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Gibbons, C., Dempster, M., & Moutray, M. (2009). Surveying nursing students on their sources of stress: A validation study. *Nurse Education Today*, 29(8), 867-872. <https://doi.org/10.1016/j.nedt.2009.04.008>

Published in:
Nurse Education Today

Document Version:
Peer reviewed version

Queen's University Belfast - Research Portal:
[Link to publication record in Queen's University Belfast Research Portal](#)

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Surveying nursing students on their sources of stress: A validation study.

ABSTRACT

This study tested the psychometric properties of a questionnaire that measured sources of distress and eustress, or good stress, in nursing students. The Transactional model of stress construes stress in these different ways and is frequently used to understand sources of stress, coping and stress responses. Limited research has attempted to measure sources of distress *and* eustress or sources that can potentially enhance performance and well-being. A volunteer sample of final year nursing students (n = 120) were surveyed in the United Kingdom in 2007. The questionnaire measured sources of stress and measures of psychological well-being were taken to test construct validity. This was tested through an exploratory factor analysis. This reduced the questionnaire from 49 to 29 items and suggested three factors: learning and teaching, placement related and course organization; second, it was analysed by testing the assumptions of the Transactional model, the model on which the questionnaire was based. In line with the assumptions of the model, measures of distress related to adverse well-being, and measures of eustress related to healthier well-being responses. The test retest reliability estimate was 0.8. While certain programme issues were associated with distress, placement related experiences were the most important source of eustress.

Keywords: Quantitative, Survey, Stress, Coping, Education, Students

1. Introduction

Most of the research on stress in nurses and students considers the effect of distress on well-being with little attempt to explore the sources of stress that enhance performance (Parkes, 1994; Jones & Johnston, 1997, 1999). That optimal level of stress or arousal is called eustress (Lazarus, 1974).

Some of the sources of stress experienced by nursing students are experienced by students generally. Sources of academic stress include exams and assessments (Howard, 2001) and the timing of exams, as an element of the curricula, impacts particularly on the work-life balance of female students with children. This student characteristic is more common among nursing students compared to other student groups (Prymachuk & Richards, 2007). In relation to workload, nursing students experience longer hours of study and an associated lack of free time (Jones & Johnston, 1997; Lo, 2002; Mahat, 1998).

The main clinical sources for nurses and nursing students include working with dying patients; conflicts with other staff; insecurity about one's clinical competence; interpersonal problems with patients and work overload (Rhead, 1995). Additional stressors faced by nursing students include developing particular clinical skills and related assessments; a perceived lack of practical skills and the time pressures in which they are expected to operate on placement. Student status on placement has been reported along with the general atmosphere and attitudes held by nursing staff towards students (Hamill, 1995; Mahat, 1998; Howard, 2001).

In Lazarus and Folkman's (1984) Transactional model of stress the primary appraisal refers to the initial perception about a stressor and whether it is judged to be positive (leading to eustress), negative (leading to distress) or benign. The secondary appraisal refers to coping resources or moderators, such as self-efficacy or a belief in one's competences to succeed (Lo, 2002); perceived control and support (e.g. Karasek & Theorell, 1990)

Many of the inventories used to measure perceptions of stressors in nursing students have been accused of not being psychometrically rigorous (Jones & Johnston, 1999). The Beck and Srivastava (1991) 43 item Stress Inventory (BSSI), for example, assesses sources of stress experienced by nursing students. Results by the authors report acceptable indices of reliability and convergent validity, however, the BSSI only applies to a sub-set of the nursing student population and it has not been validated on nursing students in the UK. Nor is it clear what criteria were used for item retention and the factor structure of the BSSI was not explored adequately during its development for use with nursing students and not tested on a sufficiently large enough sample (Jones & Johnston, 1999).

Subsequent measures (e.g. Rhead, 1995) have identified various factor structures, such as factors relating to practical and academic sources of stress; to death of patients; lack of understanding from teaching and nursing staff; the college-home interface and course organization and resources. However, some of these results were based on studies that failed to detail the factor analytic process used and where the sample size was small (e.g. Rhead, 1995).

Jones and Johnston (1999) amended the BSSI and administered it to two independent groups of first year Scottish nursing students. They factor analysed the results and tested for reliability and validity, calling the new measure the Student Nurse Stress Index (SNSI). The exploratory and later confirmatory factor analysis revealed academic load, clinical concerns, interface worries and personal problems as factors. Concurrent validity was demonstrated by a series of consistent and reliable first order correlations with the GHQ 30 (Likert) and strong test retest reliability was observed over a two week period.

What is common to all the existing inventories to explore sources of stress in nursing students (including the BSSI, Beck & Srivastava, 1991; the SNSI, Jones & Johnston, 1999 and the Stress in Nursing Students questionnaire, Deary, Watson & Hogston, 2003) is that their focus is to ask respondents to rate perceived stressors in terms of the extent to which they are distressing. The assumption is that if course and placement experiences are reported as less distressing the students' well-being, insofar as it is caused by the demands of the course, will be healthier and that they will learn more. Moreover, such an approach ignores the fact that those stressors may also contribute to eustress or a level of stress that enhances performance (Gibbons, Dempster & Moutray, 2008). Deary et al., (2003), for example, measured burn-out and stress in nursing students and found increased perceived stress combined with increased levels of personal achievement, suggesting that stress experiences can be sources of eustress.

The purpose of this study was to develop and test the psychometric properties of a questionnaire that, in measuring sources of stress in nursing students, is the first to ask respondents to appraise

potential stressors in terms of negative effects (hassle) and which are most likely lead to distress and positive effects (uplifts), which are most likely lead to eustress.

2. Method

The questionnaire, the Index of Sources of stress in Nursing students (ISSN), was developed in phases: The first was the item generation. The items evolved out of an earlier series of focus groups with final year nursing students exploring sources of eustress and distress (Gibbons et al., 2008). The focus group transcripts were reduced to themes and recurring comments informed the items generated.

The second phase involved establishing face and content validity for the ISSN: The items were reviewed by a panel consisting of the Associate Head of School in Nursing and Midwifery in the host university and two Health psychologists. Each item was reviewed for content validity – if the questionnaire was judged to cover the main categories of stressors identified in previous research and whether the items appeared to be assessing the desired qualities. To achieve the first of these features, the category of items generated were compared with those identified in earlier studies using other inventories on nursing student stress. The second aspect relied on the judgments of the reviewers who drew on their experience of nursing-student stress and of the potential sources of stress on all aspects of the course. This ‘validity by assumption’ (Guilford, 1954), or the judgment about the assumed validity by an expert panel, is a minimum pre-requisite before use.

This review process also discussed whether those items were relevant, clear and covered all the key themes that evolved out of the focus groups.

2.1 Participants

Students were recruited for the final phase. In August 2007, a convenience sample of 180 final year nursing degree students were introduced to the study, by the lead researcher, at the start of a lecture and were invited to take part and 120 (67%) consented. Of these, 15 consented and completed the retest. The inclusion criteria were students in their final year, following the Adult nursing branch. As final year students they would have the greater experience of the course.

2.2 Measures

These included the ISSN; a social desirability scale and two well-being measures: the General Health Questionnaire (Goldberg, 1978); and an Emotional Exhaustion scale, a sub-scale of the Maslach Burn-out Inventory (Maslach & Jackson, 1986). The ISSN contained 49 items related to different sources of stress experienced on the nursing degree programme. A continuous response scale was used, with each item rated twice – once from its perceived distress, called a ‘hassle’, and once from its perceived eustress, called an ‘uplift’. A non-applicable option was also included. A rating scale from 0-5 was used, 0 indicating that it was no source and 5 an extreme source of distress or eustress.

The General Health Questionnaire (GHQ 12-item version) (Goldberg, 1978).

This was an established measure of transitory distress. A scoring scale of 0, 0,1,1 was used corresponding to the four responses per item and a total score of 3 or higher indicates caseness or a risk of developing a transitory stress-related illness.

Emotional Exhaustion Scale (Maslach & Jackson, 1986).

The nine items measuring the emotional exhaustion sub-scale from the Maslach Burnout Inventory were included. Of the three components of burn-out, this sub-scale was the most responsive to stress experiences. Participants responded on a seven point scale from 'never' to 'Everyday', scored 0-6, on how frequently they experienced the state described. The cut-off points in the Maslach Burnout Inventory (Maslach & Jackson, 1986) were used.

The Marlowe-Crowne Social Desirability (10 item version) (Crowne & Marlowe, 1960).

This measure required students to choose whether a series of statements were true or false for them. A score of 1 was given for each answer concordant with the scoring algorithm. It measured a response tendency and was used to establish a possible social desirability bias across the instrument.

2.3 Procedure.

During a course lecture the students were briefed on the project by the lead researcher and invited to attend a computer suite later that week. At that point the aims were reiterated along with the ethical considerations. The participant information sheet and consent form were given out. These were read and students were given the opportunity to ask questions before signing and returning the consent form. They were given the web browser address and shown how to complete the questionnaire on-line. Those who consented to complete the retest returned an email address which, they were informed, did not have to be their university email address, and after two weeks they were sent the browser link to the questionnaire. All the students were informed that they could receive a copy of their results if they emailed the lead researcher.

2.4 Ethical considerations

The study was approved by the University ethics committee. The information sheet handed to students emphasized that participation was entirely voluntary; that they were free to leave at any time; that being involved would have no affect on course progression and that confidentiality and anonymity would be maintained at all times. These points were re-iterated verbally by the researcher before the students began the questionnaire, especially that participation or non-participation would not affect course progression. The researcher was unknown to the students and was not one of the lecturers. This is important as it could otherwise have introduced a perceived power dimension affecting students' decision to participate or not.

2.5 Data analysis

The data was analyzed using SPSS version 15.1. The test retest method was used to test the stability of the instrument over time. The structure of the inventory was tested through an exploratory factor analysis, using principal component analysis (with oblimin rotation), and, as the instrument is premised on the Transactional model of stress (Lazarus & Folkman, 1984), construct validity was also tested by examining the associations between stress appraisals and measures of well-being, using Pearson's Product Moment Correlation Coefficient. Additionally, participants were categorized according to the cut-off point on the GHQ and t-tests were carried out in order to examine differences in the appraisals of stressors.

3. Results

Demographic characteristics

Of the 120 that took part 110 responded to the demographic items. In terms of age cohorts, 42.5% were under 21; 38.9% were 22-30; 15% 31-40 and 3.5% 41-50; and 93% were female (n=103).

Construct validity - Factor analysis and testing the assumptions of the Transactional model.

Five of the 49 items received majority non-applicable responses and were excluded from the analysis. Two principal component analyses (with oblimin rotation) were conducted on the ratings of the remaining 44 items measuring hassles and uplifts. MD why oblim rotation? The scree plot suggested a three factor solution, explaining 74.8% of the variance for the hassles and 74.6% for the uplifts for the 44 item version. Items with factorial loadings of less than .4 on either factor analysis were deleted. This reduced the instrument to 29 items and a second factor analysis was carried out. The scree plot again suggested a three factor solution, explaining 46.1% of the variance for the hassles and 43.9% for the uplifts. The three factors were labeled Learning and teaching; Placement related; and Course organization. Table 1 shows the factorial loadings for these items rated as hassles and Table 2 rated as uplifts. MD comment on 'worrying drop' in variance explained. MD comment on why Bartlett and KMO statistics indicate that this data set is suitable for factor analysis?

The emboldened factor loadings for the different items indicates the items that were included in that factor. While there is large consistency there is some variation between the items that load

on to each of the factors when rated as hassles and when rated as uplifts. Two items with a factor loading of less than .4 were retained when rated as a hassle and two were retained when rated as uplift because they were close to .4 and were judged to fit into that particular factor.

Table 3 shows the correlation estimates between the factors and well-being measures and the results support the construct validity assumptions based on the Transactional model. These were that the hassles ratings would positively correlate with well-being – GHQ and emotional exhaustion measures i.e. the higher the score the more psychological well-being is adversely affected, and the uplifting ratings would negatively correlate with well-being. Moreover, eight of the twelve correlations between the sources of stress as factors and well-being (GHQ and Emotional exhaustion) were significant in the anticipated direction, supporting construct validity assumptions and provides an additional rationale for employing factor analysis.

Table 4 categorizes respondents according to caseness on the GHQ and it was anticipated that those reporting caseness or who were ‘at risk’ of developing a transitory stress-related illness, would report significantly more hassles and significantly fewer uplifts compared to those not ‘at risk’. Using an Independent samples T test, the latter expectation was confirmed but the former was not.

Partial correlations were carried out, to control for social desirability effects, between each of the factors rated as a hassle and then rated as an uplift and with each well-being measure. With the exception of learning and teaching hassles, the correlations remained broadly similar, indicating that, for the vast majority of responses, social desirability had a minimal influence.

The results of the test retest reliability ranged from 0.6 to 0.9 for each of the factors. The overall correlation estimate for first test and retest was 0.8. All showed moderate to strong consistency. It is possible that the strong consistency reported could be interpreted as indicating that the items were undiscriminating in nature. However, the Bartlett and KMO statistics (reported at the ends of table 1 and 2) indicate little multi-collinearity, suggesting that the three factors do measure different sources of stress and are reliable.

4. Discussion

This study aimed to develop and test the psychometric properties for the ISSN. The exploratory factor analysis reduced the ISSN to 29 items, explaining 46.1% of the variance for hassles (Table 1) and 43.9% for uplifts (Table 2). This compares well with the brief SNSI (Jones & Johnston, 1999). The 22 item SNSI accounted for 49.4% of the variance in scores but unlike the ISSN it did not measure stressors as potential sources of eustress, an important focus of this instrument.

The test retest correlation estimates demonstrated moderate to strong reliability for each of the three factors as hassles and uplifts. The construct validity assumptions (Table 3) were supported: There were significant positive correlations between distress (hassles) and well-being measures. If the experience of stress was one that was perceived as enhancing opportunities to achieve (uplifts) then well-being measures tended to be healthier.

Table 3 showed there was a stronger association between learning and teaching reported as a hassle and GHQ, compared to course organization and placement related hassles. This is in contrast to some earlier research which tended to find placement related stressors as a greater source of distress than those related to learning and teaching (Rhead, 1995). This finding may reflect the increasing academic demands of nursing courses since Project 2000 and the Government's continued drive to make nursing courses more academically rigorous.

When emotional exhaustion was the well-being measure, course organization as a hassle showed a slightly stronger correlation over learning and teaching. While course organization, when rated as a hassle, positively correlated with well-being measures (i.e. high scores indicating a less

healthy well-being), when perceived as an uplift it was not associated with significantly lower (i.e. healthier) well-being measures. This suggested that the structure of the course and, more likely, that nursing courses are intense programmes of study with far less flexibility than traditional undergraduate degrees, was an important source of distress. However, it may conceptually be difficult or less relevant to ask participants to rate items that relate to course organization as potential uplifting opportunities. It is more likely that items, such as the balance of time given to lectures and tutorials and the timing of feedback, can be rated in terms of possible distress but less so as providing opportunities to achieve.

While there was a negative correlation between uplifting ratings and emotional exhaustion, Table 3 showed that when broken down into factors, it was the opportunity to achieve on placement that was the only uplifting experience that negatively correlated with emotional exhaustion. The nature of the course when in the university (course organization uplifts) was not associated with lower emotional exhaustion, though this may reflect the difficulty in rating course organization as an uplift. However, the same was true for items related to learning and teaching. This may suggest there was room for improvements in learning and teaching and in some aspects of course organization.

Caseness on the GHQ indicates a risk of developing a transitory stress-related illness.

Comparisons have been made between students who qualified through the apprenticeship model of nursing and the academic model. In the former the prevalence tended to decline (from around 50% in year one to 30% in the final year), whereas it rose in students following the academic route (from 30% in year one to 40% in the final year). This finding supports the precedence

given here to learning and teaching demands as a potential for distress. The caseness reported here was 60% (n=68). As final year students following the academic route, one would expect it to be high but this prevalence rate compares with the highest found in previous research (e.g. 67% in nursing students, Jones & Johnston, 1997). As well as reflecting the pace, intensity and academic rigour of the course, demands not measured by the questionnaire would also have contributed to well-being measures, such as those related to personal relationships, part-time work, family and dependents. That the majority of the sample were female and 18.5% over thirty would increase the possibility of such demands and their combined effect, with course demands, on well-being.

Table 4 showed that there were significant differences in the perception of uplifting experiences between those who scored above and below the threshold for caseness. Those most distressed experienced fewer uplifting experiences and, of course, the absence of such may have contributed to that distress. Following on from this, one would expect those reporting caseness to experience more hassles. However, there were no significant differences between the groups. This suggested it was the absence of *perceived* uplifting experiences that was an important contributor to distress. This supports an earlier finding that those who adopted an optimistic, positive perspective towards challenges were more likely to achieve (Gibbons et al., 2008). The course demands were similar for all students, it was the differences in the perspectives towards those demands that affected how they were managed and whether they were judged to be a hassle or an uplift. This finding on uplifts challenges the traditional view – that reducing distress will increase well-being, rather, what is more important, is perceiving opportunities to achieve.

Such a result questions the assumption that stress denotes psychological distress, a conception common to much earlier research.

The ISSN has been validated – satisfactory test retest reliability was reported and construct validity was demonstrated by testing the assumptions of the primary appraisal stage of the Transactional model of stress. The students who participated were in their final year and, while the numbers who completed the retest was sufficient for the purposes of the statistical analysis, it is possible that this may have been higher had the testing coincided with a period when the course demands were less intense.

The separation of respondents into groups based on GHQ cut-off points could have introduced the cohort effect as a confounding influence. It is important to remember that well-being measures could be affected by factors and experiences not measured by the ISSN, such as other moderators, such as personality and coping style, as well as family and personal experiences.

Nursing students following the more populous Adult branch were invited to take part and extending the sample to cover the other branches of nursing would be a further test of its usefulness. Final year students were invited to take part because they had more course experience to draw on. However, what is perceived as a source of stress may vary with experience as may the extent to which it is rated as a hassle or uplift. It would therefore be useful to test the psychometric properties of this instrument with nursing students earlier in their studies. The ISSN could usefully be used in conjunction with measures of other moderators, such as personality, support, control, self-efficacy and coping style. Testing the instrument in a

longitudinal study would negate the problem of the cohort effect, and a further analysis would allow for a confirmatory factor analysis to be carried out on the ISSN.

5. Conclusions

The ISSN measures sources of stress that contribute to potential distress and eustress and there was clear evidence of both in this study. While the stressors contributing to distress and eustress may not always be separate experiences and while respondents may be unaccustomed to conceptualizing stress in this way, the results suggest the instrument holds merit to help course managers and educators identify and enhance the learning opportunities.

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Table 1. Factor loadings for 29 item ISSN for sources of stress rated as hassles

Item	Factor		
	Learning and teaching	Placement related	Course organization
Developing the ability to critically analyse and evaluate.	.739		
The learning I engage in outside class.	.720		
The typical volume of material we are expected to grasp in a lecture.	.705		
Learning by preparing to give presentations in tutorials.	.673		
The number of presentations students give in tutorials.	.672		
How much I am valued by tutorial leaders.	.664		
The OSCEs.	.603		
The pace and intensity of the course.	.560		
Question and answer sessions in tutorials.	.538		

Lecturers who occasionally use their authority to retain order.	.521		
The suitability of the course to prepare me to be a nurse.	.494	-.420	
The quality of tutorials.	.492		
Guidance and practise in preparation for OSCEs.	.481		
Portfolio feedback.	.463		

Item	Factor		
	Learning and teaching	Placement related	Course organization
Placement experience.		-.765	
Building and sustaining a relationship with patients.		-.753	
Learning on placement.		-.648	
What happens when classes are cancelled.			.350
How clinical skills are practised on placement compared to how we are expected to practise them.		-.348	
Voicing my concerns through my student representative.			.675
The balance of time given to lectures and tutorials.			.671
Timing of feedback on my assignments.			.657
Learning by listening to others present in tutorials.			.642
The behaviour of other students			.602

in lectures.			
My experience of guest lecturers.			.491
The variation in tutorial leader styles.			.485
Tutorial leader's response to student-led presentations in tutorials.			.481

Item	Factor		
	Learning and teaching	Placement related	Course organization
The level of organization on the course.			.475
The clinical examples and additional information, beyond the powerpoint slides, offered by lecturers.			.460

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.826; Bartlett's test of sphericity: Chi-square = 1326.78, $p < 0.0001$. Factor loadings less than an absolute value of 0.3 have been suppressed. Emboldened factor loadings indicate the factor to which that item belongs.

Table 2 Factor loadings for 29 item ISSN for sources of stress rated as uplifts

Item	Factor		
	Learning and teaching	Placement related	Course organisation
Learning by preparing to give presentations in tutorials.	.732		
The number of presentations students give in tutorials.	.634		
The variation in tutorial leader styles.	.631		
The learning I engage in outside class.	.623		
How much I am valued by tutorial leaders.	.616		
My experience of guest lecturers.	.614		
The clinical examples and additional information, beyond the powerpoint slides, offered by lecturers.	.606		
Question and answer sessions in tutorials.	.604		
The typical volume of material we are expected to grasp in a lecture.	.550		-.380
Developing the ability to critically analyse and evaluate.	.520		
Portfolio feedback.	.514		
The OSCEs.	.507		
Learning by listening to others present in tutorials.	.480		
Tutorial leader's response to student-led presentations in tutorials.	.467		
The pace and intensity of the course.	.432		
Voicing my concerns through my student representative.	.410		-.399
The behaviour of other students in lectures.			-.866
What happens when classes are cancelled.			-.631

Timing of feedback on my assignments.			-.577
The quality of tutorials.			-.500
The balance of time given to lectures and tutorials.	.488		-.492
The level of organization on the course.	.388		-.445
Placement experience.		.679	
Building and sustaining a relationship with patients.		.649	

Item	Factor		
	Learning and teaching	Placement related	Course organisation
Learning on placement.		.581	
The suitability of the course to prepare me to be a nurse.		.510	
How clinical skills are practised on placement compared to how we are expected to practise them.		.470	
Guidance and practise in preparation for OSCEs.			

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.826; Bartlett's test of sphericity:

Chi-square = 1063.31, $p < 0.0001$. Factor loadings less than an absolute value of 0.3 have been suppressed. Emboldened factor loadings indicate the factor to which that item belongs.

Table 3 Correlations between the factors and well-being measures

	GHQ	emotional exhaustion
Learning and teaching hassle	.324**	.344**
Placement related hassle	.135	.284**
Course organization hassle	.257**	.363**
Learning and teaching uplift	-.199*	-.098
Placement related uplift	-.352**	-.277**
Course organization uplift	-.121	-.089

*correlation is significant at $p < 0.01$ level (two-tailed) $n=115$

**correlation is significant at $p < 0.01$ level (two-tailed) $n=115$

Table 4 Using GHQ caseness as a predictor

ISSN Measures	T value	p value
Learning and teaching hassle	-.855	.395
Placement related hassle	.865	.403
Course organization hassle	-1.265	.219
Learning and teaching uplifts	2.168*	.033
Placement related uplifts	2.611**	.010
Course organization uplifts	2.105*	.039

*difference is significant at $p < 0.05$ level

**difference is significant at $p < 0.01$ level (two-tailed)

(n= 68, reporting caseness, n=45 not reporting caseness)