

Original article*Received: Aug. 23, 2025**Revised: Jan. 13, 2026**Accepted: Mar. 10, 2026**Published: Apr. 20, 2026***Reliability and Validity of The Adapted Thai Leeds Dependence Questionnaire (LDQ) in Sexual Minority Adults in Bangkok**

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Abstract

Substance use among sexual minority adults in Thailand poses significant risks. This study aimed to translate and validate the Leeds Dependence Questionnaire (LDQ) into Thai, providing a culturally sensitive tool for assessing substance dependence in this population. This quantitative study aimed to examine the psychometric properties of the Thai version of the LDQ among sexual minority adults. A total of 450 participants in Bangkok were recruited using non-probability sampling methods, specifically convenience and snowball sampling, to effectively access this target population. The instrument's reliability and validity were evaluated using Cronbach's alpha, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and convergent validity tests.

The Thai version of the LDQ demonstrated high reliability ($\alpha=.93$) and validity. EFA identified a single-factor structure, which was further confirmed by CFA. The CFA results, applying modification indices, showed $\chi^2=74.808$ ($p<.001$), $df=27$, $\chi^2/df=2.771$, CFI=0.983, TLI=0.972, GFI=0.956, RMSEA=0.077, and PNFI=0.584. Additionally, convergent validity was established with a Composite Reliability (CR) of 0.953 and an Average Variance Extracted (AVE) of 0.671. The Thai adaptation of the LDQ is a reliable and valid tool for assessing substance dependence among sexual minority adults in Bangkok. CFA confirmed the model's fit, with most indices within acceptable ranges, supporting the tool's structural integrity. This adaptation enhances self-assessment and facilitates timely access to treatment. Future research should focus on validating the LDQ in diverse cultural settings to improve its applicability and effectiveness.

Keywords: Sexual minority adults, Substance abuse, Scale adaptation, Exploratory factor analysis (EFA), Confirmatory factor analysis (CFA)

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Introduction

Background of the study

In Thai society, rigid gender roles and sexual inequality are significant factors elevating mental health risks (Rungreangkulkij & Kittirattanapaiboon, 2021). These societal pressures contribute to minority stress, which Meyer (2016) identifies as a primary mechanism driving adverse mental health outcomes and the increased reliance on substance use among LGBTQ+ populations as a coping response to daily discrimination.

Global data consistently shows that sexual minorities experience significantly higher rates of substance use disorders including alcohol, marijuana, and opioids, compared to heterosexuals (Flentje et al., 2015; National Survey on Drug Use and Health, 2018; 2020). This trend is mirrored locally in Bangkok, where recent studies report high rates of alcohol (83.3%) and recreational drug use among MSM (Muccini et al., 2024). Similarly, a study at a transgender health clinic in Bangkok found that 50% of transgender women exhibited problematic drinking levels (Yimsaard et al., 2024).

The study encompasses a broad spectrum of identities. Lesbians are women attracted to women and gay men are attracted to men (Seiter, 2022). Bisexual refers to attraction to one's own and other genders (Pollitt & Roberts, 2021), whereas pansexual extends to all identities beyond the binary (Peña & Tadros, 2021). Queer embraces ambiguity and individuality (Callis, 2016), distinct from questioning, which involves active exploration of identity (Seiter, 2022). Additionally, transgender individuals have identities differing from their birth gender (Lemma, 2021), and asexual typically lacks sexual attraction (Bunning & McKeever, 2020), acknowledging that these identities can be fluid and evolve over time.

Despite the high prevalence of substance use among sexual minorities, accurate assessment in Thailand is limited by a lack of psychometric instruments specifically validated for this population. While the LDQ is a widely established tool for measuring dependence (Raistrick et al., 1994), its reliability and validity have not yet been examined among Thai sexual minority adults. This study addresses this gap by evaluating the psychometric properties of the

adapted Thai LDQ for this specific group. Validating this instrument is critical, as it will provide clinicians and researchers with a reliable tool to accurately screen for substance dependence, ensuring this vulnerable population receives timely and appropriate support.

Literature Review

Higher rates of substance use are reported among sexual minorities. Studies often aggregate sexual minorities into a collective group, considering factors such as LGBT communities, race, socioeconomic status, age, geography, and culture, along with risks like stigma, norms, and access (Kerr et al., 2017). Substance use has notably increased among both male and female sexual minority adults compared to heterosexual counterparts. This trend includes binge drinking, marijuana use, illicit drug use, opioid misuse, alcohol use disorder in sexual minority women, and cigar use in sexual minority men (Schuler & Collins, 2020). Additionally, research has shown a significant linear growth in substance use studies among sexual minority women between 2000 and 2017, focusing on mediators and moderators within theoretical frameworks (Hughes et al., 2020).

Substance abuse has intensified in Thailand since 2016, as the country serves as a major transit hub for drugs. According to the strategic plan for narcotics control management in Thailand for 2021-2023, methamphetamine is the most commonly seized smuggled substance, followed by ice, heroin, ketamine, and marijuana, which has been legalized for medical use. This increased access has led to a rise in addiction and therapy seekers over the past four years (Narcotics Control Management Center, 2020).

Substance use among young adults is influenced by societal factors such as poly-drug use and mixing substances (Guadamauz & Kanchawee, 2016). Different groups use substances for varied reasons: young women for socializing, young men for seniority and enhanced sexual experiences, and sexual minorities for partying, emotional protection during sex, increased enjoyment, and enhanced sex drive. Addressing these varied reasons requires understanding, education, role modeling, and life skills enhancement to reduce risks among young adults.

In substance use measurement, various scales and assessments are commonly used to evaluate specific substances. For example, the Rating of Injecting Site Conditions Assessment of Injection Stigmata and Related Complications (RISC) evaluates injection site conditions and complications (Marsden et al., 1998). The Revised Fagerstrom Tolerance Questionnaire Measure of Nicotine Dependence (RTQ) assesses nicotine dependence (Tate & Schmitz, 1993). The Alcohol Use Disorders Identification Test (AUDIT) is used to identify alcohol use disorders (Babor et al., 1989; Saunders et al., 1993). However, the researcher aims to focus on broader measurements to assess substance abuse among sexual minority participants, considering three related reviews.

First, the Cutdown, Annoyed, Guilty, Eye-opener Adapted to Include Drug (CAGE-AID) is designed to briefly screen adults for alcoholism. Developed by Ewing (1984), it includes four yes-no questions to identify potential substance abuse disorders. If participants answer "yes" to two or more questions, it indicates a likelihood of substance abuse disorders (Allen et al., 1995). The CAGE-AID has demonstrated good validity for alcohol dependence in adults (Bush et al., 1987; Magruder-Habib et al., 1993; Soderstrom et al., 1997).

Second, the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), developed for the World Health Organization (WHO) by an international team, assesses health risks related to substance use and is used in health care settings for brief interventions. Initially developed in 1997 and 1983 with 12 questions across various countries, including Australia, Brazil, India, Iceland, Israel, Puerto Rico, the United Kingdom, and Zimbabwe, it demonstrated good validity and reliability. In 2002, the ASSIST was refined to 8 questions and applied in additional countries, including Thailand and the USA, to categorize risk levels (Humenuik et al., 2010).

Lastly, the Leeds Dependence Questionnaire (LDQ), developed by Raistrick et al. (1994), is a self-report instrument used to assess the severity of alcohol and other drug dependence, ranging from mild to severe. The LDQ has shown acceptable reliability and

validity in both its English (Kelly et al., 2010) and Persian versions (Massah et al., 2019). It is also significantly related to DSM-IV and ICD-10 dependence symptoms criteria (Kelly et al., 2010; First et al., 2002).

The objective of this research is to test and develop the Leeds Dependence Questionnaires in Thai culture based on previous studies' instruments, which tested the validity and reliability to suit the Thai context as a self-report to measure substance abuse for sexual minority adults in Bangkok Thailand.

Objective

The objective of this research aims to translate the Leeds Dependence Questionnaires in Thai culture based on previous studies' instruments, which tested the validity and reliability to suit the Thai context as a self-report to measure substance abuse for sexual minority adults in Bangkok Thailand.

Subjects and Methods

Participants

The sexual minority adults represented a broad and fluid spectrum of identities, including lesbian, gay, bisexual, transgender, queer, questioning, asexual, and pansexual individuals. This inclusive approach acknowledges that sexual identities are not always fixed and can be fluid, changing with different circumstances (Hartney, 2020).

Adults aged 18 to 60 were chosen for the research for two key reasons. Firstly, this age range is considered the working-age population, generally defined as those between 15 and 65 years old, and is essential for driving the nation's economy (Kirch, 2008). Secondly, this group constitutes the largest segment of the population in Thailand (World Population, 2022).

As the reviews, the participants are individuals whose gender identity does not match their assigned gender at birth aged 18 to 60.

Sampling

In this research, non-probability sampling is used due to practical constraints and the specific nature of the target population, which made random sampling challenging. The snowball sampling and convenience sampling were selected as the most suitable methods for reaching sexual minority adults in Bangkok,

Thailand because they allowed for easier access to the target population and facilitated data collection despite limited resources (Johnson, 2014; Dorsten, 2019).

Sample

The study sample consisted of individuals aged 18 to 60 whose gender identity differed from their birth gender. The initial screening questionnaires were applied to identify these participants, excluding anyone who did not meet these specific age and gender criteria.

The sample is separated into two parts. The first part involves performing Exploratory Factor Analysis (EFA) and calculating Cronbach's alpha. The recommended minimum sample size for this part ranges from 100 to 200 participants (Shultz et al., 2020). To account for potential statistical errors, the study selected a sample size of 150 participants.

The second part involves performing Confirmatory Factor Analysis (CFA). The sample size for CFA can be assessed based on the sample-to-items ratio, with an acceptable ratio being 10:1 (Ho, 2014). Given that the LDQ consists of 10 items, the recommended sample size for this part of the study is 100. To mitigate potential statistical errors, the study opted for a sample size of 300 participants.

In conclusion, the total sample size of the study is 450 participants, including 150 participants for Cronbach's alpha and EFA, and 300 participants for CFA.

Instruments

Data was collected using an online self-administered questionnaire delivered through Google forms including screening questions.

LDQ

The Leeds Dependence Questionnaire (LDQ), developed by Raistrick et al. (1994), consists of 10 items rated on a four-point rating scale: 0 = never, 1 = sometimes, 2 = often, and 3 = nearly always. This self-report instrument assesses alcohol and other drug dependence severity, categorizing it into mild, moderate, and severe levels. The LDQ demonstrates acceptable reliability, with an internal consistency of 0.98 (Kelly et al., 2010), and is significantly related to DSM-IV and ICD-10 dependence symptoms criteria (Kelly et al., 2010; First et al., 2002). It has been applied to samples of adults using alcohol or opiates (Hartney et al., 2003; Kaner et

al., 2001; Raistrick et al., 1994) and primarily to adults using alcohol (Lennings, 1999; Thomas & McCambridge, 2008).

Translation Procedures

The World Health Organization's (WHO) four-step guidelines for translation (WHO, 2013) were applied in this study to ensure the accurate translation of instruments. This approach involves constructing translations that maintain the original concept and standards of the survey, rather than translating word-for-word. The four-step translation method includes the following:

Step 1: Forward translation

The translation was carried out by experts who are fluent in English and whose first language was assigned as the target language. The translation process adhered to the original definitions of terms, avoiding a literal, word-by-word translation. The translated outcome was designed to be common and understandable for the target audience, taking into account factors such as age, gender, and other relevant considerations.

Step 2: Expert panel and back-translation

The expert panel addressed any hidden issues by identifying and resolving conceptual translation problems. They questioned words and expressions and made necessary adjustments or introduced new options. The instruments were then back-translated into English by an independent native English translator who had no prior knowledge of the original instruments. These translations were reviewed and refined through discussion until a satisfactory version was achieved.

Step 3: Pretesting and cognitive interviewing

A pretest was conducted with a minimum sample of ten individuals representing the target population. Respondents were assessed for their understanding of the instruments and provided feedback. Their responses were compiled to refine and ensure consistency in the wording of the instruments.

Step 4: Final version

The final version of the instrument was produced based on the results of the previous steps in adapting the Thai language version before data collection.

Ethical Considerations

The AU Institutional Review Board provided ethical approval on January 24, 2023 (No. 18/2022).

Data Analyses

After data collection, the data was processed and analyzed using statistical software to perform Factor Analysis and calculate Cronbach's alpha.

Factor Analysis (FA) includes two types which are Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). EFA is used to analyze the components of variables to describe and explain potential relationships between groups of variables (Sallis et al., 2021). Additionally, the Kaiser-Meyer-Olkin (KMO) measure, Bartlett's test and parallel analysis were conducted before performing EFA (Ho, 2014).

On the other hand, CFA is used to analyze structural or predicted variables based on theory or literature reviews to identify relationships between theoretical variables (Shultz et al., 2020). Furthermore, convergent validity is examined by testing factor loadings, average variance extracted (AVE), and composite reliability (CR) (Chin et al., 2018).

Cronbach's alpha, developed by Lee Cronbach (1951), is evaluated to test the internal consistency of research instruments, indicating their reliability. Acceptable alpha values range from 0.7 to 0.95 (Tavakol & Dennick, 2011).

Results

1st Sample Size: Item Identification and Reliability Analyses

In the first part of the study, EFA and internal consistency or reliability are examined using data from 150 participants.

EFA

The results of the Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's test of sphericity indicated that the data is suitable for factor analysis (KMO=0.925, $p<0.001$). Additionally, parallel analysis and the total variance explain by the components suggested that a single factor should be extracted for the LDQ in this study, as only one factor from the actual data has an eigenvalue greater than one and exceeded that of the random data.

Item Identification

The results of the EFA show that the 10 items align well within a one-factor structure (Table 1), consistent with the original LDQ. Each item has a rotated factor loading of at least 0.50, indicating that all items meaningfully contribute to the LDQ instrument as a single factor (Watkins, 2018).

Table 1 Exploratory Factor Analysis of factor loadings for LDQ ($n=150$)

Item/Factor	1
LDQ6	0.918
LDQ4	0.869
LDQ9	0.861
LDQ5	0.823
LDQ3	0.812
LDQ7	0.756
LDQ2	0.747
LDQ1	0.702
LDQ10	0.700
LDQ8	0.655

Note. LDQ=Leeds Dependence Questionnaire

Internal consistency

The internal consistency of the LDQ, as measured by Cronbach's alpha, yields a value of 0.928 in this study, with each item having a value exceeding 0.6, all of which fall within the acceptable range (Table 2 and Table 3).

Table 2 The reliability analysis by using Cronbach's alpha

Cronbach's Alpha	N of items
0.928	10

Table 3 The item-total statistics by using Cronbach's alpha

Items	Corrected Item-Total Correlation
LDQ1	0.626
LDQ2	0.678
LDQ3	0.749
LDQ4	0.821
LDQ5	0.770
LDQ6	0.883
LDQ7	0.695
LDQ8	0.583
LDQ9	0.824
LDQ10	0.638

Note. LDQ=Leeds Dependence Questionnaire

2nd Sample Size: Validity Assessments

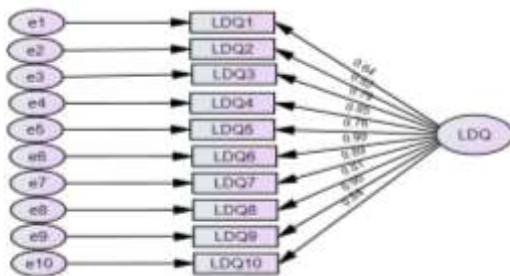
In the second part of the study, validity and CFA are analyzed using data from 300 participants, separate from those in the first part of the study.

CFA

The CFA results for the 10 items of the LDQ in the sample ($n=300$) are as follows: $\chi^2=295.697(p<.001)$, $df=35$, $\chi^2/df=8.448$, CFI=0.908, TLI=0.882, GFI=0.534, RMSEA=0.158, and PNFI=0.698. All indices are below the acceptable thresholds except for χ^2/df and CFI (Mulaik et al., 1989; Fabrigar et al., 1999; Kaplan, 2000; Hox, 2010; Schumacker & Lomax, 2010). Therefore, modification indices are considered to improve these results (Figure 1).

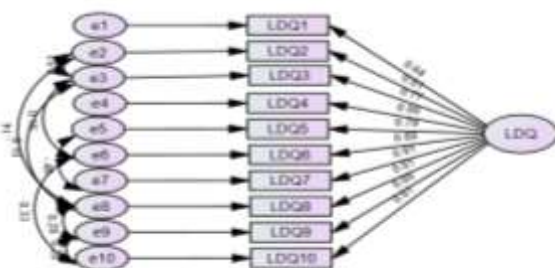
After applying the modification indices, the results improve significantly: $\chi^2=74.808(p<.001)$, $df=27$, $\chi^2/df=2.771$, CFI=0.983, TLI=0.972, GFI=0.956, RMSEA=0.077, and PNFI=0.584. All indices are within the acceptable range except for RMSEA and PNFI, which are acceptable when other indices are above 0.90 (Mulaik et al., 1989; Fabrigar et al., 1999; Kaplan, 2000; Hox, 2010; Schumacker & Lomax, 2010) (Figure 2).

Figure 1



CFA Standardized Factor Loadings ($n=300$)

Figure 2



CFA Standardized Factor Loadings after modification indices ($n=300$)

Convergent Validity

As the results of convergent validity, the CR values 0.953 and AVE values 0.671, which are in the acceptable value (Hair et al., 2020; Chin et al., 2018) (Table 2).

Table 4 Convergent Validity

Construct	Items	Factor Loadings	CR	AVE
Leeds Dependence Questionnaire	LDQ1	0.640	0.953	0.671
	LDQ2	0.810		
	LDQ3	0.770		
	LDQ4	0.860		
	LDQ5	0.790		
	LDQ6	0.880		
	LDQ7	0.910		
	LDQ8	0.810		
	LDQ9	0.880		
	LDQ10	0.810		

Discussion

Summary of Findings

This study aims to translate and test the validity and reliability of the Leeds Dependence Questionnaire (LDQ) adapted for Thai culture, specifically for use as a self-report tool for substance abuse among sexual minority adults in Bangkok, Thailand. The Thai-translated version of the LDQ demonstrated a singular component structure, consistent with the original LDQ developed by Raistrick et al. (1994). The reliability and validity indices for the Thai version were within acceptable ranges, indicating its robustness and suitability for use among the target population. Comparative analysis with previous studies shows that the factor structure of the Thai LDQ aligns with findings from the English version validated by Kelly et al. (2010) and the Persian version validated by Massah et al. (2019), reinforcing the LDQ's universal applicability as a measure of substance dependence.

Comparative Analysis

The factor structure of the Thai LDQ mirrors findings from both the English (Kelly et al., 2010) and Persian (Massah et al., 2019) versions, demonstrating a robust single-factor structure across diverse cultural contexts. This

consistency supports the theoretical model proposed by Edwards and Gross (1976), which conceptualizes dependence as a unified clinical syndrome rather than a cluster of disparate symptoms. For instance, despite the stark contrast between the individualistic norms of the UK and the collectivist framework of Thai society, the statistical grouping of items remains identical. This indicates that the latent trait of dependence operates independently of cultural expression, affirming that the core construct is stable even when the social environment changes.

Furthermore, the results highlight the universality of the primacy of substance use, where the compulsion to use displaces other valued activities regardless of the specific cultural setting. While the nature of neglected duties may vary such as prioritizing substance use over individual work responsibilities in Western contexts versus communal or familial obligations in Thailand, the underlying mechanism of displacement remains constant, as evidenced by high factor loadings on priority-related items in both the Thai and Persian studies. This reinforces the conclusion that the LDQ measures a fundamental bio-psychological drive that persists across vastly different legal, religious, and social landscapes.

Implications

The successful adaptation of the LDQ into Thai marks a significant advancement in substance abuse research, providing a culturally sensitive tool crucial for accurate assessments among sexual minority adults in Bangkok. The Thai LDQ is recommended for multidisciplinary

range of professionals. Mental health professionals, psychiatrist, psychologist, primary care physicians and nurse practitioners are encouraged to incorporate this tool into their practice to enhance diagnostic accuracy and tailor interventions to the cultural context. Furthermore, social workers and probation officers can utilize the instrument to objectively monitor recovery progress and assess the impact of dependence on social functioning. Finally, public health researchers can leverage the tool to gather robust quantitative data on dependence severity. To maximize the utility of the Thai LDQ, institution should prioritize cultural competence training, ensuring that all practitioners can interpret results within the appropriate cultural framework.

Limitations and Recommendations

This study has limitations, including the use of non-probability sampling and online data collection, which may affect the generalizability of the findings. The focus on sexual minority adults in Bangkok may not fully represent the broader population, and self-reported data could introduce biases. Future research should aim to refine and validate the LDQ and similar tools across diverse cultural settings, including broader demographic and geographic samples, to ensure comprehensive applicability. Investigating the stability of psychometric properties over time and exploring related studies will further enhance our understanding. Addressing these limitations and continuing this line of research will contribute to more accurate assessments and support for individuals dealing with substance dependence in various cultural contexts.

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