Original Research Article

A MEASURE OF YOGA PERSONAL OBSERVANCE (NIYAMA): A CONFIRMATORY FACTOR ANALYSIS

Sadhna Dadhore[1], G. Paran Gowda[2]

[1]Ph.D. Research Scholar, University of Patanjali, Haridwar, India.
[2]Professor, University of Patanjali, Haridwar, India.

Abstract: The background idea on yoga personal observance is given in the form of an aphorism in astanga yoga (eight limbed yoga). The concept on yoga personal observance scale (YPOS) is developed based on yoga books. The purpose of this paper is to develop a yoga personal observance scale using confirmatory factor analysis. A psychometric analysis of cronbach alpha, validity, reliability, correlation factor loadings, factor extraction from a uni-diagonal matrix, reduced items, fitness indices etc. We used SPSS and AMOS *version* 25 exploratory and confirmatory factor analyses to develop YPOS. To test the scale, we randomly selected 1,304 participants from general populations of Bhopal city, India. The developed 28-item five factor YPOS comprised standardized regression coefficients with 58.46% variance with a Cronbach's alpha of 0.76. The results of three different model Fitness categories of indexes with construct, convergent, concurrent validity were also analyzed and found to be acceptable. There is a scope for further research development in each of the eight limbed yoga practices.

Introduction: In English dictionary, the word 'niyama' is translated as 'personal observation'. The observation of niyamas five components in one's own personality as per yogic scriptures[1, 2] is described in the form of aphorism[3] as *"shaucha santosha tapah svadhyaya ishvarapranidhana niyamah"*. It may be translated as sauch (cleanliness), santosh (contentment), tapa (austerity), swadhyaya (personal studies), iswar prannidhan (surrender) are the observance or practice of personal training.

The qualitative explanation of these five principles of niyama[4, 5, 6]; *sauch*[7] is an, internal cleanliness of the body and mind develops an attitude that raises the self dignity, concentration, physical fitness, mastery over senses, healthy mind and behavior all summing up as personality development components. *Santosha*[8] is cognition qualities of mind such as happiness, mental relaxation, joy, and satisfaction can be realized. *Tapa*[9] is a training the body and mind; one can

have good health and overcome negative behavioral qualities of mind. *Swadhyaya*[10] is self study; one can harness the infinite capabilities of mind. The intense concentration of mind is *ishwarpranidhana*[11] which leads to an attitude that one can aim/achieve anything in life.

Yoga education can prevent the erosion of values and restore our Indian traditional values of truth, co-operation, nonviolence, peace, love and respect in order to promote healthy life-style, to build up high moral character and to develop refined personality of the present generation[12]. Astanga yoga with its eight pronged path addresses not only individual development but also focuses on building a healthy society[13]. Yoga practices can be suggested as a very congenial model for the protection of human rights[14]. Ethical and a learning mind, which will concern itself not only with greater 'progress', but primarily or more importantly with the inner transformation of the human consciousness[15]. Practice of integrated yoga improves the personality and thus performance of employee[16]. Significant effect on the personality and the academic achievement of the students[17]. Yoga Personality Development camp has the significant effect on Satva, Rajas and Tamas in Children[18].

Results suggest that yoga practice enhances self-efficacy and processing speed with fine motor coordination, visual–motor integration, visual perception, planning ability, and cognitive performance[19]. In all the above references, there was no mention of standardization of scale development for the yoga concept of personal observance (niyama). Hence, we conceptualized, developed and carried out the psychometric analysis for five items of personal observance and tested for its validity and reliability. With these moral and physical benefits/values of the individual, how it gets benefited to the society, a sense of connectedness through one's own personality may be compared with the western concept of behavioral traits. Based on the above conceptualization process of niyama.

Conceptual Frame
The conceptual framework of yoga personal observance is designed based on five sub components of niyama. The basic five codes of yoga personal observance or niyama are Cleanliness, contentment, austerity, self studies, and surrender[20]. These five categories cover the self training guidelines that deal with underlying principles governing one's own personality development. The aphorisms[9, 21] related to niyama are used in designing the conceptual frame; *sauchat sva-anga jugupsa paraih asamsargah; sattva shuddhi saumanasya ekagra indriya-jaya atma darshana yogyatvani cha (*as internal cleanliness of the body and mind develops an attitude that raises the self dignity, concentration, physical fitness, mastery over senses, healthy mind and behaviour all summing up as personality development components)[8], *santosha anuttamah sukha labhah* (as cognition qualities of mind such as happiness, mental relaxation, joy, and satisfaction can be realized)[4], *kaya indriya siddhih ashuddhi kshayat tapasah* (by training the body and mind, one can have good health and overcome negative behavioral qualities of mind)[10], *svadhyayat ishta devata samprayogah* (by self study, one can harness the infinite capabilities of mind)[6], *samadhi siddhih ishvarapranidhana* (the intense concentration of mind leads to an attitude that one can aim/achieve anything in life)[11].

The middle frame of niyama has five domains viz; cleanliness, contentment, austerity, self studies and surrender. Each of these domains is further elucidated and explained using different values. For cleanliness, it is physical fitness, self dignity, healthy mind and mastery over senses. The overall cleanliness is not only related to inner cleanliness but also gets projected to outside cleanliness. The typical daily usage of vocabulary terms like one's own dignity with mastery control over senses leads to the growth of personality development. On the same lines, the second domain viz; contentment is satisfaction with whatever we have. But in reality of life, one never gets contended with bare necessities. Therefore, one has to practice the values like such as happiness, satisfaction and relaxation. The third domain – austerity or following strict discipline in one's life like by following the examples like controlling the diet to maintain good health and avoiding the

harmful foods not congenial to one's own body. Under this domain, it is further explained by the words- good health, better characteristics of mind leading to better behavior. The fourth domain is self studies on infinite capacities of mind for better efficacy. The last domain is surrender indicated with concentration and equanimity. The

niyama reference frame Fig.1 shows the five sub component principles of personal observance. The inner core is related to personality development principles linking to outermost society or community development principles. From individual to society wellness are shown in the frame.
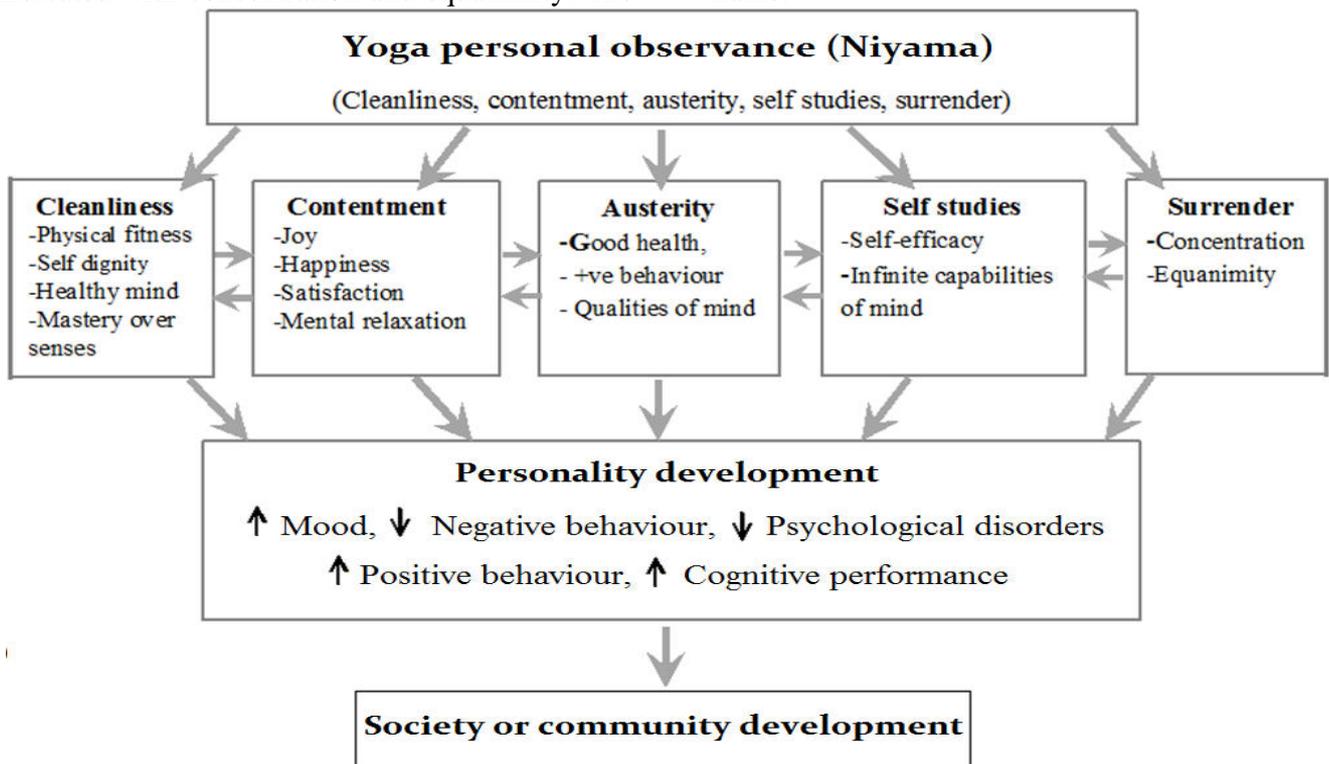
Fig 1. Reference frame for yoga personal observance or niyama

Method

Participants: Based on convenient sampling basis 1,304 healthy participants were selected for the study to test the psychometric properties of the Yoga Personal Observance Scale (YPOS). DeVellis RF[22] recommends a ratio of 1:15 or 1:20 as an ideal sample size. Learning from the literature, a sample size of greater than 750 or 1,000 is adequate enough for the study since the initial pool of items were 50 only. An age group of 10-18 years participants was considered as the criterion for inclusion in the study. The individuals who consented to provide data were considered in the sample size selection. The data were collected from 5 April to 4 May 2018. The

demographic details of the subjects are given in Table 1.

Procedures of scale development: Scale development is a systematic process that is carried out at different stages of analysis. Following recommendations of DeVellis RF[22] and Pasquali L[23] scale development for the present study was accomplished in three stages viz; Instrument (content domain) specification, theoretical analysis and psychometric analysis.

Instrument (content domain) specification: We developed the instrument for Personal observance or niyama on the lines of methodology given by Montero I and Leon OG[24]. It is based on the conceptual mode of personal observance (Fig 1). The researcher considered all five concepts of

personal observance as the constructs for scale development. Item pool generation provides a conceptual endorsement for the initial item pool[25]. The present research employed combination of deductive and inductive methods of initial item pool generation as recommended by Kapuscinski AN & Masters KS[26]. The researchers also interacted with experts in the fields of yoga science and obtained qualitative information regarding the content domains and objective of the research. The information was analyzed and related with the concept of yoga personal observance to generate pool initial items.

Theoretical analysis

Content validity: To estimate the content validity of the initial item pool, the researchers clearly defined the conceptual framework of yoga personal observance by undertaking a thorough literature review and seeking expert opinion. The expert panel comprised a group of experts from psychiatry, psychology, yoga science departments. We provided the measurement, target population, a clear frame work definition and item selection to all the individual experts from different disciplines of the studies. The panel determined the content validity index (CVI) developed by Waltz[27], which is used for evaluating meaning and clarity by using a 4-point scale (1 = *not relevant,* 2 = *some-what relevant*, 3 = *quite relevant*, 4 = *highly relevant)* and sent their answers by email. A score of 3 or 4 indicates that the content represented by each item was considered valid and in harmony with the theory that is being measured and they are retained. The items which received score 1 or 2 were rejected from the scale indicates that the theoretically or practically irrelevant questions or any ambiguous items that apparently repeated the essential content of other items.

Face validity: Face validity evaluates the appearance of the tool in terms of feasibility, readability, consistency of style and formatting, and the clarity of the language used[28] was tested by applying the initial level scale with 40 individuals. The respondents were asked to judge the user-friendliness of the tool. Feedback from the respondents was incorporated to improve the tool. This process was helpful to assess ambiguity and skewedness i.e. respondents providing very similar answer to all the items.

Psychometric analysis

The psychometric analysis involves a number of quantitative techniques to test construct validity[29] and reliability of the scale. In addition to construct validity; convergent validity, criterion validity and discriminate validity of the scale were tested quantitatively. DeVellis RF[22] strongly recommends the combined use of Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to achieve consistent results of the psychometric indices. Hence, these validity tests were done using EFA and CFA. Reliability, a quantification method producing the consistent results on recurring examinations[22] was measured in terms of indicators namely Cronbach Alpha, Spearman-Brown coefficient, composite reliability and average variance extraction. Concurrent validity was assessed by calculating the correlation between the scores of the present scale and an established scale namely Yoga Self Efficacy Scale[30].

Data collection and analysis: In these study the scale was with five options ranging from 'strongly disagree' (score 1) to 'strongly agree' (score 5). Each of the items in the scale is an agreement statement on the five point Likert scale[31]. All the items in the scale were positively stated about Yoga personal observance. The summated score of all the items was treated as the quantifiable measure of the construct and it was considered for all quantitative analytical purposes. All items included in the Likert scale were considered as continuous variables. The scale was prepared in English and Hindi to facilitate respondents' comprehension over the statements. The questionnaire was filled by the respondents. Factors are extracted and a factor structure including the correlation between the factors is proposed by EFA. The proposed factor structure is hypothesized and tested in CFA. It the statistical results fit with the hypothesized model the researcher can conclude that the factor structure is valid[32]. Hence, the study evaluated the scale using both EFA and CFA. *IBM SPSS & AMOS 25* version was used to calculate descriptive statistics,

correlation matrix, EFA, Cronbach Alpha and CFA. Convergent validity was verified using the Average Variance Extracted, a statistic calculated from values of factor loads. Construct validity was assessed by computing model fitness indices namely p value of Chi square, RMSEA, GFI, AGFI, CFI, TLI, NFI and Chisq/df which were the outputs of confirmatory factor analysis. Discriminate validity was examined by measuring the level of redundancy of items through Modification Indices.

Results
General characteristics of the sample: We have selected 1,304 healthy participants for the study to test the psychometric properties of the YPOS. They were adolescents (mean age of 14±4) covering both male 652 (50%) and female 652 (50%) populations. Among the total participants 97.12% practiced yoga as a theory and practical subject. The demographic details of the subjects are given in Table 1.

Table 1   Characteristics of participants

Characteristics	Total Sample						Test-retest sample					
	Total (N = 1304)		Male (N = 652)		Female (N = 652)		Total (N = 304)		Male (N = 152)		Female (N = 152)	
	N	%	N	%	N	%	N	%	N	%	N	%
11-12 years	326	25	163	50	163	50	76	25	38	25	38	25
13-14 years	318	24.39	159	50	159	50	76	25	38	25	38	25
15-16 Years	328	25.15	162	49.39	166	50.60	76	25	38	25	38	25
17-18 Years	332	25.46	168	50.60	164	49.40	76	25	38	25	38	25

Item generation or content domain specification: As a result based on the conceptual frame work of yoga personal observance (Fig. 1), 50 items were developed under the selected content domains. We divided the 50 items into five major domains: cleanliness (10 items), contentment (10 items), austerity (10 items) self studies (10 items), and surrender (10 items) as the initial pool of items. Items worded negatively for the construct were reverse coded and scored. Following the recommendations by[22, 24, 26] parameters such simplicity, clarity, specificity, capability to ensure variability of response and freeness from bias of the items were carefully considered while drafting the items.

Theoretical analysis
The initial item pool consisting of 50 items was vetted by four experts to assess the degree to which the items taken together constitute an adequate operational definition of a construct[27] i.e. content validity. The experts reviewed the initial item pool using a CVI rating tool. CVI was calculated following the recommendation of Waltz

C[27]. The experts gave their rating individually. Then, for each item, the index was calculated as the number of experts giving a rating 3 or 4 and this was divided by total number of experts. The items for which the index was less than 0.75 were considered to be irrelevant eliminated from the original list. From the initial pool, 10 items on the draft YPOS were deemed to be invalid because they yielded CVIs of 1/4=0.25 to 2/4=0.50 and were removed with CVI lower than 0.75[33], All the remaining items were valid with CVIs ranging from 0.75 (3/4) to 1 (4/4) and were retained[33] which resulted in a 40-item questionnaire. After modifying the scale based on rating by the experts, the scale was individually administered with 40 persons who regularly practiced Yoga. Each statement was read out to the respondent and in reply, the respondent stated what he/she understood from the item. If the content what the respondent comprehended and what had been conceived by the researchers matched, the item would be considered to be qualified. If mismatch was identified, the researcher was asked, "Why

did you mean the statement like this?" The response would uncover issues present in the items like vagueness, ambiguity, leading words/sentence, unfamiliar words, complicated sentence, closed ended statement, sensitive statement etc. Based on this information, statements were rephrased. The modified statements were once again read out to the respondent and feedback was received and accordingly modified. The 40 items developed after content validity testing and cognitive interviews with select respondents.

Psychometric analysis

Exploratory factor analysis (EFA): The scale evolved after theoretical analysis with 40 items was administered to 1,304 participants. Exploratory factor analysis was conducted using

the scores obtained from the survey. To ensure having an appropriate sample size, *Kaiser-Meyer-Olkin (KMO) measure* is used assess the sample adequacy and to prove the correlation matrix is an identity matrix Bartlett's Test of Sphericity is calculated. We examined the 40-item questionnaire through the EFA with Croanbach's alpha value 0.64 which enabled further item reduction. Following the EFA, 12 items were excluded from the 40-item scale, which resulted in 28-items and five factor variables with alpha value 0.75. Summarized descriptive statistics; the Kaiser-Meyer-Olkin (KMO) for measure of sample adequacy was 0.85 which indicated meritorious levels and the Bartlett's Test of Sphericity for adequacy of scale was significant at $p<0.001$ which are discussed below in table 2.

Table 2: KMO and Bartlett's test of sphericity for YPOS.

Sl. No.	Sub- Scales	Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
			Approx. Chi-Square	df	Sig.
1.	Shouch	0.94	6681.79	28	0.001
2.	Santosh	0.82	2158.98	10	0.001
3.	Ishwarpranidhana	0.83	1867.31	10	0.001
4.	Tapa	0.8	1929.19	10	0.001
5.	Swadhyaya	0.81	1701.63	10	0.001

Maximum Likelihood Analysis method of factor extraction with Promax Rotation was used and five factors were extracted explaining 59.32% within 1σ of the total variance. Results of the Scree plot technique indicated extraction of five factors from the 28 variables. Factor loading measures ranged from 0.44 to 0.82. To undertake the most appropriate interpretation, the loading values were carefully examined using Hair JF[34] guideline for practical significance. Since all the factor load values of all the 28 variables were greater than 0.40, all of them were retained in the scale for next level confirmatory factor analysis. Table 3 shows variance contributed by each factor and their corresponding Eigen values.

Since the KMO measure of Sampling Adequacy meets the minimum criteria, we do not have a problem that requires us to examine the Anti-Image Correlation Matrix. The description of factor analysis for each sub-scale is elucidated below.

I. Souch (cleanliness) Sub-Scale: This sub-scale had eight items. The KMO value was 0.94 which indicated about marvelous levels and Bartlett test of sphericity was significant with 6681.79, at $p<0.001$. One factor solution was sought which explained 19.02% of variance. The Eigen value of the factor was 5.32.

II. Santosh (contentment) Sub-Scale: This sub-scale had five items. The KMO value was 0.82 which indicated about meritorious levels and the Bartlett test of sphericity was significant with 2158.98, $p<0.001$. One factor solution was sought which explained 30.64% of variance. The Eigen value of the factor was 3.26.

III. Tapa (austerity) Sub-Scale: This sub-scale had five items. The KMO value was 0.83 which indicated about meritorious levels and the Bartlett test of sphericity was highly significant with 11867.31 at $p<0.001$. One factor solution was sought which explained 41.67% of variance. The Eigen value of the factor was 3.09.

Table 3: Exploratory factor analysis of 28 items YPOS scale

Domain/Item	Component with factor loadings				
	1	2	3	4	5
Factor 1: Shouch (S)					
S1: Cleanliness removes impurity.	0.78				
S2: Cleanliness is godliness.	0.79				
S3: Surrounding cleanliness is important to have inside cleanliness.	0.80				
S4: Cleanliness brings good health and hygiene.	0.77				
S5: Yoga Kriyas are essential for saucha.	0.82				
S6: One of the components of Personality is cleanliness.	0.75				
S7: Clean mind brings self observance.	0.74				
S8: Non corruption is a quality of cleanliness.	0.80				
Factor 2: Santosh (SN)					
SN1: I am satisfied and have no greediness to possess more.		0.81			
SN2: I am joyful in fulfilling the necessary things in life.		0.77			
SN3: Be contented with whatever we have.		0.64			
SN4: I am cheerful always.		0.61			
SN5: Individual happiness brings community happiness.		0.62			
Factor 3: Ishwarpranidhana (I)					
I1: I have an attitude of mind that can achieve anything in life.			0.74		
I2: Devoting to higher knowledge brings self development.			0.77		
I3: Surrender is surrendering one's own ego.			0.63		
I4: I am determined to achieve higher goals of life.			0.57		
I5: Surrender to the betterment of society.			0.64		
Factor 4: Tapa (T)					
T1: I am self disciplined and have self control.				0.77	
T2: Tapas removes negative qualities of mind.				0.74	
T3: I have Intense concentration towards success.				0.64	
T4: With concentration I train my body-mind.				0.58	
T5: Personal goal achievement is possible through tapas.				0.62	
Factor 5: Swadhyana (SW)					
SW1: Self studies bring knowledge.					0.76
SW2: I believe self studies leads to wisdom.					0.77
SW3: With self enlightenment, knowledge may be spread to society.					0.67
SW4: I study myself and make others also to study.					0.44
SW5: Self studies leads to one's personality development.					0.58
Eigenvalue	**5.32**	**3.26**	**3.09**	**2.58**	**2.36**
% of variance	**19.02**	**11.63**	**11.03**	**9.22**	**8.43**
Cumulative %	**19.02**	**30.64**	**41.67**	**50.89**	**59.32**

Note. Extraction Method: Maximum Likelihood. Rotation Method: Promax. Only factor loadings greater than 0.40 are reported, in order to aid interpretation of the factor structure. Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.85.

IV. Swadhyaya (self studies) Sub-Scale: This sub-scale had five items. The KMO value was 0.80 which indicated about acceptable levels, and the Bartlett test of sphericity was significant with 1929.19, at $p < 0.001$. One factor solution was

sought which explained 50.89% of variance. The Eigen value of the factor was 2.58.

V. Ishwarpranidhana (surrender) Sub-Scale: This sub-scale had five items. The KMO value was 0.81 which indicated about meritorious levels, and the Bartlett test of sphericity was significant with 1701.63, at p<0.001. One factor solution was sought which explained 59.32% of variance. The Eigen value of the factor was 2.36.

Confirmatory factor analysis (CFA): The researchers conducted a CFA applying a structural

equation modeling to test a hypothetically developed factor structure through EFA with five latent factors and 28 observed variables. The model obtained from confirmatory analysis is presented in Figure 2. The model shows factor loading values and the standardized maximum likelihood parameter estimates (path coefficients) with strong correlations. The factor loadings included five personal observance and most path coefficients were strong (presented in table 5).
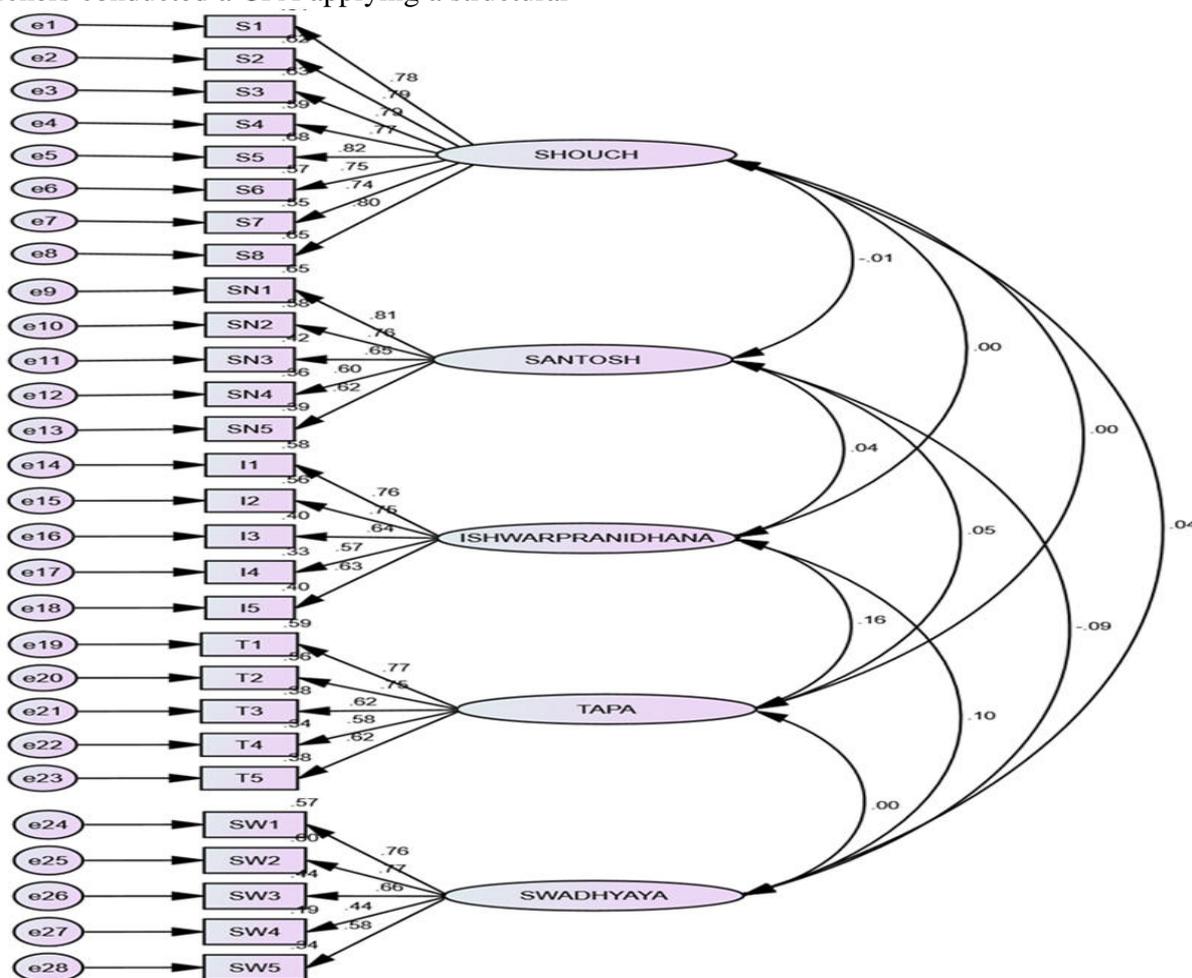
Figure 2 Yoga self observance model through CFA

Abbreviations: S = Souch; SN = Santosh; I = Ishwarpranidhana; T = Tapa; SW = Swadhyaya

Construct validity: In confirmatory factor analysis many indices of model fitness are used to test construct validity. Hair JF[34] recommends to use at least one index from model fit categories namely absolute fit, incremental fit and

Parsimonious fit. All three indices minimum level was achieved[35]. Results obtained in the present study on model fitness indices are presented in Table 4.

Table 4: Model fitness indices computed for the compared with acceptable levels

Sl. no.	Name of category	Name of index	Accepted level	Study result
1	Incremental fit	CFI	>0.90	0.93
		TLI	>0.90	0.92
		NFI	>0.90	0.91
		AGFI	>0.90	0.91
2	Parsimonious fit	Chi Square/df	<3.0; or <5.0	4.38*
3	Absolute fit	RMSEA	<0.08	0.05
		GFI	>0.90	0.93

Note: * indicates Wheatson, B., et al., (1977) ratio of normed chi square to df is< 5 which is a reasonable value. The ratio obtained in the present study was 4.38 and hence it could be inferred that the value is reasonable to judge that the model has parsimonious fitness.

Convergent validity: We performed three additional factor extractions to confirm the model structure, presented in Table 5. This table shows item quality (Chi-square), composite reliability (CR), and average variance extraction (AVE) were quantified to test convergent validity. Statistical significance of all the items in the model indicates presence of convergent validity. All factors had values of .50 or higher, demonstrating that the observed variable sufficiently reflected its construct's latent variable[36]. Factors with a CR of .96 were considered good[37], and all factors appropriately exceeded this level. The acceptable AVE of 0.50 ranged between 0.42 and 0.61[38]; all five–order factors demonstrated values within this range, exhibiting good strength.

Table 5: Factor loadings of all 28 items in the measurement model of YPOS

Domain/Item	Regression coefficients	CR	AVE
Factor 1: Shouch (S)	0.78	0.93	0.61
S1: Cleanliness removes impurity. S2: Cleanliness is godliness. S3: Surrounding cleanliness is important to have inside cleanliness. S4: Cleanliness brings good health and hygiene. S5: Yoga Kriyas are essential for saucha. S6: One of the components of Personality is cleanliness. S7: Clean mind brings self observance. S8: Non corruption is a quality of cleanliness.			
Factor 2: Santosh (SN)	0.688	0.81	0.47
SN1: I am satisfied and have no greediness to possess more. SN2: I am joyful in fulfilling the necessary things in life. SN3: Be contented with whatever we have. SN4: I am cheerful always. SN5: Individual happiness brings community happiness.			
Factor 3: Ishwarpranidhana (I)	0.672	0.8	0.45
I1: I have an attitude of mind that can achieve anything in life. I2: Devoting to higher knowledge brings self development. I3: Surrender is surrendering one's own ego. I4: I am determined to achieve higher goals of life. I5: Surrender to the betterment of society.			
Factor 4: Tapa (T)	0.668	0.78	0.43

T1: I am self disciplined and have self control. T2: Tapas removes negative qualities of mind. T3: I have Intense concentration towards success. T4: With concentration I train my body-mind. T5: Personal goal achievement is possible through tapas.			
Factor 5: Swadhyana (SW)	0.642	0.78	0.42
SW1: Self studies bring knowledge. SW2: I believe self studies leads to wisdom. SW3: With self enlightenment, knowledge may be spread to society. SW4: I study myself and make others also to study. SW5: Self studies leads to one's personality development.			
Note: CR= Composite reliability; AVE= Average variance extracted.			

Concurrent validity: A Yoga Self Efficacy Scale (YSES) developed by Birdee GS[30] with 3 constructs and 12 items was selected to test concurrent validity of the present scale. YSES has been developed to measure self-efficacy among the practitioners of Yoga. The tool has been evolved based on the theory of self-efficacy. YSES has robust internal consistency with Cronbach's alpha value of 0.93 and good construct validity measures. When the scale was administered in our study, it had Cronbach's alpha value of 0.876. The scores of the scale developed in the present study were correlated with YSES. Since the data were not normally distributed, non-parametric tool of association measurement namely Spearman's correlation coefficient was applied. Both the scores were positively correlated (ρ=0.87) and it was significant (p<0.001). Presence of criterion validity was proved due to positive and significant correlation coefficient between the newly developed scale and an established scale.

Reliability: Internal consistency of the 28 item five factor scale was determined by calculating Cronbach's alpha. Cronbach's alpha was computed for each subscale. Our values (Table 6) are found to be at accepted level of internal reliability with 0.75 and ranged from 0.78 to 0.93 for sub-scales. Generally, the Cronbach's alpha coefficient ranges from 0 to 1 with a minimum of 0.6 while other studies suggest that anything above 0.7 suggest high levels of internal reliability[28].

Test-retest reliability: was carried out for a month's time in 300 participants. The Intra-class correlation coefficient (ICC), Cronbach's alpha and one-sample statistics was used to calculate the test-retest reliability. ICC of average measures was ranged from 0.77 to 0.93 for entire scale was 0.77 considered an adequate reliability score[41]. The Overall scale reliability for the items was better, with Cronbach's alpha for the subscale ranging from 0.79 to 0.93 and over all being 0.75 for the entire scale. These results confirmed that five factor YPOS has good stability. Test-retest analysis data mean 3.91±0.94 with t-value 71.46 were same over a month's time showed better consistency.

Discussion: The yoga personal observance scale concept developed based on ancient Indian yoga philosophical texts has been validated and found to be reliable by using the psychometric analysis. The stated objective that yoga personal observance may be related to social health and wellbeing has been proved with final five regression coefficient values (Table 5). These coefficients were calculated using EFA and CFA statistical analytical techniques on the lines of Berry,et al., (2011) to assess the influence of personal observance on personal and social health well being.

Each of these five factors exhibited good internal reliability and constituted a model with a good fit (GoF) with the data. The research community, over the years, has developed a number of GOF Indices to test the construct validity. The GoF Indices are categorized into three groups namely absolute fit indices, incremental fit indices and parsimonious fit indices. Absolute fit indices are a quantity of degree of fitness of the model to the

empirical data. They offer the most fundamental measure of the fitness[39]. Goodness of Fit Index (GFI) is another absolute fit index. According to Tanaka JS & Huba GJ[40] GFI is equivalent to R^2 in regression analysis. In the lines of R^2 measure, for GFI also Adjusted index is calculated (AGFI). Root Mean Square Error of Approximation (RMSEA) is a population based index and is less sensitive to sample size. Tucker Lewis Index (TLI) has values range between 0 and 1. Models with values close to 1 show better fit. Likewise, Normed Fit Index (NFI) values range from 0 to 1 and values above 0.90 indicate better fit[41]. According to Hair JF[34] a parsimonious model is significant to prove that the postulated model fits the data in comparison with a complex model. According to Wheaton[42] the ratio of Normed Chi square/df is reasonable. The ratio obtained in the present study was 4.38 and hence it could be inferred that the value is reasonable to judge that the model has parsimonious fitness.

The results of this study suggest that the YPO Scale is providing an appropriate instrument for measuring the Social wellness among adolescents and support the factor structure, reliability, and validity of the measures. We identified five factors of the YPOS scale and these fit the hierarchical model: sauch, santosh, tapa, swadhyaya, ishwarpranidhana. Each of these five factors exhibited good internal reliability and constituted a model with a good fit with the data. Those five factors were moderately correlated with each other, suggesting that they each assess related, although distinct, components of yoga personal observance or niyama. The 28-item YPOS is a short scale that can be administered both for general population and for school setting. The age appropriateness is compared with the adolescent psychiatry of the quality of life[43]. The psychometric quality of the YPOS is generally comparable to the pattern matrix, goodness of fit and factor loadings of the CFA analysis carried out by Huang CH[44]. Van den Berg PT & Pitariu H[45] has brought out a relationship between wellbeing and personality during societal change. The YPOS scale are positively and significantly correlated with the standardized scale of Birdee's[30] Yoga Self-Efficacy Scale to prove existence of concurrent validity.

Conclusion: A yoga Personal observance scale is described to measure social health and analyze its relation with five personal observance; cleanliness, contentment, austerity, self studies, and surrender. We employed both qualitative and quantitative methods to develop and validate an YPOS scale using SPSS and AMOS *version* 25's exploratory and confirmatory factor analyses for 1,304 adolescents from Bhopal city, India. We used a cluster random sampling method for our study. The standardized estimated regression value is found to be 0.69 which is greater than the required level of ≥ 0.5 and thus showing a good relation between five observance of yoga and personality development of the adolescents. This yoga instrument can facilitate and provide personal health care and wellbeing: self-esteem, interpersonal skills, healthy behaviors, educational attainment and indirect social benefits. There is a scope for further research in the field of eight limbed yoga.

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Author Contribution: The main author is the administrative head and the remaining co-authors contributed to the data analysis and its statistical interpretation.

Compliance with Ethical Standards

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References
1. Malhotra AK. An Introduction to Yoga Philosophy: an annotated translation of the Yoga Sutras. Routledge; 2017 Jul 31.

2. Satchidananda S. The Yoga Sutras of Patanjali: Translation and Commentary by Sri Swami Satchidananda.
3. Saraswati S, Saraswati SN. Four chapters on freedom: Commentary on the yoga sutras of Patanjali. Nesma Books India; 2002.
4. De Michelis E. A history of modern yoga: Patanjali and western esotericism. A&C Black; 2005 Dec 8.
5. Bharati SV. Yoga Sutras of Patanjali (with the Exposition of Vyasa),(Vol. II: Sadhana-Pada).
6. Ranjan RK, Kumar D. Astanga Yoga: the Eight fold path of Holistic Health.
7. Satish L. An approach to counseling Based on Yoga sutra of Patanjali. Editor's Note. 2014 Jun 8.
8. Patanjali SV. The Yoga Sutras Of Patanjali- The Book Of The Spiritual Man (Annotated Edition). Jazzybee Verlag; 2012.
9. Adele D. The Yamas & Niyamas: Exploring yoga's ethical practice. Duluth, MN: On-Word Bound Books; 2009.
10. Alter JS. Yoga in modern India: The body between science and philosophy. Princeton University Press; 2004.
11. Iyengar BKS. Light on yoga. 1965.
12. Bera N. The integration of yoga in modern education: Why and how?. integration. 2017 May;2(3).
13. MANJULA M. Role of ashtanga yoga in building positive individuals and positive society. Arts & Education International Research Journal : Volume 4 Issue 1 (2017).
14. Betal C. Role of Yoga Practices in the Protection of Human Rights. International Journal of Health Sciences & Research. Vol.7; Issue: 12; December 2017.
15. Bhatta CP. Holistic personality development through education: Ancient Indian cultural experiences. Journal of Human Values. 2009 Jan;15(1):49-59.
16. Chokkalingam PS, Kumari S. Effect of Integrated Yoga Module on Personality and Performance of Employees: An Action Research Study. IBA JoUrNAl of MANAgEMENt & lEADErShIp. 2015 Jul;7(1):63.
17. Krishnan S. Personality development through Yoga practices.
18. Patil SS, Nagendra HR. Effect Of Yoga Personality Development Camp On The Triguna In Children. Voice of Research. 2014 Dec;3(3).
19. Das M, Deepeshwar S, Subramanya P, Manjunath NK. influence of Yoga-Based Personality Development Program on Psychomotor Performance and self-efficacy in school children. Frontiers in pediatrics. 2016 Jun 15;4:62.
20. White DG. The Yoga Sutra of Patanjali: A Biography. Princeton University Press; 2014 May 25.
21. Vivekananda R. Practical yoga psychology. Bihar: Yoga Publications Trust; 2005.
22. DeVellis RF. Scale development: Theory and applications. Sage publications; 2016 Apr 12.
23. Pasquali L. Instrumentação psicológica: Fundamentos e práticas [Psychological instrumentation: Bases and practices] Porto Alegre. RS: Artmed.[Links]. 2010.
24. Montero I, León OG. A guide for naming research studies in Psychology. international Journal of clinical and Health psychology. 2007;7(3).
25. Hutz CS, Bandeira DR, Trentini CM. Psicometria. Artmed Editora; 2015 Jul 1.
26. Kapuscinski AN, Masters KS. The current status of measures of spirituality: A critical review of scale development. Psycholog Relig Spiritual. 2010 Nov;2(4):191.
27. Waltz CF, Strickland OL, Lenz ER, editors. Measurement in nursing and health research. Springer publishing company; 2010 Apr 17.
28. DeVon HA, Block ME, Moyle Wright P, Ernst DM, Hayden SJ, Lazzara DJ, Savoy SM, Kostas Polston E. A psychometric toolbox for testing validity and reliability. Journal of Nursing scholarship. 2007 Jun;39(2):155-64.
29. Podsakoff PM, House RJ. Leadership effectiveness: Past perspectives and future directions for research. InOrganizational behavior 2013 Mar 7 (pp. 55-92). Routledge.
30. Birdee GS, Sohl SJ, Wallston K. Development and psychometric properties of the Yoga Self-

Efficacy Scale (YSES). BMC complementary and alternative medicine. 2015 Dec;16(1):3.

31. Likert R. A technique for the measurement of attitudes. Archives of psychology. 1932.

32. Babbie E, Wagner III WE, Zaino J. Adventures in social research: Data analysis using IBM® SPSS® Statistics. Sage Publications; 2018 May 15.

33. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, Bouter LM, de Vet HC. Quality criteria were proposed for measurement properties of health status questionnaires. Journal of clinical epidemiology. 2007 Jan 1;60(1):34-42.

34. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate Data Analysis. pdf.

35. Awang Z. Structural equation modeling using AMOS graphic. Penerbit Universiti Teknologi MARA; 2012.

36. Tabachnick BG, Fidell LS. Using multivariate statistics. Allyn & Bacon/Pearson Education; 2007.

37. Raines-Eudy R. Using structural equation modeling to test for differential reliability and validity: An empirical demonstration. Structural Equation Modeling. 2000 Jan 1;7(1):124-41.

38. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research. 1981 Feb 1:39-50.

39. Hair JF, Black WC, Babin BJ, Anderson RE, Tatham RL. Multivariate data analysis (Vol. 6).

40. Tanaka JS, Huba GJ. A general coefficient of determination for covariance structure models under arbitrary GLS estimation. British Journal of Mathematical and Statistical Psychology. 1989 Nov;42(2):233-9.

41. Hoon Song J, Uhm D, Won Yoon S. Organizational knowledge creation practice: Comprehensive and systematic processes for scale development. Leadersh Organ Dev J. 2011 May 10;32(3):243-59.

42. Wheaton B, Muthen B, Alwin DF, Summers GF. Assessing reliability and stability in panel models. Sociol Methodol. 1977 Jan 1; 8:84-136.

43. Ravens-Sieberer U, Karow A, Barthel D, Klasen F. How to assess quality of life in child and adolescent psychiatry. Dialogues in clinical neuroscience. 2014 Jun;16(2):147.

44. Huang CH, Wang TF, Tang FI, Chen IJ, Yu S. Development and validation of a Quality of Life Scale for elementary school students. International journal of clinical and health psychology. 2017 May 1;17(2):180-91.

45. van den Berg PT, Pitariu H. The relationships between personality and well-being during societal change. Personality and individual differences. 2005 Jul 1;39(1):229-34.