



Correlates between sexual desire and disposition to sexual fantasies with inhibitory control and cognitive planning in young Colombians

Correlación del deseo sexual y disposición a fantasías sexuales con control inhibitorio y planificación cognitiva en jóvenes colombianos

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Abstract

Objective: the research was oriented to investigate the correlation between some executive functions (inhibitory control, risk-benefit calculation, cognitive flexibility, the planning ability, and decision making) and the general, dyadic and solitary sexual desire, sexual desire inhibition and disposition to sexual fantasies in a 17-to-30-year-old people sample. **Method:** An observational cross-sectional study in a purposive sample of 64 young college students, aged between 17 and 30, who were in a couple relationship at the time of the study and gave their consent for their participation in the research. The participants completed the Neuropsychological Battery of Executive Functions and Frontal Lobes tasks (BANFE for its abbreviation in Spanish): Stroop, card games, card classification and Hanoi Tower, and it was administered the Inhibited Sexual Desire Test, the Sexual Desire Inventory (SDI-2) and the Scale of Attitude Towards Sexual Fantasies. **Results:** The results indicate a correlation between the executive functions and sexual desire; it was found a correlation between total and dyadic sexual desire and disposition towards sexual fantasies with inhibitory control; and the inhibited sexual desire was correlated to planning ability and inhibitory control.

Discussion: Although the study presents some methodological limitations (size of the sample and need of a more rigorous validation of instruments in the Colombian population), the results confirm previous research findings, allowing to formulate new hypotheses in the field of sexuality and neurosciences. The study findings draw attention to the educational implications aimed to develop the executive functions in adolescents and young people to prevent risky sexual behavior.

Keywords: dyadic and lonely sexual desire, inhibited sexual desire, disposition to sexual fantasies, inhibitory control, planning and problem solving.

Resumen

Objetivo: El estudio se orientó a indagar la relación entre algunas funciones ejecutivas (FE) (control inhibitorio, cálculo de riesgo-beneficio, flexibilidad cognitiva, habilidad de planeación y toma de decisiones) con el deseo sexual general, diádico y solitario, inhibición del deseo sexual y disposición hacia las fantasías sexuales en una muestra de jóvenes entre 17 y 30 años.

Método: Estudio de enfoque cuantitativo de corte transversal. Mediante un muestreo intencional por conveniencia se seleccionaron 64 jóvenes entre 17 y 30 años, estudiantes universitarios que se encontraban en una relación de pareja. Para evaluar las variables de las FE se utilizaron tareas de la Batería Neuropsicológica de Funciones Ejecutivas y Lóbulos Frontales (BANFE): Stroop, juego de cartas, clasificación de cartas y Torre de Hanoi, y las variables relacionadas con el deseo sexual fueron valoradas mediante el Test del Deseo Sexual Inhibido, el Inventario del Deseo Sexual (SDI-2, sigla de *Sexual Desire Inventory*) y la Escala de la Actitud hacia las Fantasías Sexuales.

Resultados: Se encontraron correlaciones entre las variables del deseo sexual, disposición hacia las fantasías sexuales y el deseo sexual inhibido; deseo sexual total y diádico y disposición hacia las fantasías sexuales correlacionó con el control inhibitorio; y el deseo sexual inhibido correlacionó con la planificación y el control de impulsos.

Discusión: Los hallazgos del estudio llaman la atención sobre las implicaciones educativas encaminadas a desarrollar las funciones ejecutivas en adolescentes y jóvenes con el fin prevenir conductas sexuales de riesgo.

Palabras clave: deseo sexual diádico y solitario, deseo sexual inhibido, disposición a fantasías sexuales, control inhibitorio, planeación y solución de problemas.

Introduction

The research of human sexuality is a very vast topic, which has had an important progress since the second half of the last century. In the last decades, neuroscience, supported on the advanced techniques of neuroimaging has gotten significantly close to the comprehension of several neurological mechanisms of the human being; nonetheless, we still know relatively little about the human behavior and neuronal mechanisms underpinning sexual desire (Seok & Sohn, 2015).

Brain studies using functional magnetic resonance imaging have identified cortical areas related to sexual desire aspects. Authors, as an example, indicate that the events, objects, and people's perception reveal a certain activity in the upper orbitofrontal cortex, the medium cingulate and the anterior cingulate cortex (Kawabata & Zeki, 2008).

Sylva et al. (2013) proposed that most men have a specific pattern of genetics and subjective sexual arousal, responding significantly more intensely to erotic stimulus representing their preferred sex than to stimulus representing their non-preferred sex. Women, in contrast tend to have a less specific sexual arousal pattern.

Over the last decades, attention has been oriented to studying compulsive sexual behavior (CSB) or problematic hypersexual behavior (PHB) which has been conceptualized as a behavioral addiction (Voon et al., 2014; Seok & Sohn, 2015). Neurological research has shown that individuals with CSB demonstrate a greater activation of the anterior dorsal cingulate, striatum, and amygdale; areas equally involved in addiction problems, stating a connection between both problems (Voon et al., 2014).

Seok and Sohn (2015) state that the individuals with problematic hypersexual behavior (PHB) and a stronger sexual desire showed a disturbed activation in pre-frontal cortex and subcortical regions. These are interesting data, considering that pre-frontal cortex is mainly involved in human executive functioning, allowing for planning, control and supervision of behavior.

On this line of thought, the authors indicate that desire and sexual love not only share a surprising number of common areas in the brain that mediate somatosensory integration, expectation and cognitive social behavior; but, also, require a strong relationship with the higher cognitive function of the human being (Ortigue et al., 2010; Caciopo et al., 2012).

Some authors have directed their attention to the management of certain aspects related to the executive functioning in people who present problems of sexual compulsivity, indicating the presence of several problems in this respect, such as a greater tendency to alter decision making and cognitive flexibility after being exposed to an erotic stimulus (Messina et al., 2017). Miner et al. (2009) argue that subjects with a compulsive sexual behavior show a significant decrease in the inhibition and control of impulses, while Laier et al. (2014) proved that sexual excitement interferes significantly with decision making skills which is one of the most important capacities belonging to the executive functioning.

Mulhauser et al. (2014) also confirm the presence of altered decision-making skills and control of impulses in subjects that seek treatment for hypersexuality, noting a pattern of executive dysregulation in this type of population. Likewise, Reid et al. (2010) affirm that people treated for hypersexuality exhibit traits like impulsiveness, cognitive rigidity, lack of judgement, poor emotional regulation, and excessive concern towards sex; some of these traits are common among patients that have a neurologic pathology associated with executive distinction. A comparative study between hypersexual patients and control group patients showed the disturbance of global indexes for executive function, emphasizing problems in emotional control, cognitive flexibility, planning and behavioral setup, findings that provide evidence to support the hypothesis that executive distinction could be involved in hypersexual behavior.

Likewise, the Diagnostic and Statistical Manual on Mental Disorders, 5th edition, defines hypersexual disorder based on models of executive dysfunction (Echeburúa, 2012). The studies of subjects with cranioencephalic trauma that show the presence of dysfunctions concerning cognitive and sexual functioning product of the lesion, are in alignment with this definition. War et al. (2014) found a significant correlation between mental velocity, verbal memory, planning, visual memory, and sexual impulse in this population.

On this topic, some studies reveal that cerebral trauma related to the frontal lobes have an incidence in control of impulses, including sexual impulse (Bernal-Pacheco et al., 2009). The classic example of the case of Phineas Gage exposes the link between trauma of the frontal lobes and cognitive/emotional alterations, pointing at the existence of two types of frontal syndromes, just as delimited by Ardila (2013). The first one is related solely to cognitive and metacognitive functions and involves the dorsolateral area of the prefrontal cortex; the second one is related to the “executive emotional functions” that are in charge of coordinating cognition and emotion, allowing the fulfilment of basic impulses following socially acceptable strategies, involving orbitofrontal and ventromedial areas of the frontal cortex (Ardila, 2013).

The latter indicates the presence of a connection between the management of cognitive capacities that make part of human being executive functioning and the behavior related to human sexual desire.

However, other research contradicts the presence of this connection, such as the research carried out by Reid et al. (2011); in their research, they indicate the absence of significant differences between executive functioning in people with sexual compulsive behavioral disturbances and controls.

Taking into account the ambiguity in the results related to the topic, and the importance of the compulsive sexual behavior given the growing population with this behavior in contemporaneous society, associated mainly to the usage of virtual media (Echeberúa, 2012; Ballester et al., 2014), the present research was oriented to enquire about the connection between some sub-components of executive functioning, such as inhibitory control, risk-benefit calculation, cognitive flexibility, the ability for planning and the general sexual desire (both dyadic and solitaire), sexual desire inhibition and disposition towards sexual fantasies in a sample of people between 17 to 30 years.

We oriented our interest to the late adolescence and young adulthood because of two relevant aspects about these ages: frontal lobes maturation as a support for the executive functioning (Johnson et al. 2009), and the growing exercise of sexuality showed during and after adolescence, which is known to be a stage with important changes in human development where several sexual attitudes consolidate and will later determine the adult sexual life (Calero et al., 2017). In this aspect, one of the most frequent sexual manifestations during this period are sexual fantasies (De la Cruz & Fernández-Cuesta, 2014); these, being a sexual arousal and desire enhancer, act as a potentiating factor on sexual conduct, including masturbation (Zubeidat et al., 2004).

Method

Research Design

The present study had a quantitative approach, a descriptive-correlational level, and a non-experimental method.

Participants

The purposive sample consisted of 64 people (17-to-30-year-old subjects) that live in municipality of Envigado, Colombia, and coursing university level education, who were in a couple relationship at the time of the study and gave their consent for participation in the research. The average age was 24 years old ($SD=6$), with a 43, 8% (28) women and 56, 3% (36) men.

Measures

For identifying the characteristics of the participants' sexual desire, three instruments were used:

Test of Inhibited Sexual Desire by Masters et al. (1994), validated for Spanish population by Sierra et al. (2003). It is composed of 15 items that are classified on a Likert style scale from 1 (Totally fake) to 9 (Totally true). Its internal consistency index measured with the alpha of Cronbach is of 0.80, which makes it a reliable test. The scoring is between 15 and 135.

The Sexual Desire Inventory (SDI-2) by Spector et al. (1996), translated and adapted to Spanish by this research, using a certified translator and evaluated by a linguistics expert. It is a short scale of 14 items; four items are placed on an answer scale of 8 items that goes from '0' (= "not completely") to '7' ("more than once a day") regarding to the frequency of the desire. The remaining items are to be answered on a Likert scale of 9 points from '0' (= "no desire") to '8' (= "Intense desire"). The total scoring variates from 0 to 112. The scale measures two dimensions: Dyadic and individual sexual desire. Internal consistency is estimated using the Cronbach Alpha revealed coefficients of 0, 86 for dyadic sexual desire and 0,96 for individual (lonely) sexual desire.

Hurlbert Index of Sexual Fantasy (HISF) of Hurlbert and Apt (1993). A Spanish version of this instrument that measures attitude towards sexual fantasies - was used. It was validated in a Spanish population by Desvarieux et al. (2005); this instrument measures two factors that agglutinate the items with negative statements (Negative disposition towards sexual fantasies; $\alpha= 0.83$) and positive statements (Positive disposition towards sexual fantasies; $\alpha= 0.85$). The scorings are distributed on a scale from 0 to 100.

Neuropsychological Battery of Executive Functions (Flores et al., 2014) was used for the measurement of the sub-components of executive functioning, which has an interjudge reliability of 0.80. In the current research only the sub-test of Stroop A and B (inhibitory control),

card game (risk-benefit estimate), card classification (mental flexibility) and Hanoi tower (planning in problem solving situations) were used.

Data analysis

Was used the Kolmogorov-Smirnov test to examine if variables are normally distributed, bivariate correlations were conducted, thus, non-parametric (Spearman) and parametric (Pearson) correlations were used for these analyses. Analysis of groups was performed using independent t-test and non-parametric test (Mann–Whitney U). For the analysis of data by age groups, the age variable was recoded in late teenager (17-22) and young adult (23-30). The results were considered relevance if P value <0.05. The data was processed with the statistical program SPSS, version 22 for Windows.

Research Procedures

To collect information was made a random contact with young university students belonging to a university located in the Municipality of Envigado and it was explained to them the purpose of the study. The participants who agreed to participate in the study signed the informed consent. The application of instruments was carried out by the researchers inside the university location and the application time was between forty and fifty minutes per participant. Were considered the regulations corresponding to ethical aspects, according to Resolution 8430 of the Ministry of Health of Colombia and the Code of Ethics of the Psychologist (Colegio Colombiano de Psicólogos, 2009). Likewise, the procedures were endorsed by the Ethics Committee of the respective university.

Results

Table 1 shows that the score obtained by participants on total sexual desire and dyadic sexual desire was located in the middle level. The score of lonely sexual desire was positioned on low level. Also inhibited sexual desire was placed on low level, which indicates a low level of sexual inhibition in the research sample, while disposition towards sexual fantasies was situated on a high level.

Regarding the tasks of FE, the participants got a high score on Hanoi Tower and card games. The score on Stroop tasks and card classification was situated in a medium level.

Table 1. Scores in the sexuality and FE variables in the sample of study.

<i>Variables</i>	<i>Media (De)</i>	<i>Reference values*</i>
Total sexual desire	52,9(21,3)	0-100
Dyadic sexual desire	35,3(14,5)	0-63
Lonely sexual desire	12,4(11,1)	0-28
Inhibited sexual desire	44,3(25,7)	15-135
Disposition to sexual fantasies	69,7(18,5)	0-100
Hanoi tower	17,6(2,4)	4-20
Card game	7,8(1,6)	2-10
Stroop	12,23(4,9)	4-20
Card classification	13,43(2,4)	4-20

The reference values are the minimum and maximum of scores that can be obtained in each scale and task.

Source: Authors.

A statistically significant difference between the scores in the studied variables according to sex was not found. Nonetheless, a higher score in total sexual desire and in dyadic sexual desire was seen in women; and men obtained a higher score in inhibited and lonely sexual desire. The disposition towards sexual fantasies and the variables related to executive functions that were evaluated showed a very similar scoring in both genders, except for the Stroop task, in which women presented a lower performance.

Table 2. Differences in scoring regarding the sex.

<i>Variables</i>	<i>Men Me (RI)</i>	<i>Women Me (RI)</i>	<i>U by Mann Whitney</i>	<i>P Value</i>
Total sexual desire*	49,3(20,7)	56,06(21,9)	-,859	,398
Dyadic sexual desire	34(27)	43,5(20)	91,000	,400
Lonely sexual desire	10(14)	9,5(16)	99,500	,608
Inhibited sexual desire	38(28)	36(40)	102,000	,697
Disposition to sexual fantasies	70(24)	71(30)	95,500	,498
Hanoi tower	17,5(4)	18(4)	108,500	,886
Card game	7,5(4)	8(2)	109,000	,918
Stroop	15,5(7)	11(9)	103,000	,728
Card classification*	13,4(2,5)	13,4(2,5)	-,010	,992

* Mean (Standard deviation). Student's T test.

Source: Authors.

Also, a statistically significant difference in the scores of the researched variables according to age rank was not found. However, higher scores in the lonely sexual desire in teenagers and a higher score in the dyadic sexual desire and disposition towards sexual fantasies in young adults were seen. Regarding executive functions, a tendency to higher scorings in young adulthood in the performance on the tasks of Stroop and Hanoi tower was detected.

Table 3. Difference in the scoring in the study variables by age rank.

<i>Variables</i>	<i>Late teenagers Me (RI)</i>	<i>Young adult Me (RI)</i>	<i>U by Mann Whitney</i>	<i>P value</i>
Total sexual desire*	53,18(20,8)	52,79(22,1)	,049	,962
Dyadic sexual desire	31(27)	43(16)	80,000	,307
Lonely sexual desire	15(14)	9(12)	71,500	,158
Inhibited sexual desire	37(37)	38(33)	98,500	,800
Disposition towards sexual fantasies	68(34)	71(23)	88,500	,497
Hanoi tower	17(3)	19(4)	73,500	,185
Card game	7(2)	8(3)	89,500	,525
Stroop	9(9)	13(7)	79,000	,287
Card classification*	13,5(2,4)	13,37(2,5)	,191	,850

* Mean (Standard deviation). Student's T test.
Source: Authors.

Statistically significant differences in the scores of general, dyadic, and lonely sexual desires, inhibition of sexual desire and disposition towards sexual fantasies according to the time of couple relationship were not found. However, higher scores in total sexual desire, dyadic sexual desire, and disposition towards sexual fantasies in the group of couples that have been together from 1 to 3 years was shown. Lonely sexual desire showed a bit higher score in the group of subjects with a shorter relationship period (under a year). And, for the last, the variable of inhibited sexual desire showed higher scores in the group of long-lasting couples (over 3 years).

Table 4. Difference in the scores of Sexual desire and fantasies according to couple relationship time.

<i>Variables</i>	<i>< 1 year Me (RI)</i>	<i>1 to 3 years Me (RI)</i>	<i>> 3 years Me(RI)</i>	<i>Kruscal- Wallis</i>	<i>P value</i>
Total sexual desire*	51,73(20,3)	61,64(19,9)	42,63 (21,9)	2,001	,155
Dyadic sexual desire	31(25)	48(17)	36,5(23)	5,588	,061
Lonely sexual desire	15(17)	10(13)	5(11)	3,656	,161
Inhibited sexual desire	37(41)	35(38)	41(42)	2,714	,257
Disposition towards sexual fantasies	68(34)	71(20)	64(29)	3,776	,151

* Mean (Standard Deviation). One-way ANOVA
Source: Authors.

Statistically significant differences in the scores of sexual desire and sexual fantasies according to marital status between the groups of “courtship”, “free union” and “married” were not found.

However, a higher score in the total of the sexual desire, dyadic sexual desire and in the disposition towards sexual fantasies in the “free union” group was shown. In the “courtship” group it was detected a slightly higher score in the lonely sexual desire. And the variable of inhibited sexual desire showed higher scores in the “married” group.

Table 5. Difference in the scores of sexual desire and fantasies according to marital status.

<i>Variables</i>	<i>Courtship Me (RI)</i>	<i>Free union Me (RI)</i>	<i>Married Me(RI)</i>	<i>Kruscal- Wallis</i>	<i>P value</i>
Total sexual desire*	51,73(20,3)	56,11(23,8)	51,4(22,1)	,135	,874
Dyadic sexual desire	31(25)	44(17)	35(20)	2,602	,272
Lonely sexual desire	15(17)	13(18)	8(7)	2,985	,225
Inhibited sexual desire	38(34)	37(41)	41,5(35)	3,563	,168
Disposition towards sexual fantasies	68(34)	71(25)	70,5(22)	1,563	,458

* Mean (Standard Deviation). One-way ANOVA

Source: Authors.

Regarding the correlation between general, dyadic, and lonely sexual desire, inhibition of sexual desire and disposition towards sexual fantasies, it was found a strong positive correlation between total sexual desire and disposition towards sexual fantasies in the research sample ($r=,734$; $p=,000$), indicating that the higher scores in total sexual desire relate to a higher tendency towards sexual fantasies.

It was also found a moderate negative correlation between total sexual desire and inhibited sexual desire ($r= -,512$; $p=,004$), which shows that a higher score in the total sexual desire relates with a tendency to a lower sexual desire inhibition.

Also, a moderate negative correlation between dyadic sexual desire and inhibited sexual desire ($r= -,476$; $p=,008$) was identified, which shows that a higher score in dyadic sexual desire relates to a lower degree in inhibition of sexual desire.

Likewise, it was identified a strong positive correlation between the dyadic sexual desire and disposition towards sexual fantasies ($r=,829$; $p=,000$), showing that the higher scores in the dyadic sexual desire relate to the higher disposition towards sexual fantasies.

It was also found a moderate positive correlation between lonely sexual desire and disposition towards sexual fantasies ($r=,461$; $p=,010$), stating that a higher lonely sexual desire is connected to a higher tendency to sexual fantasies. However, we did not find a significant connection between lonely sexual desire and inhibition of sexual desire.

Lastly, it was identified a moderate negative correlation between inhibited sexual desire and disposition towards sexual fantasies ($r= -,543$; $p=,002$), which indicates that a higher inhibition of sexual desire is connected to a lower disposition towards sexual fantasies.

Table 6. Correlation between the sexuality variables.

<i>Correlated variables</i>	<i>Rho Spearman</i>	<i>Valor p</i>
Total sexual desire/ Inhibited sexual desire	-,512	,004
Total sexual desire/ Disposition towards sexual fantasies	,734	,000
Dyadic sexual desire/ Inhibited sexual desire	-,476	,008
Dyadic sexual desire/ Disposition towards sexual fantasies	,820	,000
Lonely sexual desire/ Inhibited sexual desire	-,340	,066
Lonely sexual desire/ Disposition towards sexual fantasies	,461	,010
Inhibited sexual desire/ Disposition towards sexual fantasies	-,543	,002

Source: Authors.

In addition, and lastly, the presence of correlation between the characteristics of sexual desire and the studied components of executive functioning was explored.

A moderate negative correlation between total sexual desire and the scores in the Stroop task ($r= -,437$; $p=,016$) was found, indicating that a higher manifestation of the sexual desire relates to a lower cognitive inhibition ability.

It was also found a moderate negative correlation between dyadic sexual desire and the scores in the Stroop task ($r= -,568$; $p=,001$), which shows, like in the previous correlation, that a higher dyadic sexual desire is associated to a lower cognitive inhibition ability.

It was also identified a moderate positive correlation between inhibited sexual desire and the scores in the Hanoi Tower task ($r = ,429$; $p = ,018$), stating that a higher level of sexual desire inhibition relate to a higher ability for planning and problem solving.

Also, it was identified a moderate positive correlation between the inhibited sexual desire and the scores in the Stroop task ($r = ,533$; $p = ,002$), indicating that a higher tendency to inhibit sexual desires is related with a better cognitive inhibition ability.

Lastly, it was found a moderate negative correlation between the disposition towards sexual fantasies and the scores in Stroop task ($r = -,532$; $p = ,002$), suggesting that a higher disposition towards sexual fantasies is connected to a lower cognitive inhibition ability.

Table 7. Correlations between sexuality variables and components of executive functions.

<i>Correlated variables</i>	<i>Rho Spearman</i>	<i>P value</i>
Total sexual desire/ Hanoi tower	-,062	,745
Total sexual desire/ Card game	,015	,937
Total sexual desire/ Stroop*	-,437	,016
Total sexual desire/ Card classification*	-,248	,187
Dyadic sexual desire/ Hanoi tower	-,142	,455
Dyadic sexual desire/ Card game	,113	,552
Dyadic sexual desire/ Stroop*	-,568	,001
Dyadic sexual desire/ Card clasification	-,087	,646
Lonely sexual desire/ Hanoi tower	-,001	,995
Lonely sexual desire/ Card game	-,090	,638
Lonely sexual desire/ Stroop	-,230	,221
Lonely sexual desire/ Card classification	-,194	,304
Inhibited sexual desire/ Hanoi Tower*	,429	,018
Inhibited sexual desire/ Card Game	,067	,723
Inhibited sexual desire/ Stroop*	,533	,002
Inhibited sexual desire/Card classification	,036	,851
Disposition towards sexual fantasies/ Hanoi Tower	-,212	,260
Disposition towards sexual fantasies/ Card Game	,008	,968
Disposition towards sexual fantasies/ Stroop*	-,532	,002
Disposition towards sexual fantasies/ card classification	-,192	,309

*Pearson correlation coefficient.

Source: Authors.

Discussion

This research data indicates that the scores in total sexual desire, considering this one as the general interest to sexual activities, and in the dyadic sexual desire, connected to sexual desire oriented to the partner, are located in the medium level in the sample of the study. Being this sample not clinic, these data indicate an average level in the total and dyadic sexual desire, without a tendency to extreme scorings. Instead, the score in lonely sexual desire was located in a low level, which indicates a lower tendency towards sexual activities without a partner in the research sample. The above, may be related to the fact that the subjects in the sample were in a stable relationship for at least six months by the time of the research. Also, it can be connected to the subjects' age ($M=26$ $DE=6$), which is a development stage in which the orientation towards the search for a partner and the establishment of intimate relationships becomes more prominent. In this aspect, the research data show a higher tendency in the increase of the dyadic sexual desire in young adulthood and a higher score in the lonely sexual desire in adolescence, without a statistically significant difference between both. The above shows that, even if there is not a significant difference, there is a certain tendency towards the decrease of lonely sexual desire and an increase of the dyadic sexual desire within the transition from adolescence to young adulthood, which may be connected to the search for a partner and the establishment of intimate relationships in this stage of life (Cabrera et al, 2013; Escalante-Romero et al., 2008).

Regarding inhibited sexual desire, the scoring mean was located in a low level, indicating a low inhibition level of the sexual desire in the research sample. Nonetheless, their values ($M: 37,5$) were superior to Spanish population ($M: 21,54$) (Sierra et al., 2003), considering that both samples had a partner.

The above may be related to cultural factors, among which can be considered a higher religiousness in the population, knowing that some investigations indicate that religiousness has a predominantly negative incidence on sexual attitudes ($M: 21,54$) (Sierra et al., 2003), same as the traditionalist values in the particular culture that the participants in the research belong to.

The scoring mean in the disposition towards sexual fantasies was located in the high level ($M: 69,7$ ($DT 18,5$)), this being a lower score than the one obtained in the Mexican population (men $M: 75.08$; $DT: 11.19$ and women $M: 72.34$; $DT: 14.18$) (Desvarieux et al., 2005). The above indicates the presence of a satisfactory level regarding sexual fantasies in the research sample,

being these an important element in sexual life, as some authors state (Nutter & Condrón, 1985; Fuertes & López, 1997; Sierra et al., 2003).

Regarding the performance in executive functioning tasks, it was identified a high level in Hanoi Tower and card game, which indicates a good level in planning and risk-benefit estimation in the sample subjects. Nonetheless, the Stroop tasks and card classification scores was located in a medium level, indicating a certain difficulty in the mental flexibility and inhibition in the subjects of the sample.

It was not found a significant difference in the scores of sexuality variables nor the tasks of the executive functioning between men and women. However, women had higher scores in total and dyadic sexual desire. In this aspect, there are studies that indicate a higher frequency and strength of desire in both dyadic and lonely sexual desire in men (Baumeister et al., 2001; Regan & Atkins, 2006). In any case, there are studies affirming that sexual desire emerges in a similar way in both men and women (Dawson & Chivers, 2014), being influenced by multiple factors.

Even if data in this research do not show a significant difference between both genders, they do indicate a slightly higher tendency in total and dyadic sexual desire in women in the sample, and the equality of score in lonely sexual desire, which show the need to go deeper in this research topic, considering that these differences in the results may be due to inconsistency in the use of instruments and the cultural differences among the subjects in different samples.

Taking into account that female sexual desire and sexual behavior have a higher possibility to be influenced, disturbed and molded by cultural influences, such as education, religion and acculturation (Baumeister, 2000) and that female sexual desire has been considered socially problematic for decades (Štulhofer et al., 2016), it is important to address researches towards female sexual desire in contemporary society since there are changes and cultural openness in a general level regarding sexuality, and particularly feminine sexuality as well as the fact that women with a higher sexual desire also claim to have a better sexual functioning and a higher sexual satisfaction (Štulhofer et al., 2016).

The difference in inhibited sexual desire between genders was not significant, even though men had slightly higher scores than women, indicating a slight tendency to a higher inhibition of sexual desire; these results match the ones found in the investigation by Sierra et al. (2003). These data contradict the evidence found in other research that indicate that women have a

higher tendency to inhibit sexual desire than men have (Spector & Fremeth, 1996; Simons & Carey, 2001).

The disposition towards sexual fantasies did also not show a significant difference between genders, which matches the results obtained from Mexican population (Desvarieux et al., 2005). However, there is also research indicating a higher tendency towards sexual fantasies in men (Wilson & Lang, 1981; Ellis & Symons, 1990; Leitenberg & Henning, 1995; Sierra et al., 2002).

Regarding lonely sexual desire, it was found a slightly superior score for men, without a significant difference. In this aspect, there is research that indicate that women value more the sexuality within the couple and abstinence (Moral & Ortega, 2008), but there is also some research showing the absence of significant differences between both genders in the attitude towards masturbation (Sierra et al., 2010).

The evaluated executive functions did not show a significant difference between both genders. However, the data indicate slightly higher scores in the inhibition in men. Regarding the differences in inhibitory control, some research indicates a better inhibition in women (Yyuan et al., 2008); others state that men have a better inhibition related to the most complex tasks that require an inhibition of immediate responses to obvious stimulus, favoring responses to less obvious stimulus, while women overcome men in simple tasks, over learnt or perceptual (Broverman et al., 1968).

Even though a significant difference in sexuality variables scores regarding age rank was not found, it was perceived a higher score obtained in lonely sexual desire in adolescence, and a higher score in dyadic sexual desire in young adulthood. The above can be connected to different experiences of sexuality during adolescence, when a high level of sexual desire is experienced due to hormonal changes and a higher tendency towards sexual exploration, which includes more masturbation practices (Egea, 2016). Equally, the higher level of dyadic sexual desire in young adulthood may be connected to an orientation towards the couple relationship in this age, due to its evolutionary importance in this age for the process of identity consolidation, responsibility development, intimacy and commitment (Erikson, 1986; Contreras et al., 2011).

Likewise, a tendency (not significant) to the highest disposition towards sexual fantasies in young adulthood was found. The above can be connected to a higher sexual experience and a higher disinhibition in the sexual practices in young adulthood compared to adolescence. Some research indicate that the sexual experience, sexual liberty and sexual attitudes are associated to age (Sáez & Guijarro, 2016).

A significant difference in the performance in tasks that evaluate executive functioning regarding age was not found. However, data show slightly higher scores in the inhibition control and the ability to planning in young adulthood compared to teenagers. These results may be associated to the process of maturation of the frontal lobes responsible for the performance in tasks related to executive functioning, which ends approximately at 20-25 years old (Johnson et al., 2009).

A significant difference in sexual desire and sexual fantasies variables according to relationship-lasting time was not found. Nonetheless, higher scores of inhibited sexual desires in the group with the longest relationships (over 3 years) were found; also, there were higher scores of the total and dyadic sexual desire and a higher disposition towards sexual fantasies in the group from 1 to 3 years long, which suggests that this long time relationship seems to be the best for the couple sexual desire. This may relate to research that explore the biological bases in the infatuation process, and which indicate that the romantic love stage, associated with the obsessive behavior and searching for sexual relationships with a partner, lasts for a maximum period of 3 years. From this point, dopamine activity changes, resulting in the decrease of interest towards the object of infatuation (Garza, 2010). Likewise, superior scores in lonely sexual desire in the group with the shortest-term relationship (less than a year) may be connected to the adjustment in the sexual relation during the initial time in the couple's relationship.

Some authors indicate that the first year of the couple's relationship represents the dyadic adjustment process, where the members of the couple learn about each other and each member gradually start to show themselves as they are; and this process can be influenced by multiple factors from an individual to a cultural level (Collins, 2003; Rojas-Solís & Flores, 2013).

It was not identified a significant difference in the sexual fantasies and sexual desire variables between groups of marital stage (courtship, free union and marriage). However, it was perceived a higher score in total sexual desire, dyadic sexual desire and disposition towards sexual fantasies in the “free union” group. At the same time, the “courtship” group showed a

higher score in lonely sexual desire; the higher scores of the inhibited sexual desire were found in the group of married people. The latter suggest that the “free union” marital state is favorable for dyadic sexual desire and disposition towards sexual fantasies. Some authors state that young people in modern times choose the “free union” modality with more frequency because marriage is taken as a legal “antiromantic” contract that does not guarantee a quality relationship nor stability (Sebastián, 2015; Thornton & Young-DeMarco, 2001).

As for correlation between the sexuality variables, it was identified the significant positive correlation between the disposition towards sexual fantasies and the total sexual desire, dyadic and lonely sexual desire. This indicates that a higher level of sexual fantasies relates to a stronger sexual desire, mostly dyadic. These findings show the importance of sexual fantasies in sexual desire, just like the Santos-Iglesias, Calvillo & Sierra (2011), who found that intimate and exploratory fantasies predict the dyadic desire, while lonely sexual desire is predicted by exploratory and impersonal fantasies. In the same line of results, Zubeidat et al. (2003), found in adolescent population that sexual fantasies (exploratory, intimate, impersonal and sadomasochist) show a positive correlation with both dyadic and lonely desire, indicating that intimate sexual fantasies predict more the dyadic desire, while the impersonal sexual fantasies influence mostly lonely desire. Wilson & Lang (1981) established that sexual fantasies are associated with high sexual desire and orgasm frequency, especially for women.

The inhibited sexual desire variable showed a negative moderate correlation with the total, dyadic and lonely sexual desire, indicating that a higher degree of sexual inhibition relates to a lower sexual desire. In this aspect, the previous research indicated that inhibited sexual desire, being one of the most common problems, affects negatively the manifestation of sexual desire and it is connected to sexual avoidance (Morse, 1985); connecting inhibited sexual desire, especially in women, with a lower frequency of orgasm during coitus, but not during masturbation (Nutter & Condrón, 1985).

In addition, a negative moderate correlation between inhibited sexual desire and disposition towards sexual fantasies was shown, indicating that a higher sexual inhibition is associated to a lower disposition towards sexual fantasies. These results match other research that indicate the negative correlation between sexual desire inhibition and intimate and exploratory sexual fantasies (Sierra et al., 2003). Likewise, the research by Nutter & Condrón (1983; 1985) state that both women and men with inhibited sexual desire fantasize less during foreplay, coitus, masturbation and general sleep than the individuals of control group.

Regarding the correlation between the sexuality variables and the components of executive functioning, a positive moderate correlation between inhibited sexual desire and Hanoi Tower and Stroop tasks scores was shown. The latter indicates that individuals with a higher inhibitory control, planning and problem solving show tendency to a higher sexual desire inhibition.

According to these findings, this research shows a connection between compulsive sexual behavior and significant decrease in impulse control and inhibition (Miner et al., 2009). In addition, hypersexuality was connected to disturbances in decision making and impulse control, associated to impulsive behavior (Mulhauser et al., 2014; Reid et al., 2010). Planning was related to sexual impulse, indicating problems in sexual impulse controlling in people with traumatic lesions and poor management of planning ability (War et al., 2014).

On the other hand, a moderate negative correlation between the Stroop task scores and the disposition towards sexual fantasies, total and dyadic sexual desire was seen, indicating that the increase of inhibitory control can be associated with a lower disposition towards sexual fantasies and a lower total and dyadic sexual desire. In this respect, lonely desire did not correlate with inhibitory control. The latter indicates the role of inhibitory control in dyadic sexual desire and in the disposition towards sexual fantasies. These findings agree with other studies that indicate the relationship between a deficiency in inhibitory control and poor regulation of sexual behavior (Miner et al., 2009; Reid et al., 2010; Mulhauser et al., 2014).

Lastly, although it is important to clarify that this study presents methodological limitations like the size of the sample and the lack of a strict validation of instruments in the Colombian population, the results obtained confirm the findings in other investigations; thus, it acts as a starting point for the formulation of new hypothesis in the field of sexuality and neuroscience.

It is suggested to continue with this line of study in larger samples, in order to contrast the relationship between executive functioning and sexual desire according to age, gender and other sociodemographic variables, as also to use neuroimaging for study the connection between complex cognitive functions and the control of sexual desire, especially in adolescents.

In addition, these results indicate the importance of educational promotion of skills related to executive functioning, such as inhibitory control, decision making, problem solving and planning during adolescence and early adulthood as one of the preventive strategies for addictive behaviors related to sex.

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