

Latent structure and differential item functioning of the Social Interaction Anxiety Scale (SIAS-6) in college alcohol consumers

Estructura latente y funcionamiento diferencial del ítem de la Escala de Ansiedad de Interacción Social (SIAS-6) en universitarios consumidores de alcohol

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Abstract

The aim of this study was to analyze the structure of the SIAS-6 from an integrative approach of psychological network analysis and item response theory (IRT). In addition, differential item functioning (DIF) was identified as a function of gender. In this regard, an exploratory graph analysis (EGA) followed by a Bootstrap (bootEGA) was applied to assess the stability and consistency of items and dimensions. Then, a graduated response IRT model with discrimination and difficulty parameters was used and complemented with a DIF analysis. The results showed a community with structural consistency and replicable stability in the various resamplings. From IRT, the model reflected a unidimensionality measure (RMSEA = 0.047 [95%CI, 0.027/0.068], SRMR = 0.025, TLI = 0.993, CFI = 0.995). Item 5 was the most discriminant and most accurate; while item 6 provided less information, but presented greater difficulty. Only item 6 showed DIF with minimal effect size with higher scores in favor of the female group. Additionally, the association between the SIAS-6 and depression was of minimal effect size ($Rho = 0.44$). It is concluded that the SIAS-6 is a unidimensional instrument applicable to male and female college students with alcohol consumption in an educational context.

Keywords: SIAS-6; anxiety; Samejima; differential item functioning; alcohol.

Resumen

El objetivo de este estudio fue analizar la estructura del SIAS-6 desde un enfoque integrador de análisis de redes psicológicas y teoría de respuesta al ítem (TRI). También se identificó el funcionamiento diferencial del ítem (DIF) en función del género. En tal sentido, se aplicó un análisis exploratorio de grafos (EGA) seguido de un Bootstrap (bootEGA) para evaluar la estabilidad y consistencia de ítems y dimensiones. Luego, se utilizó un modelo TRI de respuesta graduada con los parámetros de discriminación y dificultad y se complementó con un análisis del DIF. Los resultados evidenciaron una comunidad con consistencia estructural y estabilidad replicable en los diversos remuestreos. Desde la TRI, el modelo reflejó una medida unidimensionalidad (RMSEA = 0.047 [IC95%, 0.027/0.068], SRMR = 0.025, TLI = 0.993, CFI = 0.995). El ítem 5 fue el más discriminante y de mayor precisión; mientras que el ítem 6 aportó menor información, pero presentó mayor dificultad. Solo el ítem 6 mostró DIF con tamaño de efecto mínimo con mayores puntajes a favor del grupo de mujeres. Adicionalmente, la asociación entre el SIAS-6 y depresión fue de magnitud de efecto mínima ($Rho = 0.44$). Se concluye que el SIAS-6 es un instrumento unidimensional aplicable a universitarios varones y mujeres con consumo de alcohol en contexto educativos.

Palabras clave: SIAS-6; ansiedad; Samejima; funcionamiento diferencial del ítem; alcohol.

INTRODUCTION

Anxiety disorder or social phobia affects various age groups, especially young adults, and generates occupational, academic and interpersonal difficulties (Wittchen et al., 2020). Stein et al. (2017) in a multinational study in the Americas in which Peru was included, found that the lifetime, annual and monthly prevalence of the disorder reached 4%, 2.4% and 1.3%, respectively. In addition, it is usually prevalent in young people, women and people with low educational level and income (Stein et al., 2017). In Peru, in regional hospitals, social anxiety usually has higher lifetime prevalence in females (3.8%) compared to males (3%); it happens in the same way with annual (1.2%, 1%) and semi-annual (1.1%, 0.9%) prevalence, respectively (Instituto Nacional de Salud Mental [INSM], 2019). Social anxiety is often associated with affective disorders, anxiety and substance abuse, especially in young people aged 14-24 years (Pilling et al., 2013; Campos-Arregui et al., 2023), being common its relationship with alcohol consumption (Caumiant et al., 2023; Goodman et al., 2022; Patel et al., 2024). In addition, alcohol abuse is a risk factor for developing social anxiety in adolescents (Walukevich-Dienst et al., 2022) and is associated with a lower response to treatment (Bulley et al., 2016). In the academic context, social anxiety takes on other nuances as college students are exposed to various situations of interpersonal interaction and stress. In some cases, social anxiety re-generates a disorder that leads college students to develop additional pathologies such as alcohol consumption (Caumiant et al., 2023; Goodman et al., 2022; Oliveira et al., 2018; Patel et al., 2024) or depression (Lyvers et al., 2018).

Social anxiety involves a continuum of different conditions in which it can worsen to the point of developing a disorder. Variants of social anxiety have led to consider a type related to social interaction and another in which the person feels observed by others (Brown et al., 1997). Mattick and Clarke (1998) have considered these two types of social anxiety linked to initiating or maintaining a conversation with other people and that which is provoked in the presence of an observer, respectively. In this context, Mattick and Clarke (1998) developed the Social Interaction Anxiety Scale (SIAS-20). Then, Peters et al. (2012), in a varied sample of Australian clinical, community or university

patients, adapted a brief six-item version of the SIAS-20 (SIAS-6), finding acceptable loadings ($>.30$), in addition to favorable fit (SRMR=0.08, CFI=0.95, TFI = 0.94). Sunderland et al. (2020), in a sample of Australian adults, analyzed the SIAS-20 and SIAS-6 and found that the extended version of the SIAS showed a favorable fit (CFI = 0.95, TLI = 0.95, RMSEA = 0.01). From an Item Response Theory (IRT) approach, the SIAS-6 also gained support for unidimensionality and found item 5 ($a=2.98$) to be most discriminant. Ouyang et al. (2020) conducted research with Chinese college students and found that confirmatory factor analysis (CFA) identifies a unidimensional structure. Then, from an IRT-MRG approach (Samejima, 1969), support was found for the unidimensionality of the SIAS-6, reporting moderate factor loadings (0.42/0.63). The Chinese study found item 6 to be the least discriminant ($a= .89$) and item 2 the most discriminant ($a= 1.75$). Regarding difficulty, item 3 was identified as the most difficult ($b1=- 0.38$), while the least difficult in the same category was item 6 ($b1= -2.60$). Zsido et al. (2021), in samples of different characteristics from Hungary, also found favorable fit of the SIAS-6 (SRMR=0.025, CFI =0.978, TLI = 0.972, RMSEA = .051), evidencing a level of discrimination between 1.11(item 6) and 3.4 (item 5). Rodebaugh et al. (2006) found a one-dimensional model (SRMR=0.03, CFI=0.95, TLI=0.99, RMSEA=0.07) in a U.S. sample of college students and clients of various mental health programs. In addition, from a graduated response IRT (GRT) approach, item 5 was identified as more discriminative and item 6 with a higher degree of difficulty. In Mexico, De la Rubia et al. (2013) translated the SIAS-20 into Spanish and identified the same unidimensional structure with favorable fit indices (SRMR=0.025, GFI =0.95, AGFI = 0.94, RMSEA = .05) in a sample of university students.

Nowadays, novel techniques have appeared that apply to the analysis of the dimensionality of the instruments. In this context, the psychological network analysis approach makes it possible to establish association or nodes among observable variables (Epskamp et al., 2018), which tend to influence each other by forming communities (Christensen and Golino, 2021). It is mentioned that network analysis has even been shown to be superior to exploratory factor analysis (EFA) in determining the number of factors present (Ouyang et al., 2023), which is an interesting contribution to the study of social anxiety since

its unidimensionality has only been analyzed from traditional techniques such as factor analysis and less frequently from IRT. As for IRT, it stands out for the independence of its parameters with respect to the sample, greater precision in measuring the trait depending on the item applied, and adds model evaluation adjustment indexes (Abad et al., 2011; Lord, 2012). In this context, IRT allows identifying the discrimination and difficulty of an item given a certain level of social anxiety, which in the clinical setting can be very useful for the analysis of the severity of a symptom.

At present, it is considered relevant to have brief psychological instruments that can measure social anxiety quickly and accurately, especially considering that there are few studies of the SIAS-6 in Latin America and in the Peruvian context it has not been validated in samples of university students. Furthermore, although IRT and network analysis are often complementary approaches, there is still no research that analyzes the psychometric properties of social anxiety instruments from these models, which highlights their methodological value. It is pointed out that the validation of the SIAS-6 is also a contribution to the clinical assessment of social anxiety in a young sample of alcohol consumers who may be at risk of aggravating pre-existing disorders. Likewise, considering that university students face a series of personal, family, work and academic demands, the relevance of the study of social anxiety is emphasized because of its association with other mental health problems such as alcohol consumption in a university population (Caumiant et al., 2023; Goodman et al., 2022; Patel et al., 2024) and even more so in the Peruvian context in which anxiety is more prevalent in young people (Stein et al., 2017), with a higher prevalence in the case of women (INSM, 2019; World Health Organization [WHO], 2023). The aim of the present study is to: (a) identify the number of communities present in the SIAS-6 from a network analysis, (b) analyze the latent structure of the SIAS-6, (c) identify the discrimination and difficulty parameters from the MRG, (c) identify the presence of differential functioning of the uniform and non-uniform item from an IRT approach, (d) estimate the effect size of DIF, and (e) provide evidence of validity in relation to a measure of depression. Based on the review of previous studies, we expected to find a unidimensional structure with DIF in favor of the female group with a minimal effect size.

METHOD

Research Design

The present study is of an instrumental type (Ato et al., 2013), since it is aimed at identifying the psychometric properties of the SIAS-6, in addition to analyzing whether there are differences in the responses of examinees according to their gender.

Instruments

SIAS-6 is a brief version of the original Mattick and Clarke (1998) scale developed by Peters et al. (2012) and validated in various contexts (Ouyang et al., 2020; Sunderland et al., 2020; Zsido et al., 2021). This brief version has 6 items on a Likert scale ranging from 0 to 4 points, in which scores of 7 or more points indicate individuals with social anxiety (Peters et al., 2012). In Mexico, De la Rubia et al. (2013) conducted a Spanish adaptation of the original scale finding favorable fit indices to the unidimensional model (RMSEA = 0.05, GFI = 0.95, AGFI = 0.095) for the extended version of this as well as favorable internal consistency measures ($\alpha=.90$). In the present study, the brief version of Peters et al. (2012) was used from the validation performed by De la Rubia et al. (2013).

Patient Health Questionnaire – 9 (PHQ-9). It is an instrument that measures depressive symptoms and has a Peruvian version made from AFC (Villarreal-Zegarra et al., 2019) in which the unidimensionality of the model is noted, evidencing satisfactory adjustment indexes (RMSEA = 0.089; SRMR = 0.039; CFI = 0.936) with acceptable reliability ($\omega=.87$). Likewise, its cut-off points refer to mild, moderate, moderately severe and severe type of depression between the levels of 5-9, 10-14, 15-19 and 20-27, respectively.

Population

The sample was collected from a non-probabilistic convenience sampling in which 891 students from different private universities in Lima participated. Of this total, 42% were female and the remaining male (58%) with a mean age of 21.1 years (S.D. = 4.9). The inclusion criteria included adults who had consumed alcohol at some time in their life and during the last twelve months. Based on these criteria, the lifetime and annual prevalence was 100%. Likewise, the prevalence of biannual use was 92%; quarterly,

82%; and monthly, 61%. Of this sample (N=891), 32.6% (291) of them obtained a score equal to or higher than seven on the SIAS-6 that would reflect a possible social phobia disorder (Peters et al., 2012). This group with probable social phobia was distributed in 37.4% (109) males and 62.5% (182) females.

Procedure

The sample was collected through Google forms in which the participants were asked for their consent to participate in the study, explaining the aims and objectives. Then, the study database was created and statistical analyses were performed using Excel spreadsheets and the statistical packages Lavaan, Mirt, DIFR and bootEGA of the free software R Studio.

The analyses were carried out considering the ethical framework provided by the Declaration of Helsinki, which provides guidelines for research in humans. In addition, the Code of Ethics of the Peruvian Association of Psychologists was considered as a whole. In addition, the present study has the approval of the Vice President's Office for Research and Innovation of the Universidad de San Martín de Porres, with code No. 3308-2023.

Data analysis

Network analysis

Prior to the IRT approach, an exploratory graph analysis (EGA) based on a Gaussian graph model (GGM) was performed to assess the dimensionality of the SIAS-6. This model estimates partial correlation coefficients represented as edges. For this purpose, the GLASSO (Graph Operator of Absolute Minimum Selection and Shrinkage) method with Spearman correlation and the Louvain algorithm for community detection were used. GLASSO allows the detection of the most relevant connections, which facilitates the grouping of communities. Subsequently, the structural consistency and stability of the communities and items present (Christensen and Golino, 2021) were analyzed using the bootstrap resampling technique (bootEGA), in which it is verified whether the items are grouped consistently in the different resamplings performed. The bootEGA was applied in 1000 replicates, which aimed to determine the robustness of the empirical EGA. Regarding consistency and stability, these refer

to the proportion of times that dimensions or items can be replicated when using Bootstrap sampling, which is expected to be higher than 75% (Christensen and Golino, 2021). Descriptive statistics (mean, median, standard deviation, confidence intervals [CI] and quartiles) and a graphical analysis of stability were also calculated, noting that items with loadings below 0.15 or stability below 0.75 would be eliminated.

Univariate descriptive analysis

Likewise, the analysis of the univariate descriptive statistics of the items was performed considering the cut-off points of skewness and kurtosis within acceptable margins (± 1.5), while the standardized skewness index ($SSI < .50$) was added.

Item response theory – MRG

Subsequently, an IRT-MRG model for polytomous items (Samejima, 1969) was carried out in which the discrimination parameter reflects the degree of association of the item with the trait, while the difficulty parameter indicates that, for an item with K categories, with K-1 thresholds, under a certain theta level of latent trait, there is a 50% probability of responding to category k+1 or a higher one at threshold k. From this model, the local independence of the items was tested by inspecting the residual correlation matrix. If this has high values ($> .20$), it may indicate multidimensionality (Morizot et al., 2007). The unidimensionality of the model was also evaluated by considering acceptable fit indices ($RMSEA < 0.06$, $SRMR < 0.06$, $TLI > 0.90$, $CFI > 0.90$). The outfit and infit values were added in the suggested ranges (0.5/1.5) and the RMSEA ($< .05$) with their associated p-value. Once each item was tested, the discrimination parameters “a” ($a > 1.35$) (Baker, 2001) and “b” of difficulty associated with each item were calculated. The analyses were complemented with the inclusion of the item characteristic curve (ICC), the item information curve (IIC) and the test information curve (TIC).

Differential item performance

To analyze the differential item functioning from the IRT approach, the “all-others-as-anchors” strategy (Wang and Reeve, 2021) was used in two steps: first, items with suspected DIF were detected. Then, only these items were evaluated using the items without DIF as anchors. The likelihood ratio test (LRT) was applied, restricting

the means and variances between groups and considering the parameters a and b invariant. Items with DIF were evaluated using BIC, SABIC, AIC and Benjamini-Hochberg adjusted p-value ($BH-p \leq .05$). For uniform DIF, SIDS and UIDS are expected to match; if they differ, non-uniform DIF is evident. Effect size (ESSD) was also analyzed, using Cohen's (1988) cutoff points ($>.20$).

In addition, a sociodemographic form was used to collect information on the prevalence of annual, half-yearly, quarterly and monthly alcohol consumption through direct questions (Have you consumed alcohol during the last "n" months?) of dichotomous type (Yes/No), with which a group with alcohol consumption prevalence of twelve, six, three months and one month (risk group) was identified ($n=414$). Then, with this group, the SIAS-6 was associated with a measure of depression (PHQ-9) using Spearman's Rho coefficient considering a magnitude of effect approach (Cohen, 1988).

RESULTS

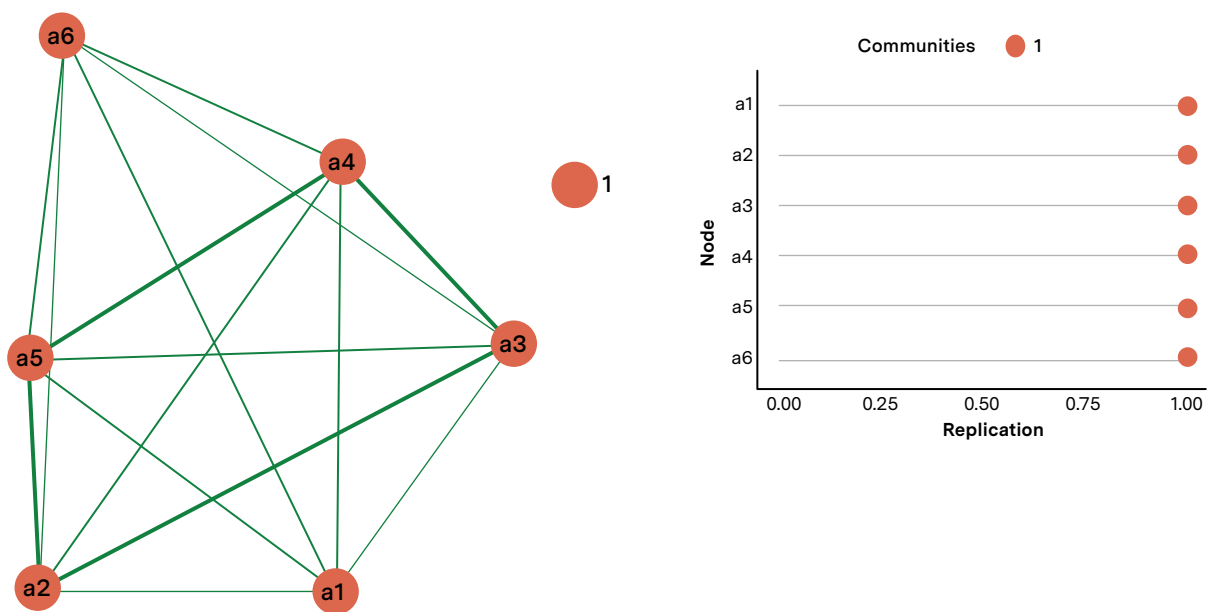
The univariate statistics indicate skewness and kurtosis values within the expected range (± 1.5), and the mean and standard deviation

range from 0.96 to 0.81 and 1 to 0.91, respectively. Similarly, the SSI remained within acceptable limits (min. 0.45/max. 0.62).

Psychological network analysis

Then, an initial EGA was performed with the GLASSO estimator considering the six items of the SIAS-6, which was found to correspond to a single community with six nodes and fifteen edges (Figure 1). Subsequently, the structural consistency of the dimension was analyzed using the bootstrap technique (bootEGA) with 1000 replicates. According to the above, it was obtained that all items maintain a stability higher than the expected 0.75 (Figure 1). Additionally, the descriptive statistics of the bootEGA refer a median of the dimensions (median.dim) of 1, a standard error (SE.dim) of 0 which refers a low variability of the scores in the resampling, likewise the lowest (Lower.CI) and highest (Upper.CI) level of the confidence interval is 1, which highlights the unidimensionality in the replicates. Additionally, the average network loadings for items 1, 2, 3, 4, 5 and 6 were 0.31, 0.39, 0.36, 0.40, 0.46 and 0.27, respectively; indicating a favorable influence of these to the network.

Figure 1
SIAS-6 Community



Samejima's Item Response Theory - MRG applied to SIAS-6

The unidimensionality of the model was tested and satisfactory fit indices were obtained ($M2 = 26.86$, $DF=9$, $p = 0.001$, $RMSEA = 0.047$ [95%CI, 0.027/0.068], $SRMR = 0.025$, $TLI = 0.993$, $CFI = 0.995$). Subsequently, each of the items was tested with different fit indices. Among them the infit and outfit values, the Chi-Square test (X^2O , X^2S), in addition to the RMSEA value ($<.05$) which is fulfilled in all items (Table 1). The local

independence of the items was also contrasted, finding correlations of the residuals below 0.20 with the exception of item 4 and 5 that slightly exceed this value. Likewise, the discrimination parameters (a) and difficulty (b) of the model were obtained, finding that the former are high ($A > 1.64$), especially in item 5 ($A = 3.44$). Regarding B , it was found that item 1 showed parameter $B1$ of lower level of difficulty, while the highest was item 6 ($B1 = -0.19$) (Table 1). In relation to parameter $B4$, the most difficult item was 6, while the one with the lowest difficulty was item 4.

Table 1

Contrast coefficients of the SIAS-6 anxiety scale items and parameters of difficulty and discrimination

ítem	Outfit	infit	RMSEA	p. X^2O	a	b1	b2	b3	b4
a1	0.86	0.90	0.03	0.02	2.02	-0.46	1.05	1.81	2.50
a2	0.70	0.82	0.03	0.02	2.84	-0.31	1.10	1.83	2.54
a3	0.75	0.86	0.01	0.23	2.39	-0.29	0.89	1.83	2.52
a4	0.75	0.84	0.02	0.05	2.73	-0.34	0.81	1.64	2.26
a5	0.62	0.76	0.03	0.01	3.44	-0.19	0.87	1.69	2.47
a6	0.87	0.94	0.02	0.03	1.64	-0.21	1.28	2.33	3.15

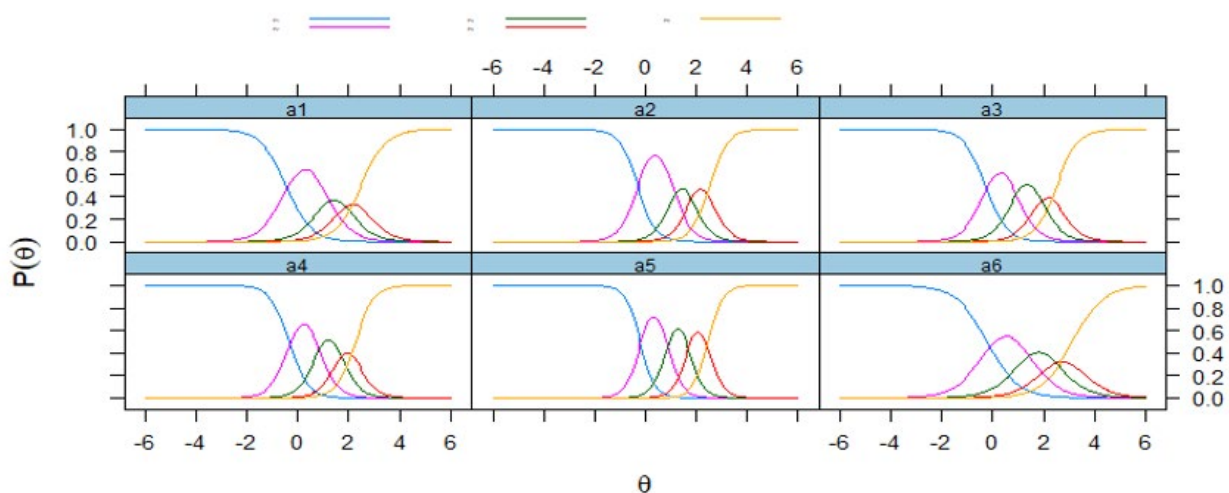
Note. p. X^2O , p - Orlando and Thissen value; a, discrimination; b, item difficulty.

Regarding the CCI, these were distributed in a decreasing manner for the three intermediate categories (Figure 2). Likewise, the CII showed that the items that provide the most information are items 2 and 5, while the items that provide the

least information are items 6 and 1. In addition, the test information curve (TIC) showed that the probability of error decreases in subjects with a higher level of anxiety. It is noted that the marginal reliability coefficient was high (.85).

Figure 2

Item characteristic curve of the SIAS-6 anxiety scale



Differential item performance – IRT

The unidimensionality of the model was tested in both the male and female groups, finding that the fit indices of the female group were adequate ($M2=25.24$, $df=9$, $p=0.002$, $RMSEA = 0.05$ [95% CI 0.032/0.087], $SRMR = 0.029$, $TLI = 0.989$, $CFI = 0.993$). Similarly, in the male group ($M2=12.37$, $df=9$, $p=0.19$, $RMSEA = 0.031$ [95% CI 0.0/0.070], $SRMR = 0.029$, $TLI = 0.996$, $CFI = 0.998$). Then, the LRT test was used to compare both males and females by selecting anchor items ($p < 0.05$). Once the test was applied, in a second step, those items without DIF were selected

as anchor to test only the items suspected of DIF from the previous step ($p < 0.05$) (Table 2). When analyzing the SIDS of difference between groups, it was found that females, in item 3, have 0.06 points less than males when the teta level in both is the same. Likewise, when SIDS and UIDS are found to coincide in item 6, the presence of uniform DIF with a minimum necessary effect size ($ESSD=0.21$) is considered. However, by not matching SIDS and UIDS in items 3 and 5, non-uniform DIF with a trivial effect size is reflected. Additionally, the effect size for the entire test would be trivial ($ETSSD= 0.041$).

Table 2

Test statistics of the restricted model and the model with anchor items of the SIAS-6.

		AIC	SABIC	HQ	BIC	X2	p	SIDS	UIDS	ESSD
Step 1	a1	5.29	11.76	12.62	24.46	2.71	0.61	0.00	0.00	0.00
	a2	5.92	12.39	13.25	25.09	2.08	0.72	0.00	0.00	0.00
	a3	-4.30	2.17	3.03	14.87	12.30	0.015*	-0.06	0.06	-0.08
	a4	5.61	12.08	12.94	24.78	2.39	0.67	0.00	0.00	0.00
	a5	-6.01	0.45	1.31	13.16	14.01	0.007*	0.11	0.12	0.14
	a6	-1.87	4.60	5.46	17.30	9.87	0.043*	0.12	0.12	0.21
Step 2	a3	0.42	6.886	7.746	19.589	7.58	0.108	-0.06	0.06	-0.08
	a5	-2.845	3.621	4.481	16.324	10.845	0.028*	0.11	0.12	0.14
	a6	-4.348	2.118	2.979	14.822	12.348	0.015*	0.12	0.12	0.21

Note: AIC, Akaike information criterion; BIC, Bayesian information criterion; SABIC, sample-adjusted BIC; X2, chi-square; p, p-value; DIF, differential item functioning; SIDS, in-sample difference of signed item; UIDS, in-sample difference of unsigned item; ESSD, standardized effect size; Step 1, all items as anchor; Step 2, only item with DIF; *, items with suspected DIF.

Validity evidence in relation to the PHQ-9 for depression

Additionally, a risk group (46% of the total [N=891]) with alcohol consumption in the last twelve, six, three months and last month ($n=414$) was identified in which social anxiety was related to depression scores and a significant association was found ($p < .001$) with minimum necessary effect magnitude ($Rho = 0.44$). In this group, 119 individuals (13% of the total) (65 females and 54 males) were identified with social anxiety (≥ 7), in addition to risky alcohol consumption (annual, semiannual and quarterly prevalence). Additionally, 280 of them (risk group) have no depression at all, but 121, 75, 29 and 30 subjects

were found with mild, moderate, moderately severe or severe depression, respectively. That is, 29% of the total had some level of depression.

DISCUSSION

As observed in previous studies (Peters et al., 2012; Ouyang et al., 2020; Rodebaugh et al., 2006; Sunderland et al., 2020; Zsido et al., 2021), either from IRT or from TCT, the SIAS-6 has shown a one-dimensional structure evidenced by the community identified by the

network analysis and the stability of the items, which refers to an important finding given the accuracy of the network analysis. Similarly, from the IRT unidimensionality test in which the local independence of the items and the adjustment of each of these was also verified.

Regarding IRT parameters, all six items showed a high discrimination value, in line with other studies (Peters et al., 2012; Rodebaugh et al., 2006; Sunderland et al., 2020; Zsido et al., 2021). In addition, item 5 “I find it difficult to have a conversation with other people” ($a=3.12$) was found to be more discriminant ($a=3.12$), which is consistent with previous reviews (Rodebaugh et al., 2006; Sunderland et al., 2020; Zsido et al., 2021). It is likely that this item is more determinant in reflecting anxiety in social interaction since initiating, maintaining and ending a conversation with another person involves the use of various behavioral resources that mobilize anxiogenic processes for a longer time. Regarding this item, it is pointed out that many university students who consume alcohol use it to improve their performance in social gatherings and thus reduce their social anxiety. For the discrimination of item 5, it was also pointed out that the item would allow differentiating individuals who consume alcohol because they experience higher levels of social anxiety from those who do not.

In terms of item difficulty, item 6 “I find it difficult to disagree with someone else’s point of view” was shown to have the highest degree of difficulty across all SIAS-6 response categories. Other researchers have also found a higher degree of difficulty in this item, especially in the last category (Ouyang et al., 2020; Sunderland et al., 2020; Zsido et al., 2021). This item is related to item 5, but to a more extreme degree. This item 6 also reflects the lowest level of discrimination, which would indicate that it is not very effective in differentiating individuals with different levels of social anxiety. In addition, to some extent, its semantics is different from the previous ones due to the degree of complexity associated with disagreeing with others, hence its greater difficulty. It is noted that the prevalence of social anxiety is low in the university sample (INSM, 2019; WHO, 2023), so it is expected that a more difficult item would have less discrimination since having fewer individuals at the difficult end makes it more complicated to differentiate or discriminate between them. It is added that this more difficult item is affected by those individuals who, in addition to having higher levels of social

anxiety, also have a higher prevalence of alcohol consumption, which would interfere with their ability to discriminate. This item is also the one that provides the least information, so its accuracy to the instrument is lower compared to the others. However, the opposite happens with item 5, which is more discriminative and provides more information to the instrument.

When evaluating the presence of DIF-TRI, according to the gender of the participants, although differences were found in the scores on items 5 and 6, it was also found that the effect size is considered trivial, with the exception of item 6. Regarding item 6 “I find it difficult to disagree with someone’s point of view”, women showed higher scores than men, which would reflect a greater difficulty on the part of women to show their disagreement with other people, perhaps due to idiosyncratic macho factors in which they are expected to be more submissive, even more so in a university context. Some authors have highlighted that those differences in social anxiety scores are related to cultural factors (Arenas and Puigcerver, 2009; Mojtabai et al., 2016), which still remain, even despite changes in gender inclusion policies given in recent decades.

In addition, it was found that the SIAS-6 is associated with a measure of depression (PHQ-9) with the minimum necessary magnitude. It has even been found that there is a risk group ($n = 414$) of alcohol consumers who at the same time have problems with social anxiety (13% of the total) and depression (29% of the total), which corresponds with the relationship of social anxiety with other alcohol use disorders (Caumiant et al., 2023; Goodman et al., 2022; Patel et al., 2024) and depression (Lyvers et al., 2018).

As limitations, the sample used comes mostly from private universities in Lima, which would restrict the findings to the context of the capital city. Likewise, there was a higher proportion of female participants, which could be balanced in larger studies with a general population. It should also be noted that although the participants have at least an annual prevalence of alcohol consumption, it was not possible to apply an instrument that identifies them in a category of substance abuse disorder, although there are individuals with a six-monthly and monthly prevalence of alcohol use higher than 60%.

CONCLUSIONS

The Peruvian version of SIAS-6 shows a unidimensional structure clearly defined from network analysis as well as the IRT.

The SIAS-6 contains items that allow discriminating individuals with a greater presence of the trait, which would be those with a higher tendency to consume alcohol.

Item 6 of the SIAS-6, which has a high degree of difficulty, would allow finding individuals with more severe alcohol use.

The SIAS-6 measures the same trait equally for both males and females, with the exception of item 6, which is sensitive to this difference.

The SIAS-6 shows evidence in relation to the PHQ-9 depression measure.

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