Psychometric characteristics of the General Well-Being Schedule (GWB) in an Iranian sample

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Abstract: The General Well-Being Schedule (GWB) is a brief, reliable, and valid instrument to assess psychological well-being. The goal of this paper was to investigate validity, reliability and factor structure of the GWB-18 in an Iranian student sample. The sample consisted of 434 students (242 girls, 192 boys) with average age of 20.38. These students were selected through multiple steps random sampling from Tehran, Shahid Beheshti, Tehran Gharb, Olom -o- Tahghighat and Elm-o-Farhang Universities. All students asked to complete General Well-Being Schedule, General Health Questionnaire, Depression Anxiety Stress Scales, Satisfaction With Life Scale and Negative and Positive Affect Scales. To examine the reliability of the GWB, method of internal consistency (Cronbach's alpha) were used, and validity was assessed using concurrent validity and Exploratory and confirmatory factor analysis. The results of factor analysis using varimax rotation showed three factors: 1. psychological distress, 2. well-being and vitality, 3. general health. Results of confirmatory factor analysis confirmed this finding. Internal consistency of the scale was 0.85 showing that this scale had acceptable internal consistency. The correlation coefficient between of the GWB-18 subscale and concurrent validity scales were significant and in the expected direction. The results of this study suggest that the GWB is a reliable and valid measure of psychological well-being in Iranian university students.

[Alagheband M, Mohamadi Ahmadabadi N, Salmani Abdollahi A. **Psychometric characteristics of the General Well-Being Schedule (GWB) in an Iranian sample**. *Life Sci J* 2013;10(6s):167-173] (ISSN:1097-8135). http://www.lifesciencesite.com. 26

Key terms: Factor analysis, General Well-Being Schedule, validity, reliability

Introduction:

In recent years, a growing number of psychologists are interested in studying various aspects of health and well-being (see, for example, Keyes & Haidt, 2003; Linley & Joseph, 2004; Snyder & Lopez, 2007; Seligman, 2002). Well-being normally is considered as subjective well-being (Diener, 1984), that encompasses the meanings of positive and negative affects and life satisfaction (Harris & Lightesy, 2005). Studies on subjective well-being show that this structure has been discussed for centuries as an important issue, even it has played a major role in ethical issues, theology, political science, economics and psychology (Lewinsohn, Redner & Seeley, 1991, quoted by Gilbert, 2004). Several definitions of subjective well-being has been done, but in general it can be defined as an assessment of experience, knowledge, communication and overall issues that are associated with the value of man during his lifetime (Keyes, Shmotkin & Ryff, 2002) .

Contemplating on the well-being, it can be said that three special features are hidden within the word. First one is the important of its mentality, in fact, according to Campbell (1976) it can be said that "it is located within individual's experience". So it is focused on individual's judgment and cannot be affected by researchers' judgment criteria (Diener, Emmons, Larsen & Griffin, 1985). Second, subjective well-being consists of not only negative factors but also positive factors. Moreover, as the third feature we can refer to the extent and magnitude of it. In other words, it is not a restricted assessment of the scope of a person's life, but it is a comprehensive measure (Diener, 1984). So according to what we said, it appears that measuring subjective well-being can make good information about the quality of life available to researchers (Stiglitz et al, 2009; quoted by Angner, 2009). However, it should not be forgotten that human well-being is a complex phenomenon and there is no agreement on how to measure it.

In the past, presence or absence of negative symptoms such as anxiety was considered as well-being, but in later years positive well-being was emphasized and it was assumed to consist of components such as autonomy, control over the environment, personal growth, positive relations with others, and purposefulness in life and self-acceptance (Reef, 1989; Ryff and Singer, 1996). Then, the psychometric studies showed that positive and negative symptoms to some degree can operate independently and the absence of negative emotions and experiences cannot be considered as positive well-being, and vice versa (Diener and Emmons, 1984; Huppert and Whittington, 2003). However, this is only part of a dispute over measuring well-being, and yet researchers have not agreed on a single idea in this

area. But this lack of consensus does not negate the necessity of well-being assessment, so a scale should be followed that can generally embed subjective well-being features. The General Well-Being Schedule (GWB) is a small scale that covers a wide range of subjective feelings of well-being and psychological distress and it can be used in national surveys (Dupuy, 1978, quoted by McDowell& Newell, 1987). The scale does not include only negative but also positive feelings. Research has shown that this questionnaire has good reliability and validity. For example, the results of Fazio (1977) in a student sample after three months showed a coefficient of retest equal to 85/0. Furthermore, it reported the internal consistency for Women 95/0 and for men 91/0 and the correlation between the subscales ranged from 16/0 to 72/0 (quoted by McDowell& Newell, 1987). Furthermore, in a Japanese sample, the correlation of this schedule was calculated with general health questionnaire (GHQ) (67/0-), Anxiety state- trait questionnaire - (for anxiety state -0/67, and for anxiety trait-0/55), and Zung depression Scale (-55/0) that showed this questionnaire has good concurrent validity (Nakayama, 2000).

On the other hand, factor analysis GWB-18, reported different results. According to basic assumption, GWB was considered to have six factors (Brook et al, 1979; McDowell and Ha Newell, 1987). But the results of exploratory factor analysis in later researches offered the three-factor model (Wan& Livieratos, 1978, Nakayama et al, 2000) and 4 factor (Poston and others, 1998). These studies indicate that the factor structure of this questionnaire was uncertain and cannot be used in different cultures similarly. However, all the researchers in their study population reported good reliability and validity for this questionnaire and relying on the results of their studies recommended to use it in order to assess psychological well-being.

Based on what was told, this study was formulated to investigate the validity and reliability of the general well-being schedule in an Iranian sample. Considering that this scale showed a different factor structure in different cultures (including American and Japanese samples), exploratory factor analysis was first used to extract major factors. Then, the proposed new model with previously proposed models, are evaluated using confirmatory factor analysis. After studying the structural validity of this questionnaire using factor analysis, validity and concurrent reliability (using internal consistency) are also calculated.

Method:

The study sample included all undergraduate students at Tehran University who were enrolled in school year 89-88. Of the 432 subjects (192 males and 242 females) from the Tehran, Shahid Beheshti, Tehran Gharb, Olom -o- Tahghighat and Elm-o-Farhang Universities, were selected using multistage sampling. The average age of female students were 17/20 and male students 66/20, respectively.

The General Well-Being Schedule (GWB-18): General well-being schedule is a brief index of a wide range of subjective emotions, well-being and psychological distress. This questionnaire included both positive and negative questions. Each question has a time frame (within the past month). First 14 questions, answers are formed on a 6 degrees scale which represents the intensity or frequency. Sequential qualities of these options are selected experimentally. The remaining four questions are a rating scale of 0 to 10, which includes attributes at each end.

Dupuy (1977) for scoring GWB-18 used a total performance score of 0 to 110, and for this purpose, the number 14 was subtracted from scores derived from the codes shown in the questionnaire. Dupuy (1977), according to the overall score, has shown shear points to represent three levels of disorder: scores of 0 to 60 reflecting severe distress, scores 61 to 72, reflecting moderate distress, scores 73 to 110 reflects positive well-being. Moreover, in the six-factor model, grades can be achieved for anxiety, depression, positive well-being, self-control, general health and vitality. The value of Cronbach's alpha for the total score in validity study on this scale was 0/95and for each subscale was from 0/63 to 0/81.

General Health Questionnaire (GHQ): In order to measure general health, Goldberg and Hillier (1979) general health questionnaire of 28 questions was used. Factor analysis of this questionnaire has shown 4factor of "somatic symptoms", "symptoms of anxiety and sleep disorder," "social dysfunction" and "depression" (Goldberg & Hillier, 1979). In studying the validity of this questionnaire, Cronbach's alpha coefficient was reported from 76/0 to 87/0 for each subscale and 92/0 for a total score (Nagyova, 2000). In the present study also Cronbach's alpha coefficient was calculated 92/0 for the total score.

Questionnaire of Depression-Anxiety-Stress (DASS-21): This is a scale that measures the rate of depression, anxiety and stress, consists of 21 questions in which each case is answered as never, low, high, and very high (Livieratos and Livieratos, 1995). In this scale Cronbach's alpha coefficient for depression, anxiety and stress is calculated, as 0/94, 0/87 and 0/91, respectively (Antony, Bieling & Cox, 1998). In the present study this value equaled 82 for depression and 0/78 and 0/81 for anxiety/ stress.

Satisfaction with Life Scale (SWLS): This scale is used for individual's overall life satisfaction and includes five articles that are answered according to the seven degree scale as "completely agree" to

"totally disagree" (Diener, Emmons, Larsen& Griffin, 1985). The Cronbach's alpha for this scale in studying its psychometric characteristics on 830 persons is reported 0/83 (Swami, Chamorro-Premuzic, 2008). In this study also, the Cronbach's alpha value was 0/88.

Results:

The mean, standard deviation, and kurtosis and skewness of each GWB-18 questions for all of the samples are presented in Table 1 below. Tilt and strain of all articles of this scale were examined, and if kurtosis and skewness was high, data transformation methods have to be used in order to adjust them. If kurtosis and skewness was less than | 2 | there is no need to transform, and resuming analysis procedure did not produce ant problems in results (Garson, 2002). As seen in Table 1, every 18 articles in this study had less than | 2 | tilt and strain, so we can say this is not a problem and it does not require conversion.

Exploratory and confirmatory factor analysis of questionnaire GWB-18

To examine the factor structure of the scale GWB-18, a factor analysis by principal component extraction method was used. Measure of sampling adequacy indicated that the present sample is suitable for analysis (KMO=0/87). Bartlett test result also showed that data are in good condition for being factor. (p=0/000). To determine the number of factors that must be extracted from the statistical analysis, in addition to Egenvalue method, screen Plot method (Figure 1) and parallel analysis method (Watkins, 2000) were used. All three methods showed 3 factors. These factors explained 52.36% of the score variance.

The exploratory factor analysis (EFA) has been carried out with two orthogonal varimax and oblique promax rotations that showed similar results. In both rotations, 18 articles of scale of were equally loaded on three factors. The results of exploratory factor analysis of this study, (with varimax rotation) and some previous research are presented in Table 2. As can be seen in the Table, 8 questions on factor 1, 6 questions on factor 2 and 4 questions on factor3, had factor loading of more than 0/40. Based on the results obtained from Taylor's study (2003), factors 1, 2 and 3, respectively, were named as "psychological distress", "well-being and vitality" and" general health".

In order to confirm the factor structure obtained from the exploratory analysis, confirmatory factor analysis was used. Confirmatory factor analysis is a method based on Structural Equation Modeling (SEM), in which the researcher analyzes the relationships, based on his hypothesis about the relationship between latent constructs and measured variables (McCallum and Austin, 2000). To evaluate the proposed model, maximum likelihood model was used in confirmatory factor analysis and to examine the fitness of the hypothetical model, the fitness indexes were used. Given that there are often many fitness indexes that to each reflects a particular aspect of the model fitness, multiple indexes were used (Klein, 2005). Sun (2005), for measuring model fitness, in studies that are designed to investigate the structure validity of psychometric tools, proposes indexes such as Root Mean Square of Error Approximation (RMSEA), Tuker-lewis Index (TLI) or Non Normal Fit Index (NNFI), Comparative Fit Index (CFI) and Standardized Root mean Square Residual (SRMR). In the present study, these indexes and other indexes that are recommended by researchers in various studies were used. The results of the confirmatory factor analysis are reflected in Table 3.

Table1. The mean, standard deviation, and tilt and strain of articles and total score of GWB-18

scale	mean	standard deviation	Kurtosis	Skewness
General feeling	3/75	1/24	-0/03	-0/21
Nervousness	3/76	1/42	-0/25	-1/07
Constant control of behavior and emotion	4/19	1/18	-0/69	0/09
Sad, discouraged, and hopeless	4/20	1/57	-0/48	-0/98
Stress	3/44	1/41	0/14	-0/93
Happiness, life satisfaction	3/63	1/21	-0/08	-0/49
Emotional stability, self confidence	4/59	1/39	-0/71	-0/55
Confusion, concern	3/81	1/39	-0/71	-0/55
Waking up happy	3/72	1/45	0/34	-0/94
Distressed due to illness	4/24	1/49	-0/57	-0/67
Charm of daily life	3/72	1/32	-0/35	-0/72
Low mood, depression risk	3/42	1/42	0/00	-0/87
Emotional stability, self confidence	3/40	1/34	0/001	-0/94
Feeling tired, worn out	3/87	1/47	-0/24	-0/99
Concerned about health	5/93	2/73	-0/39	-0/64
relaxed or tense	5/38	2/25	-0/11	-0/46
Energy level	6/05	2/49	-0/26	-0/60
Cheerful - Distracted	5/98	2/18	-0/10	-0/16
Overall score	63/05	16/06	-0/02	-0/15

Table 2: Results of GWB-18 exploratory factor analysis in the present study and earlier research

Articles		Findings of present study		Findings of Nakayama		Findings of Tyler		Findings of Poston		Findings of Wan		Findings of Dupuy	
		Coefficient	Factor4	Coefficient	Factor2	Coefficient	Factor4	Coefficient	Factor3	Coefficient	Factor2	Coefficient	Factor1
1	General feeling	0/64	2	0/65	3	0/51	2	0/63	3	0/65	2	0/67	3
2	Nervousness	0/65	1	0/78	1	0/58	1	0/78	1	0/79	1	0/78	1
3	Constant control of behavior and emotion	0/48	1	0/65	3	0/51	1	0/69	2	0/65	3	0/67	4
4	Sad, discouraged, and hopeless	0/77	1	0/71	1	0/61	1	0/71	1	0/72	1	0/69	2
5	Stress	0/70	1	0/76	1	0/53	1	0/75	1	0/75	1	0/76	1
6	Happiness, life satisfaction	0/68	2	0/53	3	0/56	2	0/52	3	0/52	3	0/53	3
7	Emotional stability, self confidence	0/50	1	0/57	1	0/54	1	0/56	1	0/57	1	0/59	4
8	Confusion, concern	0/76	1	0/72	1	0/68	1	0/72	1	0/73	1	0/73	1
9	Waking up happy	0/63	2	0/55	3	0/51	2	0/58	2	0/56	2	0/55	5
10	Distressed due to illness	0/62	3	0/63	2	0/54	3	0/53	1	0/58	2	0/77	6
11	Charm of daily life	0/64	2	-	-	0/67	2	0/15	2	0/11	3	0/10	3
12	Low mood, depression risk	0/70	1	0/82	1	0/62	1	0/80	1	0/79	1	0/79	2
13	Emotional stability, self confidence	0/57	1	0/67	3	0/47	1	0/70	2	0/67	3	0/67	4
14	Feeling tired, worn out	0/56	3	0/64	2	0/55	3	0/54	1	0/60	2	0/62	5
15	Concerned about health	0/84	3	0/50	2	0/53	3	0/42	3	0/48	2	0/58	6
16	relaxed or tense	0/75	3	0/66	2	0/51	3	0/58	3	0/60	2	0/57	1
17	Energy level	0/63	2	0/57	3	0/61	2	0/83	4	0/57	2	0/58	5
18	Cheerful - Distracted	0/58	2	0/62	3	0/61	2	0/92	4	0/61	3	0/58	2

1- Factor 1: anxiety, factor 2: Depression, factor 3: positive well-being 4: self-control, factor 5: vitality, factor 6: general health
2- Factor 1: depressed mood, factor 2: worried, factor 3: life satisfaction and emotional stability
3- Factor 1: Lack of psychological distress, factor 2: Welfare, factor 3: general health factor 4: Vitality
4- Factor 1: Psychological distress factor 2: Welfare and vitality, factor 3: general health

Table 3. Results of confirmatory factor analysis of the structure of organizational factors

Fitness Index	IFI	AGFI	GFI	CFI	NNFI	NFI	SRMR	RMSEA
	0/94	0/92	0/93	0/94	0/96	0/92	0/060	0/80

Concurrent validity of the GWB-18:

Table 4: Correlations of the dimensions of well-being with general health , life satisfaction, depression, anxiety, stress, negative emotions, positive emotions and emotional rate

	1	2	3	4	5	6	7	8
1. General health	1							
2. Life satisfaction	-0/58**	1						
3. Depression	0/74**	-0/62**	1					
4. Anxiety	0/69**	-0/39**	0/67**	1				
5. Stress	0/71**	-0/48**	0/72**	0/68**	1			
6. Well-being and vitality	-0/60**	0/58**	-0/60**	-0/44**	-0/49**	1		
7. Psychological distress	0/75**	-0/56**	0/78**	0/63**	0/75**	-0/62**	1	
8. General Health	-0/74**	0/64**	-0/79**	0/60**	-0/69**	0/90**	-0/89**	1
9. General health								

**P<0/01

Now, considering that χ_2 is influenced by sample size and number of structural model relationships, and is not a reliable index, other parameters were used for model fitness. Root Mean Square Error of Approximation (RMSEA) is another index that in good models is less than 0/05, in intermediate models 0/05 to 0/08 and in weak models is 0/1 (Brown and Svdk, 1993). As can be seen in Table 5, the values of RMSEA=0/08 and SRMR<0/08, show good model fitness (Bentler, 1999). Indexes NFI, NNFI, CFI, GFI, IFI, and AGFI indicate acceptable model fitness. Because based on a general rule, these values are 0/9 to 0/95 in good models. Values above 0/8 also represent relatively good or average model fitness (McCallum & Austin, 2000; Klein, 2005). Among the Indexes mentioned, Incremental Fit Index (IFI), Non Normal Fit Index (NNFI), comparative fit index (CFI), Root Mean Square of Error Approximation (RMSEA), and Standardized Root mean Square Residual (SRMR) are not influenced by external factors and their desirability further indicates the model fitness (Hu and Bentler, 1998). So in factor analysis of the present study, three-factor model is quite good, which confirms the good model fitness. The final model related to the structure of well-being questionnaire is presented below.

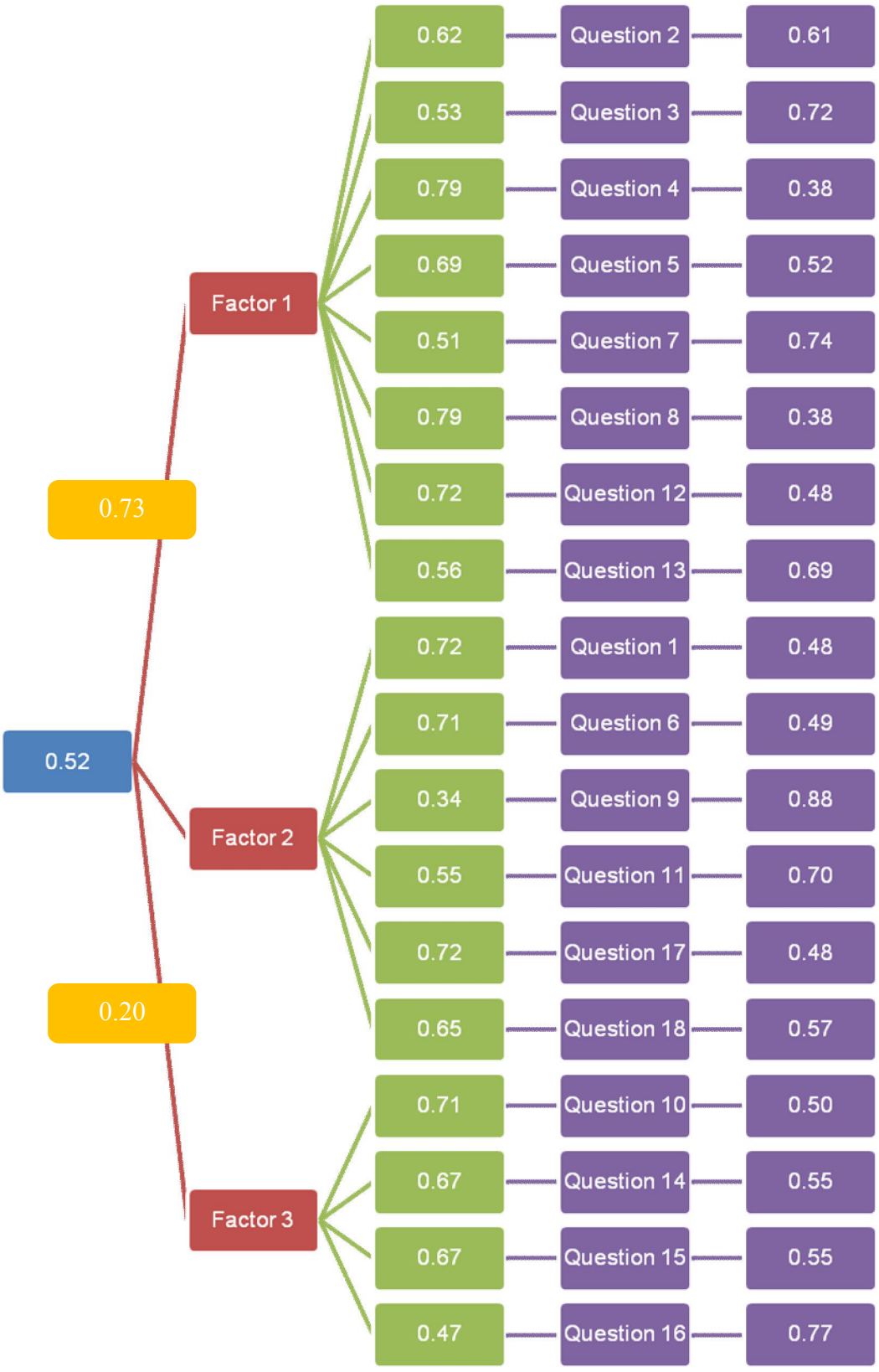

Figure 1: GWB-18 three-factor model and factor loading of each question on each factor

In order to check the validity of the general well-being schedule, the correlation of its scores was calculated by General Health Questionnaire (GHQ), Satisfaction with Life Scale (SWLS), Depression Anxiety - Stress Scale (DASS) and the Positive and Negative Affect scales which are presented in Table 5.

Table 5: Cronbach's alpha for GWB-18 in each subscale and total scale

	Psychological distress	Well-being and vitality	General health	Total well-being
Findings of Tyler's study	0/87	0/88	0/64	0/92
Findings of present study	0/85	0/76	0/70	0/85

As can be seen in the table, the correlation of well being and vitality, psychological distress and general health scores were significant with other studied variables and ranged from 0/44 to 0/79.

GWB-18 Reliability:

For studying GWB-18 reliability, Cronbach's alpha was calculated for articles of each subscale and total scale. The results of the present study and the findings of Tyler are reflected in Table 5.

Discussion and Conclusion:

Given the importance of measuring psychological well-being, this study was conducted to evaluate the psychometric properties of general well-being schedule. The results indicated that GWB-18 has a good validity and reliability among the students. Considering that various studies, had reported different factors for GWB-18 compared to Dupuy's 6-factor model (1977) (Poston's 4-factor model, Wan, Nakayama and Tyler's 3-factor model), therefore exploratory confirmatory factor analysis was carried out to examine the appropriate model in an Iranian sample.

Exploratory factor analysis with both varimax and promax rotations in the present study, as findings of Tyler (2003), Nakayama (2000) and Wan (1978) showed three factors. However, the way questions were loaded was consistent with the findings of Taylor (2003). Of course the questions in this study were generally loaded with higher rate on their factors. Question 14 also had a common loading of factor on both factor of 2 and factor 1. Finally, according to the results, and based on the three-factor model of Tyler, three extracted factors were respectively named as "psychological distress", "well-being and vitality" and "general health". In addition, to ensure the proposed model, a confirmatory factor analysis was used. After analysis, fitness indexes showed that the three-factor model fits fairly well.

In line with consistency of GWB-18, previous researches show internal reliability more than this scale. For example Dupuy (1977) has reported coefficient of internal consistency for the total score scale 0/92 and for 6 factor of domain 63 to 0/6 to 0/81 (quoted by McDowell and Ha Neul, 1987). In the present study also, internal consistency is calculated for the total score and three subscales from 0/70 to 0/85 that is close to findings of Taylor (2003) and demonstrate the appropriate reliability of this scale.

Also GWB-18 correlation of total score, with scores of General Health Questionnaire (GHQ), Satisfaction with Life Scale (SWLS), Depression - Anxiety - Stress Scale (DASS) and the Positive and Negative Affect Scale, demonstrated good validity in this questionnaire. All correlations obtained were significant and consistent with theoretical GWB. In fact, we can say that people who score high on the well-being had higher life satisfaction and appear to report positive affect and better general health. Also lower well-being scores are accompanied by with increased depression, anxiety, stress and negative emotions.

In general it can be said that the results of this study indicate that this scale in student sample is formed of three-factor structure and has good reliability and validity. However, since the sample size is small, and is limited only to the students, it cannot be generalized to the entire population. So considering that the extent of GWB is cited in previous research, it is emphasized that, it can be used in the national surveys, in order to assess individuals' psychological state and in identifying mental aspects of the clinical patient. Therefore it is suggested that the factor structure and reliability and validity of it in a broader sample that includes all levels of society, must be examined.

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3/17/2013