

## Personality and Levels of Cholesterol and Glucose

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### Abstract

This research aims to investigate the relationship between personality traits according to the Big-Five model and the levels of cholesterol and glucose. A convenience sample of 52 individuals participated in this study (mean age was 25 years old; SD=7,8 years of age); 59,6% were women (40,4% were men). The Neo Reviewed Personality Inventory (Portuguese version) was used to measure personality according to the Big-Five Personality Model: Openness (O), Conscientiousness (C), Extraversion (E), Agreeableness (A), and Neuroticism (N). Regarding the serum determinations, the following parameters were quantified: Total Cholesterol, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL), Triglycerides and Glucose. Results show that there is a negative correlation between Extroversion and total levels of cholesterol, as well as LDL; a negative correlation between Neuroticism and LDL and Glucose; and, finally a positive correlation between Conscientiousness and glucose levels. This study is a contribution for further research, and our aim is to develop other topics of investigation, expanding it into the psychoneuroimmunological implications present in the mechanisms that mediate the relation between psychological and physical variables, namely between the personality and levels of cholesterol and glucose.

**Keywords:** Personality; Cholesterol; Glucose

### Introduction

Some psychological variables have been studied to be associated to the occurrence of physical illnesses, particularly stress, mainly due to its effect on the contribution for the decrease of immunological response because of its interference with corticoid production [1-3].

On the other hand, there is no significant reference in the literature of relevant associations between personality and cholesterol and glucose parameters, even though some studies show that there is a relation between these two aspects and other psychological variables such as: suicide [4-8]; hyperactive behavior [9]; impulsivity [10]; violent crime [11]; bulimia nervosa [12], or borderline personality disorder [13].

Therefore, this research aims to investigate the possible relationship between personality traits according to the Big-Five model and the levels of cholesterol and glucose.

### Methods

#### Sample

A convenience sample of 52 individuals participated in this study. Students, professors and employees from the University of Beira Interior were recruited, and their mean age was 25 years old (SD=7,8 years of age); 59,6% were women (40,4% were men). At the moment of the sampling, all participants had a normative body mass index, were not taking any medication, did not smoke, did not drink alcohol, and did not have any chronic disease. Also, for women, it was assured that they were not taking the birth control pill. All these criteria were controlled in order to eliminate other factors that might change the levels of cholesterol and glucose.

#### Materials

For this study the Neo Reviewed Personality Inventory (Portuguese version) was utilized. This instrument was validated for the Portuguese population and is made of 240 self-response items. It has five different

scales for each domain of the Big-Five Personality Model: Openness (O), Conscientiousness (C), Extraversion (E), Agreeableness (A), and Neuroticism (N).

Regarding the serum determinations, the following parameters were quantified: Total Cholesterol, Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL), Triglycerides and Glucose.

#### Procedures

All participants signed the informed consent regarding their participation in the study and were scheduled for blood sampling after twelve hours of fast. Immediately after, the participants were given the personality inventory to be filled out. The blood sample was then centrifuged and the serum was frozen for posterior analysis in the laboratory.

#### Results

From the submission of the five factors of personality scores to the correlational analysis with the levels of Cholesterol, and glucose, LDL, HDL and Triglycerides, the following results were obtained ( $p < 0,05$ ):

A negative correlation between Extroversion and total levels of Cholesterol ( $r = -0,278$ ;  $p = 0,046$ ), as shown in Figure 1, which suggests that individuals who are not extroverted present higher levels of total cholesterol.

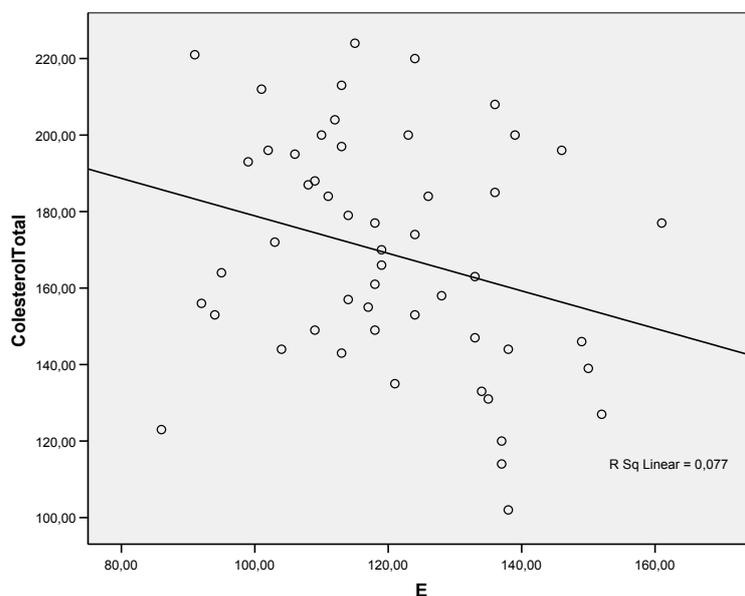
Also, a negative correlation between Conscientiousness and levels

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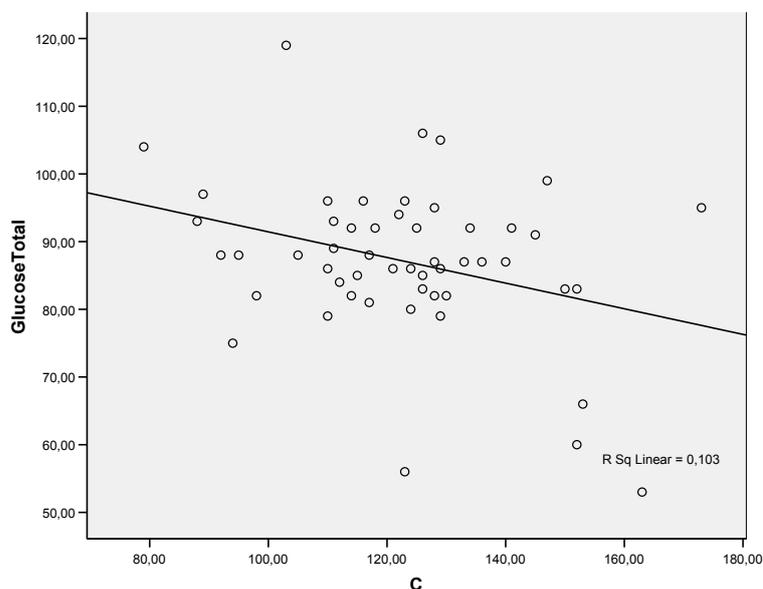
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( $r=-0,278$ ;  $p=0.046$ )

**Figure 1:** Results for the correlation between Extroversion and levels of cholesterol.



( $r=0,321$ ;  $p=0.020$ ).

**Figure 2:** Results for the correlation between Conscientiousness and glucose.

of glucose ( $r=-0,321$ ;  $p=0,020$ ) was obtained which suggests that individuals with lower levels of Conscientiousness present higher levels of glucose (Figure 2).

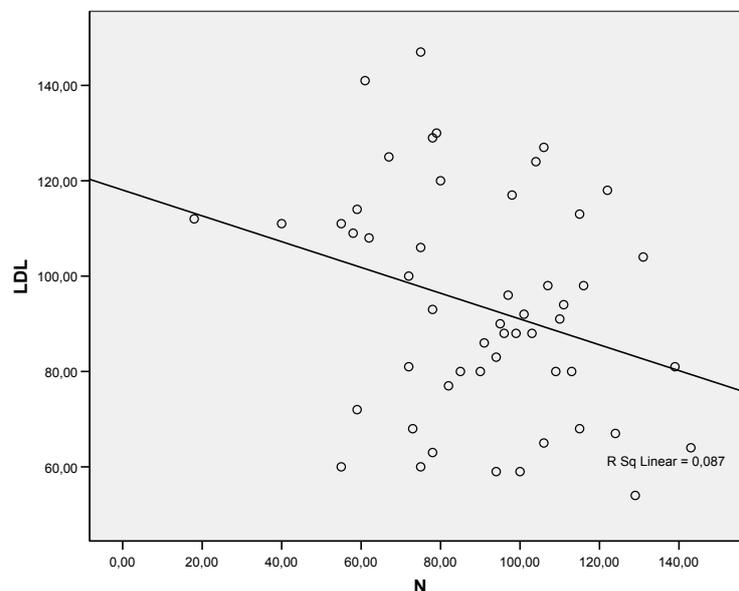
A negative correlation between LDL and Neuroticism ( $r=-0,296$ ;  $p=0,033$ ), suggests that participants with lower levels of neuroticism present higher levels of LDL (see Figure 3).

We also obtained a negative correlation between the levels of LDL and Extroversion ( $r=-0,274$ ;  $p=0,049$ ), suggesting that participants who had lower levels of extraversion, presented higher levels of LDL (Figure 4).

Finally, a positive correlation between levels of Glucose and Neuroticism was obtained ( $r=0,347$ ;  $p=0,012$ ), which suggests that participants who show higher levels of neuroticism also have higher levels of glucose (see Figure 5).

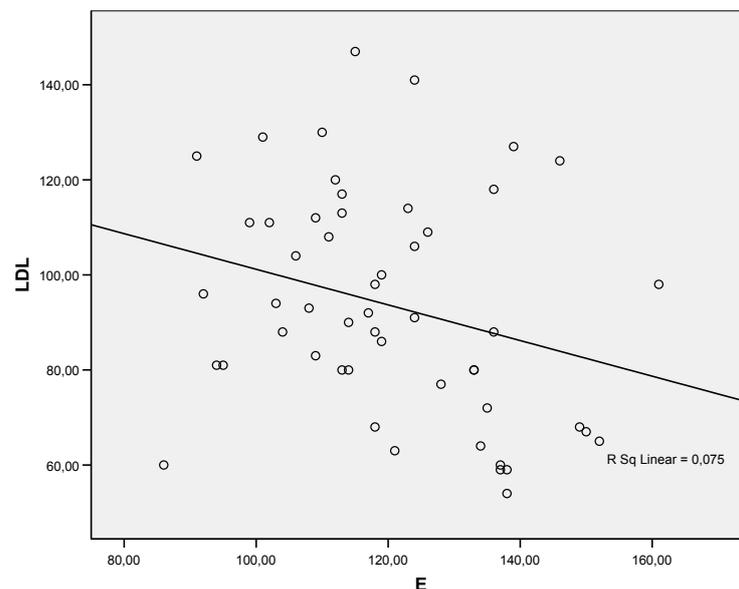
## Discussion

Although the obtained correlations were not very strong, they were significant ( $p<0,05$ ), and were gathered under very rigorous controlled conditions, allowing us to accept the produced data which, in other studies, seems to be impeditive of strong conclusions [14].



( $r=-0,296$ ;  $p=0,033$ ).

**Figure 3:** Results for the correlation between LDL and Neuroticism.



( $r=-0,274$ ;  $p=0,049$ ).

**Figure 4:** Results for the correlation between LDL and Extroversion

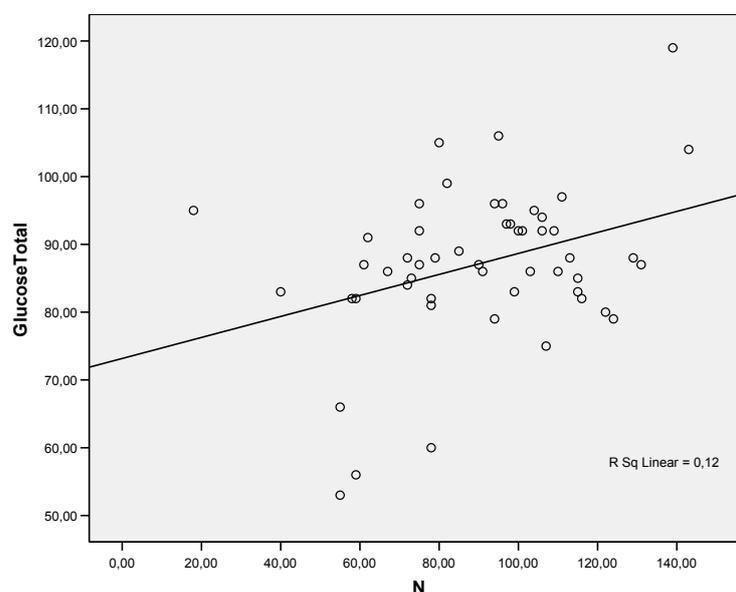
Therefore, there seems to exist a correlation between Extroversion and total levels of cholesterol, as well as LDL; between Neuroticism and LDL and Glucose; and, finally between Conscientiousness and glucose levels.

The fact that negative correlations between measures of cholesterol and Extroversion were found was unexpected. In fact, LeBlanc found proximity in the extroverted functioning (associated to Type A behavior) to higher levels of cholesterol [14]. On the other hand, eventual associations of Type C behavior to Neuroticism are also

not fully explained since participants who present lower levels of Neuroticism also present lower levels of LDL. Nevertheless, the positive correlation found between levels of Glucose and Neuroticism allows us to associate a possible relation between Type C functioning and higher levels of glucose.

## Conclusion

Each person has a different physiological reaction to life events, circumstances and stress. Our research suggests that an individual's



**Figure 5:** Results for the correlation between Glucose and Neuroticism. ( $r=-0,247$ ;  $p=0,012$ ).

personality type can predict some response regarding cholesterol and glucose. Although this in a correlational study and no causal inference is possible to determine, we may expect that individuals who are more either extroverted or neurotic in terms of their personality seem especially protected to stress hormones which, in turn, may affect cholesterol and glucose levels. This means that psychosomatic mechanisms may be present, and therefore more research to better understand these mechanisms is needed.

Assuming that this study is a contribution for further research our aim is to develop other topics of investigation, expanding it into the psychoneuroimmunological implications present in the mechanisms that mediate the relation between psychological (namely personality traits that tend to be stable and not subject to immediate change) and physical variables, namely between the personality and levels of cholesterol and glucose.

## Consent

All authors declare that informed consent was obtained from the participants for publication of this study.

## Ethical Approval

All authors hereby declare that this research has been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 by Declaration of Helsinki.

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## Competing Interests

The authors have declared that no competing interests exist.

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