

ความเชื่อถือได้และความแม่นยำของแบบวัดการปรับตัวทางสังคมและการทำงานฉบับภาษาไทยในผู้ป่วยนอกแผนกจิตเวชที่ไม่มีอาการโรคจิต

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บทคัดย่อ

วัตถุประสงค์ เพื่อพัฒนาและประเมินความเชื่อมั่น ความตรง และความไวต่อการเปลี่ยนแปลงของแบบวัดการปรับตัวทางสังคมและการทำงานฉบับภาษาไทย (Work and Social Adjustment Scale, WSAS) ในผู้ป่วยนอกแผนกจิตเวชที่ไม่มีอาการโรคจิต

วิธีการศึกษา การศึกษานี้เป็นการวิเคราะห์ข้อมูลทุติยภูมิ โดยใช้ชุดข้อมูลผู้ป่วยจิตเวชที่ไม่มีอาการโรคจิต (อายุ 18 - 65 ปี) ซึ่งเข้ารับการรักษากับแผนกผู้ป่วยนอก โรงพยาบาลรามาธิบดี และสถาบันการแพทย์จักรีนฤเบดินทร์ จำนวน 159 คน ผู้เข้าร่วมวิจัยทำแบบประเมิน WSAS, Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder-7 (GAD-7) และ World Health Organization-5 Well-Being Index (WHO-5) ในครั้งแรกที่มาปรึกษา และทำแบบประเมินซ้ำหลังจากนั้น 6 - 8 สัปดาห์ ผู้วิจัยตรวจสอบความตรงเชิงโครงสร้างด้วยการวิเคราะห์องค์ประกอบเชิงยืนยัน ประเมินความสอดคล้องภายในของเครื่องมือด้วยค่า Cronbach's alpha ประเมินความตรงเชิงโครงสร้างระหว่างแบบประเมิน WSAS กับแบบประเมิน PHQ-9, GAD-7 และ WHO-5 ด้วยค่าสหสัมพันธ์ของ Spearman และประเมินความไวต่อการเปลี่ยนแปลงด้วยการเปรียบเทียบการเปลี่ยนแปลงของคะแนน WSAS ระหว่างกลุ่มที่ตอบสนองและไม่ตอบสนองต่อการรักษาด้วย Mann-Whitney U test โดยนิยามการตอบสนองการรักษาจากการลดลงของคะแนน PHQ-9 หรือ GAD-7 อย่างน้อยร้อยละ 50

ผลการศึกษา ผู้เข้าร่วมมีอายุเฉลี่ย 33.9 ปี (ส่วนเบี่ยงเบนมาตรฐาน 12.8 ปี) ส่วนใหญ่เป็นเพศหญิง (ร้อยละ 73.0) การวิเคราะห์องค์ประกอบเชิงยืนยันพบว่า โมเดลองค์ประกอบเดียวที่อนุญาตให้ความคลาดเคลื่อนของข้อคำถามที่ 3 (ด้านกิจกรรมยามว่างทางสังคม) และ 5 (ด้านความสัมพันธ์ใกล้ชิด) สัมพันธ์กัน มีความสอดคล้องกับข้อมูลในระดับดีเยี่ยม ($\chi^2 (4) = 2.12, p = .714$, CFI = 1.000, TLI = 1.010, RMSEA = 0.000 [90% CI: 0.000, 0.089], SRMR = 0.010) และค่าน้ำหนักองค์ประกอบมาตรฐานของทั้ง 5 ข้อคำถามมีขนาดใหญ่ (พิสัย: .709 - .838, $p < .001$) ค่าความสอดคล้องภายในของแบบประเมิน WSAS อยู่ในระดับดีมาก (Cronbach's $\alpha = 0.897$) คะแนนรวมของ WSAS มีความสัมพันธ์เชิงบวกอย่างมากกับอาการซึมเศร้า (PHQ-9: $p = 0.717$, $p < .001$) และวิตกกังวล (GAD-7: $p = 0.662$, $p < .001$) และมีความสัมพันธ์เชิงลบในระดับปานกลางกับสุขภาวะ (WHO-5: $p = -0.552$, $p < .001$) การทดสอบความไวต่อการเปลี่ยนแปลงพบว่า กลุ่มที่ตอบสนองต่อการรักษามีคะแนน WSAS ลดลงจากระดับเริ่มต้นมากกว่ากลุ่มที่ไม่ตอบสนองต่อการรักษาอย่างมีนัยสำคัญทางสถิติ ($p < .001$)

สรุป แบบประเมิน WSAS มีความเชื่อมั่น ความตรง และความไวต่อการเปลี่ยนแปลงทางคลินิกในระดับดี ในการประเมินความบกพร่องในการทำหน้าที่ในกลุ่มผู้ป่วยนอกแผนกจิตเวชชาวไทยที่ไม่มีอาการโรคจิต ซึ่งสนับสนุนการนำแบบประเมินนี้ไปใช้ในการติดตามผลการรักษา และประเมินการฟื้นคืนความสามารถในการทำหน้าที่ในบริบทวิชาชีพไทย

คำสำคัญ ความบกพร่องในการทำหน้าที่ แบบวัดการปรับตัวทางสังคมและการทำงานฉบับภาษาไทย ความเชื่อถือได้ ความแม่นยำ

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Reliability and Validity of the Thai Version of the Work and Social Adjustment Scale in Non-Psychotic Psychiatric Outpatients

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ABSTRACT

Objective: To develop and evaluate the reliability, validity, and sensitivity to change of the Thai version of the Work and Social Adjustment Scale (WSAS) in non-psychotic psychiatric outpatients.

Methods: This study used secondary data derived from 159 non-psychotic psychiatric outpatients (age 18 - 65 years) who visited the psychiatric outpatient clinics at Ramathibodi Hospital and Chakri Naruebodindra Medical Institute. The participants completed the WSAS, Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder-7 (GAD-7), and World Health Organization-5 Well-Being Index (WHO-5) at their first visit to the clinics and 6 – 8 weeks later. Internal consistency was assessed using Cronbach's alpha. Construct validity was assessed using confirmatory factor analysis (CFA). Convergent validity was examined using Spearman's rank correlations between WSAS and measures of depression (PHQ-9), anxiety (GAD-7), and well-being (WHO-5). Sensitivity to change was evaluated by comparing the changes in WSAS scores between treatment responders, defined as those with $\geq 50\%$ reduction in PHQ-9 or GAD-7 scores, and non-responders, using the Mann-Whitney U test.

Results: The mean age (standard deviation, SD) of participants was 33.9 (12.8) years. Most were female (73.0%). The WSAS demonstrated excellent internal consistency (Cronbach's $\alpha = 0.897$). CFA revealed an excellent fit for a modified one-factor model, allowing correlated errors between Items 3 (social leisure activities) and 5 (close relationship) ($\chi^2 (4) = 2.12, p = .714, CFI = 1.000, TLI = 1.010, RMSEA = 0.000 [90\% CI: 0.000, 0.089], SRMR = 0.010$), and large standardized factor loadings of all 5 items (range: .709 - .838, all $ps < .001$). The total scores of WSAS were strongly positively correlated with depressive symptoms (PHQ-9: $\rho = 0.717, p < .001$) and anxiety symptoms (GAD-7: $\rho = 0.662, p < .001$), and moderately negatively correlated with well-being (WHO-5: $\rho = -0.552, p < .001$). Assessing sensitivity to changes showed that treatment responders showed greater reductions in WSAS scores from baseline compared with non-responders ($p < .001$).

Conclusion: The WSAS is a reliable, valid, and clinically sensitive measure of functional impairment in Thai non-psychotic psychiatric outpatients. Its strong psychometric properties and responsiveness to clinical change support its use in routine outcome monitoring and evaluation of treatment-related functional recovery in Thai mental health settings.

Keywords: functional impairment, Work and Social Adjustment Scale Thai version, reliability, validity

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INTRODUCTION

Functional impairment is a defining characteristic of psychiatric disorders, shaping both clinical presentation and patient quality of life.¹ Beyond symptom severity, the degree to which mental illness interferes with occupational roles, domestic responsibilities, and social functioning reflects the lived burden of disease.² A reliable assessment of this dimension is therefore crucial for guiding treatment decisions, monitoring progress, and evaluating the outcomes of interventions.

Among disability measurements, the Work and Social Adjustment Scale (WSAS) has emerged as a practical self-report measure of functional impairment due to its brevity, sensitivity, and ease of use. It was designed as a versatile scale for an identified problem and was originally used to study the treatment of depression and anxiety.³ Comprising five items covering work, home management, social leisure, private leisure, and interpersonal relationships, the WSAS has demonstrated strong psychometric properties across a wide range of clinical populations^{3,4}, including youth.^{5,6} Compared with broader or more time-intensive disability measures, such as the World Health Organization Disability Assessment Schedule Two (WHODAS 2.0), the Sheehan Disability Scale (SDS), or the Global Assessment of Functioning (GAF), the WSAS offers a concise, clinically focused assessment that remains highly responsive to treatment-related change.^{7,8} This combination of practicality and robustness has contributed to its widespread adoption and growing use in routine outcome monitoring.

Cross-cultural validation studies have further established the robustness of the WSAS. Evidence from Denmark⁹, Norway^{10,11}, Portugal¹², Spain^{13,14}, Germany¹⁵, and China¹⁶ consistently supports its unidimensional structure, high internal consistency, and meaningful associations with psychiatric symptoms. However, the WSAS has not yet been studied in Thai populations. This represents a critical gap, given Thailand's unique cultural context and the rising public health burden of mental disorders. A Thai validation is necessary to ensure both linguistic and conceptual equivalence, enabling clinicians

to reliably assess functional impairment and compare outcomes internationally.

Therefore, this study aimed to develop and assess the validity, reliability, and sensitivity to change of the Thai version of the WSAS in a psychiatric outpatient setting, where patient-reported functional impairment would be particularly helpful to a busy clinician in providing more comprehensive, patient-centered care within a time-limited service. We hypothesized that the Thai version of the WSAS would be unidimensional and exhibit good internal consistency, similar to the original English version.³ Besides, WSAS scores were hypothesized to be positively correlated with depression and anxiety but negatively correlated with well-being. These correlations were expected to be moderate, reflecting the distinctiveness yet relatedness of the WSAS to well-established clinically relevant constructs. Finally, we hypothesized that changes in WSAS scores would be associated with clinical responses to treatment, supporting its utility in monitoring functional recovery.

METHODS

Participants and Procedure

This study utilized secondary data from a project investigating the psychometric properties of the Thai version of the Generalized Anxiety Disorder-7 (GAD-7) in non-psychotic psychiatric outpatients (Manuscript in preparation). Participants were enrolled at their first visit to the psychiatric outpatient clinics of Ramathibodi Hospital or Chakri Naruebodindra Medical Institute. Inclusion criteria were 1) age 18 - 65 years, and 2) the ability to read and understand Thai. Exclusion criteria were 1) having psychotic symptoms, 2) having serious brain disease or health problems causing communication difficulty, and 3) refusing to join the research or withdrawing consent during the study. After obtaining informed consent, participants were asked to provide their demographic information and complete a set of questionnaires at their first visit to the outpatient units. The clinical diagnosis for their presenting problem was also obtained from the medical records. At 6-to-8-week

follow-up, the participants were asked to complete the same set of questionnaires to assess their clinical changes. In this study, we utilized the entire sample enrolled in the study, comprising 159 participants, to maximize the power of the analysis. Exemption of informed consent to use the data for the current analysis was approved by the Ethics Committee of the Faculty of Medicine, Ramathibodi Hospital, Mahidol University (MURA2025/660). This study was reported according to the COSMIN Reporting Guideline for studies on measurement properties.¹⁷

Development of Thai-version WSAS

The Work and Social Adjustment Scale (WSAS) is a 5-item self-report measure assessing functional impairment contributed by an identified problem across key domains of daily life: work (Item 1), home management (Item 2), social leisure activities (Item 3), private leisure activities (Item 4), and close relationships (Item 5).³ The permission to translate the original WSAS into Thai was obtained from the copyright holder. The development of the WSAS-Thai was then conducted in accordance with the principle of good practices for translation and cultural adaptation of patient-reported outcome measures.¹⁸ Briefly, two independent psychiatrists translated the English version of WSAS into Thai. Thereafter, a third psychiatrist gathered with the two forward translators to discuss and reconcile the differences into a consensus, which was later back-translated by a bilingual native English speaker. A review of the back translation was performed to ensure the conceptual equivalence of the WSAS-Thai to the original version. Subsequently, cognitive debriefing was conducted by a mental health professional and a layperson who had not seen the original version, which suggested a modified translation for Item 3. Specifically, the translation for the term “dating” was changed from “การนัดพบ” to “การนัดเดท”, and that for the term “home entertaining”, from “ความบันเทิงภายในบ้าน” to “เชิญแขกมาที่บ้าน”. The final Thai version of the WSAS consists of five statements with similar sentence structure: “เป็นเพราะสภาพจิตใจของฉัน ทำให้ (functioning) แย่ลง”. The five domains of functioning were translated as

“ความสามารถในการทำงานของฉัน”, “การจัดการสิ่งต่างๆ ภายในบ้าน (ทำความสะอาด เก็บกวาด ซักผ้าของ ทำอาหาร ดูแลบ้านหรือเด็กๆ การจ่ายบิล)”, “กิจกรรมยามว่างทางสังคม ของฉัน (ร่วมกับผู้อื่น เช่น งานเลี้ยง เทียวบาร์ เทียวคลับ ไปเที่ยว ไปเยี่ยมเยียน การนัดเดท เชิญแขกมาที่บ้าน)”, “กิจกรรมยามว่างส่วนตัวของฉัน (ที่ทำเพียงลำพัง เช่น อ่านหนังสือ ทำสวน สะสมของ เย็บปักถักร้อย เดินเล่นคนเดียว)”, and “ความสามารถ ในการสร้างและรักษาความสัมพันธ์ใกล้ชิดสนิทสนมกับผู้อื่น รวมถึงคนที่ฉันใช้ชีวิตอยู่ด้วย”. Each item is rated on a 9-point scale from 0 (“ไม่เลย” indicating “not at all impaired”) to 8 (“รุนแรงมาก” indicating “very severely impaired”). Scores are summed to give a total between 0 and 40. A higher score indicates greater functional impairment.

Measurements

Patient Health Questionnaire-9 (PHQ-9, Thai version)

The PHQ-9 is a brief screening tool for depression.¹ It contains nine items based on the diagnostic criteria for major depressive disorder. Each item is rated on a 4-point scale from 0 (“not at all”) to 3 (“nearly every day”). The total score ranges from 0 to 27, with higher scores reflecting more severe depressive symptoms. The PHQ-9 demonstrated excellent reliability in this sample (Cronbach’s $\alpha = 0.893$).

Generalized Anxiety Disorder-7 (GAD-7, Thai version)

The GAD-7 measures the severity of anxiety symptoms.²⁰ It has seven items, each rated on a 4-point scale from 0 (“not at all”) to 3 (“nearly every day”). Scores are added to produce a total score between 0 and 21. Higher scores indicate greater anxiety severity. Internal consistency in the present study was excellent (Cronbach’s $\alpha = 0.892$).

World Health Organization-5 Well-Being Index (WHO-5, Thai version)

The WHO-5 is a short scale that measures psychological well-being.²¹ It has five items asking about positive mood, vitality, and general interest. Each is rated from 0 (“at no time”) to 5 (“all of the time”). The raw total (0 - 25) is multiplied by 4 to give a percentage score from

0 to 100, where higher scores indicate better well-being. The WHO-5 showed excellent reliability in the current sample (Cronbach's $\alpha = 0.882$).

Statistical Analyses

All analyses were performed using Stata 16.1 SE. There were no missing values for any of the measurement items (WSAS, PHQ-9, GAD-7, and WHO-5). However, some missing data were present in demographic variables, as shown in Table 1. The evaluation of the WSAS was carried out in four steps. First, confirmatory factor analysis (CFA) was conducted to examine the factor structure of the WSAS based on a one-factor model, using the maximum likelihood estimator. The criteria for acceptable model fit were root mean square error of approximation (RMSEA) < .08, Comparative Fit Index (CFI) > .95, Tucker–Lewis index (TLI) > .95, and Standardized Root Mean Square Residual (SRMR) < .08²². The chi-square statistic (χ^2) was also reported; however, given its sensitivity to sample size, it was not used as the primary criterion for model rejection. In cases of suboptimal fit, modification indices (MIs) were inspected to identify potential sources of local misfit. Second, the internal consistency was assessed using Cronbach's alpha, which reflects the scale's internal reliability. Third, convergent validity was assessed by testing the correlations between WSAS total scores and the PHQ-9, GAD-7, and WHO-5. Due to the non-normal distribution of WSAS scores, Spearman's rank correlation was used. Finally, sensitivity to change was examined in the subgroup of participants with clinically significant depression (PHQ-9 ≥ 10) or anxiety (GAD-7 ≥ 10) at baseline who also completed the questionnaires at the follow-up visit. Of the total sample, only participants who completed both baseline and follow-up assessments were included in this analysis. The baseline and follow-up scores, and changes from baseline in the WSAS total and its five domain scores were then compared between treatment responders, defined by $\geq 50\%$ reduction in PHQ-9 or GAD-7 total scores, and treatment non-responders, using the Mann–Whitney U test. Rank-biserial correlation coefficients (r_{rb}) were calculated to reflect the

effect sizes of the WSAS score differences between groups. All statistical tests were two-tailed, with significance set at $p < 0.05$.

RESULTS

Sample Characteristics

A total of 159 participants were included in the analysis. The mean age was 33.9 years (SD = 12.8, range 18 - 65), and the majority were female (73.0%). Most participants were single (66.0%) and had completed secondary education or higher (66.0%). One hundred and seventeen (73.6%) and 91 (57.2%) participants met the criteria for clinically significant depression (PHQ-9 ≥ 10) and anxiety (GAD-7 ≥ 10), respectively, with 84 (52.8%) meeting both. The median (interquartile range, IQR) PHQ-9 and GAD-7 scores were 14.0 (9.0 - 19.0) and 10.0 (7.0 - 15.0), respectively. The median (IQR) WHO-5 score was 36.0 (20.0 - 52.0), suggesting relatively low baseline subjective well-being. At follow-up, 68 (42.8%) participants dropped out of the study, leaving 91 (57.2%) for the sensitivity-to-change analysis. No statistically significant differences in baseline characteristics between the completers and non-completers were observed (Table 1).

Construct Validity

Following the original study³, a one-factor CFA model was fitted to the baseline WSAS data, yielding standardized factor loadings ranging from 0.686 (Item 1) to 0.891 (Item 5) (Figure 1a). Goodness of fit test revealed adequate fit on most indices (CFI = 0.977, TLI = 0.955, SRMR = 0.030), except for the chi-square test (χ^2 (5) = 15.67, $p = .008$) and RMSEA (0.116 [90% CI: 0.054, 0.184]). Subsequent inspection of modification indices suggested correlated error between Items 3 (social leisure activities) and 5 (close relationship) (MI = 15.1). Allowing a correlation between the residuals of Items 3 and 5 yielded an excellent model fit (χ^2 (4) = 2.12, $p = .714$, CFI = 1.000, TLI = 1.010, RMSEA = 0.000 [90% CI: 0.000, 0.089], SRMR = 0.010). The LR test confirmed that the modified model fit significantly better than the baseline model, $\Delta\chi^2$ (1) = 13.55, $p < .001$. All standardized factor loadings in the

modified model were large and statistically significant (range: .709 - .838, all p s < .001) (Figure 1b).

Reliability

The WSAS demonstrated excellent internal consistency with Cronbach's alpha of 0.897. Regarding item-level reliability, Item 5 (impairment in close relationships) demonstrated the highest item-test correlation, indicating a strong contribution to the overall WSAS construct (Table 2). Consistently, removal of this item resulted in the greatest reduction in Cronbach's alpha. On the other hand, Item 1 (impairment in the ability to work) showed the lowest item-test correlation, and its removal had the smallest effect on Cronbach's alpha (Table 2).

Convergent Validity

Spearman's correlation analyses showed that higher WSAS total scores were strongly associated with greater depressive symptoms (PHQ-9: $\rho = 0.717$, $p < .001$)

and anxiety symptoms (GAD-7: $\rho = 0.662$, $p < .001$), and moderately to strongly negatively associated with well-being (WHO-5: $\rho = -0.552$, $p < .001$) (Table 3). At the item level, Item 5 (impairment in close relationships) showed the strongest correlation with both depressive symptoms ($\rho = 0.653$, $p < .001$) and anxiety ($\rho = 0.615$, $p < .001$). In contrast, Item 4 (impairment in private leisure activities) was most strongly associated with lower well-being ($\rho = -0.541$, $p < .001$) (Table 3).

Sensitivity to Change

Among 91 participants completing both baseline (visit 1) and follow-up (visit 2) assessments, 67 (73.6%) and 51 (56.0%) met the criteria for clinically significant depression (PHQ-9 ≥ 10) and anxiety (GAD-7 ≥ 10), respectively, with 47 (51.6%) meeting both. At baseline, the total WSAS and all domain scores were comparable between treatment responders and non-responders for

Table 1 Sample characteristics.

Characteristics	Total (N = 159)	Completer (N = 91)	Non-completer (N = 68)	p-value
Age (years) ^a , median (IQR)	29.5 (24.0 - 41.0)	31 (25.0 - 45.0)	27 (23.0 - 37.0)	.086
Gender, n (%)				.616
Male	43 (27.0)	26 (28.6)	17 (25.0)	
Female	116 (73.0)	65 (71.4)	51 (75.0)	
Marital status, n (%)				.396
Single	105 (66.0)	60 (65.9)	45 (66.2)	
Married/De facto	48 (30.2)	26 (28.6)	22 (32.4)	
Divorced/Separated/Widowed	6 (3.8)	5 (5.5)	1 (1.5)	
Education, n (%)				.047
Secondary school or vocational certification	39 (24.5)	16 (17.6)	23 (33.8)	
Higher vocational certification, associate degree, Bachelor's degree	105 (66.0)	67 (73.6)	38 (55.9)	
Master's or Doctoral degree	15 (9.4)	8 (8.8)	7 (10.3)	
Work status, n (%)				.284
Unemployed/Retired	30 (18.9)	15 (16.5)	15 (22.1)	
Students	29 (18.2)	14 (15.4)	15 (22.1)	
Employed	100 (62.9)	62 (68.1)	38 (55.9)	

Table 1 Sample characteristics. (con)

Monthly income (Baht), n (%)			
less than 10,000	43 (27.0)	19 (21.6)	24 (36.9)
10,000 - 29,999	66 (41.5)	41 (46.6)	25 (38.5)
30,000 - 49,999	28 (17.6)	16 (18.2)	12 (18.5)
50,000 - 99,999	16 (10.5)	12 (13.6)	4 (6.2)
missing	6 (3.8)		
Psychiatric Diagnosis ^b , n (%)			.588
Depressive disorder	55 (34.6)	33 (36.3)	22 (32.4)
Anxiety disorder	38 (25.5)	26 (28.6)	12 (17.7)
Adjustment disorder	32 (20.1)	15 (16.5)	17 (25.0)
Insomnia disorder	13 (10.7)	7 (7.7)	6 (8.8)
Bipolar disorder	6 (3.8)	3 (3.3)	3 (4.4)
Others ^c	15 (9.4)	7 (7.7)	8 (11.7)
Total PHQ-9, median (IQR)	14.0 (9.0 - 19.0)		
Total GAD-7, median (IQR)	10.0 (7.0 - 15.0)		
Total WHO-5, median (IQR)	36.0 (20.0 - 52.0)		

^a N = 158 due to missing data

^b In case of dual diagnosis, the classification was based on the primary diagnosis for the presenting problem.

^c Other diagnoses include shift work disorder, ADHD, trichotillomania, OCD, Parkinson's disease, mental disorder NOS, memory impairment, unspecified mood disorder, and nicotine dependence.

Note: SD, standard deviation; IQR, interquartile range; PHQ-9, Patient Health Questionnaire-9; GAD-7, Generalized Anxiety Disorder-7; WHO-5, World Health Organization-5 Well-Being Index.

Table 2 Descriptive statistics of WSAS and its internal reliability (N = 159)

WSAS	Median (IQR)	Item-test correlation	Item-rest correlation	Cronbach's alpha if the item is deleted
Item 1: ability to work	4 (2 - 6)	0.783	0.659	0.894
Item 2: home management	3 (2 - 6)	0.853	0.768	0.871
Item 3: social leisure activities	4 (2 - 6)	0.859	0.771	0.869
Item 4: private leisure activities	3 (1 - 6)	0.830	0.725	0.880
Item 5: close relationships	4 (2 - 6)	0.887	0.814	0.859
Full scale	19 (10 - 28)			0.897*

* Cronbach's alpha of the full-scale WSAS

Note: IQR, interquartile range; WSAS, Work and Social Adjustment Scale.

depression (Table 4). For anxiety, treatment responders had significantly higher scores at baseline for the overall functional impairment (total WSAS), and impairments in

social (Item 3) and private (Item 4) leisure activities (all $p < .05$, Table 4). However, treatment responders for both depression and anxiety showed significantly lower scores

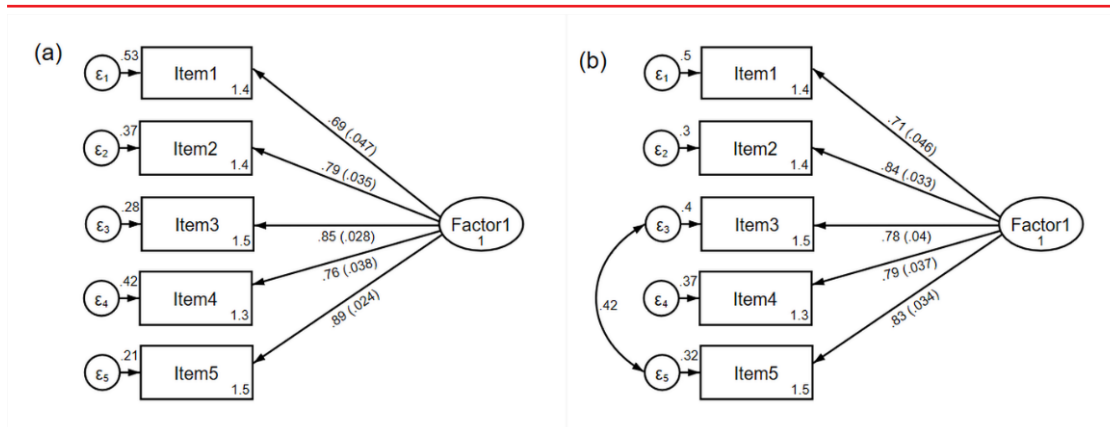


Figure 1 Confirmatory factor analysis of WSAS-Thai (a) initial one-factor model, (b) modified one-factor model with correlated residuals between Item 3 and 5

Note: Standardized factor loadings (standard errors) were shown

Table 3 Spearman's correlations of WSAS with depression, anxiety, and well-being (N = 159)

WSAS	PHQ-9	GAD-7	WHO-5
Total	0.717	0.662	-0.552
Item 1: ability to work	0.551	0.489	-0.375
Item 2: home management	0.644	0.566	-0.447
Item 3: social leisure activities	0.563	0.566	-0.499
Item 4: private leisure activities	0.634	0.584	-0.541
Item 5: close relationships	0.653	0.615	-0.487

Note: All correlations were statistically significant at $p < .001$. Abbreviations: WSAS, Work and Social Adjustment Scale; PHQ-9, Patient Health Questionnaire-9; GAD-7, Generalized Anxiety Disorder-7; WHO-5, World Health Organization-5 Well-Being Index.

of total WSAS and all its domains at follow-up than the non-responders (all $p < .01$), with significantly larger changes in total WSAS and all domain scores from baseline (all $p < .05$, Table 4). The differences in reduction of WSAS total and domain scores between treatment responders and non-responders were mostly large ($r_{rb} > 0.5$), except Item 3 (social leisure activities) ($r_{rb} = -0.43$) for depression and Item 1 (work) and 2 (home management) for anxiety (both $r_{rb} = -0.38$) (Table 4).

DISCUSSION

This study aimed to translate, culturally adapt, and psychometrically evaluate the Thai version of the WSAS in a clinical sample of non-psychotic psychiatric outpatients. Overall, the findings provide strong evidence that the WSAS is a reliable, valid, and clinically sensitive

measure of functional impairment in Thai mental healthcare settings. The results align closely with international research across diverse cultural contexts, while also offering new evidence on the WSAS's sensitivity to clinical change in Thai populations.

Construct Validity

The initial one-factor model demonstrated good fit on most indices except for RMSEA. As suggested by modification indices, allowing a correlation between residuals of Items 3 and 5 significantly improved model fit to excellent, aligning with prior reports from Norway¹¹ and Germany.¹⁵ This is not surprising as Items 3 (social leisure activities) and 5 (close relationships) both assess impairment in social functioning. Such cross-language convergence suggests that the overlap between these

Table 4 Comparison of median (IQR) of WSAS scores between treatment responders and non-responders for depression and anxiety

WSAS	Depression			Anxiety		
	Responder (N = 31)	Non-responder (N = 36)	r_b p-value	Responder (N = 28)	Non-responder (N = 23)	r_b p-value
Total						
Baseline	23.0 (16.0, 30.0)	23.0 (16.0, 30.0)	0.15 .285	26.0 (19.5, 32.0)	20.0 (12.0, 27.0)	0.38 .022
Follow-up	4.0 (2.0, 9.0)	20.0 (11.5, 26.0)	-0.75 <.001	6.5 (2.5, 17.0)	20.0 (10.0, 26.0)	-0.54 .001
Change	-18.0 (-24.0, -5.0)	-2.0 (-11.0, 11.0)	-0.62 <.001	-16.5 (-24.0, -6.5)	-2.0 (-12.0, -11.0)	-0.58 <.001
Item 1: ability to work						
Baseline	5.0 (2.0, 6.0)	4.0 (3.0, 6.0)	0.05 .735	6.0 (3.0, 6.5)	4.0 (3.0, 6.0)	0.13 .419
Follow-up	1.0 (0.0, 2.0)	4.0 (2.0, 6.0)	-0.69 <.001	2.0 (0.0, 3.5)	4.0 (2.0, 5.0)	-0.44 .006
Change	-4.0 (-5.0, -1.0)	-0.5 (-2.0, 1.5)	-0.51 <.001	-3.5 (-5.0, -0.5)	-1.0 (-3.0, 1.0)	-0.38 .020
Item 2: home management						
Baseline	4.0 (2.0, 6.0)	3.0 (2.0, 6.0)	0.07 .626	4.5 (3.0, 6.0)	4.0 (2.0, 6.0)	0.15 .367
Follow-up	0.0 (0.0, 2.0)	4.0 (2.0, 5.5)	-0.69 <.001	1.0 (0.0, 3.0)	3.0 (2.0, 5.0)	-0.47 .004
Change	-3.0 (-5.0, -1.0)	0.0 (-2.0, 2.0)	-0.57 <.001	-3.0 (-4.5, -1.0)	0.0 (-3.0, 2.0)	-0.38 .019
Item 3: social leisure activities						
Baseline	5.0 (2.0, 7.0)	4.0 (2.0, 6.0)	0.07 .625	6.0 (3.0, 7.0)	4.0 (2.0, 5.0)	0.40 .014
Follow-up	1.0 (0.0, 2.0)	4.0 (2.0, 6.5)	-0.58 <.001	2.0 (0.0, 3.5)	4.0 (2.0, 7.0)	-0.43 .008
Change	-3.0 (-6.0, 0.0)	0.0 (-2.0, 2.0)	-0.43 .002	-3.0 (-6.0, -2.0)	1.0 (-2.0, 3.0)	-0.61 <.001
Item 4: private leisure activities						
Baseline	5.0 (2.0, 7.0)	3.5 (2.0, 6.0)	0.20 .156	6.0 (3.0, 7.0)	3.0 (2.0, 6.0)	0.44 .006
Follow-up	0.0 (0.0, 1.0)	4.0 (2.0, 5.5)	-0.69 <.001	0.0 (0.0, 3.0)	5.0 (2.0, 6.0)	-0.56 .001
Change	-4.0 (-6.0, 0.0)	0.0 (-2.0, 3.0)	-0.57 <.001	-4.0 (-6.5, -1.0)	0.0 (-2.0, 3.0)	-0.60 <.001
Item 5: close relationships						
Baseline	5.0 (3.0, 7.0)	4.0 (2.0, 6.0)	0.16 .270	5.0 (4.0, 7.0)	5.0 (2.0, 6.0)	0.30 .068
Follow-up	1.0 (0.0, 2.0)	3.0 (2.0, 6.0)	-0.67 <.001	0.0 (2.0, 3.0)	4.0 (2.0, 6.0)	-0.47 .004
Change	-4.0 (-5.0, -1.0)	0.0 (-2.5, 1.5)	-0.56 <.001	-4.0 (-5.0, -1.0)	0.5 (-4.0, 2.0)	-0.55 .001

Note: p < .05 is bolded. Abbreviations: WSAS, Work and Social Adjustment Scale; r_b , rank-biserial correlation coefficient

two items reflects a substantive feature of the construct rather than a sample-specific artifact. All factor loadings were large and significant (range: .709 - .838), supporting strong item-factor relationships and indicating that each item is a reliable indicator of functional impairment. These results provide support for the construct validity of the Thai version of the WSAS and suggest a unidimensional structure consistent with existing versions.^{3,11,15}

Reliability

The internal consistency of the WSAS was excellent (Cronbach's $\alpha = 0.897$), comparable to the original scale.³ Similarly, prior cross-cultural validations in multiple countries, including Spain, Norway, Germany, and China, have reported the alpha values ranging from 0.80 to 0.90.^{9-11,13-16} The present results, therefore, support the scale's stability and coherence in the Thai cultural context.

Convergent Validity

As hypothesized, the total scores of WSAS showed positive correlations with PHQ-9 and GAD-7, and a negative correlation with WHO-5 scores. Such findings indicate that higher levels of functional impairment were associated with more severe depressive and anxiety symptoms and a lower level of well-being. The magnitude of the correlations between WSAS and PHQ-9 ($\rho = 0.72$) and GAD-7 ($\rho = 0.67$) aligns closely with findings from Spanish, German, and Norwegian validation studies, which have consistently reported moderate-to-strong correlations between functional impairment and symptom severity.^{11,12,14-16} Furthermore, the moderate inverse correlation between WSAS and WHO-5 ($\rho = -0.55$) supports the conceptual distinction between functional impairment and general well-being.²³ Interestingly, while impairment in close relationships (Item 5) was most strongly correlated with depressive and anxiety symptoms, impairment in private leisure activities (Item 4) was instead the domain most strongly correlated with well-being. Such domain-specific differentiation suggests that WSAS items capture functionally distinct aspects of real-world

impairment that are not uniformly reducible to either symptom burden or subjective well-being.

Sensitivity to Clinical Change

Confirming our hypothesis, the WSAS appeared to be sensitive to change following treatment. Participants who achieved a $\geq 50\%$ reduction in PHQ-9 or GAD-7 scores showed significantly larger improvements in overall WSAS and all five domain scores than non-responders, indicating that the WSAS can detect clinically meaningful functional recovery. This aligns well with previous studies demonstrating that WSAS scores improve in parallel with reductions in depressive and anxiety symptoms, supporting the scale's sensitivity to treatment-related change.^{3,7,8} Interestingly, investigation on individual domains of impairment revealed that while treatment responders for anxiety reported significantly more severe impairments in social and private leisure activities than non-responders at baseline, the significant improvement at follow-up was observed across all functional domains, including those without baseline group differences. This implies that the observed functional changes at follow-up were unlikely to be solely explained by regression to the mean but might also indicate genuine improvement associated with treatment responses. Altogether, these findings suggest that the WSAS is responsive to therapeutic change, highlighting its usefulness in routine clinical care with the ultimate goal of functional recovery. Although the sample size decreased at follow-up, baseline characteristics did not differ significantly between completers and non-completers except for education level ($p = 0.047$), suggesting that the impact of attrition on the sensitivity-to-change analysis is likely limited.

Interpretation and Clinical Implications

The reliability and validity findings indicate that the WSAS captures a coherent construct of functional impairment that is meaningfully associated with symptom severity and well-being, while remaining distinct from them. This distinction is clinically important, as the WSAS measures functioning in ways that symptom scales cannot,

offering valuable information in situations where symptoms and real-world functioning do not align.²⁴ As the WSAS lacks a defined cut-off score, it should be interpreted as a continuous measure of functional impairment rather than a diagnostic tool. In practice, the scale is more useful for tracking changes in functioning over time and for complementing symptom-based assessments. The sensitivity to change further demonstrates its ability to detect meaningful improvements in functioning beyond symptom reduction.⁷

In the Thai healthcare context, the WSAS offers several practical advantages. First, it provides a simple, standardized tool for measuring functional impairment, a domain increasingly prioritized in mental health policy and service planning. Second, the instrument's strong convergence with the PHQ-9 and GAD-7, which are commonly used patient-reported outcome measures, enables its integration into existing screening and monitoring workflows in clinical practices. Finally, the scale's sensitivity to change in the overall functioning, along with a comprehensive profile of impairment in work, social, and personal life domains, makes the WSAS a suitable tool for longitudinal care, stepped-care models, and program-level evaluation (e.g., outpatient clinics, psychotherapy services, digital mental-health platforms) to promote functional recovery.

Strengths and Contributions

This study has several strengths. First, it was conducted in a real-world outpatient setting, enhancing the clinical relevance and applicability of the findings. Second, the use of routinely collected clinical measures allowed for a pragmatic evaluation of the WSAS in typical practice settings. Third, the inclusion of a follow-up assessment enabled the examination of sensitivity to change, providing additional evidence of the scale's usefulness in monitoring functional outcomes over time.

From a clinical perspective, WSAS scores could support meaningful interpretation and decision-making by capturing functional outcomes that may not align with

symptom severity. Patients with severe symptoms but preserved functioning may reflect resilience, whereas those with milder symptoms yet marked impairment may require targeted intervention. The demonstrated moderate correlations with symptoms and well-being measures support the WSAS as a complementary tool that assesses functional recovery beyond symptom reduction.

Limitations and Future Research

Several limitations warrant consideration. First, the study included only non-psychotic outpatient participants, which may limit generalizability to inpatient settings, individuals with psychotic symptoms, or community samples. In addition, the sample was predominantly female and relatively highly educated, which may limit the applicability of the findings to male patients or individuals with lower levels of education.

Second, discriminant validity was not formally evaluated in this study. Even though the domain-specific associations with different external validators and the consistent sensitivity to change for both depression and anxiety symptoms at follow-up provide indirect support for the distinctiveness of the WSAS, the construct overlap with depression cannot be fully ruled out, given its strong correlation with PHQ-9 ($p = 0.717$). Therefore, further studies are needed to delineate the discriminant boundaries between these two constructs.

Third, due to the utilization of secondary data for the current analyses, the unavailability of other functional-impairment measures (e.g., WHODAS and SDS) in the dataset precludes a direct comparison of the WSAS with other established instruments to further support its clinical utility. Future research should examine the performance of the WSAS across a wider range of psychiatric populations to determine whether the scale functions consistently in different clinical contexts and whether diagnostic groups show distinct patterns of functional impairment.

Fourth, the use of the GAD-7 and PHQ-9 as both measures of convergent validity and criteria for treatment

response in our study may introduce some degree of overlap, as both analyses were based on the same dataset. Finally, although the WSAS showed sensitivity to change over a 6-to-8-week interval, longer-term functional outcomes remain unclear, and studies with extended follow-up are needed to understand how functional impairment improves over time.

CONCLUSION

The WSAS demonstrates excellent reliability, strong convergent validity, and clear sensitivity to clinical change. The scale provides a culturally appropriate, clinically meaningful measure of functional impairment for Thai psychiatric outpatient populations. Its integration into routine outcome monitoring can support a more comprehensive and patient-centered approach to mental health care in Thailand, emphasizing not only symptom reduction but also restoration of daily functioning and well-being.

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Conflict of Interest

All authors declare no conflict of interest.

Authors' Contributions

Sasipang Chamchuen: analyze data and prepare the manuscript; Manusporn Manatssathit: collect and clean data; Pitchayawadee Chittaropas: collect data; Ratana Saipanish: forward translation and finalize the scale; Punjaporn Waleeprakone: forward translation and finalize the scale; Thanavadee Prachason: design the study, process and analyze data, prepare and finalize the manuscript

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