components on the other. The five types of attitude proved to be invariant across samples from five European countries. The Aggression Scale (ATAS) is a reliable and valid measure that will enable researchers to perform international comparative research on attitudes and aggression.

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Keywords: Attitudes; Staff; Inpatient aggression; Psychiatry; Instrument

1. Introduction

In order to develop models for the management of aggression it is important to know the significant domains in the attitudes of health professionals towards aggressive patients. In the reasoned action model, the attitude towards an object (person, events) is a predictor of behaviour (Fishbein and Ajzen, 1975). In the context of aggression, the aggressive patient must be considered as the object and the management of aggression by staff

members as the behaviour to be predicted on the basis of the type of attitude.

Several studies were performed to clarify the perception of aggression in samples of nurses working in general hospitals (Zernike and Sharpe, 1998; Farrell, 1997, 1999) and in psychiatric hospitals (Lanza, 1983; Morrison, 1993; Wynn and Bratlid, 1998). These studies tend to focus on the opinions nurses have about aggression-related issues, such as the causes of aggression, its various manifestations, characteristics of the perpetrators, severity of the injuries sustained and the management of aggression, rather than on attitudes towards aggression (Jansen et al., 2004a). Attitudes in contrast to opinions are always evaluative by nature, in

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that they relate to feelings towards an object in terms of a person's favourable or unfavourable evaluation (Fishbein and Ajzen, 1975). Studies that focus on the attitudes of staff towards patient aggression in admission wards are predominantly concerned with the issues of patient responsibility for behaviour and staff safety (Poster and Ryan, 1989; Collins, 1994). Bowers (2002) studied the attitudes of nurses towards patients with a specific psychiatric diagnosis, namely patients with personality disorders. This study concludes that although a majority of the sample had been attacked or seriously threatened, there was no significant correlation between being confronted with patient aggression and an overall negative attitude towards patients with personality disorders.

The perception of aggression among nurses was studied with the Perception of Aggression Scale (POAS) in a number of the studies cited below. The concept of 'perception' is in conflict with operationalization in the POAS scale due to the evaluative character of the scale's items. Therefore, the concept of 'attitude' has now entered use, derived from the widely applied model of reasoned action (Fishbein and Ajzen, 1975), which resulted in the relabelling of the POAS as the 'Attitude Towards Aggression Scale' (ATAS), reflecting what it really purports to measure.

One of these 'POAS' studies includes a Dutch sample of 618 nurses from psychiatric hospitals, psychiatric hospitals for children and respondents from psycho-geriatric nursing homes, where three domains (scales) were identified by factor analysis (oblique rotation), reducing the original 60-item version of the scale to 37 items.

The original 60-item questionnaire was a self-administered questionnaire consisting of demographic data and 60 statements about aggression. The statements were listed in random order, that is, without any theoretical structure. Of these 60 statements, 46 were selected from a qualitative study on the definition of aggression by psychiatric nurses (Finnema et al., 1994). The other 14 statements were added from reviewed literature. Every statement was given a Likert-type scale ranging from strongly agree (value five), to strongly disagree (value one).

The three dimensions found were that nurses experienced patient aggression as: (1) a harming reaction, 17 items, alpha .87, (2) a normal reaction, 12 items, alpha .82 and (3) a functional reaction, three items alpha .50 (Jansen et al., 2004b). The harming reaction represented the violent and intrusive physical dimension of the concept, which was evaluated as an unacceptable manifestation of aggression. Aggression as a basic human feeling and behaviour is reflected in the attitude towards aggression as a normal reaction. The third attitude was called functional because the items in the

scale described aggression as a feeling expressed by patients to meet a particular need.

In an international pilot study with a sample of four European countries ($n = 366$), 32 items were found to be identical throughout the countries (Jansen and Mamier, 2000). Abderhalden (2002) tested this 32-item version on a sample of nurses working in the inpatient psychiatric departments of German-speaking hospitals in Switzerland. In this study, two components were identified: factor 1: aggression as a functional and comprehensible phenomenon (11 items, alpha .80), and factor 2 aggression as a dysfunctional, undesirable behaviour (19 items, alpha .88). Needham et al. (2004) developed a shortened version of the 32-item scale with the same two-component structure (factor 1: alpha .67, six items, factor 2: alpha .69 six items). On the item level test-retest correlations, coefficients varied from .26 to .70.

Psychometric properties of five questionnaires/instruments were found in the literature.

- (1) The Attitudes Towards Physical Assault Questionnaire (Poster and Ryan, 1989) is a self-report questionnaire consisting of 31 statements on a five-point Likert scale (strongly disagree–strongly agree) focussing on four areas: beliefs and concerns of staff about safety, staff competence and performance, legal issues and patient responsibility for behaviour. The Attitudes Towards Physical Assault Questionnaire by Poster and Ryan was tested on reliability (test-retest, $r = .69$) and content validity by a literature review and a panel of nurse experts.
- (2) The Management of Aggression and Violence Attitude Scale (MAVAS) was developed by Duxbury (2002). This scale had four subscales, three reflecting explanatory models for aggression (situational, external, and internal) and one reflecting views about management approaches. The reliability of the MAVAS was .89 and the item loading on the four subscales was $\geq .80$.
- (3) The instrument items used by O'Connell (O'Connell et al., 2000) had a high reliability with correlations between .7 and 1.0 and was developed from literature and based on expert opinion. The test-retest reliability of the items in the questionnaire used by Collins was .972 (Collins, 1994).
- (4) The Violence Scale was tested on reliability (Cronbach α .68–.91) and interrater reliability (Cohen's Kappa 87%). The construct validity was examined by factor analysis. The factors extracted explained 70% of the variance.
- (5) The construct validity of the POAS was examined in two studies (Jansen et al. 1997; Abderhalden et al., 2002). In the first study, three scales were constructed. The items of the scales had factor loadings $\geq .30$ and a reliability ranging from .70–.89. In the

latter study, a two-factor solution was extracted, with item factor loadings $\geq .35$ and reliability coefficients of .80 and .88.

In conclusion, research on staff attitudes towards aggression is mainly focussed on cognitions of staff about patient aggression related issues and only a few studies address the attitude component in the sense of an evaluation of the aggressive behaviour. Some studies investigate attitudes towards aggression, but these studies are hampered by the lack of valid and reliable instruments. Consequently, the aim of this international multi-centre study was to evaluate the stability or invariance of the components (domains) of the ATAS across five European countries. A standardized instrument to measure attitudes towards inpatient aggression in psychiatry would enable the comparison of attitudes between countries. Accordingly, the 32-item version of ATAS was given to nurses in Germany, Switzerland, England, the Republic of Ireland, Norway and China.

The research question addressed in this study was as follows. To what extent does the construct validity and the reliability of the 32-item scale for the measurement of attitudes towards inpatient aggression in psychiatry vary in five European countries?

2. Method

2.1. Data collection procedure

Data were collected in collaboration with the participating members of the European Violence in Psychiatry Research Group in their home countries. Each member used his/her own professional network to recruit participants for the present study. The way the samples were accessed varied from country to country, depending on the type of network of the member. This could be a group of nurses working on the wards in a psychiatric hospital the member of the group was employed at, or a sample of nurses the member had a teaching relation with. In another situation the member of the group used the research network of his organisation. The European Violence in Psychiatry Research Group (EViPRG) promotes the sharing of expertise and knowledge between researchers studying psychiatry. Each member nation is represented by experts in research, education, psychiatry, psychiatric nursing, psychology, sociology and trainers specialised in the management of violence. The group has gained wide experience in the translation and cross-cultural analysis of survey instruments. Members of the group have good access to their local hospitals and work areas and utilise appropriate occasions to approach large groups of nurses to participate in this study.

2.2. Translation procedure

The questionnaire consisted of 32 statements that nurses could appraise as relevant definitions of aggression. The response options varied from 'totally agree' with the statement (value 5) to 'totally disagree' (value 1). The translation of the 32-item Dutch version of ATAS into German, English, Norwegian and Chinese sought equal familiarity and colloquialness in both source and target languages (Chapman and Carter, 1979). The most common and recommended procedure for verifying the translation of an instrument is back translation (Jones, 1987). The initial forward and back translation (Dutch–English–Dutch) was carried out by the author and revised by the City University of London. The clarity of each item of the English version was discussed with some native Dutch and English-speaking members of the EViPRG.

Some item descriptions were modified to attain a greater degree of familiarity in both countries. The final English translation was developed following this translation protocol, which served as the source document for the Norwegian, Chinese and German versions; the German version was also used in the participating German-speaking regions of Switzerland.

2.3. Sample

The sample was composed of nurses working in psychiatric hospitals and student nurses from seven countries: Germany ($n=253$), England ($n=154$), Republic of Ireland ($n=41$), the Netherlands ($n=566$), Switzerland ($n=725$), Norway ($n=104$) and China ($n=103$).

2.4. Statistical methods

The factor analysis (principal component analysis (PCA), Oblimin rotated) was used to examine the factor structure of ATAS. A scree plot was used to determine the principal components for retention.

Although a three-factor solution was known from an earlier ATAS study, an explorative rather than a confirmative approach was preferred. Items with a factor loading lower than .50 were assumed to have no association with the underlying construct and were eliminated from further analysis.

Simultaneous component analysis (SCA) was used to examine the hypothesis that ATAS has identical dimensions across the samples from five different countries. In SCA, a component is defined as a variable that is constructed as a weighted sum of the original variables. Furthermore, a loading is defined as the correlation between a variable and a component. It should be noted that the term loading does not refer to an element of the pattern matrix (Kiers, 1990). By

comparing the results of the SCA analysis with the results of a PCA, it was possible to check whether a certain component structure was stable over several samples (e.g. countries). In PCA, the optimal variable structure was assessed for all samples separately, whereas in SCA this structure is estimated simultaneously for all samples. As a result, PCA accounts for the maximum amount of variance, while SCA tests component weights in such a way that the components optimally summarise the variables in all populations simultaneously (Kiers, 1990). By comparing the amount of variance explained by PCA and SCA, an indication can be obtained of whether or not the components are invariant across the subsamples (countries). If the explained variance of the separate PCAs is much larger than the explained variance found by SCA, the idea of common components has to be reconsidered.

Finally, the reliability coefficients (Cronbach's α) were computed for all components of ATAS in every sample (country) and in the combined sample of all countries. The last step in the analysis was to examine the intercorrelations between ATAS subscales for each country and for the merged sample of all countries. After construction of the scales, missing data on a particular item of a scale were replaced by the mean score of the respondent on the remaining items of the scale in question. The coefficient alpha in connection with the number of items included in the scales was used as the criterion for the number of missing data that were allowed to be replaced (Sondereren, 2000). To illustrate the principle consider the following: when e.g. the number of items in the scale is seven and alpha is at least .87, it is allowed to replace the missing scores of no more than two items within that scale by the mean the same respondent scored on the remaining five items of that particular scale. When the scale has a length of 20 items and the alpha is at least .93, then a maximum of eight missing items can be replaced.

In order to investigate the invariance of ATAS components across the participating countries' samples, items were selected according to the following criteria:

1. Items should correlate sufficiently (factor loading $> .50$) with the expected factor in the data from each country using the 32-item version of ATAS. A factor is a group of linear combinations of items all indicating the same underlying construct. If an item had a factor loading $< .50$, the linear relation of the item with the construct (factor) was considered to be too weak, meaning, less than 25% of the variance in the scores on the item was explained by the factor. In general, a factor loading .30 is considered to be sufficient for its contribution to a factor (Nunnally and Bernstein, 1994).
2. Items with dual factor loadings in one of the countries on more than one ATAS dimension were eliminated. If an item loaded inconsistently across the countries on the factor it belonged to, this was considered to be a violation of the assumption that the item exclusively contributed to the assessment of a particular factor or dimension.
3. The number of observations had to meet the criteria required by Principal Component factor Analysis and SCA. As a rule of thumb the minimal number of observations required is 10 times the number of variables (items). In this study that would be $10 \times 32 = 320$ observations (Nunnally and Bernstein, 1994). If the number of observations is too small this could result in an unstable factor solution due to chance.
4. Compared to the results from the PCA, items had to correlate identically with the factor in the SCA. Differences in the correlation matrix of an item with a factor between the PCA and SCA would indicate instability of the item over several countries. If so, the item was removed since the goal of the study was to develop an instrument for international research.
5. Items with inconsistent PCA loadings on the expected factor (in the comparison of the factor solution across the countries examined) were removed if a factor loading was $< .50$ on the target factor in more than one country. The aim of the study was to develop a valid instrument for the assessment of the attitude towards aggression. For this reason it is vital that there is a consistent correlation pattern between the item and the target factor in all samples (countries) examined. The pattern of item loadings should be independent of the country (i.e. the cultural impact). The 'consistency criterion' that the size of an item loading should not deviate substantially from .50 in more than one country, was formulated by the researchers themselves.

3. Results

The results of the component analysis (PCA) of the data of the five countries in turn will be presented in this section, then the PCA results will be combined with the SCA data. Unfortunately, the Chinese and Irish data were not suitable for analysis as the distributions of scores were skewed and the correlation coefficients of the items belonging to the domains were extremely low compared to the other samples. Further analysis showed that the factor structure in the Chinese data was substantially different compared to the other samples in the study. Using the Chinese data would have led to invalid results. Translation bias seems to be the source of unreliable and invalid measures of the constructs. Since the translation problems did not apply to the Irish data set, the non-fit between the items in this data set and the domains has to be attributed to sampling bias.

From the original 32-item set, 15 items were removed according to the criteria described below:

- One item was removed because the loading deviated in more than one country from the expected factor.
- Twelve items were removed either because they had a factor loading $<.50$ or they had a factor loading $>.50$ but were correlated inconsistently (with a varying combination of items) with the expected factor in the Dutch reference sample as well as in the sample concerned.
- One item was removed in the SCA as it only correlated with the expected factor in the Dutch sample and in the simultaneous comparison with the Swiss and German samples.

3.1. The invariance of component structure

It was hypothesised that the components or subscales were invariant across the five countries. This hypothesis was a necessary condition in obtaining evidence to answer the question of whether ATAS is a suitable instrument for international comparative research. Furthermore, the decision to test the stability of five components (domains) was primarily based on the factors found in the Dutch sample in which the ATAS was initially developed.

As a result of the PCA, five components were identified and were labelled as (Table 1):

1. *Offensive*, in the sense of insulting, hurtful, unpleasant and unacceptable behaviour including verbal aggression.
2. *Communicative*, in the sense of a signal resulting from the patient's powerlessness aimed at enhancing the therapeutic relationship.
3. *Destructive*, a component indicating the threat of or an actual act of physical harm or violence.
4. *Protective*, indicating the shielding or defending of physical and emotional space.
5. *Intrusive*, expressing the intention to damage or injure others.

After identification of the items that correspond to the scales both by PCA and SCA, the item loadings were checked for incorrect or suspect items by country. An item was regarded as 'incorrect' if the highest loading was not on the intended component but on another, unintended component. An item was described as 'suspect' when it loaded on the intended component but also relatively highly on another, unintended component.

Table 1 also shows the loading range of the scale components (item scale correlations) for the 18 items in ATAS for all five countries.

The component structure of the five ATAS components was found to be identical in all countries. The

lowest factor loading was .53 (item 35) on the 'offensive scale' and the highest loading found was .89 (item 7) on the 'communication scale'.

3.2. Reliability, means and standard deviations

Table 2 shows the reliability coefficients (Cronbach's α) for the five subscales.

As explained in the method section, missing data on a particular item of a scale were replaced by the mean score of the respondent on the remaining items of the scale in question. The coefficient alpha in connection with the number of items included in the scales was used as the criterion for the number of missing data that were allowed to be replaced (Sonderen, 2000).

Since the 'protective' scale consisted of only two items, the alpha is in fact the Pearson correlation coefficient of the scores on the two items. The highest coefficient was found for the 'offensive' scale (.87 in Germany) with a maximum of seven items. The lowest mean inter-item correlation found was for the 'destruction' scale in The Netherlands and the 'intrusiveness' scale in the Swiss sample (.33).

3.3. Inter-component analysis

The scale component analysis provided evidence of the multi-dimensionality of ATAS.

The Pearson correlation coefficients between the components were calculated using summated respondent scores on the individual scale components (Table 3).

A strong correlation was found between the 'offensive' (I) and the 'intrusive' (V) dimensions ($r = .55$) in each of the five countries included in the analysis. This means that approximately 30% of the variance in the 'offensive' scale scores was linearly explained by the variance in the 'intrusive' scale scores. Furthermore, a moderate percentage of explained variance was found between the 'destructive' (III) and the 'offensive' (I) components ($R^2 = .15$). With the exception of the Norwegian sample ($R^2 = .01$), a moderately strong linear association was found between the 'destructive' (III) component of the ATAS and the 'intrusive' (V) component ($R^2 = .17$). A moderately strong correlation was also found between the 'communicative' (II) and 'protective' (IV) components ($R^2 = .12$). Negative correlations were found between the 'offensive' (I) and 'communicative' (II) dimensions but also between the 'offensive' (I) and the 'protective' (IV) components.

Table 4 presents the explained variance percentages for the five SCA and PCA components.

The total variances accounted for by SCA (60.2%) and by the separate PCAs per country was small (The Netherlands 59.6%, Germany 62.7%, Switzerland 59.4% and Norway 62.9%).

Table 1
Principal Component factor Analysis (Oblimin rotated) and the range of item loadings with the aggregated data from the Netherlands, Switzerland, Germany, England and Norway
($n = 1769$)

Item no ^a :	Aggression.....	Factor I		Factor II		Factor III		Factor IV		Factor V	
		Offensive		Communicative		Destructive		Protective		Intrusive	
		Item loading	Range of loadings	Item loading	Range of loadings	Item loading	Range of loadings	Item loading	Range of loadings	Item loading	Range of loadings
9.	is destructive behaviour and therefore unwanted	.69	.61–.77	–.05		–.15		.01		.01	
20.	is unnecessary and unacceptable behaviour	.72	.76–.83	–.06		–.00		.09		–.10	
28.	is unpleasant and repulsive behaviour	.79	.66–.81	.05		.05		.06		.03	
35.	is an example of a non-cooperative attitude	.52	.53–.64	.14		.04		–.05		–.22	
37.	poisons the atmosphere on the ward and obstructs treatment	.62	.60–.70	–.05		–.08		–.10		–.01	
39.	in any form is always negative and unacceptable	.78	.79–.84	–.07		.02		–.01		–.01	
57.	cannot be tolerated	.78	.74–.79	–.08		–.01		.03		.07	
13.	offers new possibilities in nursing care	–.02		.81	.78–.81	–.09		.07		.14	
30.	helps the nurse to see the patient from another point of view	–.05		.76	.76–.81	–.01		–.02		.11	
44.	is the start of a more positive nurse relationship	–.04		.61	.66–.70	.07		–.17		–.00	
				–.00							
2.	is when a patient has feelings that will result in physical harm to self or to others	–.01		–.03		–.85	.74–.84	–.03		–.02	
7.	is violent behaviour to others or self	.06		.01		–.83	.79–.89	–.02		.01	
12.	is threatening to damage others or objects	.15				–.58	.69–.80	.07		–.07	
38.	is to protect oneself	–.09		–.04		–.06		–.85	.84–.86	–.04	
42.	is the protection of one's own territory and privacy	.09		.11		.08		–.81	.83–.85	.07	
17.	is a powerful, mistaken, non-adaptive, verbal and/or physical action done out of self-interest	.02		–.09		–.11		–.08		–.70	.70–.81
18.	is expressed deliberately, with the exception of aggressive behaviour of someone who is psychotic	.06		.06		.09		.09		–.72	.64–.76
19.	is an impulse to disturb and interfere in order to dominate or harm others	–.02		–.04		–.09		–.08		–.78	.78–.83

^aThe item numbers refer to the original 60-item version.

Table 2

Internal consistency (Cronbach's α), inter-item correlations, means and standard deviations of the ATAS with 5 subscales

Scale component	Offensive (7 items)	Communicative (3 items)	Destructive (3 items)	Protective (2 items)	Intrusive (3 items)
Number of scale items	7	3	3	2	3
Scale scoring range	7–35	3–15	3–15	2–10	3–15
<i>The Netherlands (n = 571)</i>					
Cronbach's α	.83 ^a	.63	.60	.63	.62
Mean inter-item corr.	.42	.36	.33	.46	.35
Mean	18.23	8.70	8.93	6.30	7.4
SD	4.99	2.07	2.46	1.72	2.14
<i>Germany (n = 252)</i>					
Cronbach's α	.87	.63	.70	.65	.66
Mean inter-item corr.	.50	.37	.44	.48	.39
Mean	18.54	8.44	11.57	6.44	8.67
SD	6.13	2.46	2.31	1.88	2.64
<i>England (n = 123)</i>					
Cronbach's α	.82	.65	.67	.60	.67
Inter-item corr.	.40	.38	.40	.43	.40
Mean	23.26	8.50	11.28	5.54	9.39
SD	5.86	2.60	2.67	1.96	2.56
<i>Switzerland (n = 730)</i>					
Cronbach's α	.86	.61	.68	.62	.60
Mean inter-item corr.	.48	.34	.41	.45	.33
Mean	18.10	8.96	10.59	6.65	7.82
SD	5.93	2.31	2.65	1.73	2.48
<i>Norway (n = 93)</i>					
Cronbach's α	.84	.60	.80	.62	.65
Mean inter-item corr.	.43	.34	.57	.45	.38
Mean	21.06	8.97	11.75	7.29	9.14
SD	5.75	2.07	2.60	1.54	2.30
<i>Combined data of all countries (n = 1769)</i>					
Cronbach's α	.86	.62	.69	.62	.65
Mean inter-item corr.	.46	.35	.42	.45	.38
Mean	18.72	8.77	10.30	6.46	7.90
SD	5.82	2.27	2.74	1.79	2.50

^aWithin this scale 1 missing item was replaced according to the van Sonderen (2000) principle.

Table 3

The scale (components) correlations of the ATAS in the Netherlands, Switzerland, England, Germany and Norway

The Netherlands	I	II	III	IV	V
I. Offensive		-.29	.39	-.20	.55
II. Communicative			-.05	.35	-.07
III. Destructive				-.03	.41
IV. Protective					-.03
V. Intrusive					

This result indicated that the common components produced by SCA fitted the data almost as well as the components of the separate PCAs. Therefore, the same linear combinations (components) of the variables can be used to describe the data in all subsamples.

Furthermore, the SCA solution with the five original subscales (the intended subscales) as components explained 59.69% of the total variance (the non-optimal, simple weight method). The optimal weight solution explained only .5% more (60.2%, Table 4).

In general, it can be concluded from Table 5 that the rotated SCA weights matched the item solution found by the PCA perfectly. A more detailed inspection of the item weights revealed that some items also loaded on scales other than the intended ones. Item 9, 'aggression is destructive behaviour and therefore unwanted,' not only loaded on the intended 'offensive' attitude but also on the 'destructive' component of the scale (.13). Item 35, 'aggression is an example of a non-cooperative attitude' had a loading of .26 on the intended 'offensive' attitude, but also moderately strong loadings on the 'communicative' and the 'intrusive' attitudes (.13 and .19, respectively). Finally, item 13, 'aggression offers

new possibilities in nursing care', part of the 'communicative' component, had a logical negative loading on the 'intrusive' attitude (−.13).

4. Discussion

The aim of this study was to test the invariance of components (construct validity) of an instrument developed to measure staff attitudes towards inpatient aggression in psychiatric settings. ATAS's psychometric properties will now be discussed with respect to this aim.

Table 4

Percentages of explained variance from SCA and PCA analyses in samples from the five countries

Components	SCA	PCA				
		Nethl.	Germ.	Swi.	Engl.	Nor.
I. Offensive	28.2	26.3	30.6	30.3	28.7	25.8
II. Communicative	40.7	39.1	42.8	40.8	42.9	39.9
III. Destructive	49.0	46.0	51.2	48.3	50.6	50.7
IV. Protective	55.0	52.3	57.8	54.1	56.9	57.3
V. Intrusive	60.2	59.6	62.7	59.4	62.5	62.9

Table 5

The rotated weights matrix yielded by SCA common to the five countries

	FACT I	FACT II	FACT III	FACT IV	FACT V
<i>FACT I. Offensive</i>					
Item 9 unwanted	.34	−.00	.13	.02	−.05
Item 20 unnecessary	.40	−.01	.00	−.12	.01
Item 28 repulsive	.37	.01	.00	−.03	.02
Item 35 non-cooperative	.26	.13	−.01	.01	.19
Item 37 poisons atmosphere	.32	−.05	−.04	.11	.09
Item 39 negative	.48	.01	−.08	.03	−.06
Item 57 not tolerable	− .42	−.05	.01	.01	−.08
<i>FACT II. Communicative</i>					
Item 13 new possibilities	.03	.64	.04	−.05	−.13
Item 30 another point of view	−.02	.60	−.01	−.04	.10
Item 44 positive relationship	−.03	.46	−.05	.15	−.02
<i>FACT III. Destructive</i>					
Item 2 physical harm	−.04	.01	.61	−.02	−.02
Item 7 violent to others /self	.03	−.02	.61	.03	−.04
Item 12 physical violence	.00	.02	.47	.02	.10
<i>FACT IV. Protective</i>					
Item 38 protect	.03	−.00	.01	.71	−.05
Item 42 territory	−.02	.02	.01	.66	.04
<i>FACT V. Intrusive</i>					
Item 17 non-adaptive	−.00	−.04	−.02	.02	.56
Item 18 expressed deliberately	.04	.06	−.01	−.08	.48
Item 19 impulse to interfere	−.02	−.05	.04	.04	.60

Five components or factors expressing nurses' attitude towards aggression by inpatients in psychiatry could be clearly identified in all five countries. The minor differences in variances accounted for by SCA and by the separate PCAs per country imply that the same linear combination of variables could be used in all populations to describe the data adequately (Kiers, 1990). The intended five-component structure of ATAS accounted for only .5% less variance than the optimal weights solution. This result is supported by the fact that not a single incorrect item was found in the structure matrix. The internal consistency (Cronbach's α) of the five subscales was satisfactory. For all countries together, the reliability coefficients can be considered as good for the 'offensive' scale (.86) and somewhat less good for the other four scales (about .60).

The configuration of correlations between the components of ATAS found in all five countries suggested the existence of two basic underlying divergent domains in the scale. The 'communication' and 'protection' scale components on one hand, and the 'offence', 'destruction' and 'intrusion' components on other. The domains can be regarded as divergent because of the negative correlations found between the two sets. The convergent combination of 'communication' and 'protection' can be characterised as positive human energy or behaviour, in contrast to the attitudes termed as 'offence', 'destruction' and 'intrusion', which can be considered to be the violent and negative perspectives on aggressive behaviour. In the first ATAS study (Jansen et al., 1997), three subscales were identified and labelled as the harmful, the functional and the normal attitudes towards aggressive behaviour. The items on the earlier 'violence' scale are now spread out over three separate scales, differentiating between disapproval of the behaviour (offensive), a physical act of violence without expressing a value judgement (destructive) and an intent to hurt or dominate others (intrusive). The items that made up the 'normal' and 'functional' scales in the earlier study were rephrased in this study as the 'protective' and the 'communicative' perspectives on aggression. The two basic, almost complementary, domains of acceptance and rejection of the behaviour were also found in the study by Bowers. In this study a negative attitude towards patients with personality disorders was found, though some staff were able to manage the disruptive behaviour in a positive manner (Bowers, 2002).

According to one-way analysis of variance, the mean values on all five scales were significantly different across the five countries. The same holds true for ATAS as a whole. Additional research is required to obtain an understanding of which factors actually account for these differences.

The analysis of the data in this study started with 32 items. In this international study, more components were extracted than when using the original scale, five

this time and three the previous time, resulting in a reduced number of items for the total scale. The original scale had 32 items, which was reduced to 18 items. This result will make ATAS easier to administer. Needham (2004) derived a shortened 12-item version from the 32-item POAS with the basic assumption of a two-dimensional factor structure. Six items of the shortened 12-item POAS were identical to the 18 items that remained in the five component ATAS solution found in this study. Some items in the two-factor shortened Swiss solution version had poor retest correlation coefficients. Retest reliability assessment with the ATAS items should indicate ATAS's superiority over the two-dimensional POAS. The test-retest reliability of the five ATAS scales will be evaluated in a follow-up study.

The study had a nonprobability sampling design which can be appraised as a methodological weakness. Therefore, it might be questionable whether the sample scores can be treated as country scores that reflect a representative indicator of the national attitude of psychiatric nurses towards inpatient aggression. There was no stratification on age, sex, nurses' work environment or on other key characteristics of the target population. Using a convenience sampling approach, overestimation or underestimation of some segments in the population may have occurred. This weakness may affect the external validity of the findings. Despite this sampling procedure, identical attitude components were identified across the country samples involved in the study with nonstratified nonprobability samples. However, for the aims of this study, specifically the validation of ATAS in terms of the construct validity, the representativeness of the samples is of minor importance.

As mentioned in the introduction, there is no instrument available to measure attitudes towards aggression from an uniform perspective in the way this instrument does. This instrument does not focus on cognitions nurses or other health care workers may have about aggression. These cognitions can relate to the nurses' ideas about the causes, frequency, nature or the management of aggression. This instrument does, however, address another, more fundamental issue, namely that of the evaluation of the function of aggressive patient behaviour. The idea that there are different types of aggression expressing different functions is not new. Various typologies of aggressive behaviour are described in the literature (Buss, 1961; Geen, 2001). However, the unique approach inherent in this ATAS study is that some of these different connotations are captured within the instrument. With respect to this result, it should be noted that the instrument was not developed from literature, but mainly relied on qualitative statements made by respondents (Finnema et al., 1994).

In this study, factor analysis was used as the only method for construct validation. Factor analysis, in effect, constitutes another means of looking at convergent and discriminant validity of a large set of measures (Polit and Hungler, 1999). Additional alternative approaches such as the use of the known group technique or the multi-trait–multi-method matrix method would have resulted in more information about the construct validity of ATAS, but these techniques were not possible given the uniqueness of the instrument. Nevertheless, this study offers a valid instrument for international research. The study population was limited to psychiatric nurses and student nurses. However, aggression by patients is not a phenomenon exclusive to psychiatric or mental health care. Aggression by patients against staff is an issue and often a problem in general health care settings as well. For this reason, we feel that the instrument is useful in a professional respect, and not merely for nurses but also other professionals who have to cope with aggression in a mental health care setting.

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