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## Testing the Fisher's Temperament Model on a Croatian Sample

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### Abstract

*According to Helen Fisher's theory of temperament, which is founded on a biological basis, there are four dimensions of temperament: Curious/Energetic, Cautious/Social-Norm Compliant, Analytical/Tough-Minded, and Prosocial/Empathetic. The aim of this research was to test the relationship of these dimensions of temperament to some socio-demographic characteristics and relationship characteristics in a sample of young adult subjects. The sample consisted of 846 participants who were in the age range from 18 to 40 years. Participants filled out online Fisher's Temperament Inventory and sociodemographic data were collected.*

*The results showed that men were more Analytical/Tough-Minded in comparison to women, whilst women were more Prosocial/Empathetic in comparison to men. Members of a particular religion, in relation to those who were not religious, were more Cautious/Social Norm Compliant. The better educated individuals did not differ from the less educated regarding the temperament dimension Curious/Energetic. As expected, more conservative participants were more Cautious/Social Norm Compliant and less Prosocial/Empathetic than the more liberal. Individuals who had a stronger opinion about sex as an essential part of a successful relationship, were more Curious/Energetic and Analytical/Tough-Minded and less Cautious/Social Norm Compliant compared to those who had a less expressive opinion about that. These results are in line with the initial hypotheses and further evaluation of the Fisher's temperament model is needed.*

*Keywords: temperament, Curious/Energetic, Cautious/Social Norm Compliant, Analytical/Tough-Minded, Prosocial/Empathetic*

## Introduction

Temperament traits are defined as the fundamental dispositions which appear early in the development in the domains of self-regulation, activity, affectivity and attention. They are the products of the complex interaction between genetic, biological and environmental factors, which act over time (Shiner et al. 2012). Quite a large number of temperament dimensions are inherited and remain stable throughout life. They are also linked to specific genetic paths, neurotransmitter systems and hormones (Fisher, Rich, Island, Marchalick and Silver, 2010b). There are many different theories and temperament models, but the focus of this research is the new model proposed by Helen Fisher. The author differentiates four broad dimensions of temperament, to which she adds characteristic traits and forms of behaviour, which stem from their biological basis. Specifically, the presumed biological bases of the fundamental dimension *Curious/Energetic* are the neurotransmitters dopamine and norepinephrine. On the basis of previous research into the links between dopamine and individual personality traits and patterns of behaviour, Fisher describes the *Curious/Energetic* temperament type. Earlier research, which is her starting point, shows that people with high levels of dopamine are prone to sensation seeking and novelty seeking (Zuckerman and Kuhlman, 2000). They are more likely to participate in risky activities such as smoking, gambling, or abuse of drugs or alcohol (Zuckerman, 2005). Higher levels of dopamine were also positively linked with curiosity (Braun Marvin, 2015), creative performance (de Manzano, Cervenka, Karabanov, Farde and Ullen, 2010), sexual drive (Melis and Argiolas, 1995) and impulsiveness (Dalley and Roiser, 2012). For the second dimension of temperament, *Cautious/Social Norm Compliant*, the presumed biological basis is the neurotransmitter serotonin. The personality traits that Fisher ascribes to people who express this dimension are based on previous research into their connection with serotonin. These are: numerical and visual creativity (Reuter, Roth, Holve and Hennig, 2006), lower levels of anxiety, greater sociability (Golimbet, Alfimova and Mityushina, 2004), better self-control (Bizot, Le Bihan, Puech, Hamon and Thiébot, 1999) and self-transcendence, that is, the personality trait from Cloninger's model which is linked with some aspects of religious behaviour (Lorenzi et al., 2005). Research has also confirmed the important role of serotonin in socially cooperative behaviour (Wood, Rilling, Sanfey, Bhagwagar and Rogers, 2006), and lower levels of its activity are linked with aggressiveness (Davidge et al., 2004). Fisher (2009) presumed that a *Cautious/Social Norm Compliant* person would be the least sexual of the four temperament types. The author bases this presumption on the results of research according to which higher levels of serotonin lead to a reduction in sexual desire and sexual function (Rosen, Lane and Menza, 1999). The presumed biological basis of the third dimension, *Analytical/Tough-Minded*, is the hormone testosterone. The traits and forms of behaviour which Fisher links to this dimension are based on earlier research, which reports on their connection with testosterone levels. Prenatal levels of testosterone were shown to be significant predictors of results achieved in cognitive tests examining focus on details (Auyeung et al., 2012). Prenatal testosterone is also negatively linked with empathy (Chapman et al., 2006) and the frequency of making eye contact (Lutchmaya, Baron-Cohen and Raggatt, 2002). Testosterone was shown to worsen verbal fluency (Wolf et al., 2000) and lead to a reduction in the use of words in social interactions (Pennebaker, Groom, Loew and Dabbs, 2004). Its positive connection was confirmed with social domination, and a negative correlation was found with socio-emotional engagement (Farrant, Mattes, Keelan, Hickey and Whitehouse, 2012). In terms of sexual motivation, higher levels of testosterone are linked to greater sexual desire (Meston and Frohlich, 2000). Finally, for the fourth and final dimension, *Prosocial/Empathetic*, the presumed biological bases are the hormones oestrogen and oxytocin. For oestrogen it was shown that it improves verbal working memory (Rosenberg and Park, 2002) and verbal fluency (Miller, Conney, Rasgon, Fairbanks and Small, 2002). It was confirmed for women that they are more emotionally expressive (Kring and Gordon, 1998) and that they remember emotions better (Canli, Desmond, Zhao and Gabrieli, 2002). The level of oestrogen is positively correlated with agreeable-

ness (Treleaven, Jackowich, Roberts, Wassersug and Johnson, 2013). On the basis of this research, Fisher et al. (2015) presume that *Prosocial/Empathetic* individuals have stronger mental flexibility and contextual thinking. Alongside oestrogen (Derntl, Hack, Kryspin-Exner and Habel, 2013), studies also report a positive correlation between oxytocin (Barraza and Zak, 2009; Shamay-Tsoory et al., 2013) and empathy. This hormone is also linked to social affiliation (Feldman, 2012) and altruism (Israel, Weisel, Ebstein and Bornstein, 2012), and it is also connected to trust, probably motivating cooperation (Zak, Kurzban and Matzner, 2004).

Since, as far as we know, only the author Fisher and her associates have dealt with empirical verification of the temperament model described, the aim of this research was to assess the relationship of the above mentioned temperament dimensions to some socio-demographic traits and relationship traits in a sample of young adult subjects. Based on previous research, it was to be expected that men would be more *Analytical/Tough-Minded* in comparison with women, and that women would be more *Prosocial/Empathetic* in comparison with men. It was also expected that members of a specific religious group would be more *Cautious/Social Norm Compliant* than individuals who are not religious. Better educated individuals should be more *Curious/Energetic* than those who are less educated. In terms of political orientation, it was presumed that more conservative individuals would be more *Cautious/Social Norm Compliant* than liberals, and less *Prosocial/Empathetic*. It is also to be expected that individuals with more strongly expressed feelings about sex as an essential part of a successful relationship would be more *Curious/Energetic* and more *Analytical/Tough-Minded*, and less *Cautious/Social Norm Compliant* than those individuals who have a less strongly expressed opinion about that subject.

## Method and material

### Participants

The convenience sample comprised a total of 864 participants (for details see Lucić, 2018). In this paper the results are shown for a total of 846 young adult participants (323 men and 523 women), aged from 18 to 40 years ( $M=23.49$ ;  $SD=3.82$ ). In relation to sexual orientation, people of heterosexual orientation dominated the sample ( $N=820$ ), whilst 26 participants were of bisexual orientation. In relation to the level of education, most participants ( $N=429$ ) had high school education. The largest number of participants ( $N=429$ ) were also politically liberally oriented, and in terms of religion, members of a specific religious group were dominant in the sample ( $N=560$ ) (Catholic, Orthodox, Protestant, Muslim, or other).

### Measuring instruments

#### *The Fisher Temperament Inventory*

The Fisher Temperament Inventory, by Fisher et al. (2010a), measures four dimensions of temperament, as follows: *Curious/Energetic*, *Cautious/Social Norm Compliant*, *Analytical/Tough-Minded*, and *Prosocial/Empathetic*. The inventory consists of a total of 56 items. For each of these dimensions there are 14 items, to which answers are given on 4-degree scales (from *strongly disagree* to *strongly agree*). The *Curious/Energetic* scale comprises items such as: “*I am more enthusiastic than most people*” and “*I find unpredictable situations exhilarating*”. The *Cautious/Social Norm Compliant* scale consists of the following items: “*In general, I think it is important to follow the rules*” and “*My family and friends would say I have traditional values*”. The *Analytical/Tough-Minded* scale contains items such as: “*I am more analytical and logical than most people*” and “*I am tough-minded*”. Finally, the *Prosocial/Empathetic* scale includes: “*I am very sensitive*”

*to people's feelings and needs" and "I have a vivid imagination".*

Permission to use the Fisher Temperament Inventory was given by the author herself. The inventory was translated from English into Croatian language and then back from Croatian to English in order to identify possible discrepancies. Equivalence English and Croatian version was obtained by the authors of this study and an English language expert.

For more details about four-factor structure of the Croatian version Fisher Temperament Inventory see Lucić (2018). In the research, satisfactory values were also obtained for the Cronbach-alpha reliability coefficients, which were: 0.80 (the scale Curious/Energetic), 0.79 (the scale Cautious/Social Norm Compliant), 0.78 (the scale Analytical/Tough-minded) and 0.87 (the scale Prosocial/Empathetic).

### *Socio-demographic Data*

For the purpose of the research a questionnaire was designed to collect socio-demographic data. The questionnaire consisted of 15 multiple-choice questions, or with filling in blanks, related to the gender, age, sexual orientation, level of education, occupation, political orientation and religiosity of participants.

In order to determine the education level, next categories were offered: high school, undergraduate university level, graduate university level, postgraduate level and *"other"*.

Furthermore, for determination of political orientation, five categories were offered, defined as: *very liberal*, *liberal*, *conservative* and *very conservative*, and a category defined as *"other"*. The subjects had to select the category that related to their political orientation. Religious (non)affiliation was defined by the following categories: belonging to a specific religion (Catholic, Orthodox, Islam, Protestant, or some other religion), Atheism, Agnosticism, Spirituality and Non-Religiosity, and Non-Religiosity. The subjects were also required to determine on a scale of one to four (in a range from *"I disagree entirely"* to *"I agree completely"*) to what extent they agree with the statement that sex is an essential part of a successful relationship.

The questions described here relating to political orientation, religious affiliation and to the importance of sex were defined in the same or a similar manner as in previous research by Fisher et al. (2015).

### *The Procedure*

The research was conducted during the months of May and June 2017. The questionnaires took about 10 minutes to complete. A link leading to the online questionnaire was given through the Facebook social network and posted in various Facebook groups, and also using personal messages. As some participants expressed their will to further distribute questionnaire, e-mail was also used (snowball method). The anonymity was emphasized to potential participants in the research, as well as the fact that the data obtained would be used exclusively for scientific purposes.

## **Results**

The results for all variables were first standardized and extremes were removed, that is, z-scores larger than 3.29 (Field, 2009), and their values were replaced by average values (23 cases i.e. less than 3%).

Descriptive parameters for dimensions of temperament are presented in Table 1. The normality of distributions were tested using Kline's criteria (2011), which includes calculation of the skewness index (SI) and the kurtosis index (KI). An SI value less than 3.00 and KI less than 8.00 meet Kline's criteria (2011), and enable the use of parametric statistical analysis.

Table 1 Descriptive parameters for dimensions of temperament

| Dimension                      | <i>M</i> | <i>SD</i> | <i>SI</i> | <i>KI</i> |
|--------------------------------|----------|-----------|-----------|-----------|
| Curious/Energetic              | 24.85    | 5.43      | 0.36      | 0.42      |
| Cautious/Social Norm Compliant | 26.11    | 5.06      | 0.21      | 0.38      |
| Analytical/Tough-Minded        | 25.40    | 5.25      | 0.30      | 0.54      |
| Prosocial/Empathetic           | 26.20    | 6.96      | -0.16     | 0.06      |

*M*-mean; *SD*- standard deviation; *SI*- skewness index; *KI*- kurtosis index

T-tests and one-way analyses of variance were performed. Before these analyses, Levene's tests were used to test the equality of variances. In case of unequal variances, Welch's analysis of variance was used. More specifically, it was used in the case of testing difference in the dimension of *Analytical/Tough-Minded* with regard to opinion about sex as an essential part of successful relationship.

Testing difference in the dimension *Analytical/Tough-Minded* between men ( $n=323$ ) and women ( $n=523$ ) has shown a significant difference ( $t=-7.77, p=0.00$ ). As expected, men were more *Analytical/Tough-Minded* ( $M=24.13, SD=5.14$ ) in comparison to women ( $M=24.34, SD=5.03$ ). With regard to the dimension *Prosocial/Empathetic*, a significant difference is also found ( $t=10.96, p=0.00$ ). In line with our expectations, women were more *Prosocial/Empathetic* ( $M=28.12, SD=6.76$ ) in comparison to men ( $M=23.08, SD=6.10$ ). For both dimensions of temperament the  $d$  value ( $d=0.55$  for *Analytical/Tough-Minded* and  $d=0.78$  for *Prosocial/Empathetic*) may be interpreted as the medium effect size (Kolesarić, 2006). Additionally, gender differences in other two dimensions of temperament (*Curious/Energetic* and *Cautious/Social Norm Compliant*) were also tested by t-tests and significant differences were not found ( $p>0.05$ ).

In further analysis, a t-test was conducted to check if the members of a specific religion were more *Cautious/Social Norm Compliant* than those who are not. The group of "religious" participants ( $n=560$ ) included those who indicated that they were members of a specific religion. Those participants who stated that they were atheists, agnostics, spiritual but not religious and the non-religious were in the "non-religious" group ( $n=286$ ). In line with our expectations, religious participants had significantly higher results in the dimension *Cautious/Social Norm Compliant* ( $M=26.90, SD=5.38$ ) than the non-religious ( $M=23.88, SD=5.44; t=3.51, p=0.00$ ). According to Kolesarić (2006) the  $d$  value ( $d=0.56$ ) may be interpreted as the medium effect size.

Further analysis included testing the difference in the dimension *Curious/Energetic* in relation to the level of education. Difference was tested between two groups, ie. the participants with high school education ( $n=429$ ) and the participants with university education ( $n=409$ ). This last group consisted of participants with undergraduate, graduate and postgraduate level. Participants with elementary school ( $n=8$ ) did not include in this analysis. The difference in the dimension *Curious/Energetic* did not find between participants with high school and university level ( $F=0.45, df=1, p=0.50, \eta^2=0.00$ ).

The following analysis verified the hypothesis about the differences between very liberal, liberal, conservative and very conservative participants in relation to the dimensions *Cautious/Social Norm Compliant* and *Prosocial/Empathetic*. A significant difference in the dimension *Cautious/Social Norm Compliant* was found ( $F=20.43, df=3, p=0.00; \eta^2=0.08$ ). Fisher's LSD post-hoc testing confirmed significant differences between the following groups: very liberal ( $M=24.81, SD=4.90$ ) and conservative ( $28.12, SD=5.52$ ); very liberal ( $M=24.81, SD=4.90$ ) and very conservative ( $30.30, SD=7.11$ ); liberal ( $M=25.42, SD=5.11$ ) and conservative ( $28.12, SD=5.52$ ); and liberal ( $M=25.42, SD=5.11$ ) and very conservative ( $30.30, SD=7.11$ ) political orientation. In all these cases, the differences are significant at the level of 5% or lower. According to our presumption, participants with a more conservative orientation were more *Cautious/Social Norm*

*Compliant.*

Regarding the dimension *Prosocial/Empathetic*, there was also a statistically significant difference according to political orientation ( $F=3.16$ ,  $df=3$ ,  $p=0.02$ ,  $\eta^2=0.01$ ). Fisher's LSD post-hoc testing confirmed significant differences ( $p<0.05$ ) between the following groups: very liberal ( $M=27.51$ ,  $SD=7.48$ ) and very conservative ( $M=22.60$ ,  $SD=8.67$ ); liberal ( $M=26.42$ ,  $SD=6.54$ ) and very conservative ( $M=22.60$ ,  $SD=8.67$ ); and conservative ( $M=26.01$ ,  $SD=7.36$ ) and very conservative ( $M=22.60$ ,  $SD=8.67$ ) political orientation. In all cases, the participants with more liberal political orientation were more *Prosocial/Empathetic*.

Further analyses related to testing the significance of differences in the dimensions *Curious/Energetic*, *Analytical/Tough-Minded* and *Cautious/Social Norm Compliant* between the four groups of participants who differed in their opinion about the importance of sex as an essential part of a successful relationship (completely disagree ( $n=47$ ), disagree ( $n=93$ ), agree ( $n=386$ ) and completely agree ( $n=320$ )). Significant differences were obtained for all three these dimensions. For *Curious/Energetic* dimension significant difference is confirmed by analysis of variance ( $F=9.39$ ,  $df=3$ ,  $p=0.00$ ,  $\eta^2=0.03$ ). Post-hoc testing (Fisher's test) found significant differences ( $p<0.05$ ) between the groups of participants who did not agree ( $M=23.51$ ,  $SD=5.21$ ) and who agreed completely ( $M=26.05$ ,  $SD=5.87$ ), as well as those who agreed ( $M=24.17$ ,  $SD=5.18$ ) and those who completely agreed ( $M=26.05$ ,  $SD=5.87$ ) with the opinion that sex is an important part of a successful relationship. The participants who agreed completely with this opinion were more *Curious/Energetic*.

Similar results are obtained for the dimension of *Analytical/Tough-minded*. Welch's analysis of variance also confirmed significant difference (Welch's  $F=5.64$ ,  $df=3$ ,  $p=0.00$ ,  $\eta^2=0.03$ ). Fisher's test showed significant differences ( $p<0.05$ ) between groups of subjects who did not agree ( $M=24.96$ ,  $SD=5.21$ ) and who agreed completely ( $M=26.37$ ,  $SD=5.93$ ), as well as those who agreed ( $M=24.73$ ,  $SD=4.72$ ) and those who completely agreed ( $M=26.37$ ,  $SD=5.93$ ) with the opinion that sex is an important part of a successful relationship. The participants who agreed completely with this opinion were more *Analytical/Tough-Minded*.

Regarding the dimension *Cautious/Social Norm Compliant*, significant differences were also determined by analysis of variance ( $F=3.94$ ,  $df=3$ ,  $p=0.01$ ,  $\eta^2=0.01$ ) and post-hoc testing ( $p<0.05$ ) between participants who did not agree completely ( $M=28.13$ ,  $SD=6.26$ ) and those who agree ( $M=26.15$ ,  $SD=4.87$ ) and those who agreed completely ( $M=25.61$ ,  $SD=5.88$ ) with the opinion that sex is an important part of a successful relationship. There is also a significant difference between the group who did not agree completely ( $M=28.13$ ,  $SD=6.26$ ) and the group who completely agreed ( $M=25.61$ ,  $SD=5.88$ ) with this opinion ( $p<0.01$ ). These results showed that participants who agreed less with the opinion that sex as an essential part of a successful relationship were more *Cautious/Social Norm Compliant*.

## Discussion

Based on the study of authors Fisher et al. (2015), in this research, the differences in some dimensions of temperament were examined. More precisely, differences in relation to the gender, religiosity, education levels and political orientation of the participants, and their opinion about the importance of sex as an essential part of a successful relationship. In line with the initial presumption, it was established that men are more *Analytical/Tough-Minded* than women, whilst women are more *Prosocial/Empathetic* than men. The results are in line with the research by Fisher et al. (2015). These differences the authors interpreted as indirect proof that the *Analytical/Tough-minded* scale measures some of the effect of the testosterone system, whilst the *Prosocial/Empathetic* scale relates to the effect of the oestrogen and oxytocin systems. Investigating neural correlates of Fisher's temperament dimensions, a brain-imaging study (Brown,

Acevedo and Fisher, 2013) also showed a significant relation between the results attained on the *Analytical/Tough-Minded* scale and neural activity in the parietal and occipital areas of the cortex. These areas are involved in spatial/mathematical thinking and basic visual functions. Those areas are also sexually dimorphic areas of the cortex. According to the authors, the positive relation between *Analytical/Tough-Minded* and neural activity in the occipital cortex is one more proof that this scale reflects aspects of behaviour which are related to testosterone. In terms of the dimension *Prosocial/Empathetic*, the results on this scale were significantly correlated with neural activity in the following areas of the cortex: anterior insula, inferior frontal gyrus and fusiform gyrus (Brown et al. 2013). These areas are rich in mirror neurons, which have been linked to empathy (Lamm, Batson and Decety, 2007), and the function of the oestrogen and oxytocin system is also linked to empathy (Brown et al. 2013). Although Fisher et al. (2015) connected gender differences in these two dimensions of temperament indirectly with biological differences in the functioning of hormonal and neural systems of men and women, the influence of various socialization processes could not be ruled out. Fisher's temperament model did not assume gender differences in other two dimensions of temperament. Additional analyses in this research did not show differences in *Curious/Energetic* and *Cautious/Social Norm Compliant* dimensions.

Furthermore, the results confirmed the hypothesis, according to which the participants who identified themselves as members of a specific religion achieved significantly higher results on the *Cautious/Social Norm Compliant* scale than those who are not. The results are in line with the research by Fisher et al. (2015), as by Borg et al. (2003) about the positive relationship between serotonin receptors and self-transcendence, which is one of the dimension of Cloninger's model of personality, and which is also linked to religious behaviour, subjective experience and a personal view of the world. The study by Lorenzo et al. (2005) confirms the influence of the serotonin system on this dimension of personality.

Regarding educational status, the results of the research carried out did not show any significant difference in the dimension of temperament *Curious/Energetic* between participants with different levels of education. This result may be explained by the structure of the sample itself. That is to say, the level of education of most of the participants was high school education.

The results related to political orientation turned out as expected. The more conservative participants were more *Cautious/Social Norm Compliant* and less *Prosocial/Empathetic* than the liberal ones. In the research by Graham, Haidt and Nosek (2009), more conservative individuals than the more liberal ones achieved higher results on the scales measuring respect of authority and tradition, which are traits linked with the dimension *Cautious/Social Norm Compliant* (Fisher et al. 2015). The more liberal participants, however, in comparison with the more conservative ones, had higher results on the scales measuring care and concern, which are characteristics linked to oestrogen (Smith et al, 2012) and oxytocin (Feldman, 2012). However, alongside biological factors, political orientation is also affected by a variety environmental factors such as the neighbourhood, family, religious affiliation and work experience (Marcus et al, 1995, according to Alford, Funk and Hibbing, 2005). In order to determine political orientation in this research, one item was used, as in the research by Fisher (2015). It may be assumed that there would be somewhat different results if more complex questions were used to measure political conservatism and/or liberalism.

Finally, in terms of the relationship traits relating to the opinion of the participants about the importance of sex as an essential part of a successful relationship, the expected results were obtained. The participants who had a stronger opinion about this, in comparison to those who had a less strongly expressed opinion, were more *Curious/Energetic* and *Analytical/Tough-Minded* and less *Cautious/Social Norm Compliant*. The results were in line with the results reported by Fisher et al. (2015). In the interpretation of the results, the authors emphasize the biological factors and earlier research on the basis of which the initial hypotheses were set. So, increased activation of the dopamine system, which is the bio-

logical basis of dimension *Curious/Energetic*, was shown to be positively correlated with increased sexual drive (Melis and Argiolas, 1995). The fact that dopamine can stimulate sexual desire has been also shown in animals and humans (Pfaus, 2009). Regarding the dimension *Analytical/Tough-minded*, Fisher et al. (2015) suppose that testosterone, which is the biological basis of this dimension, increases sexual desire (Meston and Frohlich, 2000; Simon et al. 2005). According to the Fisher's et al. (2015) hypothesis for the *Cautious/Social Norm Compliant* dimension, whose biological basis is serotonin, it was presumed that sex would be deemed to be a less important part of a successful relationship. Earlier research has also shown that higher levels of serotonin lead to a decrease in sexual desire and function (Rosen, Lane and Menza, 1999). Our research did not include measures of sexual desire and/or function in participants with different opinion about sex as an essential part of successful relationship, so the interpretations of results on the basis of earlier studies about relation between various hormones and/or neurotransmitters and sexual desire are not completely possible. According to the results of this study that participants with a less strongly expressed opinion about sex as an important part of a successful relationship were more *Cautious/Social Norm Compliant* could be explained by their religiousness and conservative political orientation.

In the undertaken research, the Fisher Temperament Inventory was used for the first time on a Croatian sample. The author herself (Fisher et al. 2015) emphasized its advantages as a supplement to five-factor personality questionnaires and/or use within a broader context, which in the end may contribute to insights in the field of personality. Although more recent, Fisher's Inventory is used in practice, in couples' therapy, staff training, when finding foster parents for children, and on a well-known internet site for finding life partners (Fisher et al. 2015). Its advantages should certainly be emphasized. That is to say, the inventory is constructed on the basis of brain architecture and physiology. Because of that, it may contribute to explaining the key aspects of temperament (Fisher et al. 2015).

According to  $\eta^2$  and  $d$  values, the small and medium effect sizes in this research should also be mentioned, as and in the research by Fisher et al. (2015). It should also be emphasized that the temperament dimensions proposed by Fisher's model do not represent a complete representation of the four biological systems which function completely independently of each other. That is to say, they act in interaction with one another. They also interact with other biological systems and other environmental influences, and all together in the end may contribute to individual differences in temperament. In general, Fisher's model has still not been sufficiently researched. As far as we know, only a few studies have been published (more precisely three articles and two presentations at scientific conferences), and its proposed biological basis has only been confirmed in one fMRI study (Brown et al, 2013). Some of the author's presumptions, which were verified in this research too, were founded on the immediate results of several previous studies. For example, the positive relation between the dimension *Cautious/Social Norm Compliant* (with the proposed biological basis of serotonin) with religiosity, was proposed on the basis of findings of a correlation between serotonin receptors and self-transcendence, which covers some characteristics of religiosity. Although in this research the hypothesis and results of Fisher et al. (2015) were mostly confirmed, further research is necessary with more complex statistical analyses that will take into account the effects of gender, religiosity, political orientation and different relationship variables for all four dimensions of temperament. Further studies on representative samples are also required. Our sample was specific with most participants of female gender, religious affiliation, high school education and liberal political orientation. Future research dealing with this temperament model according to the propositions by Fisher et al. (2015) is being prepared. There is room for testing different hypotheses stemming from this biological model. Examples of possible future research are testing the temperament dimensions in persons with different sexual orientation, different age groups, cultures, occupations etc.

## Conclusions

In conclusion it may be said that hypotheses about the differences between men and women, religious and non-religious, and conservative and liberal participants in relation to some temperament dimensions in Fisher's model were confirmed. Men are more *Analytical/Tough-Minded*, while women are more *Prosocial/Empathetic*. Religious participants had significantly higher results on the *Cautious/Social Norm Compliant* scale. The more conservative participants were also more *Cautious/Social Norm Compliant* and less *Prosocial/Empathetic*. The results did not show any significant difference between participants with different educational status. This research also included the opinion of the participants about sex as an important part of a successful relationship, and the results confirmed the initial presumption in expected directions. The participants who had a stronger opinion about this were more *Curious/Energetic* and *Analytical/Tough-Minded* and less *Cautious/Social Norm Compliant*.

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