# Factor Structure and Reliability of the Lithuanian Version of the Public Speaking Anxiety Scale

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**Summary**. Social Anxiety Disorder (SAD) is especially prevalent among young individuals aged 18–25 and significantly affects daily social activities and interpersonal relationships. Public Speaking Anxiety (PSA), a subtype of SAD, is a widespread concern that affects one in five individuals. The study focuses on the Public Speaking Anxiety Scale (PSAS), with the aim of assessing the factor structure and reliability of the Lithuanian version (PSAS-LT).

The PSAS-LT, administered to 227 participants aged 18–25, comprises 17 Likert-scaled items, evaluating cognitive, behavioral, and physiological aspects of PSA. Three models were tested: a single-factor model, a three-factor model and a single factor model with positive and negative item wording factors model. Results indicate less than desirable fit for the single, and three-factor models, suggesting the need for alternative structures. The model that included a single factor as well as positive and negative item wording factors demonstrated a reasonably good fit. The diagnostic validity confirmed that the PSAS-LT effectively differentiated between participants with and without history of anxiety disorders. The total score of the PSAS-LT had excellent internal consistency. Despite limitations, including convenience sampling and nonrepresentative sample, the study contributes valuable insights into refining the understanding of PSA assessment features, emphasizing the importance of considering response patterns. Future research should validate these findings with larger and more diverse samples of the Lithuanian population.

**Keywords:** public speaking anxiety, construct validity, internal consistency

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### Lietuviškosios Viešojo kalbėjimo nerimo skalės faktorių struktūra ir patikimumas

**Santrauka.** Socialinio nerimo sutrikimas (angl. *Social Anxiety Disorder* (SAD)) yra plačiai paplitęs tarp jaunų suaugusiųjų amžiaus grupėje nuo 18 iki 25 metų ir turi įtakos kasdienei socialinei veiklai bei tarpasmeniniams santykiams. Šiame tyrime dėmesys skiriamas vienam iš SAD subtipų – viešojo kalbėjimo nerimui, kuris paveikia beveik vieną iš penkių žmonių. Tyrimo tikslas – įvertinti Viešojo kalbėjimo nerimo skalės (angl. *Public Speaking Anxiety Scale* (PSAS)) lietuviškosios versijos faktorių struktūrą ir patikimumą. PSAS-LT skalę sudaro 17 teiginių, vertinančių viešojo kalbėjimo nerimą kognityviniais, elgesio ir fiziologiniais aspektais. Tyrime dalyvavo 227 tiriamieji nuo 18 iki 25 metų. Buvo testuoti 3 modeliai: vieno faktoriaus, trijų faktorių, vieno faktoriaus bei teigiamai ir neigiamai formuluotų teiginių faktorių modeliai. Gauti rezultatai parodė, kad vieno ir trijų faktorių modeliai nepakankamai atitinka duomenis, tačiau vieno faktoriaus bei teigiamai ir neigiamai formuluotų teiginių faktorių modelio atitiktis duomenims buvo pakankama. Diagnostinis validumas patvirtino metodikos gebėjimą atskirti tiriamuosius, turinčius ar praeityje turėjusius nerimo sutrikimo diagnozę arba ne. Bendras PSAS-LT balas pasižymi puikiu vidiniu suderinamumu. Nepaisant ribotumų, tokių kaip patogioji tikimybinė atranka ir nereprezentatyvi imtis, tyrimas suteikia naudingų įžvalgų apie viešojo kalbėjimo nerimą vertinančią skalę. Svarbu atsižvelgti į tai, kaip neigiamai ar teigiamai formuluojami teiginiai lemia atsakinėjimą. Rekomenduojama ateityje atlikti papildomus tyrimus surinkus didesnę ir labiau Lietuvos gyventojų struktūrą atitinkančią imtį siekiant patvirtinti šiuos rezultatus.

**Pagrindiniai žodžiai**: viešojo kalbėjimo nerimas, konstrukto validumas, vidinis suderinamumas

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## Introduction

Social anxiety disorder (SAD) is one of the most prevalent mental health disorders (Alomari et al., 2022; Stein et al., 2017). Characterized by severe and persistent anxiety in various social situations, SAD manifests through an intense and lasting fear of being observed and criticized by others (Clark, 2001). Young adults, particularly those in the 18–25 age group, are disproportionately affected by social anxiety (Jefferies & Ungar, 2020; Tang et al., 2022). The range of fearful social situations varies, spanning from a single specific event (e.g., public speaking) to a pervasive fear in all social interactions (Ernst et al., 2023). While a certain level of social anxiety is common for most individuals, it typically does not have significant negative consequences for their daily social activities. In contrast, severe social anxiety can substantially disrupt interpersonal relationships, daily social activities, and may significantly impact academic or professional achievements (Glick & Orsillo, 2011).

A person experiencing severe social anxiety may exhibit physiological symptoms (e.g., sweating, breathing difficulties, and heart palpitations), cognitive symptoms (e.g., intense fear of rejection, heightened self-criticism, reevaluation of past social experiences),

and behavioral symptoms (e.g., avoidance of eye contact, maintaining physical distance, avoiding large gatherings) (American Psychiatric Association, 2000). According to the 11th Revision of International Classification of Diseases (ICD-11,), the primary descriptive features of social anxiety disorder involve an exaggerated fear and anxiety in various social situations (e.g., social interactions, performing actions or tasks observed by others) (World Health Organization, 2018). This fear is linked to concerns about potential negative judgment from others, leading to the avoidance of these situations. These characteristics align with the definition of social phobia outlined in earlier revision ICD-10, which is presently used in Lithuania (World Health Organization, 1994).

## Public speaking anxiety

Public speaking is a situation that is often reported to be feared in the general population (Dwyer & Davidson, 2012; Sawyer, 2016). Public speaking anxiety (PSA) is a specific subtype of social anxiety disorder, referring to the tension, fear and distress that individuals experience when giving a speech or preparing to speak in front of others. PSA ranks among the most prevalent forms of anxiety disorders, affecting approximately one in five individuals to some extent, and it is most common in the 18–25 age group (Bartholomay & Houlihan, 2016; Hereen et al., 2013). Public speaking anxiety can arise due to various, but common reasons. These include fearing embarrassment, inadequate preparation, lack of confidence in one's physical appearance, concern about audience criticism, low self-esteem, audience lack of engagement, inexperience, fear of making mistakes, and dread of failure (Christy, 2021). PSA symptoms can manifest in various ways, including bodily sensations, irrational thinking, altered emotions, and avoidant behavior. Individuals experiencing significant PSA may also encounter challenges such as reduced academic performance, heightened feelings of loneliness or social isolation, and a lower quality of life (Bartholomay & Houlihan, 2016). Thus, for those who experience PSA, public speaking can have a negative impact on various aspects of their well-being.

## The Public Speaking Anxiety Scale

The Public Speaking Anxiety Scale (PSAS) was developed to evaluate the severity of disturbance and monitor the treatment of speech-related anxiety, a prevalent challenge among individuals dealing with social anxiety (Bartholomay & Houlihan, 2016). Despite its relatively recent inception, the PSAS has gained significant popularity in both social anxiety and public speaking research (Çabuker et al., 2020; Dueñas, Restrepo-Castro & Becerra Garcia, 2018; Lin at al., 2022; Soares et al., 2020). To our knowledge, there are no other scales measuring public speaking anxiety. The scale is designed to assess the three-factor model of anxiety proposed by Lang (1971) and comprises 17 Likert-scaled items distributed across three subscales:
1. Cognitive – 8 items (e.g., Giving a speech is terrifying).
2. Behavioral – 4 items (e.g., My hands shake when I give a speech).
3. Physiological – 5 items (e.g., I sweat during my speech).

The items for the PSAS were selected by revising questions from various other public speaking scales and creating new items were by evaluating the overall manifestation of public speaking anxiety (Bartholomay & Houlihan, 2016) aiming to provide a comprehensive measure of PSA.

The original version of PSAS was found to have high internal consistency (Bartholomay & Houlihan, 2016). High overall internal consistency was also reported for Spanish, Turkish and Brasil version of PSAS (Çabuker et al., 2020; Dueñas, Restrepo-Castro & Becerra Garcia, 2018; Lin at al., 2022; Soares et al., 2020). Principal components factor analysis with varimax rotation revealed two significant factors, primarily distinguished by positively and negatively worded items (Bartholomay & Houlihan, 2016). Another study analyzing psychometric characteristics of the Spanish version suggests that both factor structures – single factor model and two factor model – fit the data equally well (Dueñas, Restrepo-Castro, & Becerra Garcia, 2018). The fit of the three-factor modified model in the Turkish sample was confirmed (Çabuker et al., 2020). In their study, item 6 was excluded due to factor loadings being less than .20. The fit of the single-factor model was established in the Brazilian sample (Soares et al., 2020). Additionally, three items (6, 8, 17) were excluded from the analysis due to inadequate factor loadings and lack of informativeness. Using Rasch analysis, Lin, and colleagues (2022) identified two factors, emotional and physiological, within a small Singaporean sample. It is also important to note that, in their study, three items (5, 6, 14) were removed due to misfit and the authors conclude their solution to be suboptimal (Lin at al., 2022). Previous studies reported good reliability of PSAS, however the factor structure still requires further exploration. It remains unclear whether single-factor model fits well, or the factor structure is more complex and requires two-factor or more factors to explain the structure of the PSAS.

Empirically based psychological assessment plays a crucial role in screening as well as monitoring treatment success and outcomes. Reliable and valid methods to assess public speaking anxiety in Lithuanian adult population are lacking. Given that public speaking anxiety is one of the most prevalent forms of social anxiety, it becomes imperative to evaluate the psychometric characteristics of the Lithuanian version of the PSAS through confirmatory factor analysis and internal consistency analysis. The primary objective of this study is to assess the validity and reliability of the Lithuanian version of the PSAS.

## Methods

### Sample and procedure

The study involved 227 volunteers selected through convenience sampling. Participants were reached through youth and student Facebook groups and asked to complete anonymous online survey. Participation was voluntary and participants were not compensated in any way. The age of the participants ranged from 18 to 25 years, with a mean age of 21.06 years (standard deviation 2.33). The gender distribution in the sample is unequal,

with almost three times as many women as men. More than 72% of the respondents have completed secondary or lower education and 62.6 % of all participants were still studying. The demographic details of the participants are presented in Table 1.

**Table 1**

*Characteristics of the sample*

|  |  | N (Total = 227) | % |
|---|---|---|---|
| Gender | Male | 61 | 26.9 |
|  | Female | 164 | 72.2 |
|  | Other | 2 | 0.9 |
| Place of residence | Metropolitan | 176 | 77.5 |
|  | Urban | 26 | 11.5 |
|  | Rural | 25 | 11.0 |
| Education | Lower secondary education | 2 | 0.9 |
|  | Upper secondary education | 164 | 72.2 |
|  | Tertiary education (college or university) | 61 | 26.9 |

Participants answered questions regarding their demographic information and completed the Lithuanian version of the Public Speaking Anxiety Scale (PSAS-LT) to assess the reliability and validity of this scale. Additionally, participants were asked whether they had ever been diagnosed with or currently have an anxiety disorder, and were instructed to respond with 'yes' or 'no.' All participants were informed that data is collected to check the quality of the questionnaires, also that the participation in the study is voluntary and that they have a right to withdraw from the study at any time, the guarantee of data anonymity, and provided their consent to participate. After completing survey, participants received information about free emotional support lines.

## Instruments

**The Lithuanian version of the Public Speaking Anxiety Scale (PSAS-LT)** serves a dual purpose: assessing and monitoring public speaking anxiety across multiple dimensions (e.g., behavioral, cognitive, and physiological symptoms). The PSAS-LT consists of 17 self-report items, with responses measured on a Likert scale ranging from 1 ('not at all') to 5 ('extremely'). Scores on the scale can range from 17 to 85, with five items being reverse-coded (6, 7, 8, 16 and 17).

The scale was translated from English to Lithuanian by two independent translators with undergraduate degrees in psychology. Afterwards, a panel of three experts with extensive expertise in psychological testing compared the two translations and decided on the final wording.

## Statistical analysis

To analyze the factor structure of the Lithuanian version of the PSAS questionnaire, confirmatory factor analysis (CFA) was conducted with the Mplus 8.2 software package. In confirmatory factor analysis, when variables are dichotomous or ranked, the weighted least square mean and variance adjusted (WLSMV) estimator is commonly recommended. Consequently, the WLSMV estimator was utilized in this analysis and based on recommendations for this type of estimator the sample size requirements are ≥200–500 subjects (Bandalos, 2014, Forero, Maydeu-Olivares, & Gallardo-Pujol, 2009). For the confirmatory factor analysis, three main goodness-of-fit criteria were utilized: RMSEA (Root Mean Square Error of Approximation), SRMR (Root Mean Squared Residual); CFI (Comparative Fit Index), and TLI (Tucker–Lewis Index). CFI and TFI values approaching 1 tend to be preferred, with traditional cut-off scores of 0.90 and 0.95 reflecting adequate and good fit, respectively (Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004). RMSEA values approaching 0 are generally preferred, with values below 0.08 reflective of good fit (Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004), SRMR values below 0.08 are indicative of good fit (Hu & Bentler, 1999), but should be interpreted with caution due to possible underperformance with categorical variables (Yu, 2002). Normality of the data was assessed using skewness and kurtosis. The values between –2 and 2 were considered acceptable to prove normal data distribution (George & Mallery, 2010).

Based on theoretical assumptions and previous research, three models of the PSAS-LT were tested (Figs 1.1–1.3): (1) the single-factor model in which all 17 items load on one underlying factor of public speaking anxiety (Model 1), based on most common result of other language adaptations (Dueñas, Restrepo-Castro & Becerra Garcia, 2018; Soares et al., 2020); (2) the three-factor model with three correlated dimensions of public speaking anxiety (Model 2), based on theoretical structure described by Bartholomay and Houlihan (2016) and confirmer in Turkish version (Çabuker et al., 2020); (3) single-factor model including the positive and negative item wording factors (Model 3), based on integration of exploratory factor analysis results described in Bartholomay and Houlihan (2016) and most commonly confirmed single factor structure (Dueñas, Restrepo-Castro & Becerra Garcia, 2018; Soares et al., 2020).

**Figure 1.**
*Three competing CFA models*

**Figure 1.1.**
*Model 1*
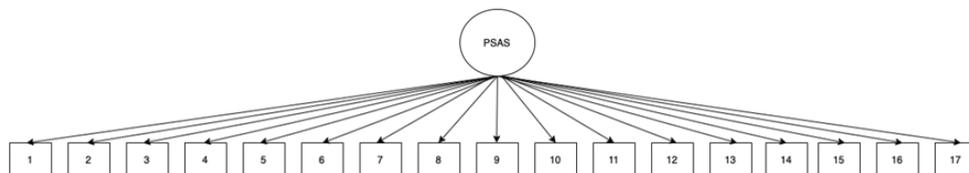
**Figure 1.2.**

*Model 2*
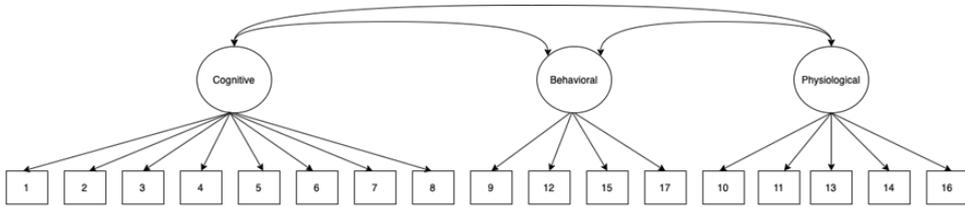


**Figure 1.3.**

*Model 3*
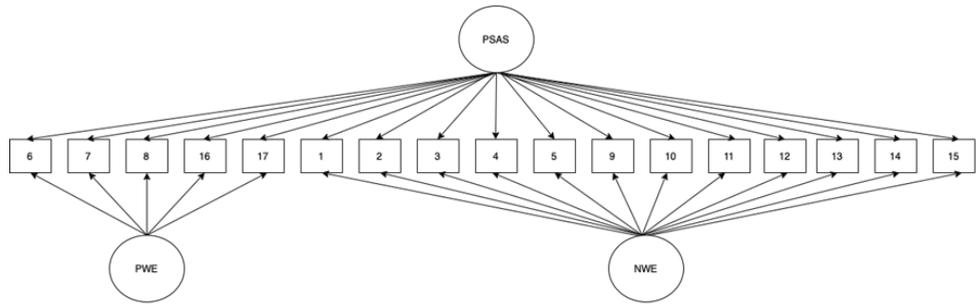


*Note:* (1) For simplicity, all residuals were assumed, but not shown. (2) PWE: positive wording effect; NWE: negative wording effect.

## Results

Descriptive statistics for both individual items and the total score are presented in Table 2. Skewness and kurtosis coefficients do not deviate from reasonable intervals allowed for normal distribution.

**Table 2**

*Descriptive statistics for the PSAS-LT*

| | Items | Mean | SD | Sk | Ku |
|---|---|---|---|---|---|
| 1 | Giving a speech is terrifying *Sakyti kalbą yra siaubinga* | 3.05 | 1.37 | 0.06 | -1.28 |
| 2 | I am afraid that I will be at a loss for words while speaking *Bijau, kad kalbėdama(-s) pritrūksiu žodžių* | 3.15 | 1.39 | 0.01 | -1.36 |
| 3 | I am nervous that I will embarrass myself in front of the audience *Aš nerimauju, kad apsikvailinsiu prieš auditoriją* | 3.43 | 1.38 | -0.21 | -1.37 |

| | | M | SD | Sk | Ku |
|---|---|---|---|---|---|
| 4 | If I make a mistake in my speech, I am unable to re-focus<br>*Jei kalboje padarau klaidą, nebegaliu susikaupti* | 2.66 | 1.31 | 0.30 | -1.01 |
| 5 | I am worried that my audience will think I am a bad speaker<br>*Jaudinuosi, kad auditorija galvos, kad esu prasta(-s) kalbėtoja(-as)* | 3.15 | 1.42 | -0.04 | -1.36 |
| 6* | I am focused on what I am saying during my speech<br>*Savo kalbos metu susikoncentruoju į tai, ką sakau* | 3.44 | 1.12 | -0.21 | -0.68 |
| 7* | I am confident when I give a speech<br>*Pasitikiu savimi, kai sakau kalbą* | 2.64 | 1.16 | 0.36 | -0.63 |
| 8* | I feel satisfied after giving a speech<br>*Po to, kai pasakau kalbą jaučiuosi patenkinta(-s)* | 3.26 | 1.25 | -0.17 | -0.89 |
| 9 | My hands shake when I give a speech<br>*Kai sakau kalbą, man dreba rankos* | 3.15 | 1.38 | 0.02 | -1.28 |
| 10 | I feel sick before speaking in front of a group<br>*Mane pykina prieš pradedant kalbėti žmonių grupei* | 2.38 | 1.48 | 0.67 | -1.01 |
| 11 | I feel tense before giving a speech<br>*Prieš sakydama(-s) kalbą jaučiuosi įsitempusi(-ęs)* | 3.60 | 1.29 | -0.40 | -1.13 |
| 12 | I fidget before speaking<br>*Nenustygstu vietoje prieš pradedant kalbėti* | 3.06 | 1.42 | 0.01 | -1.32 |
| 13 | My heart pounds when I give a speech<br>*Mano širdis daužosi, kai sakau kalbą* | 3.51 | 1.30 | -0.23 | -1.28 |
| 14 | I sweat during my speech<br>*Mane pila prakaitas, kai sakau kalbą* | 2.59 | 1.37 | 0.40 | -1.07 |
| 15 | My voice trembles when I give a speech<br>*Man dreba balsas, kai sakau kalbą* | 2.81 | 1.37 | 0.39 | -1.07 |
| 16* | I feel relaxed while giving a speech<br>*Kai sakau kalbą, jaučiuosi atsipalaidavusi(-ęs)* | 1.69 | 1.02 | 1.53 | 1.83 |
| 17* | I do not have problems making eye contact with my audience<br>*Man nesunku palaikyti akių kontaktą su auditorija* | 2.61 | 1.35 | 0.41 | -1.01 |
| Cognitive subscale | | 24.10 | 7.59 | -0.05 | -0.99 |
| Behavioral subscale | | 12.40 | 4.06 | 0.02 | -0.82 |
| Physiological subscale | | 16.38 | 5.16 | -0.02 | -1.07 |
| Total score (once starred items have been reverse-coded) | | 52.88 | 15.56 | -0.04 | -1.07 |

*Note.* Items are presented in both Lithuanian and English languages. M = Mean; SD = Standard Deviation; Sk = Coefficient of Skewness; Ku = Coefficient of Kurtosis. The numerical scale for responses is as follows: 1 = not at all, 2 = slightly, 3 = moderately, 4 = very, 5 = extremely. * Indicates reverse-coded items.

The primary data analysis examined the correlation coefficients between the PSAS-LT total score and the individual subscales (cognitive, behavioral, and physiological). Pearson correlation coefficients were calculated to assess the relationship between the PSAS-LT and its subscales. The analysis (Table 3) shows that all scales are significantly correlated with each other. Since the items were scored on a 5-point Likert scale, the results are treated as ordinal data. Therefore, Spearman correlation coefficients were calculated to assess the relationships between items. The results of this analysis (Table 4, see 40 page) show that all items of the PSAS-LT items are significantly correlated with each other and with the subscales and the overall scale, except for item 6, which is significantly correlated with only four other items and cognitive subscale.

**Table 3**

*PSAS-LT and subscales correlation coefficients*

|  | PSAS-LT total score | Cognitive subscale | Behavioral subscale |
|---|---|---|---|
| PSAS-LT total score | - | | |
| Cognitive subscale | 0.94** | - | |
| Behavioral subscale | 0.90** | 0.75** | - |
| Physiological subscale | 0.93** | 0.77** | 0.83** |

*Note.* ** $p < 0.01$.

To analyze the factor structure of the PSAS-LT, confirmatory factor analysis was employed, and three models were tested. The goodness-of-fit of the estimated models to the data is presented in Table 5. The only model that satisfies all fit requirements (RMSEA < 0.8, CFI > 0.95, TLI > 0.95, SRMR < 0.8) is Model 3.

**Table 5**

*Confirmatory factor analysis fit statistics for the PSAS-LT*

| Model | $\chi^2$ | df | $\chi^2/$df | TLI | CFI | RMSEA | RMSEA (90% CI) | SRMR |
|---|---|---|---|---|---|---|---|---|
| Model 1 | 533.50*** | 119 | 4.48 | 0.95 | 0.95 | 0.12 | 0.11–0.14 | 0.07 |
| Model 2 | 445.65*** | 116 | 3.84 | 0.96 | 0.96 | 0.11 | 0.10–0.10 | 0.06 |
| Model 3 | 222.92*** | 102 | 2.19 | 0.98 | 0.99 | 0.07 | 0.06–0.09 | 0.04 |

*Note*: $\chi^2$ = chi-square, df = degrees of freedom, TLI = Tucker-Lewis Index, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, CI = Confidence Intervals. *** $p < 0.001$.

The results indicate that, in the CFA models, item 6 continues to pose challenges (Table 6). Participant responses to the items reveal a limited association of item 6 with the overall construct of public speaking anxiety and with specific factors.

**Table 4**

*Item–total correlation coefficients*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 0.67** | – | | | | | | | | | | | | | | | |
| 3 | 0.74** | 0.73** | – | | | | | | | | | | | | | | |
| 4 | 0.69** | 0.69** | 0.76** | – | | | | | | | | | | | | | |
| 5 | 0.67** | 0.67** | 0.80** | 0.74** | – | | | | | | | | | | | | |
| 6 | 0.15* | 0.02 | -0.04 | 0.03 | 0.00 | – | | | | | | | | | | | |
| 7 | 0.57** | 0.41** | 0.48** | 0.49** | 0.53** | 0.22** | – | | | | | | | | | | |
| 8 | 0.36** | 0.28** | 0.33** | 0.43** | 0.40** | 0.20** | 0.49** | – | | | | | | | | | |
| 9 | 0.56** | 0.51** | 0.57** | 0.52** | 0.56** | 0.04 | 0.32** | 0.25** | – | | | | | | | | |
| 10 | 0.61** | 0.57** | 0.59** | 0.54** | 0.60** | -0.02 | 0.36** | 0.21** | 0.54** | – | | | | | | | |
| 11 | 0.69** | 0.64** | 0.73** | 0.63** | 0.70** | -0.05 | 0.43** | 0.25** | 0.66** | 0.61** | – | | | | | | |
| 12 | 0.35** | 0.37** | 0.44** | 0.38** | 0.45** | -0.07 | 0.20** | 0.18** | 0.41** | 0.39** | 0.54** | – | | | | | |
| 13 | 0.61** | 0.58** | 0.64** | 0.59** | 0.61** | 0.04 | 0.38** | 0.21** | 0.68** | 0.58** | 0.77** | 0.48** | – | | | | |
| 14 | 0.52** | 0.51** | 0.59** | 0.54** | 0.56** | -0.02 | 0.39** | 0.23** | 0.59** | 0.58** | 0.62** | 0.38** | 0.66** | – | | | |
| 15 | 0.63** | 0.56** | 0.61** | 0.64** | 0.63** | 0.09 | 0.49** | 0.30** | 0.65** | 0.53** | 0.66** | 0.40** | 0.64** | 0.62** | – | | |
| 16 | 0.53** | 0.45** | 0.43** | 0.40** | 0.40** | 0.12 | 0.53** | 0.33** | 0.40** | 0.36** | 0.45** | 0.12 | 0.45** | 0.32** | 0.38** | – | |
| 17 | 0.45** | 0.44** | 0.44** | 0.43** | 0.36** | 0.15* | 0.47** | 0.37** | 0.27** | 0.32** | 0.45** | 0.24** | 0.41** | 0.42** | 0.37** | 0.49** | – |
| PSAS-LT total score | 0.84 ** | 0.78 ** | 0.85 ** | 0.81 ** | 0.83 ** | 0.13 | 0.64 ** | 0.48 ** | 0.73 ** | 0.72 ** | 0.84 ** | 0.54 ** | 0.80 ** | 0.73 ** | 0.78 ** | 0.59 ** | 0.59 ** |
| Cognitive subscale | 0.85 ** | 0.80 ** | 0.86 ** | 0.85 ** | 0.85 ** | 0.22 ** | 0.70 ** | 0.59 ** | 0.60 ** | 0.62 ** | 0.72 ** | 0.41 ** | 0.65 ** | 0.59 ** | 0.70 ** | 0.54 ** | 0.53 ** |
| Behavioral subscale | 0.68 ** | 0.64 ** | 0.70 ** | 0.68 ** | 0.69 ** | 0.06 | 0.49 ** | 0.37 ** | 0.80 ** | 0.61 ** | 0.79 ** | 0.70 ** | 0.75 ** | 0.69 ** | 0.82 ** | 0.46 ** | 0.62 ** |
| Physiological subscale | 0.74 ** | 0.69 ** | 0.75 ** | 0.68 ** | 0.72 ** | 0.01 | 0.51 ** | 0.30 ** | 0.72 ** | 0.80 ** | 0.87 ** | 0.50 ** | 0.88 ** | 0.81 ** | 0.71 ** | 0.60 ** | 0.52 ** |

*Note.* * $p < 0.05$; ** $p < 0.01$.

**Table 6**

*Factor loadings for the PSAS-LT*

| Items | Model 1 | Model 2 | | | Model 3 | | |
|---|---|---|---|---|---|---|---|
| | PSAS | CO | BE | PH | POS | NEG | PSAS |
| 1 | 0.86** | 0.89** | | | | 0.05 | 0.88** |
| 2 | 0.81** | 0.83** | | | | 0.03 | 0.83** |
| 3 | 0.91** | 0.93** | | | | 0.04 | 0.93** |
| 4 | 0.84** | 0.86** | | | | 0.02 | 0.87** |
| 5 | 0.87** | 0.90** | | | | 0.08 | 0.88** |
| 6 | 0.06 | 0.07 | | | 0.41** | | 0.01 |
| 7 | 0.66** | 0.68** | | | 0.55** | | 0.63** |
| 8 | 0.45** | 0.47** | | | 0.48** | | 0.41** |
| 9 | 0.77** | | 0.78** | | | 0.52** | 0.65** |
| 12 | 0.60** | | 0.56** | | | 0.38** | 0.47** |
| 15 | 0.80** | | 0.81** | | | 0.33** | 0.75** |
| 17 | 0.60** | | 0.60** | | 0.38** | | 0.57** |
| 10 | 0.78** | | | 0.80** | | 0.32** | 0.73** |
| 11 | 0.89** | | | 0.92** | | 0.41** | 0.82** |
| 13 | 0.85** | | | 0.86** | | 0.54** | 0.72** |
| 14 | 0.77** | | | 0.78** | | 0.44** | 0.67** |
| 16 | 0.68** | | | 0.69** | 0.47** | | 0.65** |

*Note.* PSAS represents the factor of public speaking anxiety; CO denotes the cognitive factor; BE, the behavioral factor; PH, the physiological factor; POS, the positive item wording factor; NEG, the negative item wording factor. ** $p < 0.01$.

The diagnostic validity was assessed using an independent samples t-test. The analysis (Table 7) confirmed that the PSAS-LT effectively differentiated participants who reported being currently or previously diagnosed with anxiety disorder (M = 60.33; SD = 13.72) from those without history of anxiety disorders (M = 51.14; SD = 15.49), (p = 0.001). The groups differ by a medium effect size (d = 0.61 [0.27; 0.94]).

**Table 7**

*Comparison of PSAS-LT total score among those with and without history of anxiety disorders*

| Variable | Yes | | No | | t (225) | p | 95% | CI | Cohen's d |
|---|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | | | *LL* | *UL* | |
| PSAS-LT total score | 60.33 | 13.72 | 51.14 | 15.49 | 3.57 | **.001** | 4.12 | 14.25 | 0.61 |

*Note:* M = Mean; SD = Standard Deviation; CI = confidence interval; *LL* = lower limit; *UL* = upper limit. 'Yes' indicates that participant has been diagnosed or is currently diagnosed with anxiety disorder, 'No' indicates that participant has never been diagnosed with any anxiety disorder.

## Single-Factor Model

The authors initially suggested that the 17 statements in the PSAS-LT scale should form a single factor. With the exception of item 6 all other variables have satisfactory factor loadings in Lithuanian sample. Results yielded also show that some fit indexes are sufficient, but RMSEA indicates that a single-factor model does not provide good data fit, as the value exceed the recommended threshold ($> 0.08$) (Table 5). No modification indices (MI) above the minimum value of 3.84 were available. This suggests that a single factor may not adequately capture the underlying structure of the data, and alternative models or factor structures may need to be considered.

## Three-Factor Model

During development of the original scale the authors have selected the items that align with Lang's (1971) proposed three factors, which include cognitive, physiological, and behavioral dimensions. After testing the three-factor model in Lithuanian sample results showed adequate item loading in respective factors (item 6 was still an exception), satisfactory CFI and TLI indexes, but displayed less than desirable value of RMSEA ($> 0.08$) (Table 5). What is more, model estimation resulted in a Heywood case (Farooq, 2022; Jackson, Voth, & Frey, 2013), in this particular situation meaning that correlation between 2 latent variables exceeded 1. This is likely to indicate that there is either not enough data to provide stable estimates for this model, low factor loadings ($\leq 0.4$) or the model has too many factors. Most factor loadings are sufficient, and removal of item 6 did not have a positive effect on the results. But other reasons can both be true in this case: 1) the number of respondents only slightly exceed the minimum of 200 cases that is required for this type of analysis; 2) the correlations between factors reported in Table 3 show very strong relationships, which may be suggesting the need to reduce the number of factors. Even though we cannot definitively reject three-factor structure due to possibly insufficient sample size for this type of factor solution, these results do not allow us to confirm three-factor model for PSAS-LT in Lithuanian young adult sample either.

## Single-Factor Model Including Positive and Negative Item Wording Factors

As described previously, during exploratory analysis of PSAS factor structure Bartholomay and Houlihan (2016) reported that positively and negatively worded items fall together. The analysis tested a model incorporating both a single factor as well as positive and negative item wording factors, revealing acceptable fit with the data. Fit indices, including TLI (0.98), CFI (0.99), RMSEA (0.07), generally meet thresholds for good fit (Table 5). While the current model cannot be directly compared to other tested models, traditional fit indices suggest that the current model provides a better model–data fit. The testing of this model also revealed several modification indices that may significantly reduce the model's chi-square. None of the indices suggest including correlated errors, but several proposed assigning item 1 (MI = 38.08), item 3 (MI = 11.31), and item 12 (MI = 8.12)

to positive item wording factor, which is not a reasonable solution in this case. In the PSAS-LT single-factor model including positive and negative item wording factors, all factor loadings for positive item wording factor were found to be significant (ranging from 0.38 to 0.55). For the negative item wording factor, most of the factor loadings were statistically significant (ranging from 0.32 to 0.54), while the factor loadings for items 1–5 were not significant. Additionally, the general factor displayed significant and high factor loadings across all items (ranging from 0.41 to 0.93) except for item 6 that had insignificant loading. These results indicate a strong relationship between most items and the general factor.

Additionally, to the planned model testing, all three models were tested with item 6 removed. The fit indices for Model 1 without item 6 are similar to the initially tested model and indicate model misfit (RMSEA = 0.13 [CI 0.12-0.14], SRMR = 0.06, CFI = 0.96, TLI = 0.95). Model 2 estimation yet again resulted in a Heywood case, showing that removal of this item did not solve encountered statistical anomaly. Results of Model 3 without item 6 show sufficient fit with the data (RMSEA = 0.07 [CI 0.06-0.09], SRMR = 0.03, CFI =0.99, TLI = 0.98) and are very similar to the ones yielded in the initial Model 3 testing. Regular $\chi^2$ difference testing was not performed due to the use of WLSMV in model estimation.

## PSAS-LT Reliability

Once the factor structure of the scales had been validated, the reliability of the PSAS-LT instrument was assessed using the internal consistency coefficient. The Cronbach's α of the PSAS-LT was found to be 0.93. This indicates the reliability of scale in measuring its designated construct. Thus, it can be concluded that the Lithuanian version of the PSAS reliably measures public speaking anxiety in this sample.

## Discussion

The aim of this study was to assess the factor structure and reliability of the Lithuanian version of the Public Speaking Anxiety Scale. Previous studies have explored the construct validity and internal consistency of the PSAS (Bartholomay & Houlihan, 2016; Çabuker et al., 2020; Dueñas, Restrepo-Castro & Becerra Garcia, 2018; Lin et al., 2021; Soares et al., 2020). All studies to date agree on the high level of internal consistency of PSAS, but there is notable variation regarding the factor structure of the tool, thus the analysis of various factor models for the PSAS-LT in the present study provides valuable insights into the structure of public speaking anxiety assessment. The present findings suggest that the initially proposed single-factor model (Model 1) is insufficient in capturing the complexity of the underlying PSAS-LT data structure. This result is not consistent with the PSAS structure in a Spanish-speaking population, which found that the single-factor model fits the data (Dueñas, Restrepo-Castro & Becerra Garcia, 2018). Similar to the Spanish version, the single-factor model was also supported in a Brazilian sample (Soares et al., 2020); however, the single-factor fit was confirmed after removal of 3 items. For PSAS-LT

the inadequacy of fit indices emphasizes the need to consider alternative models or factor structures to more accurately depict the multifaceted nature of public speaking anxiety.

The three-factor model (Model 2), including cognitive, physiological, and behavioral factors, was not supported in this study. It is important to mention that a study analyzing PSAS construct validity conducted in the Turkish sample found that the three-factor model fits the data, but the item 6 had to be excluded (Çabuker et al., 2020). The situation with PSAS-LT, however, is not that straightforward or indisputable. Methodological issues encountered during testing of three-factor model in the Lithuanian sample do not allow to neither confirm, nor deny this theory-based model. High correlation between the factors, especially behavioral and physiological, suggests possible challenges in distinguishing between these subcategories within the PSAS-LT scale. But since the results of confirmatory factor analysis cannot be considered trustworthy, further research is needed regarding this factor solution.

Finally, the model incorporating both a single factor and positive and negative item wording factors (Model 3) exhibited a reasonably good fit with robust support from various fit indices. The sufficient and significant factor loading for most variables imply a strong relationship between the items and the factors. The best fitting model to some extent corresponds to the previously mentioned single-factor solutions established in other adaptations (Dueñas, Restrepo-Castro & Becerra Garcia, 2018; Soares et al., 2020). This main result indicated that PSAS-LT allows to estimate a total score, that is comprised of all 17 items, however we also need to consider some methodological features of this tool. The result of this research leads to an assumption that young adults tend to respond differently to negatively and positively worded item in the Lithuanian version of PSAS. This was confirmed by testing the final model including both single-factor and factors consisting of positively and negatively worded items. Even though this exactly same model was not tested during initial modeling of the PSAS, exploratory psychometric examination performed by Bartholomay & Houlihan (2016), has also suggested the presence of this methodological characteristic of the scale. The nuanced responses to positively and negatively worded items may not only be attributed to factors like inattention, haste, fatigue during survey item reading, but also to response style bias (Van Vaerenbergh & Thomas, 2013). These item wording related factors in PSAS-LT should not be considered meaningful factors representing the structure of public speaking anxiety or useful in other types of analysis, but rather a CFA related methodological artefact.

Based on the results obtained in this study, there are several practical recommendations regarding further use of PSAS-LT. Firstly, according to the results of factor analysis it is recommended to use the total score of PSAS-LT in empirical research. The total score also demonstrated diagnostic validity (i.e., the ability to differentiate between groups) by effectively distinguishing participants with or without the history of anxiety disorders. Secondly, solely on the grounds of this analysis it would be unreasonable to advice against the use of cognitive, behavioral, physiological factors, as the CFA did not disprove this factor solution. On the other hand, high correlation between the three factors and the total score may indicate that three-factor solution may not provide additional information in

the analysis. Moreover, as the three-factor structure is not confirmed in this study, it is not meaningful to calculate the internal consistency coefficients of the individual subscales. Thirdly, we do not recommend using positive and negative item wording factors as domains describing the construct of public speaking anxiety. Lastly, it is our suggestion to refrain from removing item 6 from the Lithuanian version of PSAS. This item may have weak association with the factors, however, its inclusion or exclusion does not significantly impact the overall conclusions of the PSAS studies (Bartholomay & Houlihan, 2016), but its removal reduces potential for cross-cultural comparability.

Unfortunately, this research couldn't avoid limitations. The primary limitation in this study is the use of convenience sampling method, resulting in a sample that may not fully represent the socio-demographic characteristics of the Lithuanian youth population. The relatively small number of participants, along with an uneven distribution of men and women limits the possibility to generalize these results and to make reliable conclusions. Future studies should include a larger and representative sample to validate the current findings of the PSAS-LT. Moreover, further analysis involving individuals diagnosed with SAD is needed to examine the performance of the PSAS in clinical populations.

In conclusion, the study supports the notion that the structure of PSAS-LT, incorporating positive and negative item wording factors, is viable and consistent with the single factor solution proposed by other PSAS adaptations. PSAS-LT has shown excellent internal consistency and the ability to differentiate between respondents with and without diagnosed anxiety disorders. The differentiation between positively and negatively worded items underscores the importance of considering response patterns in the interpretation of anxiety scale scores. The suggestion to focus on the total PSAS-LT score in future studies reflects a practical implication of the observed factor structure.

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# VIEŠO KALBĖJIMO NERIMO SKALĖ (PSAS)

Atidžiai perskaitykite visus žemiau pateiktus teiginius ir nurodykite prie **kiekvieno** iš jų, kiek jis tinka būtent Jums. Prašome atsakyti į **visus klausimus**, pažymint tik vieną pasirinktą atsakymą.

| **1 = visiškai ne, 2 = šiek tiek, 3 = vidutiniškai, 4 = labai, 5 = visiškai taip** | | | | | |
|---|---|---|---|---|---|
| 1. | Sakyti kalbą yra siaubinga | **1** | **2** | **3** | **4** | **5** |
| 2. | Bijau, kad kalbėdama (-s) pritrūksiu žodžių | **1** | **2** | **3** | **4** | **5** |
| 3. | Aš nerimauju, kad apsikvailinsiu prieš auditoriją | **1** | **2** | **3** | **4** | **5** |
| 4. | Jei kalboje padarau klaidą, nebegaliu susikaupti | **1** | **2** | **3** | **4** | **5** |
| 5. | Jaudinuosi, kad auditorija galvos, kad esu prasta (-s) kalbėto-ja (-as) | **1** | **2** | **3** | **4** | **5** |
| 6. | Savo kalbos metu susikoncentruoju į tai, ką sakau | **1** | **2** | **3** | **4** | **5** |
| 7. | Pasitikiu savimi, kai sakau kalbą | **1** | **2** | **3** | **4** | **5** |
| 8. | Po to, kai pasakau kalbą jaučiuosi patenkinta (-s) | **1** | **2** | **3** | **4** | **5** |
| 9. | Kai sakau kalbą, man dreba rankos | **1** | **2** | **3** | **4** | **5** |
| 10. | Mane pykina prieš pradedant kalbėti žmonių grupei | **1** | **2** | **3** | **4** | **5** |
| 11. | Prieš sakydama (-s) kalbą jaučiuosi įsitempusi (-ęs) | **1** | **2** | **3** | **4** | **5** |
| 12. | Nenustygstu vietoje prieš pradedant kalbėti | **1** | **2** | **3** | **4** | **5** |
| 13. | Mano širdis daužosi, kai sakau kalbą | **1** | **2** | **3** | **4** | **5** |
| 14. | Mane pila prakaitas, kai sakau kalbą | **1** | **2** | **3** | **4** | **5** |
| 15. | Man dreba balsas, kai sakau kalbą | **1** | **2** | **3** | **4** | **5** |
| 16. | Kai sakau kalbą, jaučiuosi atsipalaidavusi (-ęs) | **1** | **2** | **3** | **4** | **5** |
| 17. | Man nesunku palaikyti akių kontaktą su auditorija | **1** | **2** | **3** | **4** | **5** |

*Pastaba*: 6, 7, 8, 16 ir 17 teiginiai turi būti priešingai perkuoduoti skaičiuojant bendrą skalės balą.

Viešo kalbėjimo nerimo skalė (lietuviškoji versija) gali būti naudojama moksliniams tyrimams be atskiro autorių leidimo. Norint skalę naudoti komerciniais tikslais ar ją modifikuoti, maloniai prašome susisiekti su E. M. Bartholomay.

Panaudojus lietuviškąją skalės versiją tyrime prašome pacituoti šiuos šaltinius:

Bartholomay, E. M., & Houlihan, D. D. (2016). Public Speaking Anxiety Scale: Preliminary psychometric data and scale validation. *Personality and Individual Differences, 94,* 211–215. https://doi.org/10.1016/j.paid.2016.01.026

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# PUBLIC SPEAKING ANXIETY SCALE (PSAS)

Please read all the items below carefully and indicate for **each one** how applicable it is to you. Please answer **all the questions** by ticking only one answer.

| **1 = not at all, 2 = slightly, 3 = moderately, 4 = very, 5 = extremely** | | | | | |
|---|---|---|---|---|---|
| 1. Giving a speech is terrifying | **1** | **2** | **3** | **4** | **5** |
| 2. I am afraid that I will be at a loss for words while speaking | **1** | **2** | **3** | **4** | **5** |
| 3. I am nervous that I will embarrass myself in front of the audience | **1** | **2** | **3** | **4** | **5** |
| 4. If I make a mistake in my speech, I am unable to re-focus | **1** | **2** | **3** | **4** | **5** |
| 5. I am worried that my audience will think I am a bad speaker | **1** | **2** | **3** | **4** | **5** |
| 6. I am focused on what I am saying during my speech | **1** | **2** | **3** | **4** | **5** |
| 7. I am confident when I give a speech | **1** | **2** | **3** | **4** | **5** |
| 8. I feel satisfied after giving a speech | **1** | **2** | **3** | **4** | **5** |
| 9. My hands shake when I give a speech | **1** | **2** | **3** | **4** | **5** |
| 10. I feel sick before speaking in front of a group | **1** | **2** | **3** | **4** | **5** |
| 11. I feel tense before giving a speech | **1** | **2** | **3** | **4** | **5** |
| 12. I fidget before speaking | **1** | **2** | **3** | **4** | **5** |
| 13. My heart pounds when I give a speech | **1** | **2** | **3** | **4** | **5** |
| 14. I sweat during my speech | **1** | **2** | **3** | **4** | **5** |
| 15. My voice trembles when I give a speech | **1** | **2** | **3** | **4** | **5** |
| 16. I feel relaxed while giving a speech | **1** | **2** | **3** | **4** | **5** |
| 17. I do not have problems making eye contact with my audience | **1** | **2** | **3** | **4** | **5** |

*Note:* Items 6, 7, 8, 16 and 17 must be reverse recoded for the overall scale score.

The Public Speaking Anxiety Scale (Lithuanian version) may be used for research purposes without the authors' permission. If you wish to use the scale for commercial purposes or modify it, please contact E. M. Bartholomay.

If the Lithuanian version of the scale is used in a study, please cite the following sources:

Bartholomay, E. M., & Houlihan, D. D. (2016). Public Speaking Anxiety Scale: Preliminary psychometric data and scale validation. *Personality and Individual Differences, 94,* 211–215. https://doi.org/10.1016/j.paid.2016.01.026

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