



**ANA SOFIA TAVARES
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**STICSA: ANÁLISE PSICOMÉTRICA NUMA
AMOSTRA DE ESTUDANTES UNIVERSITÁRIOS
PORTUGUESES**

**STICSA: PSYCHOMETRIC ANALYSIS IN A SAMPLE
OF PORTUGUESE UNIVERSITY STUDENTS**



Universidade de Aveiro Departamento de Educação e Psicologia
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Dissertação apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Psicologia da Saúde e Reabilitação Neuropsicológica, realizada sob a orientação científica da Professora Doutora Sandra Cristina de Oliveira Soares, Professora Auxiliar do Departamento de Educação e Psicologia da Universidade de Aveiro.

Este trabalho é dedicado à minha família e amigos que sempre me apoiaram durante este percurso.

o júri / the jury

presidente

Professor Doutor Carlos Fernandes da Silva
Professor Catedrático, Universidade de Aveiro

Vogal – Arguente principal

Professora Doutora Isabel Cristina Dórdio Dimas
Professora adjunta, Universidade de Aveiro

Vogal - Orientadora

Professora Doutora Sandra Cristina de Oliveira Soares
Professora auxiliar, Universidade de Aveiro

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palavras-chave

Ansiedade cognitiva-somática, ansiedade estado-traço, State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA), análise psicométrica.

resumo

A *State-Trait Inventory for Cognitive and Somatic Anxiety* (STICSA; Ree, French, MacLeod, & Locke, 2008) é um instrumento de auto-resposta que avalia ambas as dimensões cognitivas e somáticas, para além da ansiedade estado e traço. Esta avaliação integrada expande e melhora a compreensão dos sintomas e o fenómeno de ansiedade como um todo, ambos para propósitos clínicos e de investigação, quando comparados com as escalas mais usadas, como o Inventário de Ansiedade Estado-Traço (STAI). O objetivo deste estudo foi adaptar a STICSA para o contexto português e fornecer a primeira evidência sobre a sua dimensionalidade, confiabilidade e validade. A escala foi administrada a 487 estudantes universitários. Resultados de uma análise de componentes principais apoiam a solução de duas dimensões, para ambas as condições de ansiedade estado e traço. Alguns itens não tiveram uma boa performance e foram excluídos devido à sua baixa carga fatorial. As análises de confiabilidade mostraram bons níveis de consistência interna, com alphas de Cronbach a variar de .769 até .903. As análises de correlações indicaram que as dimensões cognitivas e somáticas estão associadas, mas relativamente independentes. As análises da validade convergente e discriminante confirmam a adequabilidade da STICSA para avaliar sintomas de ansiedade, principalmente na dimensão somática. Os resultados mostraram também que a STICSA poderá ser uma medida mais confiável para medir ansiedade, comparativamente com uma das escalas mais usadas para o mesmo efeito, o STAI.

keywords

Cognitive-somatic anxiety, State-trait anxiety, State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA), psychometric analysis.

abstract

The State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree, French, MacLeod, & Locke, 2008) is a self-report instrument that assesses both cognitive and somatic dimensions, regarding trait and state anxiety. This integrated assessment expands and improves the comprehension of the symptoms and of the overall phenomenon of anxiety, both for research and clinical purposes, when compared with the mostly used scales, like State-Trait Anxiety Inventory (STAI). The aim of the present study was to adapt STICSA for the Portuguese context and provide the first evidence regarding its dimensionality, reliability and validity. The scale was administered to 487 higher education students. Results from a Principal Component Analysis support the two-dimension solution, both for trait and state conditions of anxiety. Some items did not perform well and were excluded due to low factor loadings. The reliability analysis showed good levels of internal consistency, with Cronbach alphas ranging from .769 till .903. The correlation analysis indicates that cognitive and somatic dimensions are associated but are relatively independent. The convergent and discriminant validity analysis confirm the suitability of STICSA to assess symptoms of anxiety, mainly in the somatic dimension. The results showed also that STICSA can be a more reliable measure to assess anxiety comparatively with one of the most used scales for the same effect, the STAI.

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Introduction

Anxiety

Anxiety is defined as an “anticipation of a future threat” (American Psychological Association, 2013, pp. 223), associated with sensations of apprehension and muscular tension, hypervigilance, and increased activity of autonomic nervous system (Pacheco-Unguetti, Acosta, Callejas, & Lupiáñez, 2010; Spielberger, 1972).

Given the high prevalence of anxiety around the world and its impact in both mental and physical health, research devoted to this dimension is highly relevant.

According to the World Health Organization (WHO, 2017), in 2015 nearly 300 million people worldwide suffered from anxiety disorders, specially females. Also, anxiety disorders are the sixth largest contributors to non-fatal health loss worldwide (WHO, 2017).

Portugal is not an exception. In this country, in 2015, anxiety disorders were one of the most frequent disorders, with around 500 thousand Portuguese individuals having this diagnosis (Direção Geral de Saúde (DGS), 2017; WHO, 2017).

Anxiety in university students

For most students, the entrance to the university encounters major challenges: increased responsibilities, adaptation to a new learning institution (frequently comes along with facing new methods of learning and teaching, and moving out from parents house and hometown), new social relationships (implying the integration to the new social context (i.e., university)) and maintenance, at the same time, of “childhood” relationships. Moreover, this is a period of transition from adolescence to young adulthood which, all together, can enhance the difficulties in adaptation to their new social role, that of a young adult (Ferreira et al., 2009; Papalia & Feldman, 2013). As a result, it is frequent that these factors are related to anxious conditions that can lead, among other difficulties, to sleep privation and negative interferences in several cognitive dimensions (such as in attention, memory) and, therefore, jeopardize the learning process (Ferreira et al., 2009; Papalia & Feldman, 2013).

Indeed, anxiety disorders are one of the most frequent mental health problems in higher education students (e.g., Bunevicius, Katkute, & Bunevicius, 2008; Cruz, Pinto, Almeida, & Aleluia, 2010; Gaspersz, Frings-Dresen, & Sluiter, 2012; Shamsuddin et al.,

2013; Sousa, Moreira, & Correia, 2018; Wong, Cheung, Chan, Ma, & Tang, 2006). For instance, in a study with Malaysian higher education students ($n = 506$), 34% showed moderate anxiety and 29% had severe or extremely severe anxiety (Shamsuddin et al., 2013). In Japan, on the other hand, in a sample of 7915 university students, 41.2% of them showed moderate severity symptoms of anxiety or above (Wong et al., 2006).

In Europe, the scenario is mimicked, which reinforces the transcultural nature of the problem. In a study with Lithuanian higher education students, 43% medical students sample ($n = 338$) and 53% of humanities students' sample ($n = 72$), showed symptoms of anxiety (Bunevicius et al., 2008), suggesting that the symptoms are also independent of the study subject. Nevertheless, many studies select samples of university students who are more prone to stress, given the demands of their degree, as it is the case of medical students. In a sample of 814 Dutch medical students, from the first to the fourth year, along with a sample of 316 medical students, from the fifth to the sixth year (thus, already with clinical experience), 32% and 28%, respectively, showed symptoms of anxiety (Gaspersz, Frings-Dresen, & Sluiter, 2012).

Specifically, with Portuguese students, 52.3% of a sample of fourth year nurse students ($n = 107$) presented moderate anxiety (Cruz et al., 2010). Also, in a sample of 750 higher education students from different subjects 21.50% scored higher than 10 in the anxiety component of Hospital Anxiety and Depression Scale (HADS), which corresponds to moderate or severe symptoms (Sousa et al., 2018).

Considering the high incidence and prevalence of anxiety symptoms in the university students, the corresponded risk of development of psychopathologic disorders, the consequent impairments of the individual' functionality and the social-economic costs, it's critical to develop measures of prevention and intervention in this area.

Two of the goals of the Direção Geral de Saúde for 2020, are to raise the records of mental disorders in the Primary Health Cares and to promote the number of actions in scope to programs of mental health promotion and prevention of mental diseases (DGS, 2017). So, in order to accomplish these goals, it is very important to develop reliable measures of anxiety that support the professionals (e.g., doctors, psychologists, psychiatrists) everyday practice, to prevent and detect the anxiety disorders.

Spielberger Model and STAI-Y

In the 60's, two dimensions of anxiety were proposed by Raymond Cattell, and developed later by Spielberger: the State-Anxiety (SA) and the Trait-Anxiety (TA) (Grös, Antony, Simms, & McCabe, 2007; Spielberger, 1972). The SA is the anxiety experienced in the moment, that is, a transient response to a situation that is considered by the individual as threatening. For example, a high state-anxiety present before a test, decreases after the task be completed. State anxiety involves subjective feelings of tension, apprehension, worry and an autonomic nervous system activation.

On the other hand, the TA is the daily and regular anxiety experienced by the individual. It is the equivalent to the susceptibility that each person has to perceive certain stimuli as threatening and, consequently, experience anxious states in the future. Furthermore, individuals with high trait anxiety perceive more stimulus or situations as threatening and have more intense state anxiety responses compared with individuals with low trait anxiety (Roberts, Hart, & Eastwood, 2016; Santos & Silva, 1997; Spielberger, 1972; Spielberger & Sydeman, 1994, as cited in Ree, French, MacLeod and Locke, 2008). While trait anxiety is relatively stable over time, that is, is not easily affected by a situation or environment, state anxiety varies in intensity across time and contexts (Santos & Silva, 1997; Spielberger, 1972).

According to the state-trait anxiety model developed by Spielberger, state anxiety involves a process of temporal events initiated by internal stimuli (e.g., a student who suddenly remembers that he/she did not study for a test scheduled for the next day) or by external stimuli (e.g., when a student is called by the teacher to solve an exercise on the board) that are assessed as dangerous or threatening by the individual (Elwood, Wolitzky-Taylor, & Olatunji, 2012; Spielberger, 1966, as cited in Grös et. al, 2007; Spielberger, 1972).

Individual differences in trait-anxiety, on the other hand, are prompted by past experiences, which determine the particular stimuli that are assessed as threatening by each individual (Spielberger, 1972).

The Spielberger State-Trait Anxiety Inventory (STAI) (Spielberger, 1983, as cited in Ree et al., 2008) assesses the level of anxiety state and trait anxiety considering two different scales.

The STAI was improved in 1983 to allow a better discrimination of anxiety and depression symptoms, i.e., to be able to differentiate better individuals with anxiety and depression disorders. In this improved form (named form Y for both state and trait scales), some items were rewritten or replaced due to their ambiguous meaning (i.e., some items appeared to evaluate symptoms of depression instead of anxiety) and weak psychometric properties. Also, the factorial structure was improved, with each item belonging to a unique factor (Santos & Silva, 1997; Spielberger, 1983, as cited in Elwood, Wolitzky-Taylor, & Olatunji, 2012).

According to the authors, the STAI-Y includes, besides the distinction between state and trait anxiety components, anxiety-present (e.g., “I am tense”) and anxiety-absent (e.g., “I feel calm”) components, resulting in a four-factor solution: presence of state-anxiety (Factor 1), absence of state-anxiety (Factor 2), absence of trait-anxiety (Factor 3), and presence of trait-anxiety (Factor 4) (Elwood et al., 2012; Spielberger, 1983 as cited in Santos & Silva, 1997). However, further studies failed to support this model (Bieling, Antony, & Swinson, 1998; Caci, Bayle, Dossios, Robert, & Boyer, 2003).

In order to further improve the instrument, Bieling, Antony, and Swinson (1998) conducted an exploratory analysis, using a Principal Components Analysis (PCA), to extract the number of factors from STAI-trait.

The results showed a two-factor solution, with 13 items loading on the first factor and 7 items on the second factor. The authors indicated that “These items roughly corresponded to “anxiety present” and “anxiety absent” items identified in previous research” (Bieling et al., 1998, pp.782).

After the extraction of the factors, a confirmatory factor analysis was used to test three factor models in the trait scale of STAI: a one-factor model (i.e., trait anxiety), a two-factor uncorrelated model (i.e., the factors identified in the exploratory analysis), and a tripartite hierarchical model (i.e., the two previous factors loading on a general or higher order factor). The results indicated that the hierarchical solution showed a better fit to the data than the two other factor models (Bieling et al., 1998). Bieling et al. (1998) labeled the higher order factor “negative affect” and the two order factors “depression” and “anxiety”, based on their content.

Caci, Bayle, Dossios, Robert, and Boyer (2003), with a higher education French students sample ($n = 193$), proposed a five-factor structure (i.e. “worrying”, “restlessness”,

“self-confidence”, “happiness” and “unsuccessfulness”) for the trait scale of STAI, since the CFA failed to support the two-factor model (i.e., anxiety present and anxiety absent).

Andrade, Gorenstein, Vieira, Tung, and Artes (2001), on the other hand, with a sample of Brazilian university students ($n = 1080$), found a two-factor solution for each scale of STAI: the first represented a “mood dimension” and the second was related to “worrying or cognitive aspects of anxiety”.

Using PCA, Kaupuzs, Vazne, and Usca (2015) found a four-factor solution for state (i.e., inner comfort, cognitive interpretation, internal discomfort and subjective perception of easiness) and trait (i.e., inner harmony, cognitive self-concept, feelings of happiness and rest) scales, with a sample of Latvian students ($n = 318$).

The STAI-Y (form Y) is a very popular instrument in the field of psychological research, evidencing sensibility to anxiety variations (Silva & Campos, 1998) and a good internal consistency, either with samples from populations of other countries ($\alpha_s = .78 - .93$, for trait-anxiety and $\alpha_s = .80 - .95$ for state-anxiety; Barnes, Harp & Jung, 2002; Grös et al., 2007; Spielberger, 1983 as cited in Barnes, Harp & Jung, 2002) or with samples from the Portuguese population ($\alpha_s = .85 - .91$ for trait-anxiety and $\alpha_s = .79 - .93$ for state-anxiety; Santos & Silva, 1997; Silva & Campos, 1998).

Barnes, Harp and Jung (2002), reported excellent test-retest reliability for the STAI-trait (on average, $r = .88$), being lower for the STAI-state (on average, $r = .70$). In a sample of university students, Silva and Campos (1998), reported alpha coefficients of $.89 - .91$ for state anxiety and $.90$ for trait anxiety. The corrected item-total correlations in the state-scale are $.25 - .67$ (masculine group) and $.41 - .93$ (feminine group), and in the trait-scale are $.37 - .72$ (masculine group) and $.44 - .73$ (feminine group). They also reported a good temporal stability (through test-retest) for STAI-trait ($r = .80$) and a lower coefficient for STAI-state (on average, $r = .59$).

STICSA: A promising measure of anxiety

Besides state and trait anxiety, authors have suggested that anxiety is composed by other distinct dimensions of symptoms. The two of them that have received more attention are the cognitive and somatic dimensions (Ree et al., 2008).

Somatic anxiety refers to psychophysiological manifestations of anxiety, such as hyperventilation, sweating, trembling, palpitations, muscle tension, stiffness, and increased

heart rate. Cognitive anxiety includes manifestations that are associated with cognitive processes such as worry, intrusive thoughts, such as catastrophizing about different issues in life (e.g., personal, finances, socio-occupational), indecision and lack of concentration (Ree et al., 2008; Spielberger, 1983, as cited in Roberts et al., 2016).

According to Ree and colleagues (2008) there are several instruments to measure the somatic and cognitive dimensions of anxiety, but none seem to distinguish these dimensions within state and trait anxiety. The presence of these four dimensions (state, trait, somatic and cognitive) in a single instrument, as well as the distinction of the cognitive and somatic dimensions of trait and state anxiety is of great importance, allowing, for example, the possibility to define individual profiles of anxiety responses to stress. Also, in anxiety scales that do not distinctively measure cognitive and somatic symptoms, the definition of such individual profiles regarding each of these types of symptoms is hindered. For example, two individuals can have the same score on an assessment of anxiety but can express different types of anxiety manifestations (cognitive and somatic) and, consequently, experience anxiety in very different ways. This may imply differentiated responses of the individuals to therapeutic intervention and, consequently, the need to adopt specific therapeutic strategies, as a function of each profile (Ree et al., 2008; Roberts et al., 2016).

Accordingly, Ree et al. (2008) decided to develop a questionnaire that integrated these four dimensions into a single instrument - The State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA). Although the STICSA was developed by Ree, MacLeod, French, and Locke in 2000 and presented at the annual meeting of the Association for the Advancement of Behavior Therapy through a poster session, the publication was only made available in 2008 (Grös et al., 2007).

STICSA encompasses the STAI format, while assessing state and trait anxiety independently but, additionally, also considers cognitive and somatic anxiety, as previously alluded (Grös et al., 2007; Roberts et al., 2016).

So far, STICSA is the only measure of self-response anxiety that measures these four dimensions in a reliable form (Grös et al., 2007; Roberts et al., 2016).

Ree et al. (2008) found a two-factor (i.e., cognitive and somatic) correlated model for each scale (i.e., state and trait) in a community and students' sample. A confirmatory factorial analysis was used in the state and trait scales, separately. With the first sample (n

= 576), the items loadings ranged from .89 to .63 (trait scale) and from .95 to .63 (state scale). The correlation between somatic and cognitive dimensions was .66 for the trait scale, and .73 for the state scale. With the student's sample ($n = 941$), the items loadings ranged from .94 to .66 (trait scale) and from .83 to .52 (state scale). Moreover, the correlation between cognitive and the somatic dimensions was .59 for both scales.

Since the first original validation study of STICSA, several studies have been conducted, supporting the good psychometric properties of the instrument. The two-factor (i.e., cognitive and somatic) correlated model for trait scale of STICSA was also found in other studies, with samples of Malaysian undergraduates ($n = 220$), and friendship dyads ($n = 311$) (Grös, Simms, & Antony, 2010; Seng, Wei, Yan, Yee, & Ying, 2015).

Despite the good results reported, Grös and colleagues (2007) highlighted the restricted type of samples (students and community samples) used in the original study, recommending the use of psychiatry patients to determine if the factor structure of the STICSA replicates in a sample with heightened chronic anxiety. Also, the same authors recommended the use of alternatives measures of anxiety and depression to assess the convergent and discriminant validity, respectively, of STICSA.

Accordingly, Grös and colleagues (2007) administrated the STICSA, STAI, Depression Anxiety Stress Scales 21-item (DASS-21) and Structured Clinical Interview for DMS-IV (SCID-IV) to 567 psychiatric patients and 311 undergraduates. They tested four models for STICSA in both samples. The results of the Confirmatory Factorial Analysis (CFA) showed that the four-factor model (i.e., state-cognitive, state-somatic, trait-cognitive and trait-somatic) yielded adequate to excellent fit in the patient's sample and adequate fit in the students' sample. The results of CFA also showed that all factor loadings for the patient sample ranged from .78 to .46. The mismatching factors (state-cognitive and trait-somatic $r = .50$; and trait-cognitive and state-somatic, $r = .45$) showed slightly lower correlations, compared to the two state factors (state-cognitive and state-somatic, $r = .64$) and the two trait factors (trait-cognitive and trait-somatic, $r = .57$).

Balsamo, Innamorati, Van Dam, Carlucci, and Saggino (2015), through CFA, also found that the four-factor model yielded a better fit to the data, with a sample of middle-aged and elderly Italian adults ($n = 396$).

Grös, Antony, Simms, & McCabe (2010) used friendship dyads ($n = 146$) to analyze the psychometric features of STICSA-Trait and to represent other method of

assessment (i.e., other-report assessment) besides the one using until the date with the STICSA (i.e., self-report assessment), since it is important to use multiple evaluation methods when assessing an individual.

The dyads filled a battery of questionnaires, including the STICSA-trait. The versions of the battery of questionnaires differed (i.e., different set of instructions): the person that signed up for the study (i.e., target) had the standard instructions to answer to the questionnaire's battery (i.e., complete the questionnaires based on their own characteristics) and the friend they brought (i.e., the informant) had to answer based on their view of the target participants. The results of the Confirmatory Factorial Analysis supported the two-factor model of the STICSA-trait (cognitive and somatic dimensions). The factor loadings ranged from .91 to .59.

It is important to assess different samples of population around the world to test if the instrument maintains its' good psychometric qualities through different cultures.

Seng, Wei, Yan, Yee, and Ying (2015) used STICSA to the Asia context by using Malaysian undergraduate students ($n = 220$) to analyze the psychometric properties of STICSA-trait, with the results of the CFA supporting the two-factor model (cognitive and somatic). A one-factor model was also examined but the results showed a poor fit model (Seng et al., 2015).

Roberts, Hart, and Eastwood (2016) tested six different models, including the two-factor model of STICSA-trait and the two-factor model of STICSA-state, with a sample of Canadian higher education students ($n = 560$). Through CFA, these models showed a marginal fit. The four-factor model and the hierarchical model (i.e., includes a global anxiety factor) for the 42 STICSA items had the best fit for the data. The factor loadings for the four-factor model were all significant ($p < .001$) and $\geq .73$. In the hierarchical model, the factor loadings for the global anxiety factor ranged from .82 to .40 and were all significant ($p < .001$).

According to some studies with different types of samples, STICSA has at least a very adequate internal consistency, with Cronbach's alphas ranging from .84 to .88 (state-cognitive), between .75 and .90 (state-somatic), .75 and .94 (trait-cognitive) and between .80 and .94 (trait-somatic) (Balsamo, Innamorati, Van Dam, Carlucci, and Saggino, 2015; Grös et al., 2007; Grös et al., 2010; Ree et. al, 2008; Roberts et al., 2016).

In the trait-somatic and trait-cognitive subscales, adequate test-retest correlations of two months ($r = .60$ and $r = .66$ respectively) were found (Ree et al., 2008).

In the study conducted by Ree and colleagues (2008), the results suggest that the dimensions of cognitive and somatic anxiety are highly correlated and influenced by each other. For example, an individual with high trait-somatic anxiety responds to physical exercise with an increase in heart rate which, in turn, increases state-cognitive anxiety by the perception of threat elicited by the increased heart rate.

Anxiety versus depression

Symptoms of anxiety should be distinguished from symptoms of depression given that individuals with anxiety symptoms often report symptoms of depression (Clark & Watson, 1991; Roberts et al., 2016; WHO, 2017).

Clark and Watson (1991) developed a tripartite anxiety and depression model that suggests that anxiety and depression have distinct but also have shared characteristics. The physiological hyperarousal (e.g., sweating, increased heart rate, dizziness) is a specific component of anxiety, while low positive affect (e.g., boredom, drowsiness, loss of interest) and anhedonia are characteristic of depression. A negative affect, however, (generalized willingness to experience negative emotional states, such as tension or irritation) is a component shared by both anxiety and depression (Clark & Watson, 1991; Watson & Clark, 1984, as cited in Elwood et al., 2012).

Based on this model, an anxiety measure, like STICSA, should contain items that reflect a high negative affect and hyperarousal physiological, but should not contain items that reflect low levels of positive affect, as this is a characteristic of depression (Bieling et al., 1998).

STAI has been criticized for not providing a measure of “pure” anxiety, i.e., for not adequately discriminating between anxiety and depression symptoms (Bieling et al., 1998; Caci et al., 2003; Grös et al., 2007; Grös et al., 2010; Spielberger, 1972).

Grös and colleagues (2007) argued that STICSA measures symptoms that are more specific to anxiety (i.e., elevated negative affect and physiological hyperarousal): items from the cognitive anxiety dimension (e.g., “I think that others won’t approve of me”) seem to reflect negative affective symptoms, while items of somatic anxiety dimension (e.g., “My heart beats fast”) appear to reflect symptoms of physiologic hyperarousal. Also, these authors, as well as Bieling and colleagues (1998), argued that STAI-trait appears to

measure symptoms that are more specific to depression: some items seem to measure negative affect (e.g., “I feel like a failure”) or positive (e.g., “I am happy”) and no item covers the physiological hyperarousal (although there are some arousal items in the state version of STAI).

Studies that compared STICSA and STAI (Grös et al., 2007; Grös et al., 2010; Roberts et al., 2016) found that STICSA correlated more strongly with alternative measures of anxiety and less strongly with depression measures, compared to STAI. Thus, STICSA appears to better discriminate symptoms of anxiety and depression compared to STAI, hence providing a measure closer to “pure” anxiety.

Indeed, STICSA was partly developed to address the limitations of STAI. The inclusion of the cognitive and somatic dimensions in an anxiety instrument is important because, when an individual presents anxiety, usually the set of symptoms presented includes somatic (e.g., sweating) and cognitive symptoms (e.g., worry) with a predominance of one of the types of symptoms (Grös et al., 2007; Ree et al., 2008; Roberts et al., 2016).

STAI, which only reveals the level of anxiety-state and trait, does not highlight this division of symptoms so it lacks the ability to indicate what types of symptoms are predominantly experienced by the individual. Therefore, STICSA, in comparison to STAI, has some advantages, and can be used to help healthcare professionals to choose the best therapeutic approach for his\her patient\client (e.g., a more behavioral or cognitive approach) or to help determine the effectiveness of certain treatments to reduce certain types of specific symptoms (Grös et al., 2007; Ree et al., 2008; Roberts et al., 2016).

Anxiety across cultures

When using an evaluation measure from one country to another, a simple translation may not suffice. Instead, an adaptation and revision of the content of the measure is required since items from the same instrument or a concept like anxiety, can be valued and conceptualized differentially in different countries and cultures. Also, within the same culture, there are variations between groups based on factors such as education (e.g., different levels of literacy) (Barlow, 2004; Lancaster, Melka, Klein, & Benjamin, 2015; Ribeiro, 1999; Ritsher, Struening, Hellman, & Guardino, 2002).

For example, the Khmer, an ethnic group from Kingdom of Cambodia that conceptualize their bodies as having vessels that carry blood and wind, describe somatic symptoms of anxiety, such as trembling, weakness or fatigue, as *jok*, that means “to plug up, as with cork”. Stress and diseases blocks these vessels and result in increased wind in the bodies which, in turn, elicits this type of symptoms. Symptoms of dizziness and difficulties of circulation around neck area seem to be the focus of this people (Barlow, 2004).

On the other hand, in Japan, it seems that they present anxiety disorders as *Shinkeishitsu*, a term to what in the West might refer to “neurotic people”: perfectionistic, extremely self-conscious individuals that focus their attention on particular problems like blushing, headaches or constipation and become concerned and increasingly conscious of its effects on their life (Barlow, 2004).

Another example refers to a study conducted by Lancaster, Melka, Klein and Rodriguez (2015), in which the authors conducted a psychometric evaluation of the STICSA in a sample of African Americans ($n = 165$) and European Americans ($n = 165$). They found significant differences between cognitive and somatic anxiety reported by the different racial groups: cognitive symptoms were significantly higher than somatic symptoms in the African American sample. This study highlights the importance of examining psychometric qualities of the STICSA within different cultures since there is evidence of structural invariance of other measures of anxiety across cultures, as well as a lack of research analyzing STICSA factorial structure in different cultures (Kingery, Ginsburg, & Burstein, 2009 as cited in Lancaster et al., 2015).

Since STICSA is not yet available, to our knowledge, to the Portuguese population, the purpose of the present study was to conduct a psychometric analysis (dimensionality analysis, reliability and validity (convergent and discriminant) analysis) in a sample of Portuguese higher education students, in order to contribute to the set of validation studies of STICSA. Previously, it was carried out a translation and retroversion of the instrument to the Portuguese language in order to apply the instrument to the Portuguese higher education students (available in the attachment C and D).

Method

Participants

The present research was carried out with a convenience sample, consisting of 487 higher education students (under graduated and masters students). For inclusion criteria in the sample, were considered higher education students aged 18 years or over, with Portuguese nationality, and living in Portugal.

Participants were aged between 18 and 50 years old ($M = 20.51$; $SD = 3.26$), with 278 females (57.1%) and 209 males (42.9%). They were mainly undergraduate degree students (78.2%) and attended the University of Aveiro (88.9%). Also, the sample included the polytechnic of Coimbra (3.5%) and University of Coimbra (7.6%).

Most of the participants classified their profession as students (93.0%) followed by worker-students (6.4%).

The majority of the participants were single (97.5%) and did not have children (98.4%). Those who had children ($n=8$; 1.6%), had only one (100%). Also, when asked if they have any psychological or psychiatry problem, 11.3% of the participants responded “yes”. Asthma, allergies and rhinitis were some of the health problems reported by 19.5% of the participants.

When asked to participants if they had some traumatic event during the last year 11.7% answered “yes”, being the events mostly related to the death of close relatives, end of love relationships, or diseases of their own or in close relatives.

In Table 1, a more detailed description of the sample is presented.

Instruments

In this study, the *State-Trait Inventory for Cognitive and Somatic Anxiety* was used as a measure of anxiety. The State-Trait Anxiety Inventory (STAI, form Y) and the depression scale of the Depression, Anxiety and Stress Scales-21 items (DASS-D-21) were used for analyzing, respectively, the convergent and discriminant validity of STICSA.

State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA).

The STICSA, developed by Ree, MacLeod, French, and Locke (2008) is an evaluation measure of anxiety consisting of two scales of 21 items each: a state-anxiety scale (designated STICSA-1), which asks for the evaluation of how the individual “feels at this moment, and a trait-anxiety scale (named STICSA-2), referring to “how often, in general, the sentence is true for you”.

Each scale contains two subscales that independently assess symptoms of cognitive anxiety (10 items) and somatic anxiety (11 items). Also, the items from the state-scale are exactly the same as in the trait-scale. All STICSA items (42) are measured in a four-point frequency response scale, ranging from “nothing” (1) a “very” (4) (Grös et al., 2007; Roberts et al., 2016).

State-Trait Anxiety Inventory (STAI-Y).

The STAI (Form Y), developed by Spielberger in 1983 and adapted for the Portuguese population by Santos and Silva, in 1997, is an anxiety measurement instrument, consisting of two self-response scales of 20 items each: the state anxiety scale (STAI-Y-1), which assesses how the individual feels at the moment, and the trait anxiety scale (STAI-Y-2), which assesses how the individual usually feels.

Participants respond to each item from a four-point frequency scale that ranges, in the state scale, from “*nothing at all*” (1) to “*very much so*” (4) and, in trait-anxiety scale, from “*almost never*” (1) to “*almost always*” (4). The higher the score, the greater anxiety (Grös et al., 2007; Roberts et al., 2016; Santos & Silva, 1997).

Depression, Anxiety and Stress Scales-21 (DASS-21).

This self-report instrument, developed by Lovibond and Lovibond, in 1993, is constituted by three scales of evaluation (anxiety, depression and stress) with 21 items distributed equally in the three dimensions mentioned above (Lovibond & Lovibond, 1995; Pais-Ribeiro, Honrado, & Leal, 2005).

It has a three-point frequency scale that ranges from zero (“did not apply to me at all”) to three (“applied to me very much or most of the time”), considering the frequency or severity of negative emotional symptoms experienced in the last week (Lovibond & Lovibond, 1995; Pais-Ribeiro et al., 2005). The quotation for each scale can range from zero to 21, being determined by the sum of the results of the items. Higher scores indicate more negative affective states (Pais-Ribeiro et al., 2005).

In the study conducted by Pais-Ribeiro, Honrado, & Leal (2005), to contribute to the Portuguese adaptation of the scale, the DASS-21 showed good psychometric properties with good internal consistency ($\alpha = .85$ for the depression scale; $\alpha = .74$ for the anxiety scale; $\alpha = .81$ for the stress scale) and with the solution extracted explaining 50.35% of variance.

In the present study, only the Depression dimension of the instrument was used.

Table 1*Description of the participants' characteristics*

| | | <i>N</i> | <i>%</i> |
|-----------------------------------|---|----------|----------|
| Institution | University of Aveiro | 433 | 88.9 |
| | University of Coimbra | 37 | 7.6 |
| | Superior Institute of Engineer of Coimbra | 17 | 3.5 |
| | Total | 487 | 100.0 |
| Professional situation | Student | 453 | 93.2 |
| | Worker-student | 31 | 6.4 |
| | Other | 2 | 0.4 |
| | Total | 486 | 100.0 |
| Degree of learning | Undergraduate | 381 | 78.2 |
| | Masters | 97 | 19.9 |
| | Other | 9 | 1.8 |
| | Total | 487 | 100.0 |
| Marital Status | Single | 475 | 97.5 |
| | Union of fact | 5 | 1.0 |
| | Married | 6 | 1.2 |
| | Widow | 1 | 0.2 |
| | Total | 487 | 100.0 |
| Children | Yes | 8 | 1.6 |
| | No | 479 | 98.4 |
| | Total | 487 | 100.0 |
| Psychological\psychiatry problems | Yes | 55 | 11.3 |
| | No | 431 | 88.5 |
| | Total | 487 | 100.0 |
| Psychological counselling | Yes | 21 | 4.4 |
| | No | 462 | 95.6 |
| | Total | 483 | 100.0 |
| Health problems | Yes | 95 | 19.5 |
| | No | 392 | 80.5 |
| | Total | 487 | 100.0 |
| Traumatic event | Yes | 57 | 11.7 |
| | No | 430 | 88.3 |
| | Total | 487 | 100.0 |

Procedure

The procedure and instruments used in this study were approved by the institutional review boards of the University of Aveiro.

The research protocol composed by the instruments referred in the previous section, was applied through paper support. It was administrated to the students of the University of Aveiro, ISEC and University of Coimbra, in the classroom, between February and June 2018.

Informed consent was provided to the participants, which included information about the study (aims, instructions, duration, anonymity, confidentiality, and the possibility of withdrawing at any time). Also, a sociodemographic questionnaire was included to obtain data for the participant's characterization.

Before the data collection, different professors, from the institutions where the data were collected, were contacted to allow the contact with their students during lecture time.

In the context of the classroom, participants were explained the main objectives of the study, its importance and voluntary nature of participation and asked to complete the questionnaires. After a moment to clarify possible doubts, the questionnaires were distributed and filled by the students.

The questionnaires were all distributed in the same order: first, the informed consent, followed by the sociodemographic questionnaire, STICSA-1, STICSA-2, STAI-Y-1, STAI-Y-2 and DASS-21.

Statistical procedures.

Statistical analysis of the data was performed using IBM SPSS software (version 25 for Windows).

A Principal Component Analysis (PCA) was used to test the dimensionality of the instrument. For reliability analysis, Cronbach alpha was computed for each scale. In order to assess the convergent and discriminant validity of STICSA, Pearson-product correlation was conducted (DeVellis, 2003; Kline, 2000).

Results

Missing data Imputation

Before carrying out the psychometric analysis, a missing value analysis was computed. Considering the 42 items of STICSA, two participants were excluded due to presenting more than 10% of missing values (Hair, Black, Babin, Anderson, & Tatham,

2006). The remaining missing data were replaced with Expected Maximization (EM) imputation procedure upon attending to a significant Little's MCAR Test ($\chi^2(1058)=1299.609, p<.001$). The significant result of the test indicates that a complete at random pattern (MCAR) of missing values cannot be assured and EM is the recommended option in these cases (Hair et al., 2006; Tabachnick & Fidell, 2007).

Psychometric Analysis of STICSA

Considering that until the current moment there are not, to our knowledge, validation studies of STICSA for the Portuguese population, an exploratory procedure was used to explore the dimensionality of the data collected. According to Tay and Jebb (2016), the number of dimensions from the scale should be specified by the theory and confirmed by the factorial analysis.

We then started by exploring the initial solution and the number of factors to be retained from STICSA by analyzing the complete STICSA, with both subscales, STICSA-State and STICSA-Trait. An initial analysis was carried out, through PCA, to proceed with the extraction of factors.

The solution showed the presence of 2 dimensions, which is not consistent with the theoretical indication of the model pointing to two factors (cognitive and somatic) in each scale (trait and state), in the studies of Ree et al. (2008) of the original STICSA validation. Therefore, we decided to analyze the STICSA scales separately, to explore if the separation between cognitive and somatic would be shown, and carried out with the extraction of dimensions through PCA again.

In the analysis of the state-scale (STICSA-1), we verified the presence of two dimensions: Component-1, which corresponded to items 10, 19, 13, 17, 3, 4, 9, 5 and 16 of the state scale of STICSA; the Component-2, which corresponded to items 14, 2, 6, 8, 7, 18, 1, 15 and 12 from the same scale. Some items of the adapted scale presented factorial loadings lower than 0.45, the cutoff recommended by Tabachnick and Fidell (2007). Those items were excluded in sequential steps: namely item 20 (“Eu tenho borboletas no estômago”), item 11 (“Tenho dificuldade em lembrar coisas” and item 21 (“Sinto as palmas das mãos húmidas”).

In the analysis of the trait-scale (STICSA-2), we also verified the presence of two dimensions: Component-1, which corresponded to items 10, 17, 13, 19, 3, 9, 4, 16 and 5 of

the trait scale of STICSA; the Component-2, which corresponded to items 2, 14, 7, 1, 8, 18, 6, 15, 12, 20 and 21 from the same scale. Also, in this scale, there was an item that had to be excluded: item 11 (“Tenho dificuldade em lembrar coisas”). The Kaiser-Meyer-Olkin measure of sample adequacy, $KMO = .925$, and the Bartlett sphericity test ($\chi^2 (190) = 3841,829, p < .001$) showed the adequacy of the analysis.

The remaining items were compared to the items from the original validation study of STICSA to verify if the items of the components found in this study matched with the cognitive and somatic dimensions of STICSA, both in the state and trait scales. The results also showed that items from Component-1 represent the cognitive dimension and items from Component-2 represent the somatic dimension (Ree et al., 2008).

Table 2 shows the results from the analyzes carried out at the state scale of STICSA.

The solution extracted for STICSA-state scale explains 42.483% of variance, with the cognitive component explaining 31.772%. The 9 items that compose the Cognitive component had factor loadings ranging from .784 (item 10) to .475 (item 16), with commonalities from .622 to .274. The 9 items from the somatic component had factor loadings ranging from .644 (item 14) to .467 (item 12), with commonalities from .436 to .231.

Table 2

Item loadings, commonalities and corrected item-total correlation values of STICSA-state scale

| | Cognitive | Somatic | h^2 | r |
|------------|-----------|---------|-------|------|
| STICSA1_10 | .784 | .084 | .622 | .687 |
| STICSA1_19 | .734 | .220 | .587 | .680 |
| STICSA1_13 | .705 | .086 | .505 | .612 |
| STICSA1_17 | .689 | .251 | .538 | .621 |
| STICSA1_3 | .680 | .182 | .495 | .602 |
| STICSA1_4 | .667 | .115 | .458 | .551 |
| STICSA1_9 | .663 | .142 | .459 | .578 |
| STICSA1_5 | .630 | .154 | .420 | .543 |
| STICSA1_16 | .475 | .219 | .274 | .435 |
| STICSA2_14 | .142 | .644 | .436 | .482 |
| STICSA2_2 | .206 | .613 | .419 | .507 |
| STICSA2_6 | .138 | .610 | .391 | .439 |
| STICSA2_8 | .306 | .603 | .478 | .519 |
| STICSA2_7 | .137 | .598 | .376 | .449 |
| STICSA2_18 | .282 | .545 | .377 | .477 |
| STICSA2_1 | .203 | .544 | .337 | .470 |
| STICSA2_15 | -.093 | .505 | .263 | .320 |

| | | | | |
|----------------|--------|--------|------|------|
| STICSA2_12 | .113 | .467 | .231 | .342 |
| Eigenvalue | 5.719 | 1.928 | | |
| Variance | 31.772 | 10.711 | | |
| Cronbach Alpha | .862 | .769 | | |

Note. h^2 = commonalities; r = corrected item-total correlation values.

Table 3 shows the results from the analyzes carried out at the trait scale of STICSA.

The PCA solution for STICSA-trait explains a total of variance of 47.192%. The cognitive dimension accounts for 36.978% of that variance. The cognitive component retained 9 items, with factor loadings ranging from .803 (item 10) to .625 (item 5) and commonalities ranging from .664 to .469. The somatic component included 11 items, with factor loadings from .636 (item 2) till .502 (item 21) and commonalities ranging from .431 to .275.

Table 3

Item loadings, commonalities and corrected item-total correlation values of STICSA-trait scale

| | Cognitive | Somatic | h^2 | r |
|----------------|-----------|---------|-------|------|
| STICSA1_10 | .803 | .139 | .664 | .735 |
| STICSA1_17 | .768 | .140 | .610 | .700 |
| STICSA1_13 | .764 | .167 | .612 | .708 |
| STICSA1_19 | .759 | .272 | .650 | .745 |
| STICSA1_3 | .728 | .299 | .619 | .706 |
| STICSA1_9 | .695 | .230 | .536 | .646 |
| STICSA1_4 | .655 | .221 | .491 | .622 |
| STICSA1_16 | .653 | .231 | .480 | .605 |
| STICSA1_5 | .625 | .252 | .469 | .608 |
| STICSA2_2 | .122 | .636 | .431 | .526 |
| STICSA2_14 | .132 | .631 | .416 | .535 |
| STICSA2_7 | .185 | .631 | .439 | .542 |
| STICSA2_1 | .227 | .629 | .442 | .569 |
| STICSA2_8 | .305 | .629 | .486 | .590 |
| STICSA2_18 | .326 | .601 | .467 | .587 |
| STICSA2_6 | .177 | .596 | .392 | .514 |
| STICSA2_15 | .068 | .580 | .341 | .454 |
| STICSA2_12 | .174 | .535 | .317 | .480 |
| STICSA2_20 | .265 | .527 | .347 | .510 |
| STICSA2_21 | .151 | .502 | .275 | .433 |
| Eigenvalue | 7.296 | 2.043 | | |
| Variance | 36.978 | 10.214 | | |
| Cronbach Alpha | .903 | .844 | | |

Note. h^2 = commonalities; r = corrected item-total correlation values.

Reliability analysis.

Internal consistency analysis was performed by calculating Cronbach's alpha coefficients and corrected item-total correlations. Cronbach's alphas of .65 were considered as minimal acceptable (DeVellis, 2003). Of the dimension extracted, it was verified Cronbach's alphas of .862 (state-cognitive), .769 (state-somatic), .903 (trait-cognitive) and .844 (trait-somatic), which indicates a good internal consistency of the STICSA dimensions.

Considering the quality of the individual items, according to Field (2009), the values of corrected item-total correlations should be greater than .30. The item corrected correlations of STICSA-state ($.320 < r < .687$) and STICSA-trait ($.514 < r < .745$) met this criterion, which means that all items contributed positively to the total score of the extracted dimension.

To understand the relationship between STICSA dimensions, the correlations of the STICSA factors were analyzed and are presented in Table 4.

Table 4

Correlation matrix between STICSA dimensions (n = 487)

| | STICSA1_C | STICSA1_S | STICSA2_C | STICSA2_S |
|-----------|-----------|-----------|-----------|-----------|
| STICSA1_C | 1 | .483** | .872** | .479** |
| STICSA1_S | | 1 | .407** | .706** |
| STICSA2_C | | | 1 | .567** |
| STICSA2_S | | | | 1 |

Note. STICSA1_C = STICSA-state-cognitive; STICSA1_S = STICSA-state-somatic; STICSA2_C = STICSA-trait-cognitive; STICSA2_S = STICSA-trait-somatic.

** $p < .01$

The correlations were all positive and statistically significant, ranging from $r = .407$ to $r = .872$, $p < .01$.

There was a higher correlation between the state-trait somatic ($r = .706$, $p < .01$) and the state-trait cognitive ($r = .872$, $p < .01$), compared to the correlation between cognitive and somatic dimensions of STICSA-state ($r = .483$, $p < .01$) and to the

correlation between the cognitive and somatic dimensions of STICSA-trait ($r = .567, p < .01$).

To explore the relationship between STICSA and another measure of anxiety (i.e., STAI-Y) and a measure of depression (i.e., DASS-21-D), correlations of these instruments were analyzed and are present in Table 5.

Table 5

Pearson-product correlation between STICSA dimensions and the measures of anxiety (STAI-Y) and depression (DASS-D)

| | STAIY-1 (n = 465) | STAIY-2 (n = 467) | DASS-21-D (n = 477) |
|-----------|----------------------|----------------------|------------------------|
| STICSA1-C | .652** | .719** | .573** |
| STICSA1-S | .438** | .388** | .304** |
| STICSA2-C | .630** | .756** | .580** |
| STICSA2-S | .445** | .472** | .334** |

Note. STAIY-1 = State and Trait Anxiety Inventory – State scale; STAIY-2 = State and Trait Anxiety Inventory-Trait scale; DASS-D = Depression, Anxiety and Stress Scales- depression scale.

** $p < .01$

The correlations were all positive and statistically significant, ranging from $r = .304$ to $r = .756, p < .01$. The criterion validity of STICSA was analyzed through the correlations between STICSA and a criterion test, the STAI-Y. According to Kline (2000), the correlation between the test (in this case, STICSA) and the criterion test must be high ($.75 < r < .90$).

The cognitive and somatic subscales of STICSA-trait, correlated more with the STAI-trait ($r = .756$ e $r = .472$) than with STAI-state ($r = .630$ e $r = .445$). The cognitive subscale of STICSA-state correlated more with the STAI-trait ($r = .719$) than with STAI state ($r = .652$), but the difference between these correlations was small. The subscales of STICSA state and trait correlated more with the STAI state and trait than with the DASS-D.

The correlations of the cognitive subscale (state and trait) with DASS-21-D were stronger than the correlations of the somatic subscale (state and trait) with the same measure of depression. Also, the cognitive subscale of STICSA state presented a lower

correlation with the somatic subscale ($r = .438$) than with DASS-21-D ($r = .573$). The same pattern was observed in the trait scale of STICSA.

Discussion

STICSA was developed to address the limitations of STAI, integrating beyond the dimensions of state and trait anxiety, also the cognitive and somatic dimensions (Ree et al., 2008; Grös et al., 2007). To date, STICSA has not been translated, adapted or validated for the Portuguese population. In this study, the participants were higher education students aged equal or superior to 18 years old, from several courses and learning institutions, and with Portuguese nationality, residents in Portugal.

Throughout principal components analyses, a two-component solution (i.e., cognitive and somatic) was found in each scale (state and trait) of STICSA. The results showed that the items belonging to each one of the components extracted, in each scale (state and trait) of STICSA, corresponded to the cognitive and somatic dimensions of the original STICSA (Ree et al., 2008).

However, some items of the adapted scale presented lower factorial loadings than .45 (cutoff recommended by Tabachnick & Fidell, 2007). Those items were excluded, namely item 20 (i.e., “Eu tenho borboletas no estômago”) and 21 (i.e., “Sinto as palmas das mãos húmidas”) of the state scale and the item 11 (i.e., “Tenho dificuldade em relembrar coisas”) from both scales.

When analyzing the factorial loading of these items in the validation studies of STICSA conducted so far, it was verified that item 11, the only one excluded from both scales of STICSA in the present study, was a “weak” item. In fact, this item is always among the ones with the lowest factorial loading or even the weakest item of all, so it comes as no surprise that the same item had the worst performance in the current study as well.

As stated before, when an evaluation instrument is used in a different country, we have to take into account the particularities of the culture and the country since items from the same instrument can be value and conceptualized differentially in different countries and cultures (Barlow, 2004; Ribeiro, 1999; Ritsher, Struening, Hellman, & Guardino, 2002). Therefore, in this study, the content of the excluded items may be associated with other conditions than anxiety for higher education students, or anxiety may be experienced

or conceptualized differently by higher education students or Portuguese higher education students, in this case.

Also, the controlled environment of the classroom could not favor the presence of some anxiety-state responses in the context, such as butterflies in the stomach, (i.e., item 20), wet palms (i.e., item 21) or difficulty in remembering things (i.e., item 11), since the students were not in an anxious context (e.g., exams) but rather in the context of a typical class.

Regarding the internal consistency of the scale, STICSA showed a good internal consistency in this study (Cronbach's alphas of .862 (state-cognitive), .769 (state-somatic), .903 (trait-cognitive) e .844 (trait-somatic)), being congruent with results found in other studies: between .84 - .88 (state-cognitive), .75 - .90 (state-somatic), .75 - .94 (trait-cognitive) and .80 - .94 (trait-somatic) (Balsamo, Innamorati, Van Dam, Carlucci, and Saggino, 2015; Grös et al., 2007; Grös et al., 2010; Ree et al., 2008; Roberts et al., 2016).

In the current study, there were significant positive correlations between STICSA dimensions. More specifically, there was a higher correlation between the state-trait somatic factor ($r = .706, p < .01$) and the state-trait cognitive factor ($r = .872, p < .01$) compared to the correlation between the cognitive and somatic factors of STICSA-state ($r = .483, p < .01$) and to the correlation between the cognitive and somatic factors of STICSA-trait ($r = .567, p < .01$). These results indicate the existence of significant relationships between the dimensions, but also a certain independence of the cognitive and somatic subscales.

The same pattern of correlations was also observed in STICSA validation studies by Grös et al. (2007) (state-cognitive and state-somatic, $r = .64$; trait-cognitive and trait somatic, $r = .57$; state-cognitive and trait-cognitive, $r = .84$; state-somatic and trait-somatic, $r = .76$), in the study by Roberts et al. (2016) (state-cognitive and state-somatic, $r = .71$; trait-cognitive and trait somatic, $r = .70$; state-cognitive and trait-cognitive, $r = .86$; state-somatic and trait-somatic, $r = .82$), and in Balsamo et al. (2015) study (state-cognitive and state-somatic, $r = .68$; trait-cognitive and trait somatic, $r = .67$; state-cognitive and trait-cognitive, $r = .91$; state-somatic and trait-somatic, $r = .80$)

Regarding the relationship of STICSA with the mostly used measure of anxiety (STAI-Y), the cognitive and somatic subscales of STICSA-trait, correlated more with the STAI-trait than with STAI-state.

Also, although some correlations of STICSA's dimensions with the DASS-D were moderate, the STICSA state and trait presented a higher correlation with STAI state and trait (a measure of anxiety) than with the DASS-D (a measure of depression). These results were also verified in Grös et al. (2007) studies and in the validation study of Ree et al. (2008), indicating that STICSA converges more with a measure of anxiety than with a measure of depression.

Moreover, the cognitive subscale of STICSA (state and trait) correlated more strongly with STAI (state and trait) than the somatic subscale of STICSA (state and trait) with the STAI (state and trait). Also, the cognitive subscales were more correlated with DASS-21-D than the somatic subscales with the last instrument.

The same pattern of results was observed by Grös et al. (2007) and Roberts et al. (2016). In particular, Roberts and colleagues (2016) also reported that the somatic subscale of STICSA (state and trait) was strongly correlated with somatic subscales of other anxiety scales, such as The Cognitive Somatic Anxiety Questionnaire (CSAQ), the Trimodal Anxiety Questionnaire (TAQ) and the Anxiety Sensitivity Index-3 (ASI-3). Furthermore, the first subscale was strongly correlated with the anxious arousal subscale of the Mood and Anxiety Symptom Questionnaire (MASQ).

The results of the present study, and those of previous ones, support the Clark and Watson's (1991) tripartite model of anxiety and depression, since STICSA correlated weak to moderate with DASS-D, which is in accordance with a common latent factor (i.e., high negative affection) shared by anxiety and depression, that this model defends. Also, the somatic subscale of the both STICSA scales was more correlated with STAI dimensions than with DASS-D, as well as less correlated with the depression measure than was the cognitive subscale of STICSA. This supports the theory that anxiety loads on the physiological hyperarousal component (e.g., somatic symptoms as sweating, increased heart rate, dizziness).

The weaker correlation of the somatic subscale of STICSA with DASS-D compared to the cognitive subscale, may support the theory of somatic symptoms being a unique component of anxiety since, as also Grös and colleagues (2007) and Balsamo et al. (2015) suggested, items from the cognitive subscale (e.g., "Sinto-me agonizado com os meus problemas"; "Eu perspetivo algumas desgraças no futuro") appear to reflect symptoms of negative affect (a common factor of anxiety and depression) and items from

the somatic subscale appear to reflect physiological hyperarousal (a unique component of anxiety). Hence, it was expected that the depression scale correlates less with the somatic subscale of STICSA, compared to the cognitive subscale.

Finally, STAI correlated more with the cognitive subscales of STICSA than with the somatic subscales. These results support the idea of STAI having some limitations in terms of assessing “pure” anxiety, since STAI did not correlate more with what appears to be the “purest” subscale of STICSA (i.e., somatic subscale). Consistently, Grös et al. (2007, pp. 374) also defends that STICSA “*may better discriminate the symptoms of anxiety and depression*”.

The studies carried out to analyze the psychometric analysis of STICSA have shown that this inventory can be an adequate instrument to measure anxiety. Although preliminary analyzes of STICSA showed satisfactory results, future studies will be necessary to adapt it to the Portuguese population.

Importantly, future studies should apply the instrument to several target populations (e.g., elderly, clinical patients) across the country. The use of more robust statistical procedures for the assessment of dimensionality, like confirmatory factorial analysis is also highly encouraged. Also, it is necessary to verify if the items excluded in this study have similar results in more representative samples or if they are characteristic of this sample of higher education students. We also suggest this study to be replicated but inducing additional instruments, such as Positive and Negative Affect Schedule (PANAS; Galinha & Pais-Ribeiro, 2005) to analyze the convergent and divergent validity of STICSA in the Portuguese population.

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Attachments

Attachment A - Informed consent**Consentimento Informado**

O presente questionário insere-se num estudo que tem como objetivo medir perceções individuais relativas ao estado emocional e de bem-estar. Os dados recolhidos destinam-se exclusivamente a fins de investigação, são confidenciais e recolhidos de forma anónima. Em nenhum momento será pedido qualquer elemento que o/a identifique.

A investigação onde se insere o presente estudo está a ser desenvolvida no CINTESIS e no PsyLab da Universidade de Aveiro, sob a supervisão da Doutora Sandra Soares. Nesse sentido, a sua participação implica apenas que responda a um conjunto de questões, sendo que este preenchimento demora entre 15 a 20 minutos.

Com base em estudos anteriores com procedimentos semelhantes, prevemos que a participação neste estudo não acarrete qualquer risco para o seu bem-estar físico e psicológico. Ainda assim, a sua participação é absolutamente voluntária, sendo que poderá desistir a qualquer momento. Ao participar estará a contribuir para o desenvolvimento de conhecimentos e ferramentas práticas importantes para a investigação e prática da Psicologia.

Os dados recolhidos serão exclusivamente usados para fins de investigação, estando salvaguardada a confidencialidade das informações recolhidas.

Eu, _____ autorizo a utilização dos resultados obtidos pela minha participação no estudo. Mais confirmo que a minha participação foi voluntária, tendo sido informado/a do procedimento e do direito a desistir a qualquer momento.

Assinatura do Participante

Data:

_____ / ____ / _____

Assinatura do Investigador

Data:

_____ / ____ / _____

Attachment B - Sociodemographic questionnaire

ID: ____



Questionário emoções e bem-estar

O presente questionário insere-se num estudo que tem como objetivo medir perceções individuais relativas ao **estado emocional e de bem-estar**. Os dados recolhidos destinam-se exclusivamente a fins de investigação, são **confidenciais** e **recolhidos de forma anónima**. Em nenhum momento será pedido qualquer elemento que o/a identifique.

A investigação onde se insere o presente estudo está a ser desenvolvida no CINTESIS e no PsyLab da Universidade de Aveiro, sob a supervisão da Doutora Sandra Soares.

Leia cuidadosamente cada uma das afirmações e assinale, de acordo com a escala de resposta proposta, a opção que melhor reflete o modo como sente ou pensa. Não existem respostas certas ou erradas. **Note que as instruções e as escalas de resposta não são sempre iguais.**

A sua participação implica apenas que responda a um conjunto de questões, sendo que este preenchimento demora entre 15 a 20 minutos.

Desde já agradecemos a sua colaboração e disponibilizamos os nossos contactos para qualquer questão, dúvida ou interesse na temática.

Atenciosamente,

Filipa Barros – CINTESIS UA – fmbarros@ua.pt

Dados pessoais

1. Idade: _____ anos

2. Sexo: Masculino Feminino

3. Nacionalidade: _____

4. Concelho de residência: _____

5. Estado civil: Solteiro/a
 União de facto
 Casado/a
 Divorciado/a
 Viúvo/a

6. Tem filhos? Não
 Sim Quantos? _____ filhos
 Quais são as suas idades? _____

7. Habilitações literárias: Ensino básico/obrigatório
 Ensino Secundário
 Ensino superior
 Outro (Especifique, por favor): _____

ID: _____

universidade de aveiro



theoria poiesis práxis

8. Situação profissional: Estudante Trabalhador-estudante Trabalhador por conta própria/trabalhador independente Trabalhador por conta de outrem Reformado/a Desempregado/a Doméstico/a

Outra (especifique, por favor): _____

8.1. Se escolheu a opção “Estudante” ou “Trabalhador-estudante”, preencha ainda os seguintes campos:**8.1.1. Instituição:** _____**8.1.2. Nível que frequenta:** Licenciatura Mestrado Doutoramento

Outro (especifique, por favor): _____

8.1.3. Curso: _____**8.2. Se escolheu a opção “Trabalhador-estudante”, “Trabalhador por conta própria/trabalhador independente”, “Trabalhador por conta de outrem”, “Reformado/a” ou “Desempregado/a” preencha ainda o seguinte campo:****7.2.1. Profissão:** _____**9. Tem algum problema psicológico ou psiquiátrico (por exemplo: depressão, perturbação de ansiedade, perturbação de sono, etc.)**Não Sim Se respondeu “Sim”, especifique, por favor: _____**9.1. Tem acompanhamento psicológico ou psiquiátrico atualmente?** Não Sim **9.2. Se respondeu “Sim” à questão anterior, qual o motivo do acompanhamento?** _____**10. Tem algum outro problema de saúde (por exemplo: asma, patologia cardíaca, insuficiência renal, diabetes, doença músculo-esquelética, etc.)** Não Sim Se respondeu “Sim”, especifique, por favor: _____**11. Toma alguma medicação?** Não Sim **11.1. Se respondeu “Sim”, especifique qual/quais, por favor:** _____**12. Durante o último ano, passou por algum evento traumático para si?** Não Sim **12.1. Se respondeu “Sim”, por favor descreva sucintamente a que tipo de evento se refere:** _____

Attachment C – State scale of State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA-1)

ID: ____



STICSA-1

(Ree, MacLeod, French, & Locke, 2000)

Abaixo encontra-se uma lista de frases que podem ser usadas para descrever como as pessoas se sentem. Ao lado de cada frase estão quatro números que indicam o grau com que cada frase pode descrever o seu humor ou o modo como se está a sentir neste momento (por exemplo, 1 – Nada, 4 – Muito).

Por favor leia cada frase atentamente e assinale o número que melhor indica **COMO SE SENTE NESTE MOMENTO**, neste preciso momento, mesmo que não seja a forma como se sente habitualmente.

| | Nada | Um pouco | Moderadamente | Muito |
|--|------|----------|---------------|-------|
| 1. O meu coração bate rápido | 1 | 2 | 3 | 4 |
| 2. Os meus músculos estão tensos | 1 | 2 | 3 | 4 |
| 3. Sinto-me agoniado com os meus problemas | 1 | 2 | 3 | 4 |
| 4. Eu penso que os outros não me aprovarão | 1 | 2 | 3 | 4 |
| 5. Eu sinto que me vou perdendo porque não consigo decidir-me atempadamente | 1 | 2 | 3 | 4 |
| 6. Sinto-me tonto | 1 | 2 | 3 | 4 |
| 7. Sinto fraqueza nos meus músculos | 1 | 2 | 3 | 4 |
| 8. Sinto-me trémulo e instável | 1 | 2 | 3 | 4 |
| 9. Eu perspetivo algumas desgraças futuras | 1 | 2 | 3 | 4 |
| 10. Não consigo tirar alguns pensamentos da minha cabeça | 1 | 2 | 3 | 4 |
| 11. Tenho dificuldade em relembrar coisas | 1 | 2 | 3 | 4 |
| 12. Sinto a minha face quente | 1 | 2 | 3 | 4 |
| 13. Eu penso que o pior vai acontecer | 1 | 2 | 3 | 4 |
| 14. Sinto que os meus braços e pernas estão hirtos | 1 | 2 | 3 | 4 |
| 15. Sinto a garganta seca | 1 | 2 | 3 | 4 |
| 16. Eu esforço-me a evitar pensamentos desconfortáveis | 1 | 2 | 3 | 4 |
| 17. Não me consigo concentrar sem a intrusão de pensamentos irrelevantes | 1 | 2 | 3 | 4 |
| 18. A minha respiração é rápida e superficial | 1 | 2 | 3 | 4 |
| 19. Preocupo-me por não conseguir controlar os meus pensamentos tão bem como eu gostaria | 1 | 2 | 3 | 4 |
| 20. Tenho borboletas no estômago | 1 | 2 | 3 | 4 |
| 21. Sinto as palmas das mãos húmidas | 1 | 2 | 3 | 4 |

Attachment D – Trait scale of State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA-2)

ID: ____



STICSA-2

Abaixo encontra-se uma lista de frases que podem ser usadas para descrever como as pessoas se sentem. Ao lado de cada frase estão quatro números que indicam com que frequência cada frase é verdadeira para si (por exemplo, 1 – Nada, 4 – Muito).

Por favor leia cada frase atentamente e assinale o número que melhor indica COM QUE FREQUÊNCIA, EM GERAL, A FRASE É VERDADEIRA PARA SI.

| | Nada | Um pouco | Moderadamente | Muito |
|--|------|----------|---------------|-------|
| 1. O meu coração bate rápido | 1 | 2 | 3 | 4 |
| 2. Os meus músculos estão tensos | 1 | 2 | 3 | 4 |
| 3. Sinto-me agoniado com os meus problemas | 1 | 2 | 3 | 4 |
| 4. Eu penso que os outros não me aprovarão | 1 | 2 | 3 | 4 |
| 5. Eu sinto que me vou perdendo porque não consigo decidir-me atempadamente | 1 | 2 | 3 | 4 |
| 6. Sinto-me tonto | 1 | 2 | 3 | 4 |
| 7. Sinto fraqueza nos meus músculos | 1 | 2 | 3 | 4 |
| 8. Sinto-me trémulo e instável | 1 | 2 | 3 | 4 |
| 9. Eu perspetivo algumas desgraças futuras | 1 | 2 | 3 | 4 |
| 10. Não consigo tirar alguns pensamentos da minha cabeça | 1 | 2 | 3 | 4 |
| 11. Tenho dificuldade em relembrar coisas | 1 | 2 | 3 | 4 |
| 12. Sinto a minha face quente | 1 | 2 | 3 | 4 |
| 13. Eu penso que o pior vai acontecer | 1 | 2 | 3 | 4 |
| 14. Sinto que os meus braços e pernas estão hirtos | 1 | 2 | 3 | 4 |
| 15. Sinto a garganta seca | 1 | 2 | 3 | 4 |
| 16. Eu esforço-me a evitar pensamentos desconfortáveis | 1 | 2 | 3 | 4 |
| 17. Não me consigo concentrar sem a intrusão de pensamentos irrelevantes | 1 | 2 | 3 | 4 |
| 18. A minha respiração é rápida e superficial | 1 | 2 | 3 | 4 |
| 19. Preocupo-me por não conseguir controlar os meus pensamentos tão bem como eu gostaria | 1 | 2 | 3 | 4 |
| 20. Tenho borboletas no estômago | 1 | 2 | 3 | 4 |
| 21. Sinto as palmas das mãos húmidas | 1 | 2 | 3 | 4 |

Attachment E – State scale of the State-Trait Anxiety Inventory (STAI Y-1)

ID: ____



STAI Y-1

(Spielberger, 1983; VP: Santos & Silva, 1997)

Em baixo tem uma série de frases que são habitualmente utilizadas para descrever pessoas. Leia cada uma delas e assinale o número que melhor indica **COMO SE SENTE NESTE MOMENTO**. Não há respostas certas ou erradas. Não demore muito tempo com cada frase; responda de modo a descrever o melhor possível a maneira **COMO SE SENTE AGORA**.

| | Nada | Um pouco | Moderadamente | Muito |
|---|------|----------|---------------|-------|
| 1. Sinto-me calmo | 1 | 2 | 3 | 4 |
| 2. Sinto-me seguro | 1 | 2 | 3 | 4 |
| 3. Estou tenso | 1 | 2 | 3 | 4 |
| 4. Sinto-me cansado | 1 | 2 | 3 | 4 |
| 5. Sinto-me à vontade | 1 | 2 | 3 | 4 |
| 6. Sinto-me perturbado | 1 | 2 | 3 | 4 |
| 7. Presentemente, preocupo-me com possíveis desgraças | 1 | 2 | 3 | 4 |
| 8. Sinto-me satisfeito | 1 | 2 | 3 | 4 |
| 9. Sinto-me amedrontado | 1 | 2 | 3 | 4 |
| 10. Sinto-me confortável | 1 | 2 | 3 | 4 |
| 11. Sinto-me auto-confiante | 1 | 2 | 3 | 4 |
| 12. Sinto-me nervoso | 1 | 2 | 3 | 4 |
| 13. Sinto-me trémulo | 1 | 2 | 3 | 4 |
| 14. Sinto-me indeciso | 1 | 2 | 3 | 4 |
| 15. Sinto-me descontraído | 1 | 2 | 3 | 4 |
| 16. Sinto-me contente | 1 | 2 | 3 | 4 |
| 17. Estou preocupado | 1 | 2 | 3 | 4 |
| 18. Sinto-me confuso | 1 | 2 | 3 | 4 |
| 19. Sinto-me firme | 1 | 2 | 3 | 4 |
| 20. Sinto-me bem | 1 | 2 | 3 | 4 |

Attachment F – Trait scale of the State-Trait Anxiety Inventory (STAI Y-2)

ID: ____



STAI Y-2

Em baixo tem uma série de frases que são habitualmente utilizadas para descrever pessoas. Leia cada uma delas e assinale o número que melhor indica **COMO SE SENTE NESTE HABITUALMENTE**. Não há respostas certas ou erradas. Não demore muito tempo com cada frase; responda de modo a descrever o melhor possível a maneira **COMO SE SENTE HABITUALMENTE**.

| | Quase nunca | Algumas vezes | Frequentemente | Quase sempre |
|---|-------------|---------------|----------------|--------------|
| 21. Sinto-me bem | 1 | 2 | 3 | 4 |
| 22. Sinto-me nervoso e agitado | 1 | 2 | 3 | 4 |
| 23. Sinto-me satisfeito comigo mesmo | 1 | 2 | 3 | 4 |
| 24. Gostava de poder ser tão feliz como os outros parecem ser | 1 | 2 | 3 | 4 |
| 25. Sinto-me falhado | 1 | 2 | 3 | 4 |
| 26. Sinto-me tranquilo | 1 | 2 | 3 | 4 |
| 27. Estou "calmo e concentrado" | 1 | 2 | 3 | 4 |
| 28. Sinto que as dificuldades se acumulam de tal forma que não as consigo ultrapassar | 1 | 2 | 3 | 4 |
| 29. Preocupo-me demais com coisas que na realidade não têm importância | 1 | 2 | 3 | 4 |
| 30. Estou feliz | 1 | 2 | 3 | 4 |
| 31. Tenho pensamentos que me perturbam | 1 | 2 | 3 | 4 |
| 32. Falta-me auto-confiança | 1 | 2 | 3 | 4 |
| 33. Sinto-me seguro | 1 | 2 | 3 | 4 |
| 34. Tomo decisões facilmente | 1 | 2 | 3 | 4 |
| 35. Sinto-me inadequado | 1 | 2 | 3 | 4 |
| 36. Estou contente | 1 | 2 | 3 | 4 |
| 37. Passam-me pela cabeça pensamentos sem importância que me perturbam | 1 | 2 | 3 | 4 |
| 38. As contrariedades afetam-me de modo tão intenso que não consigo afastá-las da minha mente | 1 | 2 | 3 | 4 |
| 39. Sou uma pessoa firme | 1 | 2 | 3 | 4 |
| 40. Fico tenso e perturbado quando penso nas minhas preocupações e interesses atuais | 1 | 2 | 3 | 4 |

Attachment G – Depression, Anxiety and Stress Scales-21 (DASS-21)

ID: ____



DASS 21

(Lovibond & Lovibond, 1995; VP: Pais-Ribeiro, Honrado, & Leal, 2004)

Por favor leia cada uma das afirmações abaixo e assinale 0, 1, 2 ou 3 para indicar quanto cada afirmação se aplicou a si **durante a semana passada**. Não há respostas certas ou erradas. Não leve muito tempo a indicar a sua resposta em cada afirmação.

A classificação é a seguinte:

- 0 – Não se aplicou nada a mim
- 1 – Aplicou-se a mim algumas vezes
- 2 – Aplicou-se a mim muitas vezes
- 3 – Aplicou-se a mim a maior parte das vezes

| | | | | |
|---|---|---|---|---|
| 1. Tive dificuldades em me acalmar | 0 | 1 | 2 | 3 |
| 2. Senti a minha boca seca | 0 | 1 | 2 | 3 |
| 3. Não consegui sentir nenhum sentimento positivo | 0 | 1 | 2 | 3 |
| 4. Senti dificuldades em respirar | 0 | 1 | 2 | 3 |
| 5. Tive dificuldade em tomar iniciativa para fazer coisas | 0 | 1 | 2 | 3 |