

Development and Validation of a Brief Self-Assessed Wisdom Scale

Sai-fu Fung (✉ sffung@cityu.edu.hk)

City University of Hong Kong <https://orcid.org/0000-0002-3526-6568>

Esther Oi-wah Chow

City University of Hong Kong

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Abstract

Background This longitudinal study aimed to develop a nine-item Brief Self-Assessed Wisdom Scale (BSAWS) derived from the original 40-item Self-Assessed Wisdom Scale (SAWS). **Methods** The psychometric properties of the shortened scale were evaluated based on a sample of 157 older adults. The factor structure and dimensionality of the original SAWS were examined using confirmatory factor analysis. Subsequent explorative factor analysis of the BSAWS supported the construct validity of the shortened scale. **Results** The internal consistency, criterion validity and construct validity of the shortened scale were also evaluated and the results indicated that the BSAWS possesses good psychometric properties and is comparable with the full version. **Conclusions** This scale refinement may help researchers and practitioners conduct epistemological surveys or clinical research related to wisdom.

Background

Wisdom is an ancient construct with a long history of conceptualisation based on normative approaches across cultures, ranging from Greek philosophers such as Socrates and Aristotle to Chinese philosophers such as Confucius. In recent years, the concept of wisdom has been further revitalised in empirical research on social and positive psychology [1-4]. The Self-Assessed Wisdom Scale (SAWS), a self-reported instrument for measuring wisdom at the individual level, has been widely used by researchers and clinical practitioners. SAWS focuses on five dimensions, namely experience, reminiscence, openness, emotion regulation and humour, and has received positive evaluations of its internal consistency and psychometric properties [2, 5-8].

Numerous studies have used SAWS to explore the relationships between wisdom and various psychosocial outcomes. JD Webster [9] suggested that wisdom is positively associated with psychosocial characteristics derived from the Erikson tradition, such as ego-integrity, life attitudes and values. Using hierarchical regression analysis, JD Webster, GJ Westerhof and ET Bohlmeijer [10] identified a positive relationship between wisdom and mental health among Dutch adults. The balanced time perspective also uniquely predicted both mental health and wisdom in a sample of 512 adults in the Netherlands [11]. JD Webster and XC Deng [12] used the wisdom scale to study the relationship between traumatic life events and mental health outcomes among 320 respondents in Canada. A later study further suggested that wisdom and meaning contribute to positive self-development in areas such as optimism, self-esteem and self-characteristics in emerging adulthood [8]. In a recent study, C-k Cheung and EO-w Chow [13] identified a positive relationship between wisdom and well-being among older Chinese.

Despite the widespread application of SAWS, few studies have managed to fully replicate its original factor structure. Although SAWS possesses good internal consistency and criterion validity [7, 8], its factor structure and dimensionality are inconclusive and subject to a number of limitations [6, 14]. First, to date, no studies have used confirmatory factor analysis (CFA) to validate the 40-item five latent factor structure of the scale. JD Webster [7] used CFA to analyse five sub-scale factors used to predict the latent

construct wisdom rather than analysing all of the 40 items. Second, some of the SAWS items have a complicated factor structure. For example, JD Webster [2] reported that the 'humor and openness dimensions have some overlap and weaker loadings' (p. 16). In particular, items 12, 27 and 17 share the attributes of emotion regulation and reminiscence, items 14 and 24 are related to both emotion regulation and humour and items 5 and 20 are related to openness and humour.

Hence, controversies have arisen when studies have attempted to adapt the scale to other contexts. P Alves, L Morgado and Bd Oliveira [15] attempted to validate a Portuguese version of the 40-item SAWS, but their explorative factor analysis (EFA) results showed that the factor structure was significantly different from that of the original scale. In response, the authors proposed five alternative wisdom domains, namely reflection, mood, emotional self-regulation, experience and open mindedness, which are significantly different from those of the original SAWS. Due to the mixed findings on the factor structure of the wisdom scale, A Urrutia, GM de Espanes, C Ferrari, G Borgna, AM Alderete and F Villar [16] combined the 40-item SAWS and 79-item Wisdom Development Scale (WDS) to obtain a shortened 20-item scale with a three-factor structure for studying wisdom related issues. They applied the shortened scale in a study based on a sample of older adults in Argentina. However, their CFA results suggested very marginal model fit.

Given the controversies surrounding the full version of SAWS, this study explores whether the factor structure and dimensionality of the scale need further refinement. As JD Webster [2], who developed the original scale, stated, 'continued refinement of specific scale items may eliminate those which explain little overall variance' (p. 21). The first part of this study shows that the full 40-item scale fails to replicate the factor structure of SAWS using CFA. However, the EFA results support the development of a unidimensional nine-item Brief Self-Assessed Wisdom Scale (BSAWS). In the next section, the psychometric properties of the newly proposed BSAWS are evaluated and various tools are used to examine its internal consistency, criterion validity and construct validity. Overall, the results show that the BSAWS provides an efficient and valid tool for assessing wisdom using empirical data and psychometric evidence in different cultural contexts.

Methods

Participants

This study used a longitudinal repeated measures design with 157 community-dwelling older adults from elderly service centres in Hong Kong [17-19]. The respondents were aged 72.8 years on average (SD = 8.55) and participated in the study on a voluntary basis. The respondents possessed sufficient cognitive ability (with 7.9 years of education on average) to understand and respond to the self-reported questionnaire. The sample comprised 25.5% male and 74.5% female respondents. There were four waves of data collection: the initial study (study 1; n = 157) was conducted in June 2016. The respondents then completed the questionnaire again after one (study 2; n = 136), two (study 3; n = 135) and eight (study 4;

n = 98) months. The research team strictly adhered to the relevant ethical standards and the project was approved by the university's research ethics committee.

Measurement

The latest SAWS comprises 40 items that measure five dimensions: emotion regulation (items 32, 2, 22, 12, 27, 7, 14, 24 and 17), reminiscence (items 12, 27, 17, 8, 28, 23, 13, 18, 3 and 33), openness (items 35, 25, 30, 38, 5, 20 and 34), experience (items 26, 6, 16, 21 and 1) and humour (items 14, 24, 5, 20, 39, 19, 29, 4, 9 and 10). The respondents were asked to indicate their level of agreement on a Likert-type scale ranging from 1 = *strongly disagree* to 6 = *strongly agree* [2, 5, 7].

Procedure

The interviewers administered the questionnaire to the respondents at 13 elderly service centres located in different districts in Hong Kong. The items were translated into Chinese using the back-translation procedure [20].

CFA was used to replicate and evaluate the construct validity of the SAWS and BSAWS [21-23]. The CFA estimator used diagonally weighted least squares (DWLS) due to the ordinal nature of the Likert scale. DWLS is regarded as less biased and a more optimal fit for this type of scale [24-27]. The results for the following criteria indicated adequate model fit: CFI > 0.95, TLI > 0.95, RMSEA < 0.08, SRMR < 0.08 [21, 28-30]. In addition to these measures, $\chi^2 / df \leq 3$ can be used to determine acceptable model fit [31-34].

Factor analysis with the principal component estimation method was used to evaluate the dimensionality and factor structure of the BSAWS [2, 15, 28, 35]. The Kaiser-Meyer-Olkin (KMO) and Bartlett's tests of sphericity were used to evaluate the model. The KMO estimates were over 0.70 and the Bartlett's test was significant ($p < 0.01$), thus confirming that the model had a satisfactory factor structure [36].

In addition, various psychometric testing tools and validated instruments were used to examine the newly proposed BSAWS. The internal consistency of the scale was assessed using Cronbach's alpha [37] and by examining the corrected item-total correlation between the nine items [28, 38].

The criterion validity was evaluated using other validation constructs reported in the literature on wisdom. The wisdom construct was reported to be significantly positively correlated with well-being, self-esteem and other wisdom measures [39-44]. Hence, this study used the following well-established scales to evaluate the criterion validity of the BSAWS: the Personal Well-being Index (PWI) [45], Rosenberg self-esteem (RSE) scale [46, 47] and dimensions of the WDS [42, 48]. Research also suggests that wisdom is negatively correlated with depression symptoms [2, 49, 50]. Hence, we used the Geriatric Depression Scale (GDS) [51-53] to evaluate the relationship between depression and the two wisdom scales. The above analysis was implemented using IBM SPSS 25.0 and the R (3.6.0) computing software with lavaan package 0.6-3 [54].

Results

Table 1 shows the CFA results for the original SAWS and variations of the factor structure in the literature [2, 7, 15]. The CFA results based on study 1 ($n = 157$) suggested that the original full version of SAWS (Model 1) failed to fit the model, with $\chi^2 (1570.703) / 510 = 3.08$, $p < 0.001$, SRMR = 0.121, CFI = 0.887, TLI = 0.876 and RMSEA = 0.126. Similarly, Model 2 failed to fulfil the cut-off criteria for good model fit, as $\chi^2 (2135.089) / 692 = 3.09$, $p < 0.001$, SRMR = 0.119, CFI = 0.885, TLI = 0.877 and RMSEA = 0.126.

Table 1. Confirmatory factor analysis of SAWS and BSAWS

With reference to the literature on SAWS [2, 7, 15] and the EFA results in Table 2, this study proposes a nine-item BSAWS with a single factor structure (see the appendix). The BSAWS includes the following domains used in the full scale: emotion regulation (items 22 and 27), reminiscence (items 18, 23 and 40), openness (item 34), experience (items 6 and 36) and humour (item 29).

Internal Consistency and Factorial Validity

Table 2 presents the descriptive statistics, including the mean, standardised deviation, skewness, kurtosis, corrected item-total correlations and Cronbach's alpha, if item deleted, for all nine items of the BSAWS based on the data from study 1. The results show that the BSAWS demonstrates good internal consistency. The corrected item-to-total correlations for the BSAWS ranges from 0.349 to 0.619 and Cronbach's alpha is above the acceptable range, i.e., 0.808. The BSAWS is also significantly positively correlated ($r = 0.912$, $p < 0.001$) with SAWS.

Table 2. Descriptive statistics and factor loadings from the exploratory factor analysis of BSAWS

The results of the KMO and Bartlett's tests of sphericity for the nine-item BSAWS were 0.823 ($\chi^2 = 374.389$, $p < .001$), thus indicating appropriate scale construction. The EFA results showed that the factor loadings ranged from 0.477 to 0.738 and explained 40.453% of the total variance (Table 2).

Criterion Validity

The results from study 1 show the relationships between BSAWS and SAWS and the other construct-related scales suggested in the wisdom literature (Table 3). Well-being as measured by the PWI has significant moderate positive relationships with SAWS ($r = 0.363$, $p < 0.001$) and BSAWS ($r = 0.347$, $p < 0.001$). The self-esteem scale also possesses a moderate positive relationship with the two scales. SAWS and BSAWS are strongly correlated with the WDS, with $r = 0.730$ ($p < 0.001$) and $r = 0.741$ ($p < 0.001$), respectively. The results also show a negative relationship between the scales and GDS, with $r = -0.290$ ($p < 0.001$) for SAWS and $r = -0.345$ ($p < 0.001$) for BSAWS. To sum up, the nine-item BSAWS is comparable with the full scale and possesses good criterion validity.

Table 3. Correlations between SAWS and BSAWS in relation to other construct-related scales

Construct validity

To further validate the construct validity of BSAWS, CFA was implemented on the data collected from studies 2, 3 and 4. The CFA results for BSAWS (Table 4) indicate good model fit, particularly the combined results across studies 2, 3 and 4, with χ^2 (51.278) / 27 = 1.90, SRMR = 0.040, CFI = 0.996, TLI = 0.995 and RMSEA = 0.040. Overall, the results indicate that the nine-item BSAWS has generally good fit for a unidimensional factor structure without any post hoc modifications.

Figure 1. Estimated model of the nine-item BSAWS

Table 4. Factor loadings and fit indices from the confirmatory factor analysis of BSAWS, by study (see Figure 1 for the estimated model)

Discussion

The proposed BSAWS possesses good psychometric properties and is comparable with its full-scale version. According to JD Webster, M Taylor and G Bates [6], 'the SAWS subscales [are] based upon input by a panel of wisdom experts' (p. 256). The results of this study show that the BSAWS supports the original five domains of wisdom advocated in the original SAWS, i.e., emotion, regulation, reminiscence, openness, experience and humour. Cronbach's alpha for the BSAWS is 0.808, which is similar to the values ranging from 0.78 to 0.90 reported in the original SAWS studies [2, 7]. The nine item shortened version of SAWS also possesses good criterion validity. The results show that SAWS and the BSAWS both hold identical correctional direction and magnitude with the other well-established measurements of well-being, self-esteem and depression. Both scales also have very strong and significant positive correlations ($r = 0.912$, $p < 0.001$).

This study contributes to the measurement of wisdom in the following ways. First, the shortened version of SAWS can help resolve disputes related to the complex factor structure and dimensionality of the full version of SAWS. The original scale developer and the subsequent validation studies have generally failed to fully replicate the five latent factor structure of the 40 item scale [2, 5, 7, 15, 16]. For example, a recent study showed that some SAWS items did not load on any factor and that the openness dimension had a questionable Cronbach's alpha of 0.68 [5]. Consequently, some studies have attempted to shorten the scale by forcefully combining SAWS with other wisdom related constructs without using strict validation procedures to examine the psychometric properties of the revised scale [13, 16]. A validated abbreviated version of SAWS can serve as a useful instrument for designing future studies related to wisdom among older adults and other populations.

This study also provides empirical evidence to support the factor structure of the BSAWS using CFA. Numerous SAWS related studies have used only EFA to evaluate the factorial validity of the scale, without

verifying the construct validity with CFA [2, 5, 15]. The only SAWS validation study to use CFA was based on five sub-scales, which served as the latent factors for estimating the loadings on the wisdom construct rather than evaluating all 40 items. The results failed to meet the criteria for adequate model fit, with CFI = 0.947 and RMSEA = 0.107 [7]. The CFA results of Models 1 and 2 (Table 1) in this study managed to replicate the problem of analysing the 40 items using a five latent factor structure. The results showed that none of the models were considered to have a good fit. However, the CFA results for the newly proposed nine-item BSAWS fulfilled all of the stringent criteria for determining good model fit in the structural equation modelling literature [28, 29, 33].

The procedure for developing the BSAWS strictly adhered to the recognised scale development and validation principles [23, 55]. The sample from study 1 (n = 156) was used to conduct EFA to identify the factor structure of BSAWS. The study 2 (n = 136), 3 (n = 135) and 4 (n = 98) samples were then used to verify the scale's construct validity using CFA. In addition, various psychometric evaluation tools were used to examine the internal consistency and criterion validity of the nine-item BSAWS. In short, the BSAWS was found to possess excellent psychometric properties.

This study has two potential limitations. First, the small sample size may limit the reliability of the results. This limitation may account for why the CFA results in study 4 (n = 98) only yielded a marginally adequate RMSEA value. The research team had difficulty recruiting significant numbers of respondents from the elderly service centres in Hong Kong. However, the longitudinal repeated measures design used in this study may have compensated for this limitation. It is worth mentioning that the original SAWS was developed and validated using similar numbers of respondents in Canada and Australia [2, 5, 7]. The second potential limitation is related to the demographic background of the respondents. Specifically, the results based on Chinese older adults in Hong Kong may have limited generalisability. Thus, further research is needed to replicate our findings or apply the BSAWS in different cultural contexts to verify this refinement of SAWS.

Conclusions

This study developed and validated an abbreviated nine-item version of SAWS. The results suggest that the BSAWS possesses excellent psychometric properties and is comparable with its 40-item full version. The newly developed scale can provide an efficient and valid assessment of wisdom for older adults. This abbreviated standardised wisdom measure may encourage researchers and practitioners to conduct epidemiological surveys to evaluate the effectiveness of interventions in a clinical setting.

List Of Abbreviations

BSAWS: Brief Self-Assessed Wisdom Scale; CFI: Comparative Fit Index; ER: Emotion regulation; EXP: Experience; GDS: Geriatric Depression Scale; HU: Humour; OP: Openness; PWI: Personal Wellbeing Index; RE: Reminiscence; RMSEA: root mean square error of approximation; RSE: Rosenberg self-esteem; SAWS:

Self-Assessed Wisdom Scale; SRMR: standardized root mean residual; TLI: Tucker Lewis Index; WDS: Dimensions of the Wisdom Development Scale.

Declarations

Ethics approval and consent to participate

This study was approved by the research ethical committee of the City University of Hong Kong. Its procedure was in compliance with the Declaration of Helsinki guidelines. All of the participants gave informed consent prior to the study.

Consent for publication

Not applicable.

Availability of data and material

The datasets used and analysed during the current study are available from the corresponding author on reasonable request or via Dr. Esther Chow, the principal investigator of the study on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

SF developed the idea of the paper, conducted literature review, data analysis, data interpretation and manuscript preparation. EC is the principal investigator of this study. All authors reviewed the manuscript critically and approved the final version.

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Tables

Table 1. Confirmatory factor analysis of SAWS and BSAWS

Model	χ^2	Df	χ^2/df	RMSEA	CFI	TLI	SRMR
				[90% CI]			
1. Webster et al. (2007)	1570.703	510	3.08	0.126	0.887	0.876	0.121
				[0.119-0.133]			
2. Alves et al. (2014)	2135.089	692	3.09	0.126	0.885	0.877	0.119
				[0.120-0.132]			

Table 2. Descriptive statistics and factor loadings from the exploratory factor analysis of BSAWS

Item	\bar{x}	SD	sk	ku	r_{it}	α_{iid}	λ
6	4.222	1.742	-0.805	-0.635	0.368	0.807	0.477
18	3.898	1.630	-0.572	-0.752	0.511	0.787	0.636
22	4.331	1.571	-0.905	-0.143	0.582	0.779	0.707
23	3.936	1.636	-0.618	-0.779	0.349	0.808	0.447
27	3.828	1.594	-0.513	-0.728	0.505	0.788	0.643
29	3.790	1.664	-0.447	-0.976	0.579	0.778	0.711
34	3.955	1.499	-0.663	-0.404	0.619	0.775	0.738
36	4.376	1.439	-1.194	0.698	0.534	0.785	0.654
40	3.191	1.769	0.086	-1.365	0.504	0.788	0.646

Note: \bar{x} = mean; SD = standard deviation; sk = skewness; ku = kurtosis; r_{it} = corrected item-total correlations; α_{iid} = Cronbach's alpha, if item deleted; λ = factor loadings

Table 3. Correlations between SAWS and BSAWS in relation to other construct-related scales

Scale	SAWS	BSAWS
Personal well-being index (PWI)	0.363	0.347
Rosenberg self-esteem (RSE) scale	0.340	0.357
Dimensions of the wisdom development scale (WDS)	0.730	0.741
Geriatric depression scale (GDS)	-0.290	-0.345

Note: All correlations are significant at the 0.001 level (2-tailed)

Table 4. Factor loadings and fit indices from the confirmatory factor analysis of BSAWS, by study (see Figure 1 for the estimated model)

Factor/question		Study			Combo
		2	3	4	
6. I have made important decisions throughout my life.	λ_1	0.459	0.641	0.710	0.585
18. Reviewing my past gives me a good perspective on my current concerns.	λ_2	0.775	0.749	0.692	0.732
22. I can easily express my emotions without feeling like I am losing control of the situation.	λ_3	0.805	0.727	0.760	0.760
23. I often recall the past to see if I have changed since then.	λ_4	0.506	0.528	0.576	0.538
27. I am good at identifying subtle emotions in myself.	λ_5	0.668	0.678	0.830	0.721
29. I often use humour to put other people at ease.	λ_6	0.622	0.582	0.849	0.680
34. Now I know I can truly appreciate the little things in life.	λ_7	0.818	0.801	0.839	0.815
36. I have learned valuable life lessons with others.	λ_8	0.643	0.699	0.789	0.705
40. I often wonder about the mysteries of life and what lies beyond death.	λ_9	0.592	0.554	0.668	0.587
Model fit					
<i>N</i>		136	135	98	369
RMSEA		0.055	0.069	0.084	0.049
RMSEA 90% confidence interval		0.000-0.093	0.029-0.105	0.038-0.126	0.028-0.070
SRMR		0.059	0.057	0.064	0.040
χ^2 (df = 27)		37.984	44.441	45.609	51.278
χ^2 /df		1.41	1.65	1.69	1.90
CFI		0.995	0.992	0.994	0.996
TLI		0.993	0.989	0.993	0.995

RMSEA = root mean square error of approximation; SRMR = standardised root mean residual; CFI = comparative fit index; TLI = Tucker Lewis index; Study 2 = initial study plus 1 month; Study 3 = initial study plus 2 months; Study 4 = initial study plus 8 months; Combo = combined across the three studies.

Appendix

Appendix. Factor structure and dimensionality of SAWS and BSAWS

Item	Webster et al. (2007)	Alves et al. (2014)	BSAWS
1 During my life I have already overcome many painful facts.	EXP	EXP	-
2 I easily adjust my emotions to the present situation.	ER	ESR	-
3 I often relate past with present situations.	RE	REF	-
4 I am able to laugh in embarrassment situations.	HU	MO	-
5 I love to read books that challenge me to think differently about many issues.	OP, HU	EXP	-
6 I have taken important decisions throughout my life.	EXP	EXP	EXP
7 When I take personal decisions I do not let myself take over by emotions.	ER	ESR	-
8 I often think about my own past.	RE	REF	-
9 There may be funny elements even in very difficult life's situations.	HU	MO	-
10 Besides my favourite kind of music I like to listen to other musical styles.	HU	MO	-
11 Throughout my life I have dealt with many types of people.	-	EXP	-
12 I am in tune with my own emotions.	ER, RE	ESR	-
13 I often dedicate myself to the remembering of past events.	RE	REF	-
14 When I face major life transitions I try and find a funny side.	ER, HU	MO	-
15 I love trying a variety of different ethnic foods.	-	OM	-
16 I have gone through various moral dilemmas.	EXP	OM	-
17 I am very good at interpreting my emotional states.	ER, RE	OM	-
18 Reviewing my past helps me to have a good perspective of my current concerns.	RE	REF	RE
19 I laugh easily.	HU	MO	-
20 I often try new things.	OP, HU	OM	-
21 I have met a lot of the negative side of life (e.g., dishonesty, hypocrisy...)	EXP	EXP	-
22 I can easily express my emotions without feeling like I am losing control of the situation.	ER	OM	ER
23 I often recall the past to see if I have changed since then.	RE	REF	RE
24 At this point in my life it is easy for me to laugh at my mistakes.	ER, HU	MO	-
25 Controversial works of art play an important and valuable role in society.	OP	OM	-
26 I went through many difficult changes throughout life.	EXP	EXP	-
27 I am good at identifying subtle emotions in myself.	ER, RE	OM	ER
28 Remembering my past helps me understand the important things in my life.	RE	REF	-
29 I often use humour to put other people at ease.	HU	MO	HU
30 I like being surrounded by people whose views are quite different from mine.	OP	MO	-
31 I discovered by myself that "not everything that shines is gold."	-	EXP	-
32 I am able to control my emotions when the situation demands it.	ER	ESR	-
33 I often notice that my past can be an important source of knowledge.	RE	REF	-
34 Now I know I can truly appreciate the little things in life.	OP	ESR	OP
35 I have a lot of curiosity to know more about other religions and other philosophies.	OP	ESR	-
36 I have learnt valuable life lessons with others.	-	EXP	EXP
37 It seems I have a certain gift to understand the emotions of others.	-	OM	-
38 Reliving past events increases my confidence to live today.	OP	REF	-
39 To comfort others I often make fool of me.	HU	MO	-
40 I wonder many times about the mysteries of life and what lies beyond death.	-	REF	RE

Note: ER: Emotion regulation; RE: Reminiscence; OP: Openness; EXP: Experience; HU: Humour (Webster et al. 2007); ESR: Emotional self-regulation; REF: Reflection; OM: Open-mindedness; EXP: Experience; MO: Mood (Alves et al. 2014)

Figures

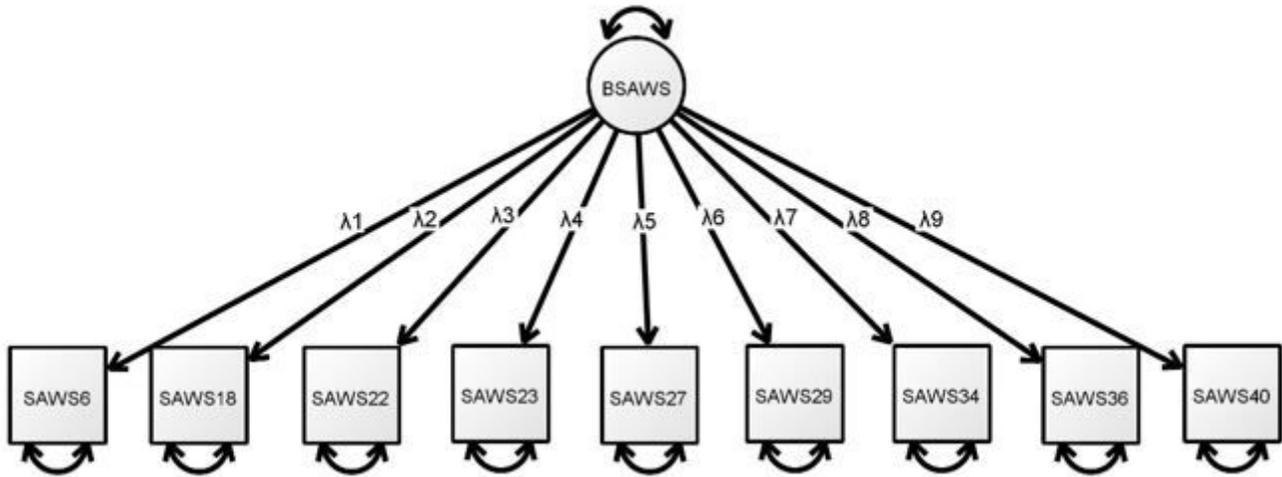


Figure 1

Estimated model of the nine-item BSAWS