ISSN online 1688-4221 *Ciencias Psicológicas* January-June 2022; 16(1), e-2560
doi: https://doi.org/10.22235/cp.v16i1.2560

Psychometric properties of the Mindful Attention Awareness Scale (MAAS) in Argentine university students

Propiedades psicométricas de la Mindful Attention Awareness Scale (MAAS) en estudiantes universitarios argentinos

Propiedades psicométricas da Mindful Attention Awareness Scale (MAAS) em estudiantes universitários argentinos

Leandro Eidman[1], ORCID 0000-0002-4553-477
Marisa Rodriguez de Behrends[2], ORDIC 0000-0003-2222-8762
Gustavo Seif[3], ORCID 000-0002-4698-1647

[1] Universidad de Ciencias Empresariales y Sociales, Instituto de Neurociencias Argentina, Argentina
[2] Universidad Católica Argentina, Instituto Universitario Hospital Italiano de Buenos Aires, Argentina
[3] Universidad de Ciencias Empresariales y Sociales, Argentina

Resumen

La Mindful Attention Awareness Scale (MAAS) es una escala que evalúa, de forma global, la capacidad en la disposición de una persona de estar atento y consciente de la experiencia del momento presente en la vida cotidiana. El objetivo del presente trabajo es estudiar las propiedades psicométricas de la MAAS en estudiantes universitarios argentinos. Se diseñó un estudio no experimental, transversal, de tipo instrumental. La base epistemológica utilizada fue la psicometría clásica. La muestra no probabilística estuvo constituida por 895 adultos argentinos de población universitaria. La edad promedio fue de 26.32 (*DE* = 6.946, *Mín* = 18, *Máx* = 48). El 54 % (*n* = 483) eran mujeres y el 45.6 % (*n* = 408) eran varones. Los análisis psicométricos informaron que la escala posee una estructura unidimensional con validez y fiabilidad adecuada (α = .89). La escala cuenta con adecuada evidencia de validez de constructo y con excelentes puntuaciones de consistencia interna, lo que determina que es un instrumento válido y confiable para evaluar atención de conciencia plena en población de estudiantes universitarios argentinos.

Palabras clave: mindfulness; Mindful Attention Awareness Scale; propiedades psicométricas; análisis factorial; confiabilidad y validez

Abstract

The Mindful Attention Awareness Scale (MAAS) is a scale that assesses, in a global way, the capacity in a person's disposition to be attentive and aware of the experience of the present moment in daily life. The aim of the present research was to study the psychometric properties of the MAAS in Argentine university students. A non-experimental, cross-sectional, instrumental study was designed. The epistemological basis used was classical psychometrics. The non-probabilistic sample consisted of 895 Argentine adults from university population. The mean age was 26.32 (*SD* = 6.946, *Min* = 18, *Max* = 48). Fifty-four percent (*n* = 483) were female and 45.6 % (*n* = 408) were male. Psychometric analyses reported that the scale has a unidimensional structure with adequate validity and reliability (α = .89). The scale has adequate evidence of construct validity and excellent internal

consistency scores, which determine that it is a valid and reliable instrument to assess mindfulness attention in a population of Argentine university students.
Keywords: mindfulness; Mindful Attention Awareness Scale; psychometric properties; factor analysis; reliability and validity

Resumo

A Mindful Attention Awareness Scale (MAAS) é uma escala que avalia, de forma global, a capacidade de disposição de uma pessoa em estar atenta e consciente da experiência do momento presente na vida cotidiana. O objetivo da pesquisa foi estudar as propriedades psicométricas do MAAS em estudantes universitários argentinos. Foi projetado um estudo não experimental, transversal e instrumental. A base epistemológica utilizada foi a psicometria clássica. A amostra não-probabilística consistiu de 895 adultos argentinos da população universitária. A idade média foi de 26.32 anos (*DP* = 6.946, *Mín* = 18, *Máx* = 48). 54 % (*n* = 483) eram mulheres e 45.6 % (*n* = 408) eram homens. As análises psicométricas relataram que a escala tem uma estrutura unidimensional com validade e confiabilidade adequadas (α = .89). A escala tem provas adequadas de validade construtiva e excelentes pontuações de consistência interna, que determinam que é um instrumento válido e confiável para avaliar a atenção de consciência plena de uma população de estudantes universitários argentinos.
***Palavras-chave*:** mindfulness; Mindful Attention Awareness Scale; propriedades psicométricas; análise fatorial; confiabilidade e validade

Received: 04/24/2021 Accepted: 05/02/2022

Correspondence: Leandro Eidman, Universidad de Ciencias Empresariales y Sociales, Instituto de Neurociencias Argentina, Argentina. E-mail: leaneidman@gmail.com

The term *mindfulness* was translated into English from the Pali language. It comes from the word *sati*, which can be translated as full attention or awareness (Álvarez, 2017; Moscoso & Lengacher, 2015). *Sati* has the connotation of perceiving, paying attention and remembering (Germer et al., 2015), which would imply reorientating our attention and becoming aware of the experience of the present moment in a kind way, without passing any critical judgment (Oblitas-Guadalupe et al., 2019). However, it is a polysemic term, usually used to explain a psychological process related to the state of consciousness, as a type of meditation, or as a dispositional trait in contraposition to a state of awareness (Álvarez, 2017). In this way, mindfulness might be conceptualized as the ability to be aware; a state which allows us to live the present moment and a characteristic attribute of the mind (Álvarez, 2017; Brown & Ryan, 2003; Germer et al., 2015; Shapiro et al., 2018; Toniolo-Barrios & Pitt, 2021). It is also defined as the realization that emerges when one deliberately pays attention, in the present moment and in a non-judgmental way, to the unfolding of the experience, moment by moment (Kabat-Zinn, 2003).

In other words, *mindfulness* refers to the vision and the clear knowledge of what is happening in the present moment, when we direct our attention in an intentional way, with kindness and curiosity, but with no criticism, creating the acquisition of awareness on the basis of compassion towards oneself. It consists of observing what is happening in our field of consciousness just as it is: here and now (Neff, 2016). Similarly, mindfulness is about

adopting a receptive mental state, without prejudice, through which an individual observes thoughts and feelings just as they are.

Mindfulness leads to a higher capacity of objectivity regarding one's own experiences, both internal and external, since it allows for the disidentification from thoughts and emotions, by observing them (Brown & Ryan, 2003). Although the origins of mindfulness stem from the Buddhist tradition, it was Jon Kabat-Zinn who, from 1979, promoted its implementation in the field of health, starting from the development of a stress-reduction program based on mindfulness, called Mindfulness Based Stress Reduction (MBSR) for the treatment of patients with chronic pain (Moscoso & Lengacher, 2015). This program has been accepted as being effective for the reduction of anxiety and stress symptomatology in different populations (Bonilla & Padilla, 2015; Moix et al., 2021) Throughout the years, multiple programs have been developed from the MBSR with different purposes (Cuevas-Toro et al., 2017).

In the last years, a robust theorical frame has been formed from the increasing scientific research on mindfulness as a process, a result or a practice in different environments (Cuevas-Toro et al., 2017). Thereafter, various instruments have been designed, which allow the assessment of the characteristics of mindfulness as well as the level in which it is exercised by individuals, whether as a trait or as a state (López-Maya et al., 2015; Soler et al., 2012).

For this study, the conceptual frame considered was the one proposed by Brown and Ryan. These authors develop a unidimensional model of the construct from which the Mindful Attention Awareness Scale, widely used in research in non-clinical populations due to its excellent psychometric properties (Brown & Ryan, 2003; Tomlinson et al., 2018), is constructed.

The Mindful Attention Awareness Scale (MASS; Brown & Ryan, 2003) is a scale which assesses the attentional dimension of mindfulness as a trait, and it assesses the ability of the individual to be attentive and aware of the experience of the present moment in daily life (Araya-Vargas et al., 2009; Caycho-Rodríguez et al., 2019; Soler et al., 2012). It consists of 15 items indicating the frequency in which the subject has had the experience described in the statement, using a Likert scale from 1 (*never or almost never*) to 5 (*always or almost always*). In the original study, conducted by Brown and Ryan (2003) in a sample of 327 university students, a multifactorial structure was found, but with a predominant factor that explained the 95 % of the variance, with an internal consistency of .82. The temporary stability of the scale was examined in an independent sample of 60 students, the intraclass correlation (equivalent to a Pearson's *r* with two measures) was of .81 ($p = .0001$). In order to prove whether the factorial model would hold for non-university adults, a sample of 239 adults from all over the United States of America, aged between 18 and 77 ($M = 43.27$) was assessed, confirming the model of one factor with $\alpha = .87$.

The MASS is a simple instrument, quick to administer, reason why it has been widely used in the field of scientific research to study the attentional dimension. Studies of the original version in English show good psychometric properties (Brown & Ryan, 2003). The scale was validated and translated to other languages; for instance, the German version of the MAAS portrayed unidimensional structure, internal consistency of $\alpha = .83$ and negative correlations, anxiety; and positive ones, subjective well-being (Michalak et al., 2008). The French version also showed a structure of a single factor and Cronbach's alpha reliability coefficient .84 (Jermann et al., 2009). The Swedish version was analyzed in 3 samples: university employees ($n = 204$), with a reliability coefficient of .86; recruits for the military

service (n = 549), with a reliability coefficient of .77; and a sample of adolescents (n = 202), with an α = .85 (Hansen et al., 2009). Finally, the translation into Spanish, by Araya-Vargas et al. (2009) in university population of Costa Rica, had a reliability coefficient of .88.

These previous studies assert the importance of mindfulness-based programs among the population of university students in relation to the increase of life satisfaction (Cuevas-Toro et al., 2017) and the reduction of anxiety (Bonilla & Padilla, 2015; Caycho-Rodríguez et al., 2019; Moix et al., 2021; Song & Lindquist, 2015). This population is directly affected by stress and anguish, and this symptomatology increases as their years at university go by (Caycho-Rodríguez et al., 2019). In the last years, numerous research assessing its application and effectivity in different populations have been carried out, among which is the one of university students; however, results are still not conclusive, which implies that research on that topic must continue (Chagoya, 2018; Oblitas-Guadalupe et al., 2019). In their majority, consulted studies report the need of conducting more research (Moix et al., 2021). A significant number of studies use the MAAS to assess the ability of university students to be attentive and aware of the present moment, which favors the comparison of results (Caycho-Rodríguez et al., 2019; Chagoya, 2018; Oblitas-Guadalupe et al., 2019).

Although in Argentina the MAAS was adapted to general population by García and Murrone (2019), and its reliability has been verified in these adaptation studies, it is important to consider that up to this date there are no studies on the psychometric properties of the instrument in the population of university students, reason why its ecological validity is still not well established for this population, being a population that would be directly benefitted by its use.

For this reason, two main objectives have been presented: (1) to study the psychometric properties of the Mindful Attention Awareness Scale (MAAS) in Argentine adults from university population, (2) to verify if there are differences in the awareness of mindful attention according to sociodemographic variables.

Method

Sample

The non-probabilistic sample consisted of 895 Argentine adults from university population. The mean age was 26.32 (SD = 6.946, Min = 18, Max = 48). Fifty-four percent (n = 483) were female and 45.6% (n = 408) were male. Regarding the place of residence, 48.6 % (n = 435) reported living in the city of Buenos Aires, 25.8 % (n = 231) in the province of Chaco, 11.1 % (n = 99) in Corrientes, 5.6 % (n = 74) in Tucumán, 4.6 % (n = 32) in Salta, and the remaining 12.4 % (n = 95) were distributed among the other provinces of Argentine. The percentage of single people was 77.8 (n = 696), while 12.1 % (n = 108) were living with their partners, 8.5 % (n = 76) were married, 1.3 % (n = 12) were divorced, and 0.3 % (n = 3) were widowers. Regarding the academic environment, 34.6 % (n = 310) reported ongoing attendance to a private university, 32.9 % (n = 295) to a public university, and 32.4 % (n = 290) to a semi-public university. The percentage of people in their third or four year of university was 67.5 (n = 605), while the remaining 32.4 % (n = 290) were finishing their degrees. Lastly, 25.9 % (n = 232) reported attending the School of Psychology and Social Sciences; 25.58 % (n = 229), the School of Legal and Political Sciences; 25 % (n = 224), the School of Economic Sciences; and the remaining 23.4 % (n = 210), the School of Health Sciences.

Measures

Sociodemographic survey (*ad-hoc*). Through this instrument, data about the gender, age, civil status and place of residence of the sample were gathered.

State-Trait Anxiety Inventory (STAI-E; Spielberger et al., 1983). It consists of 20 items in the format of statements which assess anxiety as symptomatology, by doing a cross-sectional temporary cut in the emotional stream of a person's life. Each item is rated with a Likert-type scale, from 1 (*almost never*) to 4 (*almost always*). The Argentine adaptation by Leibovich de Figueroa (1991) was used. Cronbach's alpha coefficient, as a measure of internal consistency of this study, was equal to .94.

Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). It is a questionnaire made of 15 items and rated according to a Likert scale from 1 (*almost always*) to 6 (*almost never*). It measures the frequency of the state of mindfulness in daily life without it being necessary that the individuals received training. The score is obtained by inverting the items and then the arithmetic mean of all the items is calculated. Elevated scores indicate higher mindfulness state. The Argentine version of the scale was used (García & Murrone, 2019).

Procedure

Data were collected through a non-probabilistic sample. The techniques that were used to measure the variables were distributed through social media under the modality of google forms. The participants were volunteers and did not receive any monetary compensation for their collaboration. The form contained, as a mandatory requirement, the acceptance of an informed consent, approved by the Research Ethics Committee of the Argentine Association of Psychologists Specialized in Disaster, adjusted to the Declaration of Helsinki of 1964 and its later amendments or equivalent ethical regulations, and approved by the Law 23.326 of protection of personal information, which deals with the ethical implications of research in health in which human beings take part, so as to protect their fundamental rights while weighing, in turn, the need to promote research in health.

Design and data analysis

A cross-sectional, non-experimental, instrumental study was designed (Ato et al., 2013). The epistemological basis used was classical psychometrics. In first place, the indices of skewness and kurtosis were calculated in correspondence with the numbers recommended by Bollen and Long (1993), close to 0 and lower than 1.96. After that, studies aiming to verify the construct validity of the MAAS were conducted (Brown & Ryan, 2003) through confirmatory factorial analysis (CFA). For its achievement, a robust estimator of weighted least squares means and variance adjusted (WLSMV-R) was used. The method of estimation used was MLR and, since the variables were ordinals, a polychoric matrix was used, due to its appropriateness for this type of data (Freiberg-Hoffmann et al., 2013; Muthén & Kaplan, 1985).

The following goodness of fit indices were considered: chi-square (χ^2), comparative fit index (CFI), Bollen's incremental fit index (IFI) and root mean square error of approximation (RMSEA) (Hu et al., 1992). Regarding the criteria of acceptable fit rates, a score of .90 is considered in CFI (Kline, 2018; Schumacker & Lomax, 2016), as well as scores lower than or equal to .08 in RMSEA (Browne & Cudeck, 1993). The construct validity was assessed through an exam of factorial charges. Standardized charges considered acceptable were those higher than the limit of .30 (Hair et al., 2006; Nunnally & Bernstein,

1994) and, regarding the correlations among factors, scores lower than .19 were considered as very low; between .20 and .39, as low; between .40 and .59, as moderate; between .60 and .79, as high; and higher than .80, as very high (Brown, 2006; Evans, 1996).

In order to assess the internal consistency of the scale, reliability indices were calculated using Cronbach's alpha coefficient. From Kline's perspective (2018), the scores that were considered acceptable were those higher than .70.

Regarding the evidence of convergent validity (American Educational Research Association et al., 2014; Coulacoglou & Saklofske, 2017), it was analyzed through the State-Trait Anxiety Inventory (STAI-E; Spielberger et al., 1983) in its Argentine adaptation (Leibovich de Figueroa, 1991). The index of correlation must be higher than .50 to give evidence of an adequate positive convergent validity (Coulacoglou & Saklofske, 2017), and the average variance extracted supports the convergent validity of an instrument when its score is equal to or higher than .50 (Fornell & Bookstein, 1982; Fornell & Larcker, 1981).

Lastly, in order to analyze the differences in mindful attention awareness according to sociodemographic data, the statistical tests of Student's *t* and one-way ANOVA were used.

Results were processed using R (version 3.6.0) and the RStudio interface (version 1.1.463) through the ggplot2 packages for data visualization (Villanueva & Chen, 2019), psycho (Revelle, 2018) and psychometry (Fletcher & Fletcher, 2013), to estimate a number of psychometric properties, while lavaan (Rosseel, 2017), semPlot (Epskamp et al., 2019) and semTools (Jorgensen et al., 2018) were used to calculate and trace the Structural Equation Modeling. The SPSS statistical program, in its version 25, was used for the cut scores.

Results

Evidence of internal validity and internal consistency

A preliminary analysis of the items in the scale was carried out so as to obtain the univariate normality of the items. In Table 1, the basic descriptive statistics are presented through the calculus of minimum and maximum scores, means, typical deviations, and the indices of skewness and kurtosis were estimated as well.

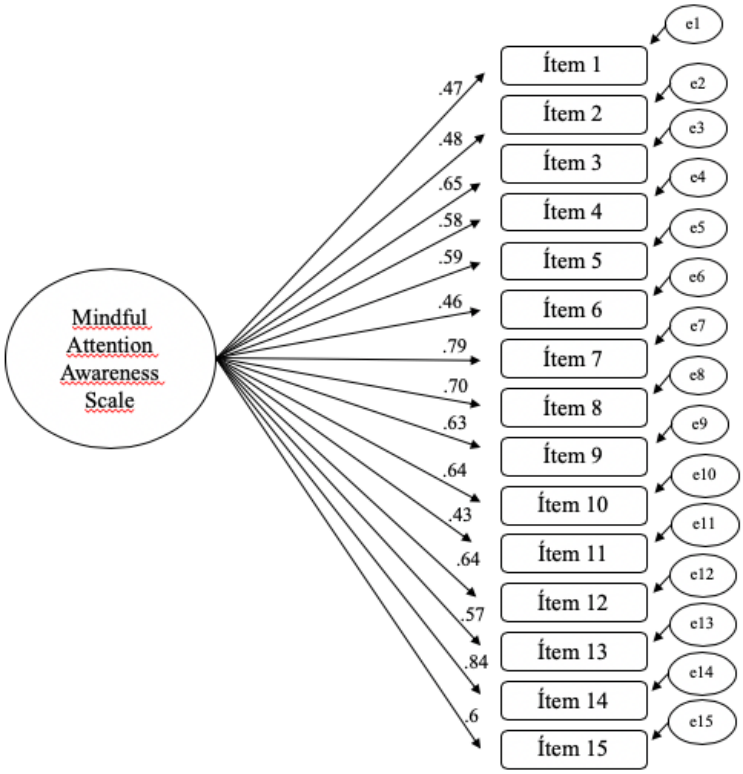
Table 1
Descriptive statistics of the MAAS

Items	*M*	*SD*	Skewness	Kurtosis
Item 1	2.50	1.21	0.49	-0.75
Item 2	1.95	1.18	1.04	0.89
Item 3	2.79	1.28	0.21	-1.05
Item 4	2.88	1.41	0.15	-1.30
Item 5	2.56	1.31	0.35	-1.08
Item 6	2.54	1.44	0.45	-1.27
Item 7	2.83	1.32	0.17	-1.18
Item 8	3.08	1.28	0.14	-1.12
Item 9	2.59	1.31	0.38	-1.02
Item 10	2.56	1.26	0.42	-0.89
Item 11	3.13	1.41	0.85	-1.33
Item 12	2.69	1.28	0.31	-1.04
Item 13	3.43	1.35	0.34	-1.17
Item 14	2.93	1.27	0.10	-1.08
Item 15	2.74	1.41	0.23	-1.29

After that, a Confirmatory Factorial Analysis was conducted. The estimation method used was MLE –robust maximum likelihood estimator– and, given that the variables were ordinal, a polychoric matrix was used, since it is more adequate for this type of data. In order to assess the goodness of fit of the model, different indices were examined: chi square (χ^2), comparative fit index (CFI), Bollen's incremental fit index (IFI) and root mean square error of approximation (RMSEA).

In Figure 1, an excellent fit of the model of a factor can be observed in the sample of Argentine university students: $\chi^2 = 976.769$, $p < .000$; CFI = .981; IFI = .977; RMSEA = .032 90% *IC*[.022, .042], $p < .000$. The regression weights for each element ranged between moderate (> .40 y < .59) and high (> .60 y < .79). Regarding the internal consistency of the scale, the results obtained were very good ($\alpha = .90$).

Figure 1
Factorial Structure of the Mindful Attention Awareness Scale



Evidence of convergent validity

An analysis of normality was conducted through the Kolmogorov-Smirnov test, with Lilliefors' corrections. The results reported that the variables were distributed in a normal way; therefore, Pearson's parametric test was performed. The STAI-E and the MAAS were used as criteria. A moderately high correlation was obtained (r = -.81, p < .001), which determines an adequate convergent validity according to the dimensions theoretically postulated as opposite constructs. Lastly, an analysis of average variance extracted was performed, which showed a score of .83, considered as very good.

Mindful Attention Awareness Scale according to sociodemographic variables

Taking into consideration that, according to the Kolmogorov-Smirnov test, the distribution of composite scores of the administered instruments, both in men as in women, did not differ from the normal distribution (p > .05), and it complied with variance homogeneity. A Student's t test was conducted to analyze the differences in mindful attention awareness based on the variable of gender. The results reported that women presented higher mindful attention awareness (t (889) = 2.64, p > .005) than men. Afterwards, the difference in mindful attention awareness was calculated according to the variable of age. A univariate analysis of variance with a Bonferroni *post-hoc* test was conducted, owing to the fact that Levene's test for homogeneity of variance demonstrated that these were equal among both

groups. In Table 3, it can be observed that the results showed a main effect of the age factor. The post-hoc test revealed that the youth (aged 18-23) presented more mindful attention awareness than the adults (aged 30 +) ($p < .001$). In turn, young adults (aged 24-29) presented higher mindful attention awareness than adults ($p < .001$). Lastly, no significant differences were found regarding the mindful attention awareness based on civil status ($p = .103$).

Table 2
Analysis of variance (ANOVA) of the MAAS according to age

Variable	Age			*F*
	18-23 (n = 408)	24-29 (n = 263)	30 + (n = 224)	
MAAS *M(SD)*	2.80(0.776)	2.76(0.782)	2.58(0.788)	6.36***

Nota. ***$p < .002$

Discussion

Although the interest in research based on mindfulness is rapidly increasing, there are no published versions of mindfulness inventories which measure this construct in an adequate ecological way among the population of Argentine university students. That is why obtaining the adequate psychometric properties to measure the construct in this population in particular was considered as relevant, since, as has been demonstrated by previous studies, this population would be highly benefitted by the implementation of strategies based on mindfulness (Bonilla & Padilla, 2015; Caycho-Rodríguez et al., 2019; Cuevas-Toro et. al., 2017; Moix et al., 2021). Therefore, the contribution of this study is to present a questionnaire that can be specifically used in the population of Argentine students.

In view of what was mentioned before, the aim of this study was to assess the psychometric properties of the Spanish version of the MAAS in a sample of 895 Argentine university students, and the differences according to sociodemographic data. For that end, the construct validity was assessed, as well as its internal consistency, evidence of convergent validity was obtained through the State-Trait Anxiety Inventory (STAI-E; Leibovich de Figueroa, 1991; Spielberger et al., 1983), and the differences were analyzed based on gender, age and civil status.

The results obtained are consistent with the original version and the version translated into Spanish (Brown & Ryan, 2003; García & Murrone, 2019). According to the confirmatory factorial analysis performed, the charges of the items were higher in this study, as compared to the previous versions. This is why it can be reported that the weight of the items ranges between moderate and high, as reported by Brown's (2006) and Evans' (1996) studies. It might be inferred that this is owing to the sample number obtained, considering that the higher the sample, the more robust the results (Kline, 2011).

Regarding the internal consistency of the scale, it proved to be robust and similar to the version translated into Spanish (García & Murrone, 2019). However, higher scores were obtained, in comparison with those of the original version (Brown & Ryan, 2003). Again, this could stem from the sample characteristics of the different studies conducted on the psychometric properties of the scale. Another important finding is that, when analyzing the associations between the constructs that are considered as theoretically opposite in order to

obtain the evidence of convergent validity (American Educational Research Association et al., 2014; Coulacoglou & Saklofske, 2017), the association that was found indicated that the lower the symptoms of anxiety as a state, the higher the capacity of mindful attention awareness. This is in line with the original psychometric studies of the scale (Brown & Ryan, 2003), with its adaptation to Argentine population (García & Murrone, 2019), and with the study conducted by Michalak et al. (2008). However, taking into consideration Endler and Kocovski's perspective (2001), the most relevant aspect of the result emerges in that the symptoms of anxiety as a state consist of a transitory and variable emotional phase, regarding its intensity and duration, so it was expected to find an inverse relationship with the MAAS.

Lastly, the fact that women presented higher mindful attention awareness is worth noting, since most research report not having found significant evidence when controlled by the variable of gender (Brown & Ryan, 2003; García & Murrone, 2019). Nonetheless, it might be inferred that women present higher use and control of emotions in the planned exercise than men (Li, 2018; Skiba, 2020; Younes & Alzahrani, 2018). However, it has been suggested in these previous studies that the study of the differences of gender in mindfulness is still considered as an open field for research.

On the other hand, data are also consistent with those obtained from the studies conducted with the German (Michalak et al., 2008), French (Jermann et al., 2009) and Swedish (Hansen et al., 2009) versions.

In turn, differences based on the age of the participants were found: youth and young adults presented higher ability of being aware and staying in a state that allows them to live the present. It might be inferred that this is in accordance with research claiming there is a high current prevalence in the practice of mindfulness among the mentioned age groups, as opposed to the population of adults and elderly (Álvarez, 2017; Brown & Ryan, 2003; Germer et al, 2015; Shapiro et al., 2018; Toniolo-Barrios & Pitt, 2021).

One of the main limitations of this study is the lack of analysis of positive and predictive correlations. In addition, it must be taken into consideration that the sample was purposive and non-probabilistic. It is advisable, in future research, that probabilistic samples be used, that factorial structure in similar population be analyzed, and that positive and predictive convergent validity studies be conducted so as to obtain more evidence regarding the psychometric properties of the instrument. In turn, it is relevant to highlight that due to the type of study, results cannot be generalized to another type of sample.

In conclusion, it could be said that the MAAS has adequate evidence of construct validity and excellent scores of internal consistency, which determines that it is a valid and reliable instrument to assess mindful attention awareness in a population of Argentine university students.

References

Álvarez, J. (2017). *Mindfulness en estudiantes universitarios y su relación con estrés, ansiedad, depresión, resiliencia y satisfacción con la vida* (Tesis Doctoral). Universidad de Huelva, España.

American Educational Research Association, American Psychological Association & National Council on Measurement in Education. (2014). *Standards for Educational and Psychological Testing*. American Educational Research Association. https://doi.org/10.2307/j.ctvr43hg2

Araya-Vargas, G. A., Gapper-Morrow, S., Moncada-Jiménez, J., & Buckworth, J. (2009). Translation and cross-cultural validation of the Spanish version of the Mindful Awareness Attention Scale (MAAS): An exploratory analysis and potential applications to exercise psychology, sport and health. *International Journal of Applied Sports Sciences, 21*(1), 94-114. https://doi.org/10.1037/t62343-000

Ato, M., López, J. J., & Benavente, A. (2013). Un sistema de clasificación de los diseños de investigación en psicología. *Anales de Psicología, 29*(3), 1038-1059. https://doi.org/10.6018/analesps.29.3.178511

Bollen, K. & Long, J. (1993). *Testing structural equation models*. Sage.

Bonilla, K. & Padilla, Y. (2015). Estudio piloto de un modelo grupal de meditación de atención plena (mindfulness) de manejo de la ansiedad para estudiantes universitarios en Puerto Rico. *Revista Puertorriqueña de Psicología, 26*(1), 72-87.

Browne, M. W. & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing Structural Equation Models* (pp. 136-162). Sage.

Brown, K. W. & Ryan, R.M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822-848. https://doi.org/10.1037/0022-3514.84.4.822

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. Guilford.

Caycho-Rodríguez, T., García-Cadena, C. H., Reyes-Bossio, M., Cabrera-Orosco, I., Oblitas-Guadalupe, L. A., & Arias-Gallegos W. (2019). Evidencias psicométricas de una versión breve de la Mindful Awareness Attention Scale en estudiantes universitarios. *Revista Argentina de Ciencias del Comportamiento, 11*(3), 19-32. https://doi.org/10.32348/1852.4206.v11.n3.24870

Coulacoglou, C. & Saklofske, D. H. (2017). *Psychometrics and Psychological Assessment Principles and Applications.* Elsevier.

Cuevas-Toro, A. M., Díaz-Batanero, C., Delgado-Rico, E., & Vélez-Toral, M. (2017). Incorporación del mindfulness en el aula: un estudio piloto con estudiantes universitarios. *Universitas Psychologica, 16*(4). https://doi.org/10.11144/javeriana.upsy16-4.imae

Chagoya, M. Á. Q. (2018). Relación entre habilidades mindfulness, estimación y frecuencia de consumo de alimentos saludables en jóvenes universitarios. *Revista Electrónica de Psicología Iztacala, 21*(3), 941.

Endler, N. S. & Kocovski, N. L. (2001). State and trait anxiety revisited. *Journal of anxiety disorders, 15*(3), 231-245.

Epskamp, S., Stuber, S., Nak, J., Veenman, M., & Jorgensen, T. D. (2019). semPlot: Path Diagrams and Visual Analysis of Various SEM Packages' Output (Version 1.1. 2) [Computer software].

Evans, J. D. (1996). *Straightforward statistics for the behavioral sciences*. Brooks/Cole Publishing.

Fletcher, T. D. & Fletcher, M. T. D. (2013). *Package psychometric.* http://cran.rproject.org/web/packages/psychometric/psychometric

Fornell, C. & Larcker, D. F. (1981). Evaluating structural equations models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50). https://doi.org/10.2307/3151312

Fornell, C. & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research, 19*(4), 440-452. https://doi.org/10.2307/3151718

Freiberg-Hoffmann, A., Stover, J. B., de la Iglesia, G. & Fernández-Liporace, M. (2013). Correlaciones Policóricas y Tetracóricas en Estudios Exploratorios y Confirmatorios. *Ciencias Psicológicas, 7*(2), 151-164. https://doi.org/10.22235/cp.v7i1.1057

García, N. M. & Murrone, R. V. (2019). *Validez y fiabilidad de la escala de Atención y Conciencia plena (MAAS) en su versión traducida al castellano* (Tesis Doctoral). Universidad Nacional de Córdoba, Argentina.

Germer, C. K., Siegel, R. D., & Fulton, P. R. (2015). *Mindfulness e psicoterapia.* Declee De Brouwer.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate Data Analysis.* Pearson Prentice Hall.

Hansen, E., Lundh, L. G., Homman, A., & Wångby-Lundh, M. (2009). Measuring mindfulness: pilot studies with the Swedish versions of the mindful attention awareness scale and the Kentucky inventory of mindfulness skills. *Cognitive Behaviour Therapy*, *38*(1), 2-15. https://doi.org/10.1080/16506070802383230

Hu, L. T., Bentler, P. M., & Kano, Y. (1992). Can test statistics in covariance structure analysis be trusted? *Psychological bulletin, 112*(2), 351. https://doi.org/10.1037/0033-2909.112.2.351

Jermann, F., Billieux, J., Laroi, F., D'Argembeau, A., Bondolfi, G., & Zermatten, A. (2009). Mindful Attention Awareness Scale: Psychometric properties of the French translation and exploration of its relations with emotion regulation strategies. *Psychological Assessment, 21,* 506-514. https://doi.org/10.1037/a0017032

Jorgensen, T. D., Pornprasertmanit, S., Schoemann, A. M., Rosseel, Y., Miller, P., Quick, C., & Garnier-Villarreal, M. (2018). semTools: Useful tools for structural equation modeling. *R package version 0.5-1*.

Kabat-Zinn, J. (2003). Mindfulness-based stress reduction (MBSR). *Constructivism in the Human Sciences*, *8*(2), 73.

Kline, R. B. (2011). *Principles and practice of structural equation modeling*. Guilford Press.

Kline, R. B. (2018). Response to leslie hayduk's review of principles and practice of structural equation modeling. *Canadian Studies in Population*, *45*(3-4), 188-95.

Leibovich de Figueroa, N. B. (1991). Ansiedad: algunas concepciones teóricas y su evaluación. In M. M. Casullo, N. B. Leibovich de Figueroa & M. Aszkenazi (Eds.), *Teoría y técnicas de evaluación psicológica* (pp. 123-155). Psicoteca.

Li, Y. (2018). Social anxiety and eating disorder risk among Chinese adolescents: the role of emotional intelligence. *School Mental Health*, *10*(3), 264-274. https://doi.org/10.1007/s12310-018-9257-4

López-Maya, E., Hernández-Pozo, M., Méndez-Segundo, L., Gutiérrez-García, J., Araujo-Díaz, D., Nuñez-Gazcón, A. & Hölzel, B. (2015). Psychometric properties of the Mexican version of the mindful attention awareness scale (MAAS). *Psychologia: avances de la disciplina*, 9(1), 13-27. https://doi.org/10.21500/19002386.990

Moix, J., Cladellas, M., Gayete, S., Guarch, M., Heredia, I., Parpal, G., & Trujillo, A. (2021). Effects of a mindfulness program for university students. *Clínica y Salud*, *32*(1), 23-28. https://doi.org/10.5093/clysa2020a24

Michalak, J., Heidenreich, T., Ströhle, G., & Nachtigall, C. (2008). Die deutsche version der mindful attention and awareness scale (MAAS). *Zeitschrift Fur Klinische Psychologie Und Psychotherapie, 37*(3), 200-208. https://doi.org/10.1026/1616-3443.37.3.200

Moscoso, M. S. & Lengacher, C. A. (2015). Mecanismos neurocognitivos de la terapiabasada en mindfulness. *Liberabit 21*(2), 221-233.

Muthén, B. & Kaplan, D. (1985). A comparison of some methodologies for the factor analysis of non-normal Likert variables. *British Journal of Mathematical and Statistical Psychology, 38*(2), 171-189. https://doi.org/10.1111/j.2044-8317.1985.tb00832.x

Neff, K. (2016). *Se amable contigo mismo. El arte de la compasión hacia uno mismo.* Paidós.

Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3ª ed.). McGraw Hill.

Oblitas-Guadalupe, L. A., Soto-Vásquez, D. E., Anicama-Gómez, J. C., & Arana-Sánchez, A. A. (2019). Incidencia del mindfulness en el estrés académico en estudiantes universitarios: Un estudio controlado. *Terapia psicológica, 37*(2), 116-128. http://dx.doi.org/10.4067/S0718-48082019000200116

Revelle, W. (2018). *Psych: Procedures for personality and psychological research* (Version 1.9. 12.31)[Computer software]. Northwestern University.

Rosseel, Y. (2017). Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA). *Journal of statistical software, 48*(2), 1-36.

Schumacker, R. & Lomax, R. (2016). *A beginner´s guide to structural equation modeling*. Routledge.

Shapiro, S., Siegel, R., & Neff, K. D. (2018). Paradoxes of Mindfulness. *Mindfulness* 9, 1693-1701. https://doi.org/10.1007/s12671-018-0957-5

Skiba, R. (2020). Effective Means of Teaching and Developing Emotional Intelligence in the Corrections Industry. *Advances in Applied Sociology, 10*(06), 187-199. https://doi.org/10.4236/aasoci.2020.106012

Soler, J., Tejedor, R., Feliu-Soler, A., Pascual, J. C., Cebolla, A., Soriano, J., Álvarez, E., & Pérez, V. (2012). Psychometric proprieties of Spanish version of Mindful Attention Awareness Scale (MAAS). *Actas Españolas de Psiquiatría, 40*(1), 19-26. https://doi.org/10.1016/j.rpsmen.2014.10.002

Song, Y. & Lindquist, R. (2015). Effects of mindfulness-based stress reduction on depression, anxiety, stress and mindfulness in Korean nursing students. *Nurse education today, 35*(1), 86-90. https://doi.org/10.1016/j.nedt.2014.06.010

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. (1983). *State-trait anxiety inventory STAI (Form Y)*. Mind Garden.

Tomlinson, E. R., Yousaf, O. & Vittersø, A. D. (2018). Dispositional Mindfulness and Psychological Health: a Systematic Review. *Mindfulness* 9, 23-43. https://doi.org/10.1007/s12671-017-0762-6

Toniolo-Barrios, M. & Pitt, L. (2021). Mindfulness and the challenges of working from home in times of crisis. *Business Horizons, 64*(2), 189-197. https://doi.org/10.1016/j.bushor.2020.09.004

Villanueva, R. A. M. & Chen, Z. J. (2019). *ggplot2: Elegant graphics for data analysis*. Springer

Younes, M. S. & Alzahrani, M. R. (2018). Could resilience and flourishing be mediators in the relationship between mindfulness and life satisfaction for saudi college students? A psychometric and exploratory study. *Journal of Educational and Psychological Studies, 12*(4), 708-723. https://doi.org/10.53543/jeps.vol12iss4pp708-723

How to cite: Eidman, L., Rodriguez de Behrends, M., & Seif, G. (2022). Psychometric properties of the Mindful Attention Awareness Scale (MAAS) in Argentine university students. *Ciencias Psicológicas*, *16*(1), e-2560. https://doi.org/10.22235/cp.v16i1.2560

Authors' participation: a) Conception and design of the work; b) Data acquisition; c) Analysis and interpretation of data; d) Writing of the manuscript; e) Critical review of the manuscript.
L. E. has contributed in a, b, c, d, e; M. R. B. in b, d, e; G. S. in b, d.

Scientific editor in charge: Dra. Cecilia Cracco.