



## Early career burnout among Dutch nurses: A process captured in a Rasch model



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### ABSTRACT

This study investigates burnout among Dutch nursing graduates as a process by testing a sequential-developmental model. A sample of 237 respondents was recruited from a population of Dutch early career nurses. Burnout was measured with the Dutch version of the Maslach Burnout Inventory Human Services Survey (MBI-HSS, Maslach & Jackson, 1981; Schaufeli & van Dierendonck, 2000). First, the dimensionality was tested with confirmatory factor analysis. A resulting one-dimensional model with exhaustion and depersonalisation was then analysed using a Rasch rating scale measurement model. Rasch analysis showed that these data adhered well to a sequential-developmental model. Burnout among early career nurses may be operationalized as a process that starts with fatigue as a result of strain and ends with severe exhaustion and depersonalisation towards patients. Personal accomplishment develops relatively independently. A separate Rasch analysis on the personal accomplishment items revealed a scale with almost similar item locations, resulting in redundant information.

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### 1. Introduction

For nursing graduates the experience of transition from school-based experience to professional practice can be stressful (Duchscher & Myrick, 2008). Scientists have noted already decades ago that younger nurses show a greater vulnerability towards burnout than older nurses (Bartz & Maloney, 1986), and this was also noted in more recent studies (Lee & Wang, 2002; Winwood, Winefield, & Lushington, 2006). Only in the last decade this issue is the explicit focus of studies among new graduate nurses. Such studies show serious levels of mental health problems and high turnover (Laschinger, Finegan & Wilk, 2009). A study by Beecroft and colleagues (2008) showed that 30% of new graduates had high turnover intentions. Bowles and Candela (2005) found an actual turnover rate of 30% in the first year and 57% after two years. In another study, 66% of new graduates were experiencing severe burnout (Cho, Laschinger and Wong, 2006).

New professionals may initially feel inadequately prepared for their occupational role, which led Duchscher (2009) to describe this transition as the most stressful, frustrating, discouraging and disillusioning stage in the process of professional role adaptation for nursing graduates. Cherniss (1980) has explained this process as an identity crisis among novice professionals. This may lead to unsuccessful occupational socialization or early career burnout (Cherniss, 1980; Gustavsson, Hallsten, & Rudman, 2010).

Burnout is generally explained as a psychological syndrome consisting of emotional exhaustion, depersonalisation and reduced personal accomplishment that can occur among individuals who work with people (Maslach & Jackson, 1981; Schaufeli, Maslach, & Marek, 1993). Emotional exhaustion refers to feelings of being overextended emotionally and physically, and depleted of resources. Depersonalisation refers to a cynical and distant attitude towards one's work and the people one works with. Reduced personal accomplishment is the tendency to evaluate one's achievements at work negatively (Maslach & Leiter, 1997). Emotional exhaustion is usually considered to be the central quality of burnout and the most obvious manifestation of the syndrome (Taris, Le Blanc, Schaufeli, & Schreurs, 2005).

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Scientists have proposed four major process models to describe the relationships between the burnout dimensions. [Cherniss \(1980\)](#) described a process of burnout consisting of three stages. The first stage involves an imbalance between resources and demand, i.e. stress. The second stage is the immediate, short-term emotional response to this imbalance, characterized by feelings of anxiety, tension, fatigue and exhaustion. The third stage consists of a number of changes in attitude and behaviour leading to depersonalisation.

[Leiter and Maslach \(1988\)](#) described a process model where burnout starts with emotional exhaustion, which then triggers depersonalisation, which leads to reduced personal accomplishment. Feelings of being overextended arise first as a consequence of a demanding work environment. To cope with exhaustion and stress, the overextended individual then distances himself from others and becomes cynical in his responses toward others. Once depersonalisation occurs, the individual may begin to feel ineffective on the job, and the self-evaluation of his or her accomplishments is likely to become negative.

Whereas in the previous models elevated levels of emotional exhaustion signify the onset of burnout, [Golembiewski, Munzenrider and Stevenson \(1986\)](#) consider emotional exhaustion to be the final stage of burnout. Golembiewski et al. describe a process of burnout that starts with depersonalisation, which triggers reduced personal accomplishment and ends in emotional exhaustion. They state that depersonalisation arises when professional detachment in dealing with others is no longer functional and thereby reduces the ability to form necessary relationships with others and to perform well on the job. As a consequence, the self-evaluation of job accomplishment becomes negative, the ability to cope with job demands declines, which in turn induces feelings of being overextended. [Lee and Ashforth \(1993\)](#) describe a process model of burnout in which emotional exhaustion is positively related to depersonalisation, and where personal accomplishment develops independently from depersonalisation. They state that elevated levels of emotional exhaustion have a direct effect on feelings of personal accomplishment rather than indirectly through depersonalisation ([Lee & Ashforth, 1993; Taris et al., 2005](#)).

These four major process models have in common that they considered burnout to be a one-dimensional syndrome consisting of several stages. However, the unidimensionality of burnout has been debated, as well as the exact causal relationships between the burnout dimensions ([Schaufeli & Buunk, 2003](#)).

[Taris et al. \(2005\)](#) investigated whether there were sequential relationships between the burnout dimensions by reviewing earlier research and analysing two longitudinal sets (a teacher sample and a sample of oncology care providers). The Cherniss model was not included in the review because the study only considered models with three dimensions of burnout ([Taris et al., 2005](#)). The review provided no convincing support for any particular process model. The longitudinal study tested the models of [Leiter and Maslach \(1988\)](#), [Golembiewski et al. \(1986\)](#), [Lee and Ashforth \(1993\)](#) and an integration of the latter two. The data supported the models of [Lee & Ashforth \(1993\)](#) and of [Leiter & Maslach \(1988\)](#), which both propose that burnout starts with emotional exhaustion and ends with reduced personal accomplishment. No evidence was found for the model of [Golembiewski and associates \(1986\)](#) that takes depersonalisation as a starting point.

In the integration of the model of [Lee and Ashforth \(1993\)](#) and [Leiter and Maslach \(1988\)](#) that [Taris et al.](#) construed, burnout starts with emotional exhaustion that triggers depersonalisation. This model assumes that persistent depersonalisation may lead to reduced personal accomplishment, but it also contains a separate direct effect of emotional exhaustion on reduced personal accomplishment. Furthermore they tested a feedback effect of depersonalisation over time on the other burnout dimensions. This

integrated model of [Taris et al. \(2005\)](#) showed the best fit of the data in comparison to the other models. Higher levels of exhaustion indeed triggered higher levels of depersonalisation, and higher levels of depersonalisation were associated with lower levels of personal accomplishment. Furthermore, a feedback effect of depersonalisation on exhaustion over time was reported ([Taris et al., 2005](#)). The last two effects were only found in the teacher sample, but not among oncology care providers. [Parker and Salmela-Aro \(2011\)](#) also compared and contrasted several major models for the development of school burnout in a four-wave longitudinal sample of high school students. Their results suggest that the model of [Taris et al. \(2005\)](#) provided a significantly better fit to the data than other models.

[Gustavsson et al. \(2010\)](#) applied an innovative approach to the [Cherniss \(1980\)](#) model in a study of early career burnout among nurses. Personal accomplishment is not a part of the Cherniss model. The burnout questionnaire that they used in their study, the Oldenburg Burnout Inventory (OLBI; [Demerouti, & Bakker, 2008](#)) also only measures exhaustion and disengagement. They assumed that early career burnout is a sequential developmental process that can be described in an item response theory. Their findings indicate a process consisting of three linked stages where first crisis and strain trigger exhaustion, then higher levels of exhaustion are associated with higher levels of defensive coping, which finally leads to even higher levels of exhaustion and disengagement.

[Gustavsson et al.](#) applied a probabilistic item response approach. The one-parameter item response measurement (Rasch model) has gained widespread recognition for its measurement properties and usage in constructing and evaluating measures of developmental-sequential or hierarchical attributes ([Gustavsson et al., 2010; Smith & Smith, 2004](#)). This method assumes that item scores are determined by the location of the respondent and the item, and provides information about items that do not fit the model. This method assumes an order of both participants and symptoms along a single latent continuum reflecting an individual growth sequence. This aspect of item response theory makes it possible to model a hypothesized developmental process. A score derived from this model then represents the severity of the burnout. If, for example, a person has developed depersonalisation after a period of severe emotional exhaustion, the model will assume and test that emotional exhaustion will not have disappeared, but still is present. Applying this to the [Taris model](#) would result in the prediction that a reduced sense of personal accomplishment can only develop after depersonalisation has been reported.

In most countries the OLBI is not used to assess burnout, but rather the Maslach Burnout Inventory (MBI). The aim of the current study is to investigate whether the items of the MBI can also be ordered as a sequential-developmental process by using an item response approach. In line with the [Cherniss \(1980\)](#) model and in line with the [Maslach \(1988\)](#) model we hypothesize that the emotional exhaustion and depersonalisation aspects of the MBI-HSS can be modeled as a sequential-developmental process where both items and individuals can be located in specifically defined unique phases as an indicator of a burnout process. Drawing on the complex findings regarding the development of personal accomplishment from the [Taris et al. \(2005\)](#) model, we will test whether personal accomplishment also fits in a one-dimensional model or has to be regarded as a rather independent process.

[Maslach and Leiter \(1997\)](#) proposed that engagement is the opposite of burnout. [Schaufeli and Bakker \(2003\)](#) state that burnout and engagement are two distinct dimensions, although negatively correlated. [Schaufeli and Bakker \(2003\)](#) define work engagement as a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication and absorption. In order to validate our findings, we will calculate correlations of the Rasch burnout scores

of participants with scores on the three engagement dimensions. We hypothesize that they will all be negative.

## 2. Method

### 2.1. Participants

In 2009, an estimated 149,000 nurses were active in the Netherlands (Van der Windt, Smeets, & Arnold, 2009). Divided into branches there were 71,500 nurses active in hospitals, 24,900 nurses in the mental health care sector, 15,600 nurses in the disabled care sector, 22,400 nurses in the elderly care sector, 8,700 nurses in the home care sector and 4,900 nurses in other settings. The intake of new nursing students in the Netherlands in 2008 was 3,583 nurses for Professional Education Level (Bachelor, HBO), and 6,542 for Intermediate Level (MBO, Van der Windt et al., 2009a). In 2009–2010, 2,600 new bachelor students graduated, while about 4,000 new nurses on intermediate level graduated in 2007–2008 (Van der Windt, van der Velde, & van der Kwartel, 2009). This number is fairly stable in the last years, but a shortage of nurses on the labour market is predicted (Van Essen, Kramer, van der Velde & van der Windt, 2016). An increased need for care for elderly people and for people with chronic illness because of a longer life expectancy (Van Essen et al., 2016) and aging of the nursing population might cause this effect (Hellenthal, 2012).

For practical reasons a convenience sample was used. The target sample population was reached with the assistance of higher professional schools of nursing studies.

Participants were nursing students and graduates from Zuyd University of Applied Sciences situated in Limburg, and the HAN University of Applied Sciences, situated in Gelderland. Limburg and Gelderland are both provinces in the Netherlands. To achieve a higher response rate, a call to fill out the questionnaire was made in a magazine for nurses (Zorg anno NU), and through Twitter. The following inclusion criteria were used. First, participants had to work (at an internship) at least six months prior to this study. They had to work in a nursing setting throughout the period of this study. Second, participants had to have a maximum working experience of three years since graduation. Although a criterion of three years for early career burnout is rather arbitrary, we used the criterion in accordance with Gustavsson and associates (2010). From the database of nursing students and graduates from Zuyd University of Applied Sciences, 323 nurses (260 students and 63 graduates) met the criteria and were asked to fill out a questionnaire. The response was 39% (127 participants). Due to privacy requirements, the HAN University of Applied Sciences contacted students and alumni themselves from their own database. As they did not provide information about the population size, it was not possible to calculate the response rate. The dissemination of the questionnaire at HAN University of Applied Sciences resulted in an additional 110 participants who filled in the questionnaire. There was no additional response through Twitter and the appeal via the magazine.

This resulted in a total of 237 participants (127 participants from Zuyd University and 110 participants from HAN University). The average age was 24 years, ( $SD = 7.7$ ) with a range of 17–58 years. In our sample 209 participants were female (88%) and 28 participants were male (12%). The average number of working hours per week was 31 h ( $SD = 6.9$ ), with a range of 10–50 h. 74 participants (31%) were working and had graduated from school, 79 participants (33%) were working in an internship while still attending school, 67 participants (28%) had just finished an internship and 17 participants (7%) had a different job/school characteristic. Of the total sample, 120 respondents (51%) were working in a general hospital, 48 respondents (20%) in mental health care, 7 respondents

(3%) in the handicapped care, 24 respondents (10%) in a nursing home, 26 (11%) of the respondents in the homecare and 12 (5%) in another care setting. The educational level of the respondents was Higher educational level (Bachelor, HBO, level 5, 201 respondents, 85%), educational level (MBO, level 3 & 4, 21 respondents, 9%) and academic or else (15 respondents, 6%). The scores on the MBI-HSS were  $M = 1.39$ ,  $SD = 0.92$  for emotional exhaustion,  $M = 0.80$ ,  $SD = 0.61$  for depersonalisation, and  $M = 4.11$ ,  $SD = 0.73$  for personal accomplishment. The percentages of average to low scores compared to a Dutch normgroup of healthcare workers were 81.1% for emotional exhaustion, 90.8% for depersonalisation and 79.8% for personal accomplishment, while consecutively, 18.9%, 9.2% and 20.2% of the sample scored high to very high (Schaufeli & van Dierendonck, 2000).

Permission to carry out the study was granted by the Commission of Nursing Studies from Zuyd University of Applied Sciences. The HAN University of Applied Sciences took notice of this decision and subsequently also gave approval. Participants were informed about the purpose of the research and the possibility to terminate their participation at any time. This was stated in an informed consent form which participants had to sign before filling out the questionnaire.

### 2.2. Design

The design of this study is a cross-sectional survey. By using an item response approach it is possible to model a theory driven underlying process of burnout based on the severity of symptoms, represented in items, and the level of severity of the burnout in a person.

Minimal sample size criterion is 100 respondents. For Rasch analysis with principal component analysis, 100 persons is a useful criterion to obtain reliable findings (Arrindell & van der Ende, 1985). In addition it is advised for Rasch measurement to have at least 10 observations for each category with polytomous data (Linacre, 2002). The MBI-HSS has 7 categories per item, meaning that, at least 70 respondents are required for Rasch analysis.

All respondents were asked to fill in an anonymous online questionnaire by e-mail. The questionnaire was made available through Thesistools, a software program for conducting online studies.

### 2.3. Instruments

Self-report instruments were used, measuring background characteristics, dimensions of burnout and engagement. For the measurement of burnout there are several questionnaires. Gustavsson and associates (2010) used the Oldenburg Burnout Inventory, which is a questionnaire measuring the burnout dimensions of exhaustion and disengagement and the opposite poles of burnout, energy and engagement (Demerouti & Bakker, 2008; Kristensen, Borritz, Villadsen, & Christensen, 2005). The questionnaire has good psychometric characteristics. However, it is not appropriate for this research because the dimension personal accomplishment is missing. The most widely-used questionnaire is the Maslach Burnout Inventory (Maslach & Jackson, 1981). It is said that over 90% of the journal articles and dissertations use the MBI-HSS for the measurement of burnout (Schaufeli, Bakker, Hoogduin, Schaap, & Kladler, 2001; Schaufeli & Enzmann, 1998). Because of the widely accepted use and good psychometric characteristics, the Dutch version of the Maslach Burnout Inventory-Human Services Survey (MBI-HSS) was used (Maslach & Jackson, 1981; Schaufeli & Dierendonck, 2000). The MBI-HSS consists of 20 items, which measure emotional exhaustion (8 items), depersonalisation (5 items) and personal accomplishment (7 items). The items are measured on a 7-point Likert scale, ranging from 1 (never) to 7 (always). High scores on the scales emotional exhaustion and depersonalisation, and low scores on

personal accomplishment indicate burnout. Examples of items are: “I feel frustrated by my job” (emotional exhaustion), “I worry that this job is hardening me emotionally” (depersonalisation), and “In my work I deal with emotional problems very calmly” (personal accomplishment). Reported internal consistency is generally high, with Cronbach’s alphas of 0.89 for emotional exhaustion, 0.69 for depersonalisation, and 0.84 for personal accomplishment (Maslach & Jackson, 1981; Schaufeli & van Dierendonck, 2000). In our study Cronbach’s alphas are 0.88 for emotional exhaustion, 0.57 for depersonalisation and 0.95 for personal accomplishment. The alpha of depersonalisation cannot directly be compared to the alpha’s from the other scales as it has fewer items than personal accomplishment or emotional exhaustion. Correcting the alpha with the Spearman-Brown prediction formula resulted in an alpha of 0.65 for depersonalisation.

Work engagement was measured by the Dutch engagement questionnaire (UBES, Schaufeli & Bakker, 2003). The questionnaire consists of 17 items measuring vigor (6 items), dedication (5 items) and absorption (6 items) and uses the same 7-point Likert scale, as the burnout questionnaire, ranging from 1 (never) to 7 (always). The internal consistency in this study was adequate, with Cronbach’s alphas of 0.83 for vigor, 0.88 for dedication, and 0.71 for absorption.

#### 2.4. Analysis

A Rasch measurement model was used. This measurement model is a mathematical model describing how the different individual’s particular responses to specific items in a multi-item instrument should be ordered. The Rasch model is part of the item response theory. In comparison to classic test theory, item response theory (modern test theory) is different in its assumptions of measurement. For instance, in classic test theory, a measure of reliability always takes into account a measure of distribution (dispersion), most likely the variance, which is based upon a distribution or population (Verhelst, 1993). Reliability is for this reason always population dependent. Second, in classic test theory a true score is always test-specific, and for this reason it is not always clear if a score is indicative for the abstract concept the test aims to measure. In item response theory, a score is not test-specific but dependent of the individual responses and the items. Third, with classic test theory it is not possible to empirically examine the test level, i.e. whether the variables are of ordinal or interval level. By using item response theory, the test level follows from the theory. An important assumption in Rasch model is the unidimensionality of residuals. To assess the unidimensionality of the burnout scales Confirmatory factor analysis (CFA) was used. The following models were tested: (1) a one-factor model with all items from the three MBI-HSS subscales; (2) a two-factor model with personal accomplishment as a factor and emotional exhaustion and depersonalisation as a one-dimensional factor; (3) a three factor model with a correlation between depersonalisation and emotional exhaustion, but no correlation with personal accomplishment; (4) and orthogonal three factor model based on the three theoretical constructs, emotional exhaustion, depersonalisation, and personal accomplishments; and (5) an oblique three factor model with the same factor structure as model 4. To interpret a model’s fit, the following indicators were used: Root Mean Squared Error of Approximation (RMSEA) below 0.05 and Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) above 0.95 indicate good fit (Browne & Cudeck, 1992) and RMSEA below 0.08 and CFI and TLI above 0.90 indicate acceptable fit (Hu & Bentler, 1999). The results of a CFA were used as a starting point for the Rasch Analysis. After that, a Partial Credit Model (PCM) was estimated in order to allow for the identification of items where response ordering is not cumulative. The data was analysed with R statisti-

**Table 1**  
Confirmatory factor analysis: Fit statistics of the tested burnout models.

model	AIC	$\chi^2$ (df)	CFI	TLI	RMSEA
1 1-factor	12033.180	1600.17 (152)	0.378	0.300	0.214
2 2-factor	10722.70	287.70 (151)	0.941	0.933	0.066
3 3-factor, no correlation PA	10697.10	262.10 (151)	0.952	0.946	0.059
4 3-factor orthogonal	10801.58	368.58 (152)	0.907	0.895	0.083
5 3-factor correlated	10699.15	260.15 (149)	0.952	0.945	0.060

Notes: AIC = Akaike’s information criterion,  $\chi^2$  = chi-square, df = degrees of freedom, CFI = Comparative fit index, TLI = Tucker-Lewis Index, RMSEA = Root mean square error of approximation.

cal software (R Core Team, 2013). CFA’s were conducted with the lavaan-package (Rosseel, 2012) and Rasch models were tested with the eRm-package (Mair & Hatzinger, 2007). The scores on the MBI Personal Accomplishment scale were reversed before they were used in the CFA and in the Rasch analysis so that higher scores in these analyses were always associated with more severe levels of burnout.

### 3. Results

#### 3.1. Confirmatory factor analysis

The dimensionality of the burnout construct measured with the (MBI-HSS) was tested with confirmatory factor analysis (CFA). For this analysis the scores of the personal accomplishment scale were reversed first. The results are summarized in Table 1.

Item EE8 (“end of my rope”) consistently came up as a Heywood case (negative estimated variance) and was removed from further analysis. The one factor model showed a very poor fit (model 1; CFI=0.38, TLI=0.30, RMSEA=0.21), indicating that the MBI-HSS measured a multidimensional construct, which violated the Rasch assumption of unidimensionality. The fit of the alternative models ranged from acceptable to good. The best model was the three-factor model without correlations for factor PA (model 3; CFI=0.95, TLI=0.95, RMSEA=0.06). The difference between the fully correlated three-factor model and model 3 was not significant ( $\chi^2(2)=1.94$ ,  $p=0.622$ ). However, the interfactor correlation between depersonalisation and emotional exhaustion was  $r=0.77$ . Due to the very high overlap between these two factors, model 2 (depersonalisation and emotional exhaustion as one unidimensional factor, versus personal accomplishment) was chosen as the preferred model, which has an acceptable fit (CFI=0.94, TLI=0.93, RMSEA=0.07). The interfactor correlation between PA and the combined scale (EE and DP) was  $r=0.08$ ,  $t(207)=1.11$ ,  $p=0.28$ . Based on the CFA, emotional exhaustion and depersonalisation could be considered unidimensional, whereas personal accomplishment needed to be considered as a distinct separate factor. This was confirmed by the Anderson Likelihood Ratio (LR) test for testing the unidimensionality of residuals. The combined scale (EE and DP) was unidimensional, Anderson-LR (103)=63.11,  $p=0.99$ , and the PA scale was unidimensional, Anderson-LR(431)=209.53,  $P=0.99$ . For this reason, Rasch analysis was performed on the items from the depersonalisation and emotional exhaustion scales and separately on the personal accomplishment scale.

#### 3.2. Verification of the order of response categories

Despite the good fit of the MBI-HSS in the factor analysis, an evaluation of the initial symptom severity and response-scale thresholds revealed that all 11 items demonstrated disordered response categories. The most severe disordering occurred in items pertaining to depersonalisation and was most likely caused by the limited number of responses higher >2. To counter this, the original seven responses in the disordered items were collapsed until

**Table 2**  
Recoded Maslach Burnout Inventory response scale.

Original scale	0	1	2	3	4	5	6
EE1 drained	0	1	2	3	3	3	4
EE2 used up	0	1	2	3	3	4	5
EE3 fatigued	0	1	2	3	3	3	4
EE4 strain	0	1	1	1	1	2	2
EE5 burned out	0	1	2	2	2	2	3
EE6 frustrated	0	1	2	2	3	3	3
EE7 working too hard	0	1	2	3	3	4	4
DP1 objects	0	1	2	2	2	3	3
DP2 callous	0	1	1	1	1	1	2
DP3 hardening	0	1	1	1	2	2	2
DP4 don't really care	0	1	2	3	3	3	3

Note: EE items are emotional exhaustion items. DP items are depersonalisation items.

**Table 3**  
Symptom severity, and item fit statistics in a Rasch model for the MBI Exhaustion and Depersonalisation items.

	Location	Chi <sup>2</sup> (202)	p-value	MSQ	
				Outfit	Infit
EE3 fatigued	-0.31	173.35	0.93	0.85	0.86
EE7 working too hard	0.15	226.67	0.11	1.12	1.02
EE1 drained	0.18	143.32	1.00	0.71	0.73
EE2 used up	0.87	162.43	0.98	0.80	0.81
EE6 frustrated	1.15	134.65	1.00	0.66	0.69
DP1 objects	1.15	209.47	0.34	1.03	1.06
EE5 burned out	1.17	144.42	1.00	0.71	0.79
DP4 don't really care	1.99	299.61	0.00	1.48	1.46
DP3 hardening	2.66	146.65	1.00	0.72	0.78
EE4 strain	3.81	65.76	1.00	0.32	0.87
DP2 callous	4.27	745.41	0.00	3.67	1.02

Note: EE items are emotional exhaustion items. DP items are depersonalisation items.

**Table 4**  
Item fit statistics in a Rasch model for the MBI Personal accomplishment scale.

	Location	Chi <sup>2</sup> (202)	p-value	MSQ	
				Outfit	Infit
PA6 achievement	1.54	163.53	0.99	0.79	0.81
PA3 positive influence	1.50	213.31	0.39	1.02	1.04
PA1 empathy	1.45	157.83	1.00	0.76	0.71
PA4 relaxed	1.43	133.09	1.00	0.64	0.62
PA2 problem solving	1.40	162.27	0.99	0.78	0.76
PA5 cheer up	1.40	157.67	1.00	0.76	0.75
PA7 emotional problems	1.05	285.96	<0.001	1.37	1.32

Note: PA = personal accomplishment.

all items had monotonously increasing thresholds. The emotional exhaustion items in general needed the least collapsing; the depersonalisation item needed the most collapsing. The final recoding resulted into three categories (0–2) for three items, four categories (0–3) for four items, five categories (0–4) for three items, and six categories (0–5) for one item; all in order of symptom severity. The resulting recoded MBI-HSS scoring is shown in [Table 2](#).

### 3.3. Item severity hierarchy

In [Table 3](#) the item locations are sorted, from top to bottom, in ascending order of symptom severity. How these locations relate to the thresholds on the latent variables is summarized in the person-item Map in [Fig. 1](#) (emotional exhaustion, depersonalisation) and [Fig. 2](#) (personal accomplishment). At these thresholds, it is equally likely a person will be classified into adjacent categories, and therefore to obtain one of two successive scores on the item. The mean of

the threshold locations within an item is represented by the location parameter. The locations range from -0.31 to 4.27 logits, where 'callous (DP2)' was the item representing the most severe symptom and 'fatigued (EE3)' was the least severe symptom. The item-fit to the Rasch model is also summarized in [Table 3](#). Both the Outfit and Infit provide information regarding residuals in comparison to the predicted model. If Outfit and Infit are equal to 1, the observed variance is equal to the predicted variance. An Infit of 1.02 'working too hard' (EE7) means that the item has 2% more variance than the predicted model ([Lai, Cella, Chang, Bode, & Heinemann, 2003](#)). All the items, except 'effectively (DP2)' and 'don't really care (DP4)' fit within the Rasch model and have Infit and Outfit Mean Squared Errors that are productive for measurement. The items 'effectively (DP2)' and 'don't really care (DP4)' suffer from a low outfit MSQ, indicating that respondents with low burnout, score lower on those items than expected, whereas respondents with high burnout score higher on these items than expected based on the Rasch model. This is most likely due to the reduction of the scale range and the few respondents with scores > 2 on these items.

### 3.4. Construct validity of the rasch burnout scale

An individual score of a person on the Rasch scale for burnout is expressed in a theta score. Correlations of the theta scores with the classical MBI scores were high,  $r = 0.93$ ,  $p < 0.001$  for emotional exhaustion, and moderately strong  $r = 0.59$ ,  $p < 0.001$  for depersonalisation. In order to validate the Rasch burnout model against other constructs, we also included a measure of work engagement (UBES, [Schaufeli & Bakker, 2003](#)). The correlations of theta scores for burnout with vigor,  $r = -0.45$ ,  $p < 0.001$ , dedication,  $r = -0.42$ ,  $p < 0.001$ , and absorption,  $r = -0.21$ ,  $p < 0.001$ , are all negative and significant, which is indicative of good construct validity.

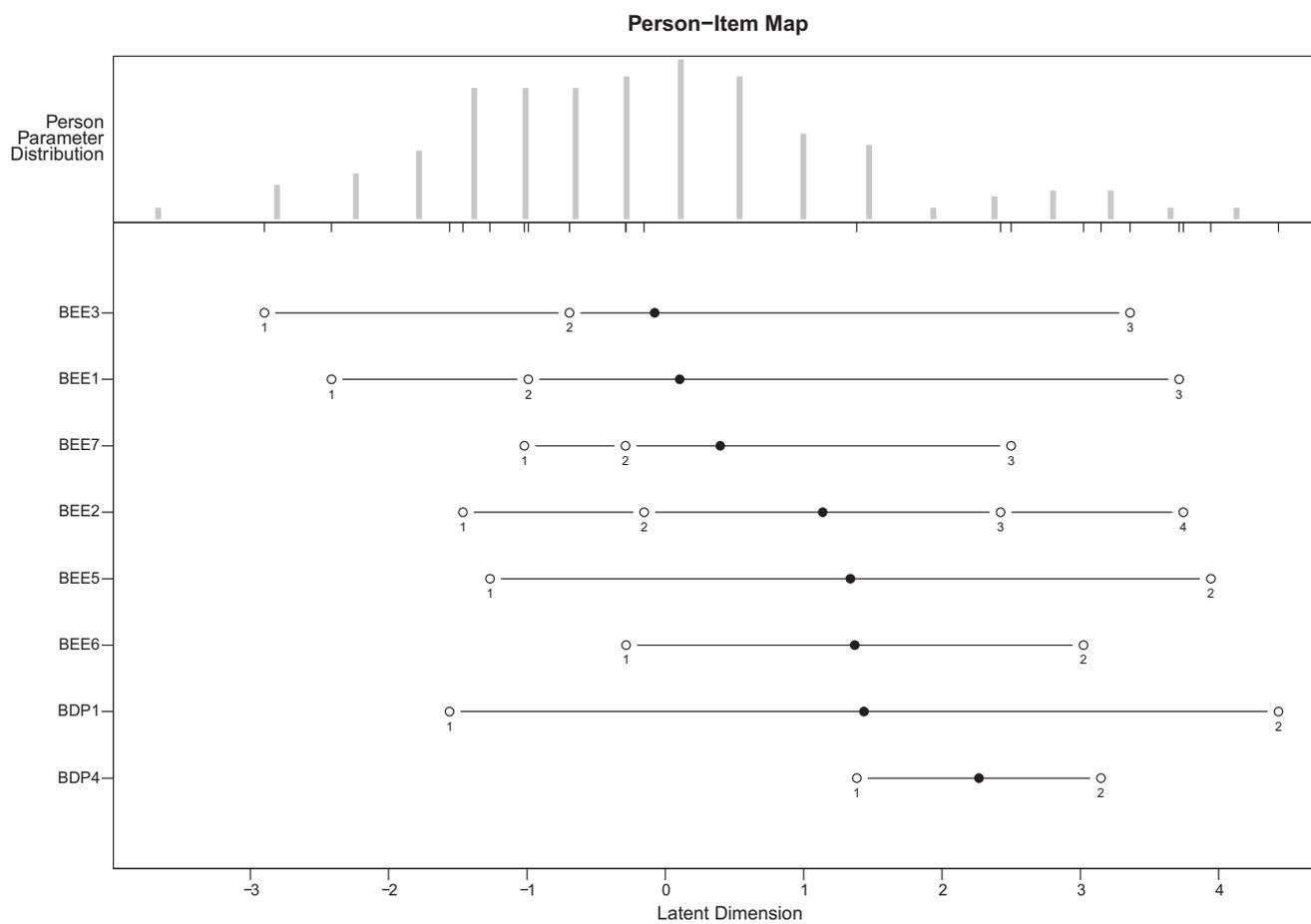
### 3.5. Personal accomplishment scale

Rasch analysis on the personal accomplishment scale showed that no reordering of scores on items was necessary. All items showed monotonously increasing scores. All item locations were centred on one and a half standard deviation higher than the average latent PA. The range in level of personal accomplishment in these items is low, with a location of 1.05 for PA7 and a level of 1.45 for PA6. The results are summarized in [Table 4](#). The correlation of the Rasch theta score for burnout with the Rasch theta score for personal accomplishment was  $r = 0.08$ , n.s. The burnout Rasch scale and the personal accomplishment scale are not related to one another.

## 4. Discussion

This study shows a hypothesized model of early career burnout among nurses as a sequential-developmental process consisting of several phases, where personal accomplishment seems to develop independently. The hypothesis about the unidimensionality of emotional exhaustion and depersonalisation could be accepted, but only after personal accomplishment was identified as a separate dimension and analysed separately in a second Rasch model. Early career burnout starts with fatigue and ends with severe exhaustion and depersonalisation towards patients. The items measuring personal accomplishment all have an almost similar difficulty level and similar thresholds. Seen from a measurement perspective, they give the same information, which makes them not very suitable to measure changes in personal accomplishment that might be associated with changes in levels of burnout. For this purpose, new items for measuring personal accomplishment would have to be developed.

Our study is a conceptual replication of the findings that [Gustavsson et al. \(2010\)](#) reported in their work on early career



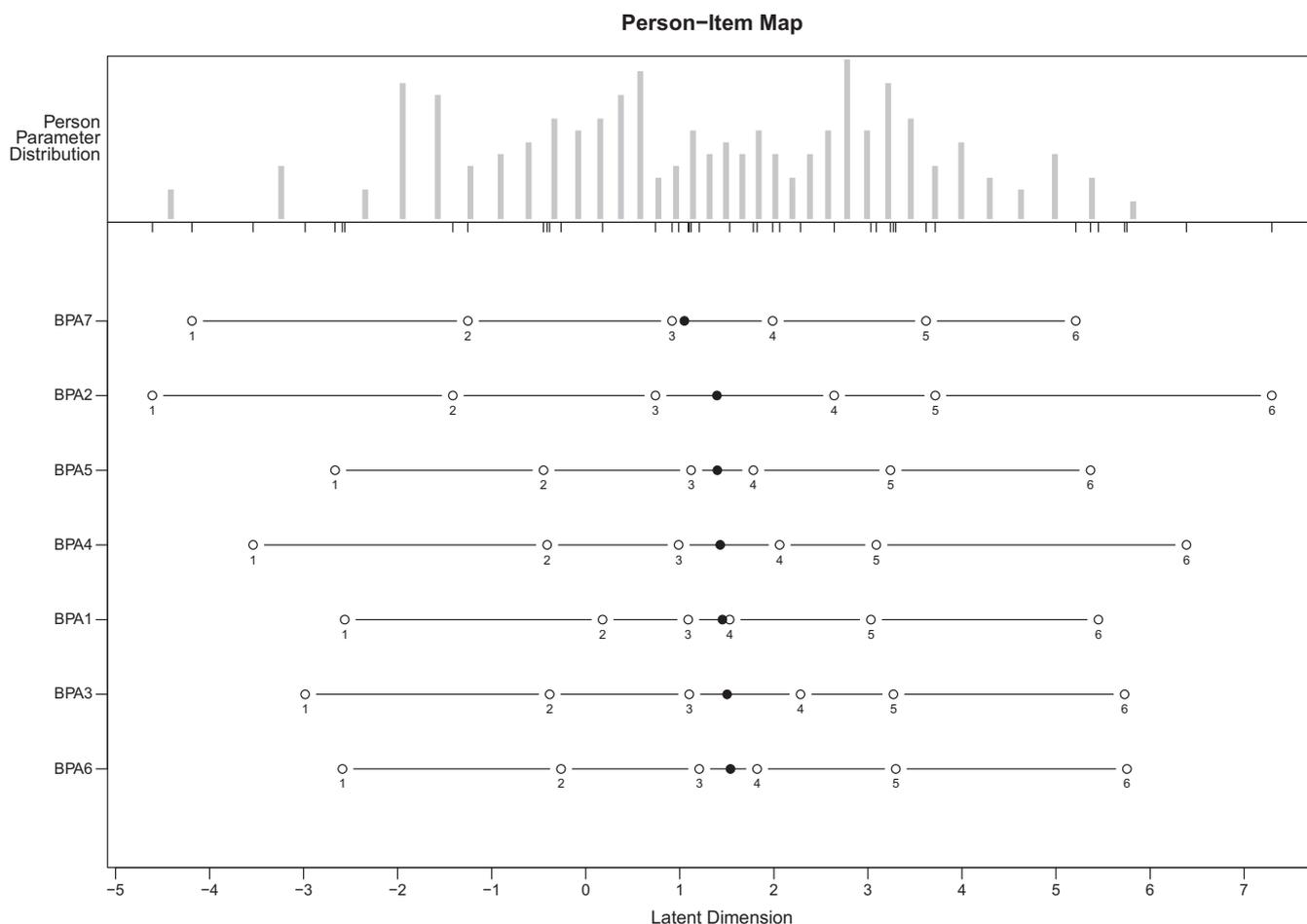
**Fig. 1.** Person-Item Map showing location parameters of the recorded items across the latent burnout variable for subscales emotional exhaustion and depersonalisation. The top of the figure shows the sample distribution over the latent variable.

burnout among Swedish nurses. Burnout clearly develops along the lines of emotional exhaustion and depersonalisation as outlined by Cherniss (1980) and by Leiter and Maslach (1988). But partially in line with the Taris et al. (2005) model, personal accomplishment seems to develop on an independent track. A comparison of the emotional exhaustion and depersonalisation findings of our study with the Gustavsson et al. (2010) study results in striking similarities.

The symptom severity hierarchy in Table 3 shows a good fit for the one-dimensional sequential developmental model of burnout from Cherniss (1980). A person who endorses an item will most likely also endorse items with equally severe symptoms. Therefore, the items with similar severity can be clustered together in three stages. The least severe complaints are captured in emotional exhaustion items ('fatigued' (EE3), 'drained' (EE1), and 'working too hard' (EE7) representing the first stage of crisis and strain. In the second stage, emotional exhaustion persists ('used up' (EE2), 'frustrated' (EE6), 'burned out' (EE5)), with a start of defensive coping ('objects' (DP1), 'don't really care' (DP4)). In the last phase the most severe exhaustion items ('strain' (EE4)) are located, together with two depersonalisation items ("hardening" (DP3) and "callous" (DP2)). Gustavsson et al. (2010) labelled their three stages as a "suffering from pressure" stage, followed by a "frustration" stage, and finally a "withdrawal and detachment" stage. The same labels can easily be applied to the three stages in our findings. We conceptually replicated a Rasch model for burnout for the MBI that was earlier found with the OLBI. If our findings with the MBI can be replicated, a much easier one-dimensional screening tool for burnout might a result.

Although many scientists will state that reduced personal accomplishment is a dimension of burnout (Lee & Ashforth, 1993; Maslach & Jackson, 1981; Taris et al., 2005), other researchers question this (Friedman, 1993; Kristensen et al., 2005; Schutte, Toppinen, Kalimo, & Schaufeli, 2000). Our findings suggest that personal accomplishment develops largely independent from the other two burnout dimensions. Earlier work by Friedman (1993) on burnout in teachers also showed that depersonalisation and emotional exhaustion develops to a climax of burnout, independent from personal accomplishment. These results also support earlier work by Walkey and Green (1992), who showed that scores on the MBI questionnaire can be explained by two main factors. The first is explained as the 'core of burnout' and consists of the scales emotional exhaustion and depersonalisation; and the second factor is personal accomplishment, which develops independently from the other scales.

Schutte and associates (2000) state that the dimension personal accomplishment may not be part of the burnout concept. Houkes, Winants, Twellaar, and Verdonk (2011) investigated the etiology of burnout and found no evidence of personal accomplishment as a dimension of burnout among men. For women, they did find evidence for personal accomplishment as a dimension of burnout, but reduced personal accomplishment was only triggered when higher levels of depersonalisation arose. One might conclude that the relation of personal accomplishment with the core dimension of burnout is complicated and that gender has to be taken into account. Our sample mainly consisted of woman and this precludes analyses that might shed more light on the gender issue in burnout.



**Fig. 2.** Person-Item Map showing location parameters of the items across the latent burnout variable for the subscale personal accomplishment. The top of the figure shows the sample distribution over the latent variable.

In comparison with norm tables, the “classical” mean score on personal accomplishment of the nurses in our sample is average (Schaufeli & van Dierendonck, 2000). Duchscher (2009) states that lack of practice experience and confidence, unrealistic performance expectations from their surroundings (institution, colleagues) and themselves, loss of control over their professional role, and insecurities in communicating and relating to new colleagues, are common among nurses during the initial months of work.

There are several limitations in this study. The first one concerns the design of the study, a cross-sectional survey consisting of only one measurement. To test a hypothesis about the development of a syndrome over time is difficult. A longitudinal design with at least two moments of measurement would be more appropriate, moreover a design with much more measurements such as in experience sampling methodology might be required.

The second shortcoming concerns the sample, which covered a normal working population, i.e. relatively healthy workers, whereas those who are ill, or have left their work of stress-related problems are not considered. Therefore our research might suffer from what is called the “healthy worker effect” (Schaufeli et al., 2001). Because we used a convenience sample, one might argue on the other hand that more nurses who suffered from burnout complaints chose to participate in this study. As the model should be applicable to exactly this population, this should not pose a threat to the validity of the model.

This study has theoretical and practical implications. Understanding the process of early career burnout can facilitate early

recognition of burnout among nurses. A clear score to measure the degree of burnout or the burnout phase someone is experiencing gives practical benefits such as early treatment, directions for treatment and prevention. These findings should be replicated for other professions, and among workers who already suffer from work stress-related health problems. The use of longitudinal studies to replicate these findings is recommended to confirm early career burnout as a process starting with exhaustion.

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