

## Original Article

# Classification of burnout according to the Maslach Burnout Inventory-General Survey: Five classifications according to the exhaustion+1 criterion

Kazuyo Kitaoka<sup>1)</sup>, Shinya Masuda<sup>2)</sup>

<sup>1)</sup>Faculty of Health Sciences, Institute of Medical, Pharmaceutical and Health Sciences, Kanazawa University

<sup>2)</sup>Faculty of Nursing and Medical Care, Keio University

### Key words

burnout, MBI-GS, occupational mental health, stress, classification

### Abstract

The Maslach Burnout Inventory (MBI) is the golden standard for the assessment of burnout. But, the MBI comprises three subscales (exhaustion, cynicism, professional efficacy), so interpretation can be difficult. There is no generally accepted classification of burnout. We aimed at classifying scores on the MBI-General Survey according to the exhaustion+1 criterion and applying neural test theory to the classification of results. We obtained data from a mental health examination we had performed in 2008 targeting on 1553 employees of a computer industry firm. The valid data for 1042 employees (669 men, 373 women) were used in the present analysis. The results suggested five classifications. Those meeting the exhaustion+1 criterion (a high score for exhaustion and a high score for cynicism, or a low score for professional efficacy) were judged as experiencing burnout, and those who additionally have both a high score for cynicism and a low score for professional efficacy were considered as experiencing severe burnout. Those with only a high exhaustion score were simply classified as being very exhausted. We also suggested increased attention to those without exhaustion but with high cynicism scores as they were at risk of depression. Those falling under none of the above were considered healthy.

### Introduction

The Maslach Burnout Inventory (MBI) is the golden standard for assessing burnout<sup>1)</sup>. Unlike the MBI-Human Services Survey (MBI-HSS)<sup>2)3)</sup>, which targets persons in only the human services sector, and the MBI-Educators Survey (MBI-ES)<sup>4)</sup>, which targets only educators, the MBI-General Survey (MBI-GS)<sup>5)</sup> is intended for use with individuals in any profession, making

it much more versatile. Furthermore, while the MBI-HSS and MBI-ES address emotional exhaustion, depersonalization, and reduced personal accomplishment, the MBI-GS covers exhaustion, cynicism, and diminished professional efficacy in slightly broader constructs. The MBI-GS has been translated into many languages, including French<sup>6)</sup>, German<sup>7)</sup>, Dutch<sup>8)9)</sup>, Swedish<sup>10)</sup>, Finnish<sup>11)</sup>, Japanese<sup>12)</sup>, and Chinese<sup>13)</sup>, and the

validity and reliability of each translation has been verified. For these reasons, the MBI-GS is frequently used in burnout research. Maximally effective use of this measure, however, still requires further research.

One area requiring further investigation is how to determine when burnout exists, and there is as yet no generally accepted classification of its severity. The MBI-GS comprises three subscales, so interpretation can be difficult. For example, when results indicate high score on one subscale but low scores on the others, it is difficult to say whether burnout is indicated. Accurate assessment of burnout is an essential step toward taking effective measures to combat it and will help those who take the MBI-GS to better understand their results. On the other hand, a clear determination of burnout risk can lead to negative labeling. To minimize this, judgment criteria with sufficient theoretical support and an understanding of the limitations of the test are needed. Therefore, the goal of the present study is to classify scores on the three subscales of the MBI-GS with theoretical support.

Some researchers use the sum of the three scores. Lewiston, Conley, & Blessing-Moore<sup>14)</sup> used the first version of the MBI<sup>2)</sup> to investigate burnout, calculating the mean numerical response for each subscale and using the values to derive the individual burnout index (BI). Subscale scores were given equal weight, and BI is defined as emotional exhaustion + depersonalization - personal accomplishment + 10. The score on the personal accomplishment subscale is subtracted because it is the loss of personal accomplishment that contributes to burnout. To ensure that all scores are positive, 10 is added to the sum of the subscale scores. A calculation method by Kalimo et al.<sup>15)</sup>, who adapted the MBI-GS to Finnish, was used in the Finnish Health 2000 Study<sup>16)</sup>. There, a weighted sum of the subscale scores was calculated to give exhaustion, cynicism, and professional efficacy different weights in the assessment of burnout (0.4 exhaustion + 0.3 cynicism + 0.3 lack of professional efficacy). Then, burnout and the dimensional scores were categorized as follows: no burnout (0–1.49), mild

burnout (1.50–3.49), and severe burnout (3.50–6). In this categorization scheme, burnout is severe when symptoms are experienced approximately daily or weekly, mild when symptoms exist monthly, and absent when symptoms are experienced no more than a few times a year (including never). These two approaches are different from the view of Maslach<sup>17)</sup> in that burnout is a multifaceted phenomenon and a simple sum of the three subscale scores is inappropriate. Shanafelt et al.<sup>18)</sup> defined burnout as a high score on the emotional exhaustion or depersonalization subscales. They did not include the subscale scores for personal accomplishment in the criteria for burnout. To assess burnout on the basis of MBI-HSS responses, independent subscale scores are calculated for each of the three domains of burnout. Low, average, and high scores for each domain correspond to, respectively, a score in the low, medium, and high tertiles of scores.

Brenninkmeijer & Van Yperen<sup>19)</sup> introduced the exhaustion+1 criterion. It is commonly held that exhaustion comes first during the burnout process, followed by cynicism and reduced professional efficacy<sup>20)</sup>. In line with this idea, subjects with intense exhaustion and either a high level of cynicism or a low level of professional efficacy, or both, were considered to have burned out. Brenninkmeijer & Van Yperen<sup>19)</sup> added a “related to work” condition and used the 10th version of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) to compare a control group with a group of persons with clinically diagnosed neurasthenia. In this test, the exhaustion+1 criterion clearly separated both groups. Kitaoka-Higashiguchi et al.<sup>21)</sup> showed that midlevel managers exhibiting burnout according to the exhaustion+1 criterion had increased risk of arteriosclerotic disease within 4–5 years of the study. The exhaustion+1 criterion is thus considered relatively established as an appropriate judgment criteria for burnout.

## Aim

In this study we aim at classifying scores on

the three subscales of the MBI-GS according to the exhaustion+1 criterion<sup>19)</sup> and applying neural test theory (NTT)<sup>22)</sup> to the classification of the results. On the basis of the results obtained, we propose a revised exhaustion+1 criterion.

NTT is a testing theory newly developed by Shojima<sup>22)</sup>. It assumes a latent ordinal scale (a potential rank scale) that reflects factors such as academic achievement and personality, thereby allowing test standardization. In contrast to item response theory, which assumes a continuous scale, NTT positions responses on an ordinal scale. One characteristic of NTT is that it describes response trends by rank, making it easier to grasp, for example, learning-related issues. If it is possible to perform appropriate ranking by applying NTT to burnout evaluation, factors peculiar to each rank should be identifiable. This would potentially lead to more effective intervention methods. Analogously to item response theory's strength on continuous characteristics, NTT can provide detailed insights regarding rank characteristics and thereby help to improve diagnostic measures. For this reason, we use NTT for classification of burnout level.

## Methods

### 1. Material

We obtained data from a mental health examination we had performed in 2008 targeting on 1553 employees of a computer industry firm<sup>23)24)</sup>. The valid data for 1042 employees (669 men, 373 women) were used in the present analysis. Of the examined employees, 122 were in their twenties, 291 were in their thirties, 428 were in their forties, 169 were in their fifties, and 31 were in their sixties (one age-unknown data). The average length of employment was 15.7 years (SD = 10.6). A variety of job duties was covered, including hardware and software engineers, salespersons, clerical workers, and manufacturing workers.

We acquired the data necessary for analysis of the Japanese version of the MBI-GS<sup>12)</sup>, the Japanese version of the Center for Epidemiologic Studies Depression (CES-D) scale<sup>25)</sup>, and the Japanese version of the Job Content Questionnaire

(JCQ)<sup>26)27)</sup> used for the mental health examination.

The following steps were taken with respect to ethics in this study. Participation in the mental health examination was voluntary. The data gathered for the analyses performed in previous study did not include names, employee identification numbers, or other personal information that could be used to identify or contact volunteers. This study was performed after review and approval of the research plan by Kanazawa Medical University's epidemiological research ethics review board.

### 2. Measures

#### 1) The Japanese version of the MBI-GS

We used the Japanese version<sup>21)</sup> of the MBI-GS<sup>5)</sup>. The Japanese MBI-GS is a 16-item measure covering exhaustion, cynicism, and professional efficacy. Responses are ranging from never to every day.

#### 2) The Japanese version of the CES-D

The CES-D<sup>28)</sup> is a diagnostic tool for assessing 20 common symptoms of depression and has been used extensively in studies of depression in general populations. It uses a 5-point Likert scale to assess the frequency of depressive states. The Japanese version of CES-D<sup>25)</sup> was used in the present study. The reliability and validity of the Japanese version have been previously verified.

#### 3) The Japanese version of the JCQ

The JCQ developed by Karasek<sup>29)</sup> was used. The Japanese version of the JCQ was developed by Kawakami et al.<sup>26) 27)</sup> in collaboration with Karasek. The authorized Japanese version of the JCQ (ver. 4/23/96) was adopted for both the questions and scoring method. In the present study, the job demand scale ("demand") and the decision latitude scale ("control") were used.

### 3. Analysis

1) Comparison and investigation of two taxonomies

(1) Eight patterns of the exhaustion+1 criterion

Following the exhaustion+1 criterion, we calculated the 75th percentile for the MBI-GS subscale scores and used those as cutoff points for exhaustion and cynicism; we used the subscale

score corresponding to the 25th percentile as the cutoff point for professional efficacy subscale. The exhaustion+1 criterion classifies evaluated individuals into “burnout” and “non-burnout” categories only, but in this study we perform classification into eight categories, one for each of the eight combinations of high/low rankings on the three subscales. Each pattern is named using H (high) or L (low) for exhaustion, cynicism, and professional efficacy, in that order. It bears particular mention that H (resp., L) is used for low (resp., high) professional efficacy so that all H scores have the same polarity. For example, people scoring below the cutoff scores for exhaustion, cynicism, and professional efficacy are categorized in the LLH group. Eight patterns are shown in Table 1.

## (2) NTT classification

Implementing NTT requires a guarantee of one-dimensional data. Exhaustion and cynicism can be conceptually distinguished between, but they are highly correlated and can be treated as having a single dimension for factor analysis. The same cannot be said for professional efficacy, however, so in this study we used the ten items related to exhaustion and cynicism for analysis.

NTT analysis furthermore requires advance specification of the number of latent ranks, and there are several things that should be considered when specifying the number of ranks. A more detailed investigation is possible when there are many ranks; conversely, when there are few items fitness can suffer. Furthermore, comparison with the exhaustion+1 criterion is facilitated by having a comparable rate of burnout designation. Those meeting the exhaustion+1 criterion accounted for 17.9% of the population. NTT under a uniform distribution should result in approximately equal populations for each rank, so we performed analysis over five ranks. We used Exametrika 5.3<sup>30)</sup> to apply NTT (using the NTT stage model), and performed estimations by using a self-organizing map. NTT uses item difficulty, item degree of discriminancy, and item monotonicity as an item reference profile to represent statistical characteristics. It is prefer-

able that each item is monotonically increasing, a condition called the strong order arrangement condition (SOAC). The SOAC was fulfilled for analysis of the five ranks. We furthermore performed analysis using from four to eight ranks, but most fitness indices indicated that the use of five ranks was superior, and thus that the analysis was appropriate.

## (3) Comparison of the eight-pattern and NTT classifications, and a new judgment criterion

We performed comparison of the eight-pattern and NTT classifications by analyzing the depression state (16 point and more of the Japanese CES-D scores is considered to be a risk of depression state<sup>25) 28)</sup>) and demand-control models (the higher the demands of the job, the greater the stress on workers, and the lower the degree of control, the greater the stress on workers<sup>29)</sup>) because burnout was assumed to precede depression<sup>31)</sup>, particularly in the case of work-related issues<sup>32)</sup>. The determination of whether someone was experiencing burnout can therefore reasonably be performed in the context of these variables. From the results of this comparison and investigation, we considered a new judgment criterion.

## Results

### 1. Subject classification

Eight-pattern classification: The 75th percentile cutoff points were 3.4 for exhaustion and 2.6 for cynicism; the 25th percentile cutoff point was 1.7 for professional efficacy. As Table 2 shows, the groups meeting the exhaustion+1 criterion were the HHH, HHL, and HLH groups, with respective group sizes of 59, 107, and 21 (187 persons in total).

NTT classification: As Table 2 shows, this resulted in 191 persons (18.3%) being classified as rank 5 (the highest rank), in good agreement with the exhaustion+1 criterion.

### 2. History of comparison and investigation of eight-pattern classification

As Table 2 shows, there was a trend for high CES-D scores in the HHH, HHL, and HLH groups, each of which fulfilled the exhaustion+1 criterion. There was no discernable single trend

Table 1 : Eight patterns of the exhaustion+ 1 criterion on the MBI-GS subscale scores

Eight patterns*	Exhaustion		Cynicism		Professional Efficacy	
	H (high)	L (low)	H (high)	L (low)	H (high)	L (low)
HHH	high		high		high	
HHL	high		high			low
HLH	high			low	high	
HLL	high			low		low
LHH		low	high		high	
LHL		low	high			low
LLH		low		low	high	
LLL		low		low		low

\*H : > 75th percentile (< 25th percentile for professional efficacy) ; L : < 75th percentile (> 25th percentile for professional efficacy)

Table 2 : Classification, latent rank, and means and SDs of other variables for categorization by percentile-based cutoff score

Percentile-based classification*	Estimated latent rank					Total	CES-D	JCQ-demand	JCQ-control
	1	2	3	4	5		Mean (SD)	Mean (SD)	Mean (SD)
LLL	153	143	145	25	0	466	9.43 (5.57)	13.38 (2.18)	25.82 (3.88)
LLH	47	64	53	10	0	174	12.74 (6.39)	13.25 (2.36)	24.5 (3.72)
LHL	1	0	7	51	12	71	15.39 (6.76)	13.49 (2.25)	25.21 (2.93)
LHH	1	1	3	28	12	45	17.18 (7.03)	12.36 (2.34)	22.87 (4.29)
HLL	0	0	21	65	13	99	13.9 (6.57)	14.48 (2.18)	26.07 (3.67)
HLH	0	0	5	13	3	21	16.43 (6.72)	13.71 (2.10)	23.33 (3.32)
HHL	0	0	0	10	97	107	20.23 (8.48)	15.58 (2.53)	25.15 (3.56)
HHH	0	0	0	5	54	59	25.44 (9.46)	15.2 (2.93)	22.24 (4.19)
Total	202	208	234	207	191	1042			
CES-D	Mean	7.36	9.82	12.97	15.15	21.81			
	(SD)	(4.26)	(5.53)	(6.03)	(6.87)	(8.73)			
JCQ-demand	Mean	12.81	13.43	13.69	13.73	15.27			
	(SD)	(2.48)	(2.05)	(2.06)	(2.32)	(2.70)			
JCQ-control	Mean	25.67	25.83	25.04	24.87	24.2			
	(SD)	(4.10)	(3.61)	(3.76)	(3.70)	(4.20)			

\*From the left, exhaustion, cynicism, and professional efficacy. H: > 75th percentile (< 25th percentile for professional efficacy) ; L: < 75th percentile (> 25th percentile for professional efficacy)

for demand and control in the JCQ. Examining the latent ranks, we find that as the rank increases, CES-D and JCQ demand scores increase and the JCQ control score decreases. This indicates that differences in rank appropriately reflect conditions of work-related stress and mental health conditions.

There were 154 persons who both met the exhaustion+1 criterion and were estimated as rank 5 by NTT (the “*a*” group below, and indicated by the dark shading in Table 1). There were 37 persons having rank 5 but not meeting the exhaustion+1 criterion (“*b*” group, indicated by line shading), and 33 persons meeting the exhaustion+1 criterion but not having rank 5 (“*c*” group, in the white area). There were 818 persons with rank 4 or below who did not meet the exhaustion+1 criterion (“*d*” group, in the white area). The classification concordance rate was 93.3%.

The exhaustion+1 criterion and latent rank are thus in high correspondence, and it is likely unproblematic to classify those in the *a* group as experiencing burnout and those in the *d* group as not experiencing burnout. To consider how to classify those in the non-conforming *b* and *c* groups, we performed a distribution analysis with CES-D, demand, and control scores as dependent variables. Each was found to be significant, but multiple comparisons (by Tukey’s method, here and below) indicated no difference between groups *b* and *c*. Mean CES-D values for groups *a* through *d* were, respectively, 22.8, 17.6, 15.1, and 11.2, indicating that the *b* group exceeded the 16-point cutoff of CES-D<sup>25</sup>). This indicates that the exhaustion+1 criterion may overlook risks due to depression.

The exhaustion+1 criterion classifies those in the HLL group, who have high scores for exhaustion but low scores for cynicism and high scores for professional efficacy, as not having burnout. We may therefore consider those in the *b* group as being in danger of experiencing burnout in the near future, and thus deserving of attention. Conversely, even those showing reduced professional efficacy and high cynicism but low exhaustion are not classified as having burnout, although such persons require attention. The

results of multiple comparisons and distribution analysis do not show a significant difference between the groups meeting the exhaustion+1 criterion (HLH, HHL, and HHH) and the LHH and LHL groups, for which CES-D scores were high. This indicates that those expressing high degrees of cynicism require attention, even if they exhibit low exhaustion. The HLL group shows high work demand and control scores but low CES-D scores, which likely indicate tiredness resulting from an aggressive approach to work, but this exhaustion has not exceeded the limits of good health.

It is likely that those with rank 5 are experiencing burnout, while those with rank 4 can be considered at risk of burnout. The results of distribution analysis taking rank as an independent variable indicate significance with each of the CES-D, demand, and control scores. The results of multiple comparisons found significant differences between depression and each rank. Furthermore, there was significance with degree of demand between rank 5 and the other ranks, and between ranks 4, 3, and 1. For control, there were significant differences between rank 5 and ranks 1 and 2. Thus, there is a large difference between ranks 4 and 5, but a relatively small difference between ranks 3 and 4.

### A new judgment criterion

The above analyses indicate that classification using the 75th percentile (25th percentile for professional efficacy) for exhaustion+1 better captures important characteristics of the relations among factors than NTT rank does. Furthermore, within the scope of this research at least, there was little difference between the judgments of both. We therefore propose a judgment criterion based on the easily calculated percentile scores, with the 75th percentile used for exhaustion and cynicism and the 25th percentile for professional efficacy.

Specifically, those meeting the exhaustion+1 criterion are judged as experiencing burnout, and those in the HHH group with high depression scores are considered as experiencing severe burnout. We also suggest increased atten-

tion to those without exhaustion but with high cynicism scores (the LHL and LHH groups) as they are at risk of depression. This covers most of the *b* group, and helps prevent those with high trends for depression being overlooked. Regarding the HLL group, we simply classify those persons as being very exhausted. Those in all other groups are considered healthy.

Figure 1 summarizes the above results. In the data used in this study, 5.7% of subjects had severe burnout, 12.3% had burnout, 9.5% were exhausted, 11.1% were at risk of depression, and 61.4% were healthy.

## Discussion

### Issues arising from comparison between the eight-pattern classification and NTT

This study found nearly identical classifications according to NTT and the eight patterns determined by cutoff scores. An important distinction, however, was that the eight patterns each showed unique characteristics. In the LHH group, for example, those with a low demand score also had a low control score and a high depression score. Thus, although such persons are not considered to have burnout according to the exhaustion+1 criterion, they nonetheless require

attention. There were few members in the HLH group. The NTT analysis used no data regarding professional efficacy, but despite this obtained results nearly identical to the results of classification according to the exhaustion+1 criterion. This indicates that burnout can be determined nearly entirely by the scores on the exhaustion and cynicism subscales. As Shanafelt et al.<sup>33)</sup> point out, it is likely best to consider professional efficacy not as a determinant of burnout, but rather as a severity index. Depression and burnout are distinct concepts, but are similar in that they express feelings of exhaustion. Note, however, that the present study suggests a deep relation between cynicism that reflects indifference or a distant attitude towards work and depression. In NTT, there is a linear worsening of each of degree of depression, degree of demand, and control by rank. It is thus possible that rank simply indicates degree of mental health. The present research examined only those in rank 5, but further investigation seems likely to show qualitative differences among ranks 1 through 4. For example, if rank 1 is considered as engagement, then a positive index can be created, one in which a higher rank indicates improved health.

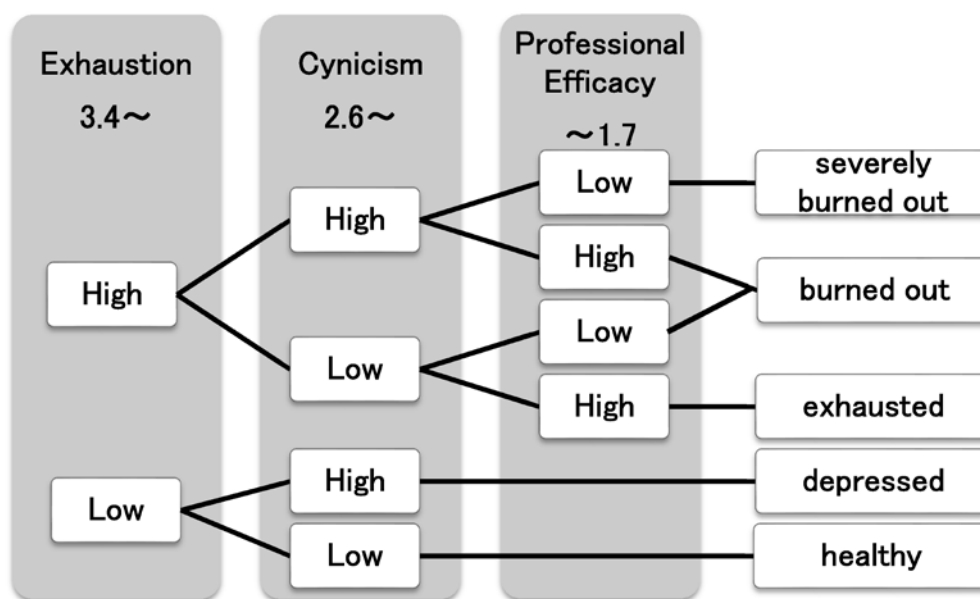


Figure 1 : Revised 'exhaustion + 1' criterion

## The proposed new judgment criterion

We propose a new judgment criterion based on the eight classifications resulting from using cutoff scores for the 75th percentile of exhaustion and cynicism and the 25th percentile for professional efficacy to evaluate the exhaustion+1 criterion. The concept of the exhaustion+1 criterion follows a process definition, where burnout is centered on exhaustion, which further develops into increased cynicism or reduced professional efficacy. A remaining problem, however, is whether the cutoff point should be determined for a given sample; alternatively, it might be better to use a common standard independent of sampling. Burnout is already considered to be a mental disorder (specifically, an adjustment disorder)<sup>34</sup>. This necessitates a diagnostic standpoint regarding the persistence of symptoms specific to the disorder. Following Kalimo et al.<sup>15</sup>, from a diagnostic standpoint it is likely appropriate to consider as “high” cases where scores for each symptom (exhaustion, cynicism, and professional efficacy) are 3.5 or higher (resp., 1.5 or lower for professional efficacy), in other words where responses are “daily” or “weekly.” (resp., “never” or “a few times a year”). Further research using these cutoff points is needed.

The revised exhaustion+1 criterion proposed by the present study could be useful to screen for employees with mental health problems. The original exhaustion+1 criterion classifies evaluated individuals into “burnout” and “non-burnout” categories only. Our revised criterion classifies individuals into five categories. Those meeting the criterion are judged as experiencing “burnout”, and those who additionally have both a high score for cynicism and a low score for professional efficacy are considered as experiencing “severe burnout”. Those with only a high exhaustion score are classified as being “exhausted”, that is to say “reserved burnout group”. Those without exhaustion but with a high cynicism score are screened at risk of “depression”. Therefore, we believe that occupational health staff could make more precise care plan for an individual with mental health problem.

## Limitations and suggestions of future research

There are reports of severe burnout leading to depression<sup>16) 35) 36)</sup>, so it is extremely important to screen for severe burnout by using the MBI-GS. However, there are no clinically validated cutoff scores available for the MBI that allow differentiation between levels of burnout. It is therefore vital that debate continues about the various concepts so that consensus can be reached among researchers and clinicians on a judgment criterion. Through comparison with the theory-backed NTT we have proposed an improved exhaustion+1 criterion. We hope to continue our investigation to determine the cutoff points that would allow for clinical burnout screening.

## Conclusions

We performed a theoretic investigation of the exhaustion+1 criterion introduced by Brenninkmeijer & Van Yperen<sup>19</sup>. The results suggest five classifications. Those meeting the criterion are experiencing burnout, and those who additionally have both a high score for cynicism and a low score for professional efficacy have severe burnout. We also found that even with a low exhaustion score, those with a high cynicism score are at risk of depression but those with only a high exhaustion score are simply exhausted. Those falling under none of the above categories are healthy.

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# Maslach Burnout Inventory-General Survey (MBI-GS) による バーンアウトの判定基準：疲弊感+1基準を用いた5分類バーンアウト

北岡 和代<sup>1)</sup>, 増田 真也<sup>2)</sup>

<sup>1)</sup>金沢大学医薬保健研究域保健学系

<sup>2)</sup>慶應義塾大学看護医療学部

## キーワード

バーンアウト, MBI-GS, 産業精神保健, ストレス, 判定基準

## 要 旨

Maslach Burnout Inventory (MBI) はバーンアウトを測定するゴールデン・スタンダードである。しかし、MBIは3つの下位尺度（疲弊感、シニシズム、職務効力感）から構成されているため、結果の解釈が難しい。そのため、広く容認されているバーンアウトの判定基準はない。そこで、私たちはバーンアウトの判定基準の一つである疲弊感+1基準について、ニューラルテスト理論を適用しながら検討し、日本版MBI-General Surveyを用いたバーンアウト判定基準を作成することを目的とした。コンピューター関連企業の社員1553名を対象として、2008年に実施したメンタルヘルス調査からデータを得た。有効データ1042名（男669、女373）を本研究の解析に用いた。その結果、5分類となった。疲弊感得点が高く且つシニシズム得点が高い、あるいは職務効力感が低い場合を「バーンアウト」とした。そのうち、シニシズム得点が高く、同時に職務効力感が低い場合は「重度バーンアウト」とした。疲弊感得点のみが高い場合は「疲労」、疲弊感得点は高くないがシニシズム得点が高い場合を「うつ注意」とした。以上に該当しない場合は「健康」とした。