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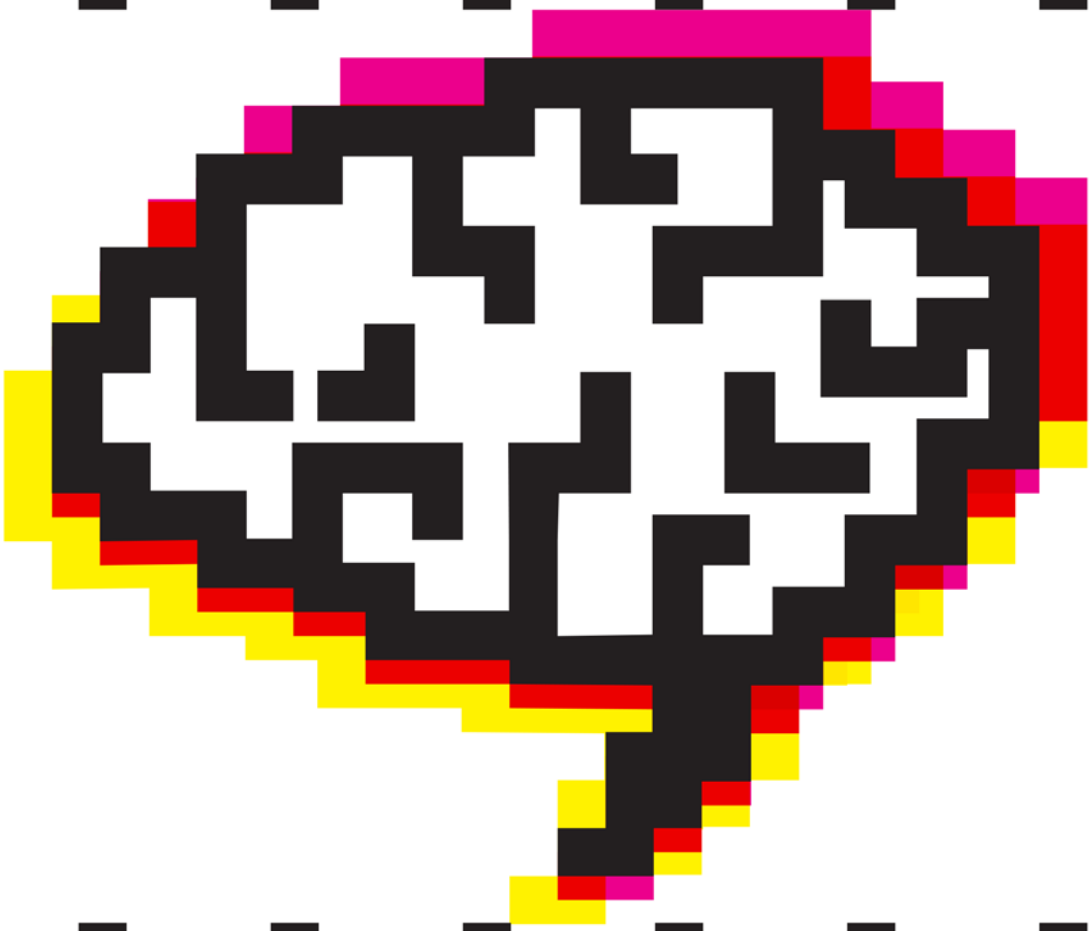

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Original contribution

Gilberto Gaviria-Castaño,[1]
Sergio Dominguez-Lara,[2]
William Tamayo-Agudelo,[3-4]

[1]*University of Antioquia, Medellin, Colombia*
[2] *University of San Martín de Porres, Lima, Peru*
[3] *Cooperative University of Colombia, Medellin, Colombia*
[4] *Division of Psychiatry- University College London, London, UK*

Factorial structure of the Survey of Autobiographical Memory (SAM) in a sample of Colombian population

Estructura Factorial de la escala The Survey Autobiographical Memory (SAM) en población adulta del departamento de Antioquia, Colombia

Abstract

Introduction: Autobiographical Memory (AM) comprises the personal recollections of events and experiences of the past, imagined events and future goals. Such recollections support narrow relations with diverse psychological and emotional processes that allow a suitable functioning in the daily life. The interest of diverse areas has been to understand the mechanisms associated with the normal and upset functioning of the AM. Colombian context, one does not possess instruments of auto report standardized for the evaluation of the AM.

Objective: The main purpose of this study is to establish the psychometric properties and the factor structure of The Survey Autobiographical Memory (SAM) in a sample of the Colombian population.

Methods: This was a cross-sectional study in which 260 subjects from the general population were assessed using The Survey Autobiographical Memory.

Results: Different models of measurement were evaluated. Results show that the configuration of the SAM who better represents the evaluated construct is that of four related factors: episodic and semantic memory, spatial memory and episodic future thinking, with acceptable ordinal alpha coefficients.

Conclusions: The SAM is a test with evidences of validity related to his internal structure. Furthermore, it is possible to be useful to understand diverse aspects of the AM in clinical and research areas.

Keywords

Autobiographical memory, factor analysis, psychometrics.

Resumen

Introducción: La Memoria Autobiográfica (MA) comprende los recuerdos personales de eventos y experiencias del pasado, acontecimientos imaginados y metas futuras. Tales recuerdos mantienen estrechas relaciones con diversos procesos psicológicos y emocionales que permiten un adecuado funcionamiento en la vida cotidiana. El interés de diversas áreas ha sido comprender los mecanismos asociados al funcionamiento normal y alterado de la MA.

Objetivo: El objetivo de este estudio fue describir la estructura factorial y la consistencia interna de la Escala *The Survey Autobiographical Memory* (SAM) en población del departamento de Antioquia, Colombia.

Método: Estudio instrumental transversal en el cual participaron 260 personas quienes respondieron la escala *The Survey Autobiographical Memory* (SAM).

Resultados: Fueron evaluados diferentes modelos de medición para determinar el que mejor representaba el constructo: el de cuatro factores oblicuos y un modelo bifactor. Con base en los resultados, la configuración del SAM que mejor representa al constructo evaluado es el de cuatro factores relacionados: MA episódica, MA semántica, MA espacial y pensamiento episódico futuro, con índices aceptables de confiabilidad de las puntuaciones (α ordinal entre .64-.87; ω entre .71 y .90; H entre .74 y .90).

Conclusiones: El SAM es una prueba de autoreporte con evidencias de validez relacionadas con su estructura interna, además puede ser útil para comprender diversos aspectos de la MA en el ámbito clínico e investigativo.

Palabras clave

Análisis factorial, memoria autobiográfica, psicometría.

Corresponding author:
William Tamayo Agudelo
Dirección: Cll. 50 # 40-74 Medellín, Colombia
Correo electrónico: william.tamayoa@campusucc.edu.co

Introduction

Autobiographical Memory (AM) includes personal memories of past events and experiences, imagined events, and future goals.[1] The construction of these memories is related to emotions, sense of self, learning processes,[2] psychological well-being, and perceptions about relationships with others.[3] Thus, the intensity of autobiographical memories, their coherence and richness, varies from one person to another depending on personal characteristics and external situations experienced.[4] The need to understand the mechanisms, processes, and functioning of AM has been the object of several sub-areas of psychological and neuroscientific research.[2] In the literature, there is evidence of relationships between evolutionary development and AM,[4] psychopathologies and AM,[5] and psychotherapy and AM,[3] among others.

In order to evaluate AM, the Survey of Autobiographical Memory (SAM) was developed.[1] The SAM explores four factors: episodic AM, semantic AM, spatial memory, and future episodic thinking. Episodic AM enables the collection of personal experiences located in a specific time and space. Semantic AM refers to one's knowledge disconnected from a space-time coding. Spatial memory enables the subject to remember coordinates that were coded and allows him to orient and navigate in past scenarios. Future thinking involves imagining events that could be experienced. Although this last component is not a type of memory per se, the brain regions that make AM possible overlap with those related to prospecting.[1]

The objective of this study is to describe the factorial structure and internal consistency of the SAM in the population of Antioquia, Colombia. The validation of this instrument is important because it allows evaluating dimensions of AM using a self-report test, which may help describe individual differences between the memory of normal subjects and subjects with some type of AM difficulty, as well as its possible relationship with various psychopathological pictures.

Methods

This study is considered an instrumental study based on the classification proposed by Montero and León.[6]

Participants

An incidental sample of 260 people (36.2% men, 63.8% women) inhabitants of the municipalities of Medellin and Rionegro (Colombia), agreed to answer the questionnaire after receiving detailed information about the objectives of the investigation. The sample size was calculated after using as criterion the total number of items that make up the SAM scale (26 items), from which at least ten subjects were considered suitable for each item.[7,8] Before applying the test they were asked if they had suffered head trauma or if they had been diagnosed with any neurological or psychiatric disorder. None of the participants reported having any of these problems, therefore they were all included. Table 1 shows the most relevant sociodemographic data of the participants.

Instrument

The Survey of Autobiographical Memory (SAM)[1] is an instrument composed of 26 items with five response options (1 = Strongly disagree, 2 = Moderately disagree, 3 = Neither agree nor disagree, 4 = Moderately agree, 5 = Strongly agree). The SAM is composed of four factors: self-reported autobiographical episodic memory with questions such as, "When I remember events, I generally can recall people, what they looked like, or what they were wearing;" semantic autobiographical memory, represented by questions such as, "I can learn and repeat facts easily even if I don't remember where I learned them from;" spatial memory, evaluated by questions such as, "If my route to work/study is blocked, I could easily find the fastest alternate route to arrive;" and future thinking studied with items such as, "When I imagine a future event, I see it clearly at a specific time and place."

The test was adapted to Spanish with the

authorization of the corresponding author of the original article, following the method of translation and re-translation with the assistance of a translation expert who made the initial translation and a native speaker of English, who translated it back to its original language. After this process, a pilot test was carried out with 15 people to verify if the test was comprehensible. It was detected that one of the items belonging to future episodic thinking presented comprehension problems. When studying the difficulties expressed by the participants of the pilot test, the researchers realized that the problem was the use of an extended phrase in which they asked about the ability to imagine an event in a defined space and time. The use of these two words seemed to generate difficulties and, for that reason, it was changed to "specific place" and "moment."

Procedure

The participants signed an informed consent approved by the bioethics committee of the Cooperative University of Colombia in Medellin (Approval report: 0800-007, Document 003/2015). Subsequently, they completed the SAM. The applications were made individually, although the participants were always accompanied by one of the researchers, who addressed any concerns about the completion of the test and verified that the items were fully answered.

Data analysis

In a preliminary way, a descriptive analysis of the items was carried out highlighting the measures of central tendency, dispersion, and distribution (asymmetry and kurtosis). Additionally, the ceiling effect and floor effect were analyzed.[9]

A confirmatory factor analysis was implemented with the EQS 6.2 program under the following conditions: maximum likelihood method; polymorphic matrices[11] since the items are ordinal measures and may describe asymmetric distributions;[12] for the evaluation of models, various adjustment indices were used, such as the *RMSEA* (≤ .05), *CFI* (≥ .95), *SRMR* (≤ .05) and the general test χ^2, adjusted to attenuate the effect of the lack of normality of the variables (SB-χ2).[13]

Different measurement models were evaluated. As a base model, we established the one that predominates in the literature, i.e., the four oblique factors model.(M1) Given that there are items in inverted scale, a method factor was modeled[14,15] together with the four oblique factors (M2). Finally, a bifactor model was evaluated[16] in which a

Table 1. Sociodemographic characteristics of the sample.

	Subgroup	M (SD)	%
Age		**32.80 (14.55)**	
Educational level	Primary		7.3
	High School		27.7
	Technician		12.7
	Technologist		8.8
	University		34.6
	Specialization		5.4
	Master's		2.3
	No response		1.2
Socioeconomic stratum	Low		30.4
	Middle		61.9
	High		7.3
	No response		.4

Note: M: median. SD: Standard deviation. %: Percentage.

general factor is modeled that influences the items simultaneously with the specific factors (M3), in order to determine if it is feasible to consider the presence of a total score or not.

To assess M3, other indicators were used in addition to the traditional adjustment indexes: ωh17 which evaluates the amount of total variance that can be attributed to the general factor, and the ECV (Explained Common Variance)[18] which quantifies the amount of common variance attributable to the general factor. Indicators greater than .60 are expected to provide sustenance to the general factor, and the PUC (Percentage of Uncontaminated Correlations)[18] provides information on the percentage of correlations not contaminated by multidimensionality.[19] These procedures are necessary because they allow evaluating the impact of the general factor with respect to the specific factors on the items, since the traditional adjustment indexes (*CFI*, *RMSEA*, etc.) tend to favor bifactor models.[20]

Finally, regarding the reliability analysis, the congeneric and tau-equivalent measurement models for each factor were evaluated in order to justify the use of the coefficient α. Afterwards, the reliability of the scores was reported using the coefficient α with confidence intervals at 95% (CI),[21] and also the ordinal α, [22,23] coefficient ω24, and the coefficient H.[25,26] This provides a broader picture regarding the assessment of reliability both at the level of observed scores and latent variables.

Results

Preliminary descriptive analysis

An inspection of the trend of the items indicates that the average of the majority tends toward the central response (approximately 3), including the inverted items, and although the asymmetry remained at acceptable levels (<1), the kurtosis obtained higher values, though all within the permissible limits (+/- 1.5).27 Finally, the presence of a floor effect and a ceiling effect was observed in several items. No missing data was found. This data can be observed in Table 2.

Internal structure analysis

In the first instance, M1 was evaluated, and poor adjustment indices were obtained: SB-χ^2(293)= 702.285 (p <.01), *CFI* = .893, *RMSEA* = .073 (IC 90% = .066, .080) , *SRMR* = .104. An analysis of the configuration coefficients indicates that many of them—especially those belonging to the items in inverted scale— are not statistically significant, and if they are, their magnitudes are quite low.

Subsequently, M2 was evaluated, in which a method factor is also modeled. The adjustment shown by the model was good: SB-χ^2(286)= 508.477 (p <.01), *CFI* = .942, *RMSEA* = .055 (IC 90% = .047, .062), *SRMR* = .088, and the configuration coefficients associated with the method factor were of moderate magnitude (λ average = .470). In view of this, it is decided to exclude such items and to try again the oblique model (M1r).

The M1r model presented favorable adjustment indices: SB-χ^2(146) = 299,823 (p <.01), *CFI* = .959, *RMSEA* = .064 (IC 90% = .053, .074), *SRMR* = .083. In this model, the presence of significant correlations between factors stands out, but without reaching multicollinearity (φij ≤ .80). When analyzing the bifactor model (M3), the presence of Heywood cases (λ> 1) was detected, and as a result, the analysis had to be repeated— this time with covariance matrices.

The adjustment of M3 was marginal: SB-χ^2(133) = 246.356 (p <.01), *CFI* = .923, *RMSEA* = .057 (IC 90% = .046, .068), *SRMR* = .060. Likewise, the configuration coefficients show that, on average, those belonging to the general factor (λ average = .475) are not significantly higher than those belonging to specific factors: Episodic Memory (λ average = .449), Semantic Memory (λ average =. 381), Spatial (λ average = .404), and Future (λ average = .517). In addition, the magnitude of the ωh of the general and specific factor (Table 3), and other additional indices such as ECV = .495, PUC = .784, and coefficients Hh 26> .60 for each specific factor indicate that the specific factors are robust.[19]

Table 2. Descriptive statistics of the SAM items.

Item	M	SD	g^1	g^2	% min	% máx
Item 1*	2.44	1.353	.467	-1.115	33.8	8.5
Item 2*	2.45	1.240	.480	-.949	26.1	5.8
Item 3	3.47	1.322	-.388	-1.117	8.5	28.5
Item 4	3.39	1.364	-.380	-1.108	12.3	26.9
Item 5	3.43	1.355	-.473	-1.059	11.9	25.8
Item 6	3.47	1.253	-.446	-.880	8.1	24.2
Item 7	3.01	1.368	.043	-1.287	15.8	18.5
Item 8	3.04	1.277	-.080	-1.013	15	15
Item 9	3.60	1.179	-.628	-.518	6.2	24.6
Item 10*	2.67	1.317	.200	-1.242	24.6	8.5
Item 11	3.37	1.442	-.371	-1.243	15.4	29.6
Item 12	3.27	1.375	-.358	-1.127	15.8	21.9
Item 13*	2.58	1.294	.255	-1.181	27.3	6.9
Item 14	3.39	1.350	-.364	-1.130	11.2	26.2
Item 15	3.12	1.290	-.148	-1.061	13.8	16.5
Item 16	3.62	1.392	-.691	-.859	12.3	34.6
Item 17*	2.77	1.339	.164	-1.164	23.1	12.3
Item 18*	2.13	1.361	.910	-.538	47.7	8.8
Item 19	3.83	1.355	-.913	-.465	10	43.8
Item 20	4.18	1.232	-1.480	1.010	6.9	58.8
Item 21	3.67	1.245	-.703	-.484	8.1	31.5
Item 22	3.58	1.148	-.583	-.414	6.2	23.1
Item 23	3.35	1.210	-.470	-.660	10.4	17.3
Item 24	3.79	1.109	-.778	-.165	3.8	30
Item 25	3.86	1.121	-.842	-.103	3.8	34.2
Item 26*	2.19	1.348	.799	-.677	44.6	8.5

Note: n = 260; *: inverse item. M: Arithmetic mean; SD: Standard deviation: g1: Asymmetry; g2: Kurtosis; % min: percentage of people who chose the option with lesser value; % max: percentage of people who chose the option with higher value.

According to the results, the SAM configuration that best represents the evaluated construct is the four related factors. Based on this model, reliability calculations were made at the level of observed and construct scores.

Evidence of Reliability

Analysis of measurement models. The congeneric model was initially evaluated for each factor separately, assuming one-dimensionality.[28] After that, the equality of configuration coefficients (tau-equivalent model) was forced and this model was compared with the previous model, expecting minor variations in the CFI (CFItau - CFIcong ≤ -.01).[29] Based on the results obtained (Table 4), only the Spatial factor would allow the calculation of the coefficient α, but it was considered for all the factors for contrast purposes with other results as seen in Table 3.

Estimates. Reliability was estimated at two levels: latent variables and observed scores (Table 3). The αordinal reached adequate levels, as well as the coefficients ω and H (> .80)[30] and the coefficient α for each factor analyzed.

Table 3. Parameters of the items and reliability in the SAM: oblique and bi-factor model.

	Oblique model				Bi-factor model	
	F_1	F_2	F_3	F_4	F_S	F_G
When remembering events, in general, I can remember objects that were in that environment.	.628				.315	.511
When remembering events, in general, I can remember the clothes I was wearing.	.758				.474	.516
I have full confidence in my ability to remember past events.	.748				.542	.471
When remembering events, I remember many details.	.665				.537	.395
When remembering events, in general, I can remember the day of the week in which they occurred.	.535				.397	.352
When remembering events, in general, I can remember the people, how they looked, and what they wore.	.579				.430	.319
I can learn and repeat facts in an agile way, even if I do not remember where I learned them.		.632			-.041	.523
After meeting someone for the first time, I easily remember their name.		.627			.746	.260
I can easily remember the names of famous people (athletes, politicians, celebrities).		.753			.423	.424
I am very good at remembering information about people I know (example: names of children of co-workers, their personalities, places that my friends visited, etc.).		.464			.397	.529
In general, my ability to find my bearings is superior to that of most of my family/friends.			.464		.065	.424
After visiting a place it is easy for me to return the second time.			.648		.198	.579
If my route to work/study is blocked, I could easily find the fastest alternate route to arrive.			.821		.891	.454
I use specific reference points to find my bearings.			.737		.460	.444
When imagining a future event, I see it clearly at a specific time and place.				.769	.397	.612
When imagining a future event, I can visualize how the space is organized.				.869	.582	.613
When imagining a future event, I can visualize the people and the way they look.				.779	.587	.477
When imagining a future event, I can imagine how I would feel there.				.742	.433	.559
When imagining a future event, I can visualize images (example, people, objects, etc.).				.842	.587	.575
F1	1					
F2	.712	1				
F3	.429	.349	1			
F4	.462	.557	.577	1		
AVE	.432	.394	.463	.643	-	-
Ω	.818	.717	.768	.900	-	-
ωh	.416	.304	.316	.400	-	.739
H	.832	.743	.810	.907	-	-
Hh	.621	.624	.806	.665	-	-
A	.787	.640	.710	.874	-	-
IC95% Inf.	.736	.562	.644	.842	-	-
IC95% Sup.	.829	.707	.766	.900	-	-
αordinal	.815	.710	.758	.899	-	-

Note: n = 260; F1: Episodic Memory; F2: Semantic Memory; F3: Spatial; F4: Future; FS: Specific factor; FG: General factor; AVE: Average variance extracted; ⍰: Omega coefficient; ⍰h: Hierarchical omega coefficient; H: coefficient H; Hh: H hierarchical coefficient.

Table 4. Evaluation of congeneric and tau-equivalent measurement models in the SAM.

Measurement model		SB-χ^2 (p)	CFI	ΔCFI	RMSEA (IC 90%)	SRMR
F1						
	Congeneric	34.247 (p < .001)	.964		.104 (.068, .142)	.067
	Tau-equivalent	56.272 (p < .001)	.939	-.025	.108 (.079, .138)	.088
F2						
	Congeneric	3.723 (p = .155)	.989		.054 (.000, .148)	.035
	Tau-equivalent	31.070 (p < .001)	.839	-.160	.142 (.096, .191)	.117
F3						
	Congeneric	34.228 (p < .001)	.894		.249 (.180, .325)	.103
	Tau-equivalent	53.206 (p < .001)	.841	-.053	.193 (.147, .240)	.116
F4						
	Congeneric	31.635 (p < .001)	.982		.143 (.098, .193)	.054
	Tau-equivalent	46.350 (p < .01)	.975	-.007	.127 (.092, .163)	.072

Note: F1: Episodic Memory; F2: Semantic Memory; F3: Spatial; F4: Future.

Discussion

Much of the clinical consultation in psychology and psychiatry relies on the credibility that professionals provide to patients' autobiographical memories. However, there are few studies related to the features of autobiographical memory. In general, the clinician's main interest is the content of the memory and the possibility of integrating it into a coherent story that allows making sense of the patient's subjective experience.

In our research, however, the interest is focused on a more general and schematic framework of the theory of memory. In general, each person can give a report of the beliefs that he has about his autobiographical memory, just as he can give a report of the beliefs about himself, his thoughts and his behaviors. In a report of autobiographical memory, it would be expected that self-perceptions about skills or difficulties to remember names, places, specific situations, or visualization of future situations would be manifested. In sum, people would be expected to account for episodic, semantic, spatial, and prospecting aspects.

The SAM is a scale elaborated precisely for this purpose, so the present study focused on the analysis of the internal structure and reliability in a sample of the Colombian general population, finding favorable results.

In the original study of creation and validation,[1] four dimensions were reported: two structurally similar dimensions to which general statements

about episodic, semantic, and spatial memory were contributed in a general way. In the first dimension, however, judgments related to episodic memory had the highest contribution percentage for their structuring. In the second dimension, the highest percentage was in semantic memory. The spatial memory contributed in a higher percentage to the third dimension, and finally, the items related to the prospective memory contributed more to the fourth dimension.

Following an alternative method of analysis of Much of the clinical consultation in psychology and psychiatry relies on the credibility that professionals provide to patients' autobiographical memories. However, there are few studies related to the features of autobiographical memory. In general, the clinician's main interest is the content of the memory and the possibility of integrating it into a coherent story that allows making sense of the patient's subjective experience.

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Following an alternative method of analysis of determination of latent dimensionality for the SAM scale, we tried to establish the most appropriate model for the representation of the construct. Our results have shown that the model of four oblique factors is the one that obtains the best indices.

A first dimension is composed of six statements related to episodic memory (i.e. *When remembering events, I generally can recall objects that were in the environment; When remembering events, I generally can recall the clothes I was wearing; I have full confidence in my ability to remember past events; When remembering events, I recall many details; When remembering events, I generally can recall the day of the week they occurred; When remembering events, I generally can remember people, how they looked and what they wore*). Classic studies in memory have shown that memories of this type have a temporal-spatial coding component and a distinctive phenomenological aspect: a sensation of internal temporal displacement which Tulving called autonoesis.[31]

A second dimension is composed of four items related to semantic memory (i. e., *I can learn and repeat facts easily, even if I do not remember where I learned them; After having met someone for the first time, I easily remember his name; I can easily remember the names of famous people, such as athletes, politicians, and celebrities; I'm very good at remembering information about people I know, such as names of children of co-workers, their personalities, places my friends visited, etc.*). This type of memory system is represented through the general knowledge of the world and is not associated with specific events or sensory-perceptual activations evocative of the moment in which the information was acquired. A recent meta-analysis[32] has shown that there is a wide overlap in the activation of

regions in episodic and semantic memory tasks; however, the bilateral hippocampal formation responds specifically to episodic memory tasks. The fact that these two types of memory share large regions of cortical activation could be a neuroimaging indicator of their correlations in psychometric terms. In our results, the correlations between these two dimensions are moderate (.712), which is in part similar to what was found in the original study,[1] a fact that points to an overlap of these two types of memory in everyday contexts.

A third dimension consists of four statements related to the spatial memory system (i. e., *My ability to find my bearings is generally superior to that of most of my relatives/friends; After visiting a place it is easy for me to return a second time; If my route to work/study is blocked, I could easily find the fastest alternate route; I use specific landmarks to get my bearings*). This type of memory makes it possible to integrate information related to objects and places that have been observed or visited. This aspect has been important both for our ancestors and for us, affecting our biological and social success. The need to remember the location of objects and places requires the integration of sensory and motor information in complex representations.[33] Such representations can be egocentric or allocentric. From an egocentric perspective, we seek to represent the location of objects in relation to the location and place occupied by the self. From an allocentric perspective, information of an object— or parts of it— is coded with respect to the location of other objects.[33] Both types of representations are dissociable.

A fourth dimension is composed of five items related to prospective memory or future episodic thinking (i. e., *When imagining a future event, I see it clearly in a specific time and place; When imagining a future event, I can visualize how the space is organized; When imagining a future event, I can visualize the people and the way they look; When imagining a future event, I can imagine how I would feel there; When imagining a future event, I can visualize images such as people, objects, etc.*). The possibility of thinking about future scenarios and contexts seems to be nourished by the contents of systems such as the episodic memory.[34] In such a way that alterations in this system can lead to difficulties in the possibility of imagining future situations, as Tulving described it with regard to patient K.C. Based on this, it seems that the ability to simulate a future episode plays a fundamental role in the regulation of emotional states, social interactions with communicative purposes, and in the achievement of important objectives for the organism.[35] Similarly, as some authors indicate, this capacity, when stimulated and directed, can provide functional benefits on the behavior of patients who have gone to psychotherapy. [35]

In the clinical setting, the use of self-reports for psychological evaluations has a series of advantages and limitations that must be considered.[36] On the one hand, self-reporting allows the attainment of exclusive information that cannot be obtained by other means of evaluation such as direct observation of the patient's behavior and verbal reports. In turn, its use can be a substantial time saver and the results can be integrated into clinical actions and decisions. In addition, they can be effective tools to know differences in perception and information about different clinical pictures in different populations.

Regarding the limitations, it is clear that there may be a series of biases in the responses of the subject that should be weighed by whoever provides this type of measure, such as halo effect, biases in the change of answers, falsification, and social desirability, among others.[36] One of the most frequent biases appears when inverted-scale items are used,[37,15] but in the present study it was appropriately controlled by eliminating those items so that it didn't have a determining influence on the study of the internal structure of the SAM. It should be noted that the bias associated with the use of inverted items may not affect all types of instruments in the same way, but this exploration is necessary. Then, the recognition of these disadvantages must influence the rational and planned use of these types of items. Although it is probable that the elimination of items could alter the total configuration of the instrument, this reagent purification was uniform— that is, two items were eliminated in each dimension (Episodic memory, Semantic memory, and Spatial), and only

one item in Future. In addition, it would be really detrimental to maintain them since they would be collaborating with irrelevant variance to the construct and, consequently, directly affecting the interpretations.
In addition, the floor and ceiling effects could affect the results, given that there is evidence that the items with extreme responses tend to form factors of difficulty,[38] although the empirical differentiation between the factors studied (correlations between moderate and low) provide evidence in favor of the instrument.
Despite the favorable psychometric indicators, the characteristics of the sampling used (i.e., incidental) probably limited the external validity of the instrument to other groups, such as, for example, university students.

As shown in this study, the SAM can be an instrument of self-report with validity evidence related to its internal structure, as well as being effective for understanding various aspects of autobiographical memory in clinical and research fields. However, it is necessary to perform new reliability tests, for example, studies of temporal stability through test-retest, and new studies of construct validity to accumulate evidence in favor of their psychometric quality, and one of them is the analysis of the measurement invariance.

Current neuroscience believes there are differences between men and women with respect to some brain structures linked to autobiographical memory (e.g., the dorsolateral prefrontal cortex),[39] so it is likely that there are differences in their measurements with the SAM, and it is necessary to perform an invariance analysis in order to evaluate that potential bias. These differences can also be extended to groups of different place of origin, degree of schooling, etc., which makes its execution necessary in order to avoid potentially biased comparisons.[40] Due to our sample size, however, it was not possible to perform this because there should be at least 200 members in each group to be compared (e.g., males and females).[41]

It is necessary to mention that although the use of the general population in the present validation study limits the applicability in the clinical setting, this step is important. It is necessary to analyze the strength and configuration of the construct in a population without significant problems in its mnesic functions in order to establish a baseline that could be considered normal, since the presence of disorders, and even comorbidities, could bias the answers and would seriously threaten the validity of the inferences.

Subsequently, diagnostic accuracy studies based on ROC curves could be carried out in order to obtain cut-off points that can appropriately differentiate normal and clinical populations.

As it could be appreciated, there were some limitations that may be overcome later. Despite this, the present study shows methodological strengths in various aspects. For example, in the study of the internal structure, in addition to the structure per se, the relevance of a general factor was analyzed. Similarly, an analysis of response bias associated with inverted items was implemented; additionally, the reliability report was rigorous, since it was focused on both the latent variables and observed scores.

Conclusion

Henceforth, the SAM can be used as a measuring instrument to understand the differences in semantic, episodic, spatial, and prospective memories in the normal population, and could be used with care in the clinical population. In turn, it can be a useful instrument to obtain information in order to carry out effective therapeutic interventions, although this should be analyzed in depth in subsequent studies.

Conflicto de intereses

The authors declare no conflicts of interest.

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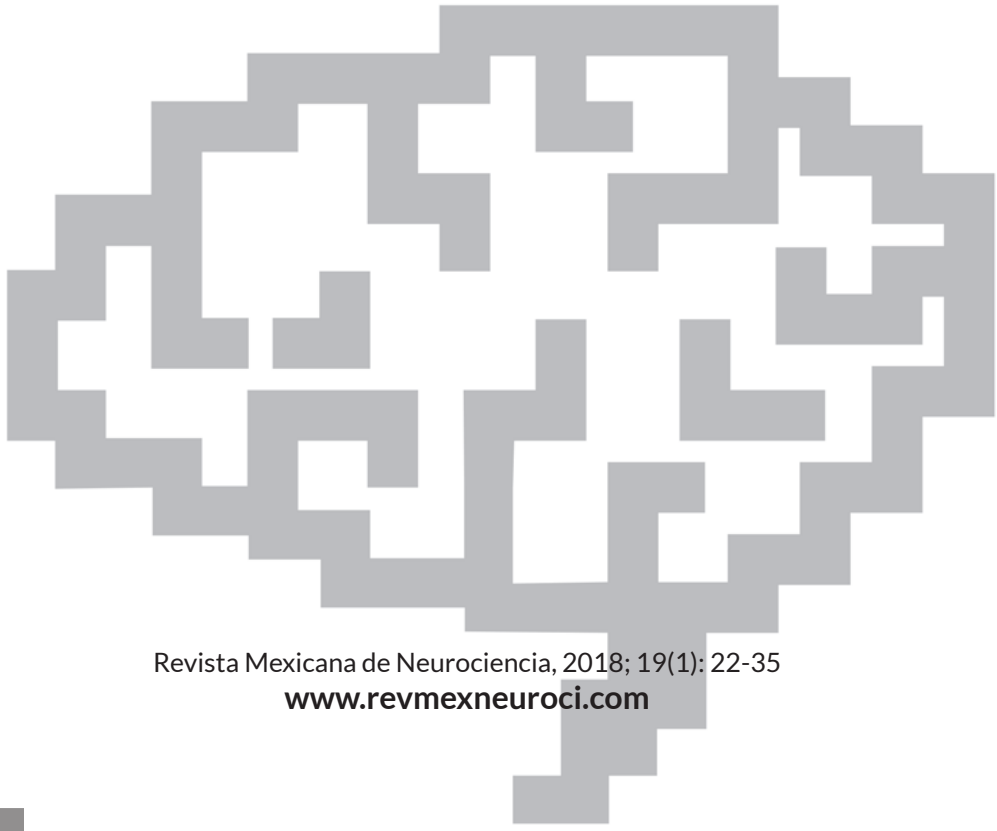

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