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The Association between Physical Appearance and Psychological Characteristics

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INTRODUCTION

Physical appearance is defined as the individuals' external appearance such as, facial features, weight, height, hairstyle and bodily characteristics. On the other hand, personality is referred as a person's cognitive, emotional, attitudinal, and behavioral characteristics. Throughout history, people assumed that physical appearance and personality are directly associated with each other. In ancient Greek times the concept was introduced as Physiognomy, which is the study of assessment of personality characteristics from an individual's outer appearance. Even though the theory later found some scientific basis, at first associations were lacking scientific methodology. As the technology and scientific thinking developed, methods to assess the connection between physical appearance and personality traits gained strength. It was found that even differences with the facial features could carry implications for behavior (Carré & McCormick, 2008).

In this review of literature, the main findings of the facial width-to-height ratio (WHR), the facial cues of dominance, the findings of the finger digit ratio (2D:4D), the waist-to-hip ratio (WHR) and shoulder-to-hip ratio (SHR) will be explained. A further explanation of how they indicate personality and behavior will be provided..

Face As a Primary Feature of Physical Appearance

When we interact with a person for the first time, the primary piece of information available to us is their physical appearance. Out of all the features of the human body, our face is the most important part as it plays a central role in our everyday life. More specifically, it is essential in social interactions, since some regions of the human brain contains a visual system that is specialized in facial stimuli processing (Re & Rule, 2016) Facial appearance purveys reliable information about a diverse array of human characteristics, from one's health and quality as a potential mating partner to complex cognitive states and traits such as one's emotions, attitudes, and propensity for particular behaviors (Re & Rule, 2016) Another important aspect of the influence of facial characteristics is that various studies have demonstrated that personality judgments are made based on facial features. The majority of these findings are concentrated on the perception of the "Big Five" personality traits which are extraversion, agreeableness, conscientiousness, emotional stability/neuroticism, and openness to experience. When presenting an image of a person's face, as a short video or even a brief personal encounter, observers will make similar if not accurate judgments of these traits. It may come as a surprise that there is any consistency in the personality assessments made of a target face, but what is perhaps more intriguing is that these assessments may actually represent actual personality. One must wonder how this association develops now that research has proved that looks have some components that represent personality. How could anything that is essentially a mental representation (personality) be in harmony with an exterior component of a physical being (physical appearance)? We will be providing an answer to this question in the forthcoming chapters of this article.

Physiognomy In Time

The accurate assessment and prediction of personality traits, dispositions, and future behaviors based on physical appearance has a long sordid history in philosophical, anthropological, and psychological thought (Valla et al., 2011). Since the ancient Chinese, Egyptian and Greek times, people have tried to establish relationships between facial morphological features and individual personality traits, which is known as physiognomy (Qin et al., 2016). Aristotle (384-322 BC) was one of the first theorists to investigate the association between facial features and personality. He explained the concept of physiognomy in his treatise *Physiognomics*. Moreover, the physiognomy theories evolved during the Middle Ages, and continued evolving and practised during the 18th centaury when in 1772 Johann Lavater published “Essays on Physiognomy” (Re & Rule, 2016) Although, the early theories regarding physiognomy were not entirely accurate, the notion that facial features might indicate personality is not vanished. Current studies have brought a new perspective in regard to physiognomy. While early studies examined relationships between isolated facial features and personality (for example, eye size and impulsiveness), modern studies have examined how overall face shape and the configuration of features within a face relate to measures of behavior. (Re & Rule, 2016). Therefore, in the upcoming chapter the main findings of the facial width-to-height ratio (WHR) and how measures and differences of this facial ratio are related to behaviour, more specifically the aggressive behaviour.

The Findings of the Facial Width-To-Height Ratio

The facial width-to-height ratio (WHR) is a sexually dimorphic trait (with men having larger ratios than women) that is independent of body size and is argued to have evolutionary origins (Weston et al., 2007) This difference can be detected in the *bizygomatic width* which is the distance from the left facial boundary to the right facial boundary, but no difference is seen in the upper facial height (Weston et al., 2007). This distinction in the facial structure of males and females emerges during puberty, partly as a result of increased testosterone levels in males. In a comparative study done by Carré and McCormick (2008), it was demonstrated that facial width-to-height ratio measured in neutral faces might be an indicator for aggressive behaviour. The facial width-to-height ratio was found to be correlated with aggressive behaviour in male laboratory subjects as well as competitive varsity hockey and professional hockey players. For research purposes, a point-subtraction aggression paradigm (PSAP) was used which is a validated measure of aggression in response to provocation. In this paradigm, the participants had to continuously press three buttons. When pressing one button they earned points, by pressing another button they protected the other players from having points stolen, and by pressing the third button they stole points from their opponent. During the study, aggression was defined as the number of times that the third button was pressed. With the data obtained by the measures of facial width-to height ratio and the point-subtraction aggression paradigm, it was demonstrated that men with larger face ratios are more aggressive than men with smaller face ratios, whereas no association was found between female face ratio and aggressive behaviour. Similar results were obtained when aggression was measured as the number of penalty minutes per game among professional hockey players. (Carré & McCormick, 2008)

The relationship between the facial width-to-height ratio and aggressive behaviour might be related to a third factor, such as the organizational effects of testosterone as part of sexual differentiation in adolescence, which influences both the development of the physique and the nervous system (Carré & McCormick, 2008) Throughout the study two limitations were presented that might have influenced the relationship between the facial metric and the aggressive behaviour: the first limitation was the way the participants positioned their head in the photographs (aggressive men tend to tilt their head upwards), and the second limitation was that there was no direct measurement of the face since only photographs were used in the experiment (Carré & McCormick, 2008) Research has shown that observers can make accurate judgments of propensity for aggression from faces displaying neutral expressions, even when exposure to the faces is limited to 39 milliseconds (Carré et al., 2009) Men with larger WHRs are rated as more aggressive whereas men with smaller ratios were rated as less aggressive. The association between estimated aggression and facial width-to-height ratio demonstrates that this facial cue allows for accurate evaluation of aggression.

Now that a relationship between facial WHRs and aggression is established, another study reported that during a trust game in which the participants had the possibility to work together for shared financial gain or profit for their own personal gain, men with a larger facial ratio were more likely to exploit the trust of others, and the other players were less likely to trust counterparts with wide rather than narrow faces. (Stirrat & Perrett, 2010) The reason why men with larger facial WHRs are aggressive and tend to deceive or cheat more than men with smaller face ratios could be explained by an underlying psychological mechanism, such as the psychological experience of power (Haselhuhn & Wong, 2012) Therefore, it was demonstrated that men with larger facial

width-to-height ratios felt more powerful and this feeling of power directly influenced their behaviour (Haselhuhn & Wong, 2012). Another research about the facial width-to-height ratio confirmed that this facial metrics is associated with personality traits (Geniole et al., 2014) To obtain these results, the relationship between psychopathic personality traits and facial-width-to-height ratio was investigated. In this study the participants (146 men, 76 women) completed the Psychopathic Personality Inventory-Revised (PPI-R) which evaluates personality traits such as: fearless dominance, self-centered impulsivity and cold-heartedness. For further investigation of personality traits and fWHRs, they measured cheating behaviour of the participants during a dice rolling/lottery procedure, which was firstly introduced by Haselhuhn and Wong (2012). From the results of this study, the results of the previous studies about facial width-to-height ratio were confirmed. Therefore, men with larger face ratios were more aggressive (Carré & McCormick, 2008) they cheated more than men with smaller face ratios (Haselhuhn & Wong, 2012) and larger faced men scored higher in the psychopathic personality factor of fearless dominance (Geniole et al., 2014) This study was one of the first to demonstrate a correlation between the facial width-to-height ratio and women. With the data obtained from the Psychopathic Personality Inventory-Revised (PPI-R) it was concluded that women with larger face ratios scored higher on the cold-heartedness factor and scored lower in the self-centered impulsivity (Geniole et al., 2014)

Facial Cues of Dominance

Dominance is a personality trait that can be perceived from facial features.

More precisely, a person's facial features may also be a sign of perceived and actual dominance. A person with a masculine and dominant-looking face is perceived as more aggressive and threatening (Oosterhof & Todorov, 2008), and men with dominant-looking faces are perceived as less trustworthy in real life (Stirrat & Perrett, 2010) Moreover, dominance is considered as a trait with great significance in humans, such as perceptions of dominance can be made from faces with neutral expressions in as little as 39 milliseconds (Carré et al., 2009; Re & Rule, 2016) Factors influencing the development of dominant/masculine looking features are hormones, more specifically testosterone. Testosterone can manifest in personality traits through enhanced aggression and testosterone levels correlate with physical and verbal aggression, as well as aggressive responses to provocation and threat (Re & Rule, 2016). A study done by Penton, Voak and Chen (2004) investigated the relationship between the circulating testosterone and facial masculinity. To carry out this experiment, they used original images of faces. Faces of individuals with high-testosterone and low-testosterone levels were presented. Participants judged the faces with high-testosterone levels as being more masculine rather than low-testosterone level faces, which were considered as less masculine. (Penton-Voak & Chen, 2004) The results obtained by this research corroborated the findings of previous studies about the face width-to-height ratio (WHR), more specifically the association between fWHR and testosterone. Until now, personality and the association with physical appearance has been explained through the typical biological causes. However, it is possible to interpret this association of personality and physical appearance as an outcome of environment, for instance, growing up in

an unhealthy environment can lead to an early start of puberty. Subsequently, an increase in testosterone levels would result in the development of dominant, masculine facial features earlier in life. Therefore, the environment together with the underlying biological processes would cause the development of an aggressive, anxious and confrontational personality (Re & Rule, 2016) Besides explaining the development of personality through the relationship between biological causes and environment, there is a possibility that the physical appearance and personality are correlated directly with each other. More precisely, facial appearance alone might determine personality. When people interact with a dominant-looking person, they might behave in a submissive way. As a result to this reaction, the dominant-looking person might behave more aggressively, and develop a dominant personality in the long term (Re & Rule, 2016) On the other hand , just as physical appearance influences personality, the opposite could occur. For instance, a dominant person who behaves aggressively might develop angry facial expressions over time (Re & Rule, 2016)

The Findings of The Finger Digit Ratio

While the face is considered a physical component of great significance, there are other parts of the physical appearance which can aid the understanding of personality characteristics. In this chapter, the main findings of the finger digit ratio (2D:4D) will be further explained.

It is possible that hands may reveal information about what happens during the embryological stage of development. Throughout this stage, a fetus is exposed to two prenatal sex hormones: testosterone and estrogen. Differences in the levels of these sex hormones will influence the development of the hand fingers (Gallup et al., 2008) Therefore, people who are exposed to high levels of testosterone will develop longer ring fingers (the fourth digit: 4D) than the index fingers (the second digit: 2D) On the

contrary, for people who are exposed to increased levels of estrogen their index fingers (2D) will be longer than their ring fingers (4D). This 2D:4D difference is defined as finger digit ratio, in which a ratio of less than 1.0 indicates high levels of testosterone, while as a ratio higher than 1.0 indicates increased levels of estrogen exposure during the prenatal stage (Gallup et al., 2008)Moreover, the finger digit ratio (2D:4D) is a sexually dimorphic trait, with men having a relatively shorter second digits (index finger) than fourth digits (ring fingers) (Bailey & Hurd, 2005) It has been found that the finger digit ratio (2D:4D) is associated with several psychological characteristics. One study by Austin et al. (2002) investigated the relationship between the finger digit ratio (2D:4D) and personality traits, such as sensation seeking, psychotism and neuroticism. To establish this relation, personality test questionnaires were used. A correlation between the female digit ratio and the pre mentioned personality traits was found (Austin et al., 2002) Research has shown that females with a smaller ratio of (2D:4D) report higher and more masculinized scores on the Bem Sex Role Inventory (CSATHO et al., 2003) To obtain these results, the finger digit ratio (2D:4D) was measured in 46 female participants. The subjects completed the Bem Sex Role Inventory (BSRI) a questionnaire used to measure masculinity and femininity. These findings demonstrated that subjects, more specifically females who were exposed to higher levels of testosterone and lower levels of estrogen during the prenatal stage, perceived themselves as more masculine rather than feminine (CSATHO et al., 2003) Moreover, in a distinct study conducted by Csathho and colleagues (2002) it was ascertained that second-to-fourth digit ratio (2D:4D) predicted navigational abilities in healthy women. To examine this relationship, 2D:4D ratio was measured in 46 female participants, whereas their navigational abilities were tested in a real arena maze (RAM). Csathho and colleagues (2002) reported that

females with a lower 2D:4D ratio demonstrated better navigational abilities (spatial recall) and better navigational cues than females with a higher 2D:4D (Csathó et al., 2003) One more significant finding of the finger digit ratio was concluded, that the second-to-fourth digit ratio may be considered as a potential indicator of autism. Manning and colleagues (2001) investigated the relationship between autism and the finger digit ratio. Evidence suggests that if exposed to high levels of testosterone during the prenatal stage of development, autism may occur. Based on this theory, Manning and colleagues (2001) conducted a study. For research purposes, 2D:4D was measured in 72 children with autism (23 with Asperger's syndrome) and their relatives. The study found that children with autism and their relatives demonstrated a lower ratio of 2D:4D. This indicates that families with low 2D:4D ratios are more at risk of developing autism. It was suggested that the primary reason for developing autism and having a low finger digit ratio is due to increased levels of testosterone (Manning et al., n.d.) Nevertheless, a further and more accurate investigation of the association between the finger digit ratio and the risk of developing autism is suggested.

Shoulder-To-Hip and Waist-To-Hip Ratio

In the previous chapters, two sexually dimorphic traits such as: facial width-to-height ratio (WHR) and the finger digit ratio (2D:4D) were identified. The aforementioned studies showed that both of the ratios demonstrate individual differences in males and females. For instance, the facial width-to-height ratio conveyed more information about males, their behaviour and personality traits. In contrast, the finger digit ratio (2D:4D) was more specific for females and, especially male-type females. Besides these two, the presence of two more body ratios was identified.

Hughes and Gallup (2003) presented two sexually dimorphic body related traits, the waist to hip ratio (WHR the circumference of the waist relative to the hips), and the

shoulder to hip ratio (SHR the circumference of the shoulders relative to the hips) (Hughes & Gallup, 2003) Research found differences between males and females' waist to hip ratio (WHR) and shoulder to hip ratio (SHR) and both ratios indicate different sexual behaviours in males and females. Men with high shoulder-to-hip ratio (SHR), and females with low waist-to-hip ratio (WHR) reported sexual intercourse at an earlier age, more sexual partners, more extrapair copulations, and having engaged in more instances of intercourse with people who were involved in another relationship. Different results were reported for men with lower WHR, such as later first sex and fewer sexual partners (Hughes & Gallup, 2003) In a similar study conducted by Varella and colleagues (2014) the relationship between sexual promiscuity (having or involving more sexual partners) and physical traits of men and women was investigated. For a further examination, sex-dimorphic body measures (2D:4D, WHR/WSR, handgrip strength, and height and weight) were used. The study demonstrates that sexual dimorphic body traits indicate promiscuous behaviour, both in men and women. (Varella et al., 2014)

CONCLUSSION AND DISCUSSION

In this report, modern studies and how they have brought a new perspective in regard to physiognomy were introduced. From the studies that investigated the facial width-to-height ratio (WHR) it was concluded that men with larger face ratios are more aggressive (Carré & McCormick, 2008) are more prone to cheat, and exploit the trust of others for their own self-interest (Haselhuhn & Wong, 2012) Moreover, it was concluded that the association between the facial width-to-height ratio and aggression was mediated by a third factor, such as testosterone (Carré & McCormick, 2008) Additionally, it was concluded that a person's facial features may be a sign of perceived and actual dominance. Four causes that might influence the development

of a dominant personality are demonstrated. The biological causes, such as the high levels of testosterone, the environmental causes, specifically growing up in an unhealthy environment, and the possibility that the physical appearance and personality are directly correlated with each other (Re & Rule, 2016) Besides the facial features, other parts of the physical appearance that explain the association between physical appearance and psychological characteristics are introduced. From the findings of the finger digit ratio (2D:4D) it was concluded that females with a smaller ratio of (2D:4D) perceive themselves as more masculine (CSATHO et al., 2003) and demonstrate better navigational abilities (Csathó et al., 2003) Moreover, it was concluded that the finger digit ratio (2D:4D) might be an indicator of autism (Manning et al., n.d.) Whereas it was concluded that the waist-to-hip ratio (WHR) and the shoulder-to-hip ratio (SHR) are indicators of promiscuous behaviour (Varella et al., 2014) Therefore, a further investigation of the sexually dimorphic traits, such as (fWHR, 2D:4D, WHR and SHR) is suggested.

From the studies and the findings that were presented, it can be concluded that physical appearance and psychological characteristics are associated with each other. This association is mediated primarily by the biological factors, such as testosterone and estrogen. Although, the early theories in regard to physiognomy were not entirely accurate, the recent studies that investigated the relationship between personality and appearance demonstrated, that the physiognomists may have been on to something all along; but their theories merely required some direction.

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