Simple visual reaction times and the Multiphasic Sex Inventory: Gender differences

Tiempos de reacción visual simple y el Inventario Multifásico de la Sexualidad: diferencias de género

Tempos de reação visual simples e o Inventário Multifásico da Sexualidade: diferenças de gênero

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ABSTRACT

Gender differences were analyzed in relation to two sexual interest evaluation strategies: a reduced *ad-hoc* version of the Multiphasic Sex Inventory (MSI) and a measurement task of Visual Reaction Times (VRT) to Sexual Stimuli. With an incidental sample of 60 individuals, psychometric properties of a 63 items version of the MSI were analyzed. The VRT was a computer-based heterosexual, homosexual, adults, children, and neutral images test. Results show an acceptable internal reliability of several MSI subscales, and construct validity among them. In the MSI, men showed more cognitive distortions and sexual obsessions, as well as early starting in sexual activities and less social desirability in sexual matters. Regarding to VRT, women spent less time on adult images (Cohen's *d:* 0.85, and more on children (*d:* 0.61) and neutral images (*d:* 0.75). Several significant correlations between MSI subscales and VRT dimensions were found.

Keywords: sexual interests, psychological evaluation, reaction times, gender.

RESUMEN

Se analizó el papel del género con relación a dos estrategias de evaluación de intereses sexuales: una versión reducida *ad-hoc* del Inventario Multifásico de la Sexualidad (IMS) y una tarea de medición de Tiempos de Reacción a Estímulos Sexuales visuales (TRES). Con una muestra incidental de 60 sujetos se analizaron las propiedades psicométricas de una versión de 63 ítems del IMS. La prueba TRES se basó en imágenes de contenidos heterosexuales, homosexuales, de adultos, infantiles y neutrales presentadas en computador. Los resultados muestran una fiabilidad interna aceptable de varias de las subescalas del IMS, y validez de constructo entre ellas. En el IMS, los hombres mostraron más distorsiones cognitivas y obsesiones sexuales, inicio más temprano en la sexualidad y menor deseabilidad social en temas sexuales. En relación con la prueba TRES, las mujeres emplearon menos tiempo ante

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imágenes de adultos (*d* de Cohen*:* 0,85), y más ante imágenes de niños y neutrales (*d:* 0.61 y *d:* 0.75). Se encontraron varias correlaciones significativas entre subescalas del IMS y las dimensiones TRES.

Palabras clave: intereses sexuales, evaluación psicológica, tiempos de reacción, género.

RESUMO

O papel do gênero foi examinado em relação a duas estratégias de avaliação de interesse sexual: uma versão abreviada ad-hoc do Multiphasic Sexuality Inventory (MSE) e uma tarefa que mede os tempos de reação aos estímulos sexuais visuais (TRES). Com uma amostra incidental de 60 sujeitos, foram analisadas as propriedades psicométricas de uma versão de 63 itens do IMS. O teste TRES foi baseado em imagens computadorizadas de conteúdo heterossexual, homossexual, adulto, infantil e neutro. Os resultados mostram a confiabilidade interna aceitável de vários dos subscritores do IMS, e constroem validade entre eles. No IMS, os homens mostraram mais distorções cognitivas e obsessões sexuais, início mais precoce da sexualidade e menos desejo social em matéria sexual. Em relação ao teste TRES, as mulheres passaram menos tempo com imagens de adultos (d: 0,85 da Cohen), e mais tempo com imagens de crianças e neutros (d: 0,61 e d: 0,75 da Cohen). Foram encontradas várias correlações significativas entre as dimensões IMS e TRES.

Palavras-chave: interesses sexuais, avaliação psicológica, tempos de reação, gênero.

Introduction

High rates of sexual crimes in Latin America (Heiskanen, 2010) or in Colombia (Policía Nacional, 2016), as the ninth most frequent type of crime in 2015 together with the impact that these crimes have on victims in the short, medium or long term (Echeburúa & Guerricaechevarría, 2000), and the risk of false reports (Rincón, 2007; Coronado-Mares & Turvey, 2018), make it necessary to evaluate sexual interests with reliable and valid instruments and strategies (Coric et al., 2005) for a topic that is considered a taboo in current societies (Spraggon, 2002), in which the majority of aggressors are men and the majority of victims are women (White et al., 2008), and that frequently generates high social desirability and defensiveness in the individuals evaluated (Ruiz, 2014).

There is a wide variability in the intensity, frequency, preferences, and sexual practices in the general population (Cáceres, 2001), while among sexual aggressors there are also differences in personality factors, level of intelligence, frequency of deviant behavior, preferences by types of victims (Garrido & Beneyto, 1995; Garrido, 2003), cognitive distortions (Ward, 2000; Spraggon, 2002; Ward & Beech, 2006; Burn & Brown, 2006), experiences of sexual or emotional victimization (Valencia et al., 2010), psychiatric disorders (Christopher et al.,

2007), concerns about issues related to sex, difficulties in self-regulation, lifestyle instability, negative family history (Vizard, 2007), affective relationship problems, tolerant attitudes towards sexual assault (Hanson & Morton-Bourgon, 2005) or the risk of relapse (Craig et al., 2008).

In this framework, the measurement of sexual interest through objective tests such as the Visual Reaction Times to Sexual Stimuli (VRT) has been important in the investigation of sexual drive, pornography consumption, gender preferences, and atypical sexual interests such as preference for children (Abel et al., 1998). In the simple visual reaction times modality, people must perform an action – such as pressing a computer key – each time a visual stimulus projected on the computer is perceived (Jain et.al. 2015).

RTs have been used to evaluate diverse behaviors and preferences, including criminal behavior and sexual interests (Abel et al., 1998; Letourneau, 2002). Thus, individuals diagnosed as psychopaths with the PCL-R used longer RTs on erotic and emotional stimuli than two comparison groups, and greater psychopathy was associated with faster reaction times in general (Montañés et al., 2000). Regarding gambling addiction, Jacobsen et al. (2007) indicate that by means of the Sproot procedure, pathological gamblers presented faster

RTs on visual stimuli of words about winning in the game, and broader RTs on words that reminded them of their problems in the game. On the other hand, Brevers et al. (2011) found, by means of ocular recordings (Eyetracking), that individuals with probable gambling addiction had higher RTs before visual stimuli of the game, were looked at more times in absolute frequencies, and were looked at more times in the first movement of the eyes with respect to neutral stimuli.

Regarding sexual interests, in a study on interest in pornography, Love et al. (1976) found that individuals who scored low on feelings of guilt, increased their reaction time to the succession of new sexual images (which were increasingly explicit), while individuals with high guilt did not record changes in the speed of reaction to new stimuli, and the individuals who had average scores in that feeling showed a curvilinear pattern of vision: they spent less time on the less and more explicit images. On the other hand, Abel et al. (1998) found in a group of individuals reported for inappropriate sexual behavior, that there was a significant correlation between the VRT to sexual stimuli and sexual behavior. For example, VRTs were broader for images of male infants in individuals with reported child abuse (male).

On the other hand, according to the same study, the VRT allowed the deviant behavior of a greater number of individuals to be identified through discriminant analysis than the plethysmography test. Along the same lines, Rupp & Wallen (2007) proposed a task of exposure to sexual stimuli to three groups of individuals, with fifteen individuals per group: men, women with a normal menstrual cycle and women with contraceptive treatment, for a total of 45 individuals. The direction of gaze on each slide and the time spent looking at the areas of the slides were recorded. The authors found that men spent more time and focused more on certain areas of the pictures, such as female faces. Women with a normal menstrual cycle spent more time and focused more on the genital areas of the pictures, while the group of women with contraceptive treatment paid more attention and spent more time on the contextual details of the pictures. The authors propose the existence of cognitive biases that lead women and men to focus on different aspects of

pictures with sexual content, since both genders show different genital, neuronal and arousal responses to visual sexual stimuli. On his side, in a sample of 57 offenders interned in various confinement regimes in a military establishment and using a VRT task, another plethysmography record and the Multiphasic Sex Inventory (MSI), Letourneau (2002) found that VRT allowed to identify the aggressors against adult women, and both VRT and the plethysmography examination identified the male adolescent aggressors.

In this framework of sexual interest evaluation, the Multiphasic Sex Inventory is a psychological test for the evaluation of sexual aggressors (Multiphasic Sex Inventory – MSI by Nichols & Molinder, 1984, in Cáceres, 2001; Lanyon, 2001; Romero, 2006; Cáceres, 2006), with certain advantages over other instruments. The first version of this instrument was developed by Nichols and Molinder (1984, in Cáceres, 2001, 2006) for the evaluation of convicted male sexual offenders who agreed to participate in treatment programs. A second version of the MSI was developed by the same authors, to evaluate sexual offenders of both sexes, both adults and infants, and both in stages prior to a sentence (forensic field) and after it (in convicted individuals). Both versions consist of 300 items distributed in a series of dimensions such as social desirability, sexual obsessions, lie scales, cognitive distortions, and justifications. The sexual obsession scale includes one on sexual deviations "pedophilia, exhibitionism, and rape", and another on atypical sexual behaviors, which includes paraphilias such as fetishism, obscene calls, voyeurism, and sadomasochism. This instrument has been used as part of the evaluation of intervention programs with sexual aggressors (Garrido & Beneyto, 1995; Romero, 2006). For their part, Kalmus & Beech (2003) recommend that the evaluation of sexual interests or preferences combine the use of a physiological technique such as VRT, with the use of questionnaires. However, this type of research is very scarce.

Under the previous considerations, the objective of this work is to know the behavior of university students, that is, individuals not prosecuted for any crime, using two sexual interest evaluation techniques: a measurement of reaction times

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before visual sexual stimuli and an adaptation of the MSI as a self-administered paper-and-pencil test. Specifically, we intend to explore the possible relationships between the responses of the individuals to both tests and the role of gender in each of the tasks. In addition, as another objective, it is intended to know the preliminary psychometric properties that the reduced version of the MSI shows in Colombian individuals.

In this sense, the sexual interest evaluation through visual reaction times to sexual stimuli (VRT) can be more precise, reasonable in a cost/benefit ratio, and with fewer bioethical inconveniences than other physiological techniques such as plethysmography "which requires erotic or pornographic materials" (Abel et al., 1998). On the other hand, it must be considered that reaction times are influenced by age, laterality (left and right), peripheral or central vision, practice, fatigue, breathing cycle, personality type and intelligence (Jain et al., 2015), and gender (Rupp & Wallen, 2007, Jain et al., 2015).

Methodology

Design

The design is quasi-experimental, transversal and with a comparative and correlational approach. The variability of age in the selection of participants was controlled, a comparison of the results of men and women was carried out from a single data collection, and the correlations between the variables measured in the paper-and-pencil instrument and measurements of reaction times were analyzed.

Participants

The participants were voluntary individuals (n: 30), with 15 women and 15 men, undergraduate and postgraduate Psychology students from a Colombian university, whose ages were between 17 and 31 years old. Individuals responded to a Sexual Stimuli Reaction Times Visual task (VRT) and then to an adaptation of the MSI. The order established for the application of the tests was carried out in this way, to avoid emotional activation that could result from reading the MSI items. Age restrictions

are given by the origin of the sample, but it must also be considered that having had older individuals introduces by itself a bias to obtain responses with greater latency in VRT in choice tasks and, especially, from the age of 50 on simple tasks (Silverman, 2006; Der & Deary, 2006; Jain et al., 2015).

Instruments

Sexual Stimuli Reaction Times. Fourteen images were selected, extracted from Google® and Flikr® online image search engines, all of them in jpeg format, which correspond to five content categories, with three images for each category: neutral, adult images, children (boys, girls, and adolescents), homosexual couples and heterosexual couples (two images). Images and tasks were assembled using Authorware software. The order of the images was similar for all the individuals, and with alternation of categories so that two images of the same category were not presented in a row. Individuals were asked to view each image on a computer monitor and move on to the next by pressing the "space" key, while the program recorded in milliseconds the time elapsed in moving from one image to another. The screen background for all images was white and a gray button with the word "next" was placed at the bottom to remind the individual to move to another image. No image was of erotic or pornographic content. The three neutral images consisted of a sea and beach area with no people, a bridge, and flowers; the adult images were of people in a swimming pool, people dressed in boxers and miniskirts; the three children images included an image of a girl, a boy sitting thinking, and a teenage girl; those alluding to homosexual contact were a hug between two women, a hug between two men and a kiss between two women. Finally, in the images related to heterosexuality, a kiss between a man and a woman was presented, a bed in which the feet of a man and a woman appeared, and an insinuation of sexual contact between a man and a woman.

Adapted Multiphasic Sex Inventory (MSI). 130 items were extracted from the original list of 300 items (Nichols & Molinder, 1984, in Garrido et al., 1993). For this, the items referring to criminal conduct were eliminated. Likewise, a linguistic revision of the test was carried out to adapt it to the uses of

Colombian Spanish. Lastly, and given that the MSI was designed to assess males, two versions were prepared for this study, one for each gender, with the corresponding adapted items. The items were dichotomous responses (true or false). The dimensions covered by this reduced version of the MSI are helplessness, cognitive distortions and immaturity, gender identity, homosexual orientation, beliefs and knowledge about sexuality, social desirability about sexuality, sadistic orientation, early sexual deviation, and negative self-perception.

This paper presents the results of the scales that had at least three items, fulfilling the minimum requirement of number of items for an indicator (Casas, 1989), for a final list of 63 items. However, and as an exception, the gender identity indicator was included, based on the sum of the scores for two MSI items, given the possible relevance of this dimension. Spearman's correlation between both scores was r(60) = .459, p <.001. Sexual impotence refers to the suffering of difficulties to carry out the sexual relationship, cognitive distortions and immaturity refer to a negative image of oneself and a threatening perception of others; from this scale, the negative self-perception subscale was derived, which brings together the items on self-perception (item example: "life has dealt me more blows than most people"). Instead, beliefs and knowledge about sexuality refer to mistaken beliefs about the sexual arousal process and about genital areas. For its part, gender orientation indicates to what extent the person feels sexual attraction towards people of the same sex, while gender identity refers to the degree in which the person feels dissatisfied with own gender. In turn, sexual obsessions refer to the experience of worry, fantasies, and thoughts about sex; early sexual deviation is an indicator of interest from an early age on sexual topics and stories (item example "when I was a child, I was curious to know things about sex"), and the sadistic orientation represents the tendency to enjoy doing harm in sexual relations. The scales have presented internal consistency coefficients from 0.50 to 0.90 (Kalichman et al., 1992).

Procedure

First, a linguistic revision of the MSI was carried out by the author and a research assistant, and the items related to criminal behavior were eliminated. A pilot test of the MSI version was carried out with students, alike to those who were going to be selected for the application of both MSI and VRT. This piloting resulted in questions, observations, and suggestions about the items, which also led to discarding those that were very similar in wording and that seemed to be repeated. After these stages, the applied version for this research was created. In addition, wording of the items was adapted so that it could also be answered by women.

The reaction times task was performed before the application of the questionnaire to avoid the effect that answering the questionnaire first could have, by activating attitudes and tendencies collected by the MSI. This VRT task was executed on a single computer, to prevent possible biases associated to the processors´ speed in cases of using more than one computer. Thirty individuals responded to both tests. Moreover, another thirty additional individuals answered only the MSI version.

The project was adjusted to bioethical principles of voluntariness in participation, being informed of the general objective of the research and tasks to be carried out in the session, respect for anonymity and search of benefit "to the country through the advancement in the development of non-intrusive measures of sexual tendencies" and non-maleficence, participating individuals were not exposed to pornographic or erotic content. The research was endorsed by the Bioethics Committee of the Faculty that financed the study.

Analysis Plan

Descriptive and psychometric results of the MSI version (reliability analysis and analysis of its dimensions by major components) and cross-references with socio-demographic variables are presented first. In order to compare the responses of men and women and correlate VRT measures with MSI scales responses, internal reliability of VRT measures is presented by calculating intra-category and inter-items correlations. Non-parametric tests were used for comparisons and Spearman's coefficient for correlations.

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Results

Multiphasic Sex Inventory: Response patterns and internal reliability analysis

A response frequencies analysis found that 13 items were answered affirmatively by, at least 70% of the individuals (for example, "Have I ever laughed at a dirty joke"), while a group of 7 items were answered negatively, that is, as 'false' by at least 90% of the participants, for example, "I don't like it to be known but I 'm attracted to people of the same sex".

Internal reliability of MSI subscales were studied, according to the test manual (Garrido et al., 1993).

The results of this analysis are shown in Table 1, after having recoded the corresponding items. For scores interpretation it must be considered that, a higher score indicates greater pathology, while in the social desirability on sexual issues scale, a lower score indicates greater social desirability, and a higher score indicates greater disinhibition to talk about sexual issues. As can be seen in these results (Table 1), most subscales show an acceptable reliability index. Sexual impotence subscale has a very low value, so it is discarded for subsequent analyses. For its part, the early sexual deviation scale shows low reliability, so the decision was to leave it for further analysis, although warning on being cautious with the results obtained.

Table 1

Subscales Internal Reliability

MSI subscales	α	Number of items	Number of individuals	Mean	SD
Sexual impotence	-0.02	5	60	2.03	1.50
Cognitive distortions	0.63	14	59	3.64	1.78
Early sexual deviation	0.41	3	60	6.39	3.26
Homosexual orientation	0.67	5	58	1.21	2.12
Beliefs about sexuality	0.56	5	58	4.03	2.35
Sexual social desirability	0.86	8	58	5.88	2.14
Sexual obsessions	0.77	12	60	3.05	2.22
Negative self-perception	0.69	8	60	2.60	2.41
Sadism	0.69	3	59	0.96	2.32
Total MSI	0.87	63	53	4.04	1.35

Multiphasic Sex Inventory: Relations between subscales and sociodemographic variables

Age, gender, and socioeconomic level were included as sociodemographic variables. Regarding marital status, most of the individuals declared themselves single (90%), and with a university educational level (73.3%), which makes the sample homogeneous in these aspects. Regarding socioeconomical level, individuals were grouped into three classes: low class (levels 1 and 2), middle class (level 3) and upper-middle class (levels 4, 5 and 6). Results are shown in table 2.

The most significant correlations found revolve around individuals' gender and, on the other hand,

to the deviation, sexual obsessions, and desirability, as well as early sexual interest group of subscales. Thus, men in the sample were characterized by expressing more cognitive distortions, obsessions, and early sexual deviation, as well as less social desirability in regard to sexuality (that is, with greater inhibition). Respecting MSI subscales, greater social deviance was associated with less social desirability, more obsessions, and erroneous beliefs about sexuality, and with greater early sexual deviance, homosexual orientation, and non-conformity with gender identity.

Early sexual deviation was associated with lower social desirability and with a higher score in sexual obsessions, while erroneous sexual beliefs were

associated with a negative self-perception, and sexual obsessions were directly associated with a sadistic orientation. On the other hand, homosexual orientation was directly associated in a moderate way with distortions and immaturity (also with worst self-perception), and greater nonconformity with one's gender (gender identity) was also associated with greater immaturity and negative self-image. In addition to the above, other groups of significant correlations were found, although at a lower level than those already mentioned. Thus, older age is tendentially associated with social desirability, obsessions, and a sadistic orientation.

Subsequently, a second-order principal components analysis with the subscales (not including negative self-perception nor early sexual deviation, since it overlapped with that of cognitive distortions), with varimax rotation, yielded two elements which jointly explained 51,02% of the item's variance. The first element, with an eigenvalue of 2.036 and a percentage of explained variance of 29.08%, groups in the rotated matrix, sexual social desirability (factorial load of 0.813), sexual obsessions (0.769), sadistic orientation (0.555), cognitive distortions (0.479) and sexual beliefs (-0.340). The second element, with an eigenvalue of 1.536 and a percentage of explained variance of 21.94%, is basically composed by beliefs and knowledge about sexuality (0.725) and homosexual orientation (0.637), cognitive distortions (0.600) and gender identity (0.409). The KMO coefficient value was 0.678 and that of the Bartlett sphericity test: 52.624, with p <.001, for 21 degrees of freedom.

Reaction Times

Reaction time to visual stimuli presented on the computer was recorded for thirty individuals. For these data analysis, times spent by the individuals in each one of the slides of the same group were added, and the result was divided by the number of slides of each group. In this way, there were five TR measures according to the categories of the slides: heterosexual people, children, homosexual couples, heterosexual couples, and neutral stimuli.

As an indirect measure of the internal reliability of visual stimuli used in this task, mean correlations

of reaction times between images of a given category, for example, neutral stimuli- and mean correlations between the other stimuli were calculated. Mean correlation between the same category stimuli is called "intra-category correlation", and mean correlation between each category and the other VRT is called "inter-item correlation". If inter-item correlation is equal to or greater than intra-category correlation, said category has low internal consistency; on the contrary, if intra-category correlation is higher than that of the rest of the items, the category has a reasonable internal consistency, that is, it is assumed that items of said category measure the same areas –neutral, adults, homosexuality, etc.

This method is inspired by the multi-trait and multi-method matrix (Campbell & Fiske, cited in Mearns, Patchett & Catanzaro, 2009). Three criteria that the evaluation of a trait must meet for said measurement to be valid are postulated in the original formulation: 1) the values of the relationships between several methods that measure the trait must be significant, 2) these values and their significance must be greater than the values of the relationships between the evaluations of other traits by various methods, 3) these values must be greater than those obtained from the evaluation of other traits by a single method, which are inflated by the variance of the method. For the present work, instead of personality trait measures we have sexual visual stimuli measures on five interests: adults, children, homosexual orientation, heterosexual orientation, and neutral stimuli. There are also three reaction time measurements for each interest, so it is possible to calculate the average correlations between same visual category items and the average between other visual category items. Table 3 shows the results obtained with this analysis.

In all categories, intra-correlations are higher than the average between the rest of the item-stimuli, so it is justified to calculate the sum of reaction times of individual stimuli of each category to obtain average reaction times to each category, which are used in the following analyses. The only exception is the result of neutral stimuli, where intra-category correlation and that of the rest of the items are very similar. Due to the interest of having these neutral stimuli, results related to

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this category will be maintained from now on, although they must be treated with caution.

Secondly, in relation to VRT data distribution, three indicators met normality criteria for women according to the Shapiro-Wilk test, suitable for samples of less than 50 individuals, and two presented a non-normal distribution: adults images [Saphiro-Wilk (16) = .885, p <.05] and homosexual couples images [Shapiro-Wilk (16) = .853, p <.05], while men presented a non-normal data distribution only in the RT of children images [Saphiro-Wilk (14) = 0.907, p <.01].

Thirdly, the analysis of VRT means (see table 4) that women spent more time especially before the children (U of Mann-Whitney: 59, p <.05) and neutral stimuli (U of Mann-Whitney: 54, p <.05), while men took more time before the adult images (Mann-Whitney U: 59, p <.05). For the total sample, neutral stimuli were the ones that captured individuals' attention the longest time in this task. There

were no relationships between RT and variables such as age or socioeconomic level.

Next, correlations analysis between MSI dimensions with VRTs was carried out. It was found that a higher level of cognitive distortions was associated to more time before heterosexual images [r(29) = -0.359, p <.10]; also, the higher the early sexual deviation, the faster reaction times were to neutral images [r(30) = -0.339, p <.10]. On the other hand, a higher score on beliefs and knowledge about sexuality subscale was related to a lower latency to visual stimuli on adults [r(29) = -0.480, p <.01] and homosexuality [r(29)= -0.324, p <.10], while lower sexual social desirability was associated with higher latency on adults [r(29) = 0.320, p <.10] and heterosexual images [r(29) = 0.361, p <.10]. On the other hand, a greater homosexual orientation in MSI correlated with greater latency before children images [r(29) = 0.412, p <.05] and those alluding to heterosexuality [r(29) = 0.479, p <.01].

Table 2

Spearman correlations between MSI subscales and with age, gender, and socioeconomic level of the individuals (n between 57 and 60)

	1.CD	2.ESD	3.SB	4.SSD	5.HO	6.SO	7.SaO	8.NSP	9.GI
Age	0.131	0.067	0.095	0.250+	0.178	0.251+	0.355+	0.177	0.272
Gender	0.199	0.341**	-0.154	0.506***	-0.118	0.463***	0.162	0.041	0.138
Social Level	-0.012	-0.086	-0.012	-0.079	-0.119	-0.110	0.077	-0.017	0.034
1. Cognitive distortions	1,000	0.557***	0.268*	0.381**	0.299*	0.398**	0.318*	0.893***	0.348**
2. Early sexual deviation		1,000	0.087	0.578***	0.187	0.369**	0.214	0.243+	0.165
3. Sexuality Beliefs			1,000	-0.049	0.139	0.044	0.001	0.404**	-0.024
4. Sexual social desirability				1,000	0.198	0.594***	0.373**	0.189	0.147
5. Homosexual orientation					1,000	0.166	0.219	0.333*	0.226
6. Sexual obsessions						1,000	0.366**	0.320*	0.111
7. Sadistic orientation							1,000	0.278*	0.219
8. Negative self - perception								1,000	0.333*
9. Gender identity									1,000

+ p < .10; * p <.05; ** p < .01; ***p<.001

Table 3

Intra-categories and inter- item RT correlations

Correlation	Neutrals	Adults	Children	Homosexuality	Heterosexuality
Intra	0.304	0.373	0.412	0.646	0.672
Inter	0.301	0.247	0.311	0.326	0.200

Table 4

Means and standard deviations in reaction times dimensions in women, men, and the total sample (values in milliseconds x 1000)

Visual Stimuli	Women		Men		Total		Cohen's *d*
	Means	CI 95%	Means	CI 95%	Means	SD	
-Adults	1.53	1.18-1.87	2.30	1.79-2.80	1.89	0.85	0,85
-Children	1.67	1.45-1.88	1.37	1.03-1.70	1.53	0.51	0.61
-Homosexuals	1.53	1.21-1.85	1.47	1.20-1.75	1.50	0.53	0,11
-Heterosexuals	1.91	1.53-2.28	1.81	1.50-2.12	1.86	0.62	0,23
-Neutrals	2.39	2.04-2.74	1.98	1.74-2.22	2.20	0.59	0.75

Discussion and Conclusions

Regarding general profile responses to MSI items, in this study we found items with high proportions in one of the two response options and intermediate proportions in other items, both tendencies or preferences and knowledge/beliefs. This profile may be considered to adjust the instrument as for to eliminate items that elicit a great consensus in the individuals and that, therefore, may be of low sensitivity. However, it must be considered that the responses profile found in this study corresponds to a sample with very specific characteristics "university students not contacted judicially for a sexual crime", and therefore a different response pattern for some items in criminal and prison forensic samples. For example, 100% of the individuals in our sample consider it false that they get excited when imagining someone urinating (item 98), but the response could be different in individuals who have committed a sexual offence.

Some of the group participants to which both tests were applied, made observations about the MSI referring to the items construction, since they mention that some of them are composite and one of the two parts is true and the other false, for example in the statement: "During my adolescence I was secretly sexually aroused, but I was embarrassed to talk about it with my friends", the participant may have been secretly sexually aroused during that stage of his life, but not embarrassed to talk about it with his friends, and the first statement, taking into account that the objective of the test is to evaluate sexual preferences, is an important item within it.

Likewise, items asking for the magnitude "aspects such as a lot or a little", are not precise enough to determine how much is a lot or a little for the person who answers the test. For example, the item "Many times I feel like a small child living in an adult body", does not specify how much time is meant by "many times". This generates equal responses with different reference magnitudes for each participant, so it would not be possible to evaluate these responses in the same way for all participants.

Regarding internal reliability and correlations between MSI subscales, the results obtained are satisfactory for several subscales and for the whole MSI

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used in subsequent analyses, while, besides that, they force us to review sexual impotence subscale and the one on early sexual deviation. However, the correlations profile between MSI subdimensions, as expected, given the high coefficient of internal reliability of the whole scale, is consistent, for example, more cognitive distortions, more sexual obsessions, earlier interest in sexuality, less sexual social desirability.

One of the limitations of the MSI is that its interpretation is exclusive to the original authors of the test, with few publications reporting their own reliability and validity indexes for the test. Thus, the studies with the MSI by Dowling et al. (2000), Letourneau (2002), Romero (2006), or Mackaronis et al. (2011) repeat internal reliability indexes reported in previous researchs (Kalichman et al., 1992) or do not provide such indexes, so Coric et al. (2005) indicate that this instrument is lacking psychometric information.

In this sense, the present work had as one of its objectives to understand preliminary psychometric properties of a reduced version of the MSI. On the other side, compared to the MSI original version aimed at evaluating individuals convicted for sexual crimes who admit their offense (Lanyon, 2001), the version used in this study, by eliminating the items on sexual criminal conduct, could constitute a basis for evaluating individuals accused of a sex crime, but not convicted. In the clinical and treatment field, this version could be of interest since it explores a wide variety of dimensions of sexuality. Nevertheless, given the low internal reliability of some of the subscales and the absence of data from prison samples, caution is required in applying the results of this study, as the individual analysis of responses to each item may be useful elements (table 1).

About reaction times, according to Abel et al. (1998), VRTs yield relevant results on sexual tendencies without using explicit sexual stimuli. These results may constitute measures of high reliability and validity, with even greater sensitivity than more intrusive and time-and- resource consuming measures such as plethysmography records. The results found in this study broadly agree with those found by Rupp and Whalen (2007), in the sense of finding gender differences in reaction times and in

responses to questionnaires on sexual issues. There may be several factors that explain such differences between genders, such as socialization in care that is traditionally assigned to women, or in expressing sexual desires or interests to men, without denying possible biological factors (Leaper & Friedman, 2007). Relative to reaction times, literature consistently reports lower reaction times in men compared to women, both in specific studies (Dykiert et. al., 2012; Jain et al., 2015) and in meta-analytical studies (Silverman, 2006). This could be related to a greater coordination between processing of visual information and the hand movement required to execute RT tasks (Mathew et al., 2020), or it could depend on cultural or generational factors (Silverman, 2006). However, these perspectives seem to be insufficient to explain gender differences in the present study on VRTs. Unlike results such as those of Jain et al. (2015), women are not less quick than men in all the stimuli, but before neutral images and those of children, while men spent more time before adult images.

Likewise, several correlations between reaction time measures and MSI scales show coherences –for example, less sexual social desirability with more time before images on heterosexual couples, more distorted beliefs about sexuality and less latency before homosexuality allusive images, and even greater early deviation in sex with lower latency before neutral stimuli. In relation to future research with VRT, it is also possible to expand the variety of sexuality aspects to be covered, the use of internationally validated visual stimuli, refining the instructions given to individuals to perform the task, and validation by experts of the categories to be assigned to each elaborated visual stimulus. And all this, while scrupulously maintaining ethical reserves on these research procedures, particularly in terms of the content that conform sexual visual stimuli.

Concerning sociodemographic variables, the sample was relatively homogeneous in educational level, marital status, and, relatively, in age. Similarity in gender proportions of the sample, on the other hand, made it possible to analyze in greater detail the role of this variable. In regard to MSI scales, a consistent pattern of differential relationships for each gender was found, with men showing more cognitive distortions and immaturity, less social

desirability, more sexual obsessions, more early sexual deviation, more interest in adults' sexual visual stimuli and less for those of children. Withal, as indicated above, verifying such differences is not equivalent to assigning a causal role to sex, since differential socialization processes in the expression of sexual interests may be behind these differences (Leaper & Friedman, 2007).

Undoubtedly, these results are mediated by the size and characteristics of the sample (university students not prosecuted for a sexual crime). Other studies are needed with broader and more varied samples "ages, professional levels, legal situation", and with an increase in the content validity of the pencil-and-paper instrument. For example, the original version of the MSI does not include aspects such as interest in intimate, exploratory or impersonal sexuality, which are covered by other instruments such as the Sexual Fantasies Questionnaire (Cáceres, 2001). Likewise, in terms of reaction time tasks, it is necessary to consider possible influences of variables such as the age of the experimental individuals (Dykiert et al., 2012) or their identification with visual stimuli (Kandil et al., 2017), the nature of the stimulus, for example, visual vs. acoustic (Jain et al., 2015).

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