

The Impact of Chinese CEOs' Facial Aesthetics on Their Compensation

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Abstract. Much of the psychological and sociological literature has shown that beauty plays a role in the workplace. Does this apply to CEOs and affect their compensation? This study uses the term facial aesthetics to measure CEO beauty. Facial attractiveness and facial maturity are two important components of facial aesthetics. This paper summarizes three methods. The first method uses the ResNet50 deep convolutional neural network, using ImageNet data, which is applied to a variety of image processing tasks. The second method is Three-Dimensional Stereo-Photogrammetry using in major contemporary studies of facial soft-tissue attractiveness. The third approach is the Visual Analogue Scales, the validity of which is also well supported by empirical data, including in terms of test-retest and interrater reliability. The results show that both facial attractiveness and facial maturity have an impact on CEO compensation. Black CEOs with baby faces have higher pay and status than those with more mature faces. CEOs who are more physically attractive are paid more than their less attractive counterparts. However, there is little research on this aspect at present. Like facial maturity, only black CEOs and their pay have been studied, but for the rest of the population, the results are unknown. And, due to the cultural differences, each race also has aesthetic differences.

Keywords: Facial attractiveness; facial maturity; compensation.

1. Introduction

Beauty is very important, both in people's daily life and in society. In life, beauty counts and has benefits in a variety of contexts including interpersonal relationships. Numerous research and anecdotal evidence indicate that a person's physical appearance affects a variety of social outcomes, including first impressions [1, 2]. People often form an initial impression of a person based on their appearance, which in turn influences their subsequent judgment of that person. A person's appearance also influences romantic attraction and dating options [3, 4]. This is very common in life, as the colloquial term "appearance association". Appearance affects peer judgment and treatment as well [5]. For example, black CEO with baby faces seem to be milder, more sincere and better paid. It is unfortunate to be ugly and fortunate to be beautiful, assert Webster and Driskell [6]. People tend to prefer beautiful things unconsciously. It's common knowledge that outcomes related to one's appearance have an impact on one's career, and those who are attractive may be compensated for their good looks [7, 8]. This alleged "beauty premium" has economic significance because it is observed that above-average-looking workers make between 10% and 15% more money than less attractive people [9]. Hamermesh and Biddle's analysis proves that some degree of employer discrimination is real. In this paper, we aim to address this issue in the case of Chinese chief executive officers (CEOs) and examine whether and how the facial aesthetics of a CEO may affect his or her compensation.

According to research, attractive workers-those who adhere to standards of attractiveness in terms of appearance, grooming, and facial features-will be treated well at work and be paid more [10]. There are many sources of executive compensation, so scholars and professionals argue over the fairness of executive compensation [11], or even ethical [12]. There has been much debate about CEO pay, but little research has been done into facial aesthetics. Of course, different countries have different

aesthetic, which leads to the same facial features may have different impact on CEO pay in different countries. For example, black CEO with baby faces tend to work for more prestigious companies and earn higher salaries than those with mature faces [13]. Decades of research have shown that baby-faced adults are perceived as being more warm, trustworthy, and innocent than mature-faced adults [14]. But this is for black CEO, not white ones. For black leaders, baby-faced leaders have better mechanisms for disarming-physical, psychological, or behavioral traits that attenuate perceptions of threat by the dominant group. However, CEO with baby-face also be considered incompetent. This is closely related to the different aesthetic differences between countries.

The combination of Facial features and Facial attractiveness is often referred to as Facial Aesthetics. The term is used to describe the aesthetic evaluation and recognition of facial features, covering people's subjective perception of the beauty and attractiveness of facial features. Facial aesthetics includes many features, such as symmetry, facial features, skin features, age and lines. The study of facial aesthetics explores how people perceive and evaluate facial features and try to understand which features are considered attractive or beautiful. Because of the aesthetic differences involved, the impact of racial CEO's facial aesthetics on their compensation may be different. The current study of CEO Race is not comprehensive. At present, there is no research on the impact of facial aesthetics on CEO compensation in China.

This article mainly provides an overview of past researches on the impact of certain facial aesthetics on pay for CEOs of different ethnicities and industries, introduces the methods and models for studying different facial aesthetics.

2. Measurement Methods

2.1. ResNet50 Deep Convolutional Neural Network

ResNet50 deep convolutional neural network is a residual learning framework. He et al. built the ResNet50 deep convolutional neural network, which this paper use to assess the attractiveness of facial photographs [15]. This method is regarded as the cutting-edge technology for machine-based image analysis [16].

The ResNet50 is pre-trained using ImageNet data [17]. It is a variant of deep residual networks proposed by Microsoft Research. Deep residual networks solve the problem of gradient vanishing and gradient explosion during deep neural network training by using residual blocks. With 50 convolutional layers, including residual blocks, pooling layers, and fully-connected layers, ResNet50 can handle large-scale image datasets and has achieved significant performance in computer vision tasks such as image classification, target detection, and semantic segmentation.

The last 10 layers of the neural network are then re-trained using data on facial features, while the first 40 layers' parameters remain unchanged. This fine-tuning is carried out using a dataset of 5500 facial photos, with facial attractiveness rated on a scale of 1 to 5 [18]. The neural network is trained with 70% of the facial photos and then validated with the remaining 30%. Following fine-tuning, the entire dataset of 5500 facial photos is used for final training. Using this method, the neural network gets an average absolute error of 0.34. In the end, the facial attractiveness of each Chinese CEO is evaluated using the trained ResNet50 convolutional neural network on a scale of 1 to 5, where 5 represents the most attractive appearance.

The ResNet50 deep convolutional neural network is a powerful tool that can be applied to a variety of image processing tasks. It solves the problem of vanishing and exploding gradients in traditional deep networks by introducing residual blocks, allowing the network to be deeper and thus perform better on image recognition tasks. In addition, the advantages of ResNet50 are not limited to image classification, but can also be applied to other areas such as facial aesthetics prediction. By using datasets such as SCUT-FBP5500, ResNet50 can be trained and evaluated for performance on tasks such as facial aesthetics prediction, thus expanding its application areas. In the field of hydrology, techniques from deep convolutional neural networks may also be applicable to morphological

analysis and prioritization of hydrological units to support water resource management and decision-making.

2.2. Three-Dimensional Stereo-Photogrammetry

Based on stereophotogrammetry and structured light methodology, the 3dMDface system (3dMD, Atlanta, GA) is a structured light system. With a relative accuracy of less than 0.5 mm, the 3dMDface system's accuracy and dependability have been demonstrated, and it has the potential to be a widely used tool for clinical research and diagnosis [19].

Clinicians are becoming increasingly interested in 3D photogrammetry due to its noninvasive, time-saving, and easily-cooperated characteristics [20]. It has been demonstrated that three-dimensional stereophotogrammetry is a precise and trustworthy imaging technique for use in orthodontics [21].

Major contemporary research on the attractiveness of soft tissue in the face, however, is still limited to two-dimensional line and angle measurements based on 3D stereophotogrammetry [22]. Only a few of the face's components were evaluated in its entirety [23]. The term "average" has been used a lot in orthodontics during the past 50 years, and large average data sets are thought to be better at illustrating face skeletal characteristics [24]. However, because of the limitations in acquiring and processing information about faces in three dimensions, the characteristics of facial soft tissue-which are crucial to diagnosis and treatment result evaluations-were seldom expressed with an average face.

Three-dimensional stereophotogrammetry has important applications in the measurement and evaluation of face parameters. It can provide more accurate, reliable and reproducible measurements and has advantages over traditional methods. These studies have also shown that the attractiveness of facial contours can be assessed more comprehensively by taking into account the features of each facial region. In addition, there may be differences in facial aesthetic preferences between different ethnic and cultural backgrounds, which also need to be taken into account in the measurement and assessment process. Therefore, some studies have concluded that average face based on stereophotogrammetry is a feasible method to analyze the facial characters.

2.3. Visual Analogue Scales

High completion and response rates are attained with Visual Analogue Scales. Because VAS procedures are easier to complete and more straightforward than Time Trade-Off or Standard Gamble approaches, they are typically less expensive to administrate. The validity of VAS techniques is also well supported by empirical data, both in terms of test-retest and inter-rater reliability. Concerns have been raised regarding the VAS's capacity to represent preferences on an interval scale, nevertheless, due to the activities' direct and non-choice character.

VAS methods seem to quantify elements of changes in health status rather than the benefits or satisfaction these changes provide. This theory is supported by qualitative data showing that respondents perceived VAS methods as a way to express numbers in terms of "percentages of the best imaginable state" or "a percentage of functioning scale," rather than as a way to get information about their preferred health states. Numerous pieces of evidence indicate that unadjusted VAS ratings are not a reliable indicator of preference strength that can be applied to economic analysis.

There has been interest in translating VAS values to SG or TTO utility values because of the evidence that suggests VAS may not yield health status utilities that can be used directly in the QALY calculation. This provides the benefit of keeping the VAS's user-friendliness while offering the potential benefits of a choice-based health metric. The degree to which VAS and SG or TTO may be mapped using a stable function, however, has been called into question [25].

3. Results and Discussion

3.1. Maturity and Compensation

Maturity is one measure of facial aesthetics. Previous research has also shown that facial features such as a baby-face and maturity are scientifically measurable, not subjective [13]. A baby's face is disarming, which suggests that black CEO with baby faces is seen as more gentle and sincere.

As predicted, black CEOs scored significantly higher on their baby faces than their white counterparts [13]. Additionally, the study contrasted assessments of the CEOs' warmth and skill with those of their organizations, using a mixed analysis. Within-subjects ANOVA. Then, researchers analyzed data specially by different races [13]. Fig 1 shows that black CEOs have a much higher rate of facial warmth than white CEOs. But among the general population, blacks have a lower rate of facial warmth than whites. According to the ratings, Black people are slightly less warm than White people and far less warm than women. Women and Blacks were seen to be slightly less skilled than Whites (Fig 1, 2).

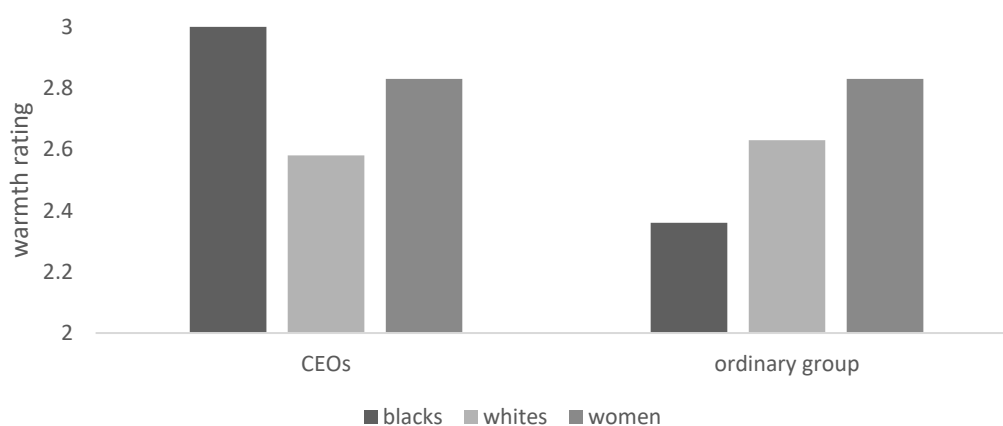


Fig. 1 Warmth rating of different types of CEO

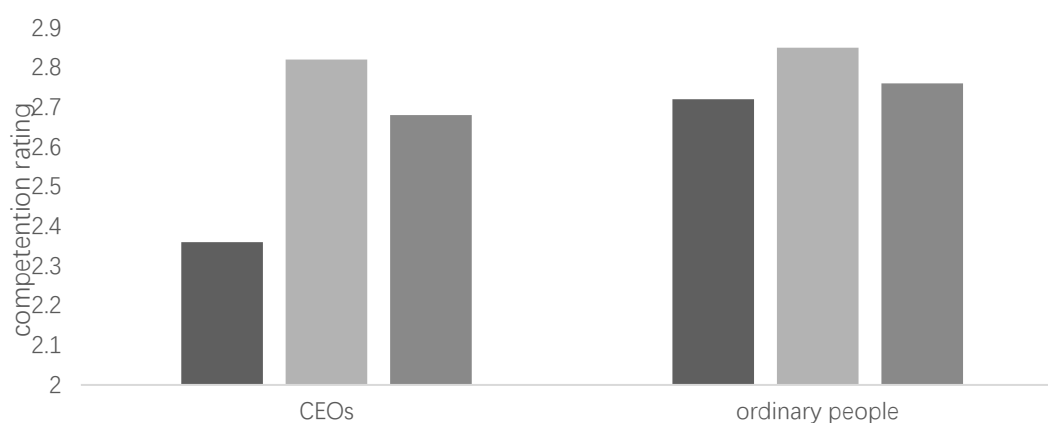


Fig. 2 Competence rating of different types of CEO

The connections between the CEOs' baby-face and their companies' corporate status and their salary were also examined by the researchers. The Fortune 500 rating and annual income of the corporation were used to operationalize corporate reputation. The top company received a score of 500 after the ranking was rescored. Researchers calculated the CEOs' total remuneration using both of their salaries and their overall pay, which additionally comprised bonuses, grants of restricted stock, payments from long-term incentive programs, the value of option awards, and other yearly remuneration [13]. Given that larger companies typically pay their CEOs more than smaller companies, these four indexes are different but not entirely independent [26]. Obtaining these data through Standard & Poor's Compustat/ExecuComp database, researchers find that there was a positive relationship between babyfacedness and both financial compensation and corporate prestige

for Black male CEOs, which suggests that relatively baby-faced Black CEOs had more financial and corporate success than did mature-faced Black CEOs. However, the opposite trend emerged for White male CEOs [13].

These findings are all about the relationship between black CEOs facial maturity and their pay, an important determinant of which is the disarming effect of the baby-face.

3.2. Attractiveness and Compensation

Both ordinary people and famous philosophers acknowledge the importance of beauty. For instance, Aristotle said that personal beauty was a better introduction than any letter. So what is the link between a CEO's facial attractiveness and his or her compensation? Because economic theory has historically dominated the executive compensation literature, there has been little research done on the topic of CEO beauty and compensation. Scholars speculate that CEO beauty may not be a key element in explaining CEO remuneration because of the abundance of research on CEO compensation that does not address CEO beauty as a factor influencing CEO compensation. Studies has proved that CEO attractiveness is positively related to CEO compensation [27]. Researchers first collected photos of CEOs and asked people to rate their attractiveness, Tobin used to measure the company's performance at time t1 by dividing the market value of total assets plus equity by the book value of equity, which ultimately proved that if each unit of added attractiveness rating was added, total compensation would increase by \$1.222 million [27]. More specifically, a one unit rise in attractiveness boosts salary by \$1.287 million in cases where the CEO is not employed by a high-tech company and a one unit rise in the CEO's attractiveness reduces salary by \$0.047 million ($= 1.287 - 1.334$) when the CEO works for a high-tech company [27]. High-tech companies seem to be a good measure of research and innovation activities because their CEOs are less likely to be able to secure larger rewards. And, for a particular industry-banking-the study found that the cosmetic premium recorded in bank chief executive compensation made economic sense, the study estimates, after controlling for various CEO-and bank-specific attributes known to influence executive compensation, total compensation increased by nearly 9% (\$395,000) for each standard deviation increase in the CEO's facial attractiveness metric, the total compensation of a bank CEO who looks above average is about 24% (\$1.06 million) higher than that of a bank CEO who looks below average, and better-than-average CEOs were paid about 55 per cent more in bonuses, stock awards and options than their less attractive peers [28].

Overall, facial attractiveness, as an important feature of facial aesthetics, is closely related to CEO compensation, CEO gender and company size.

3.3. Practical Implications

Exploring the impact of facial aesthetics of Chinese CEOs on their compensation has some practical implications. First, facial attractiveness may be related to the image formation of a CEO, and a more attractive face may leave a more positive and confident impression on investors, employees, and other stakeholders, thus positively affecting a firm's reputation and brand image. Thus, a CEO with higher facial attractiveness may contribute to the company's market position and enterprise value, which may be reflected in his or her compensation level.

On the other hand, facial maturity may be associated with leadership ability and experience. A CEO with greater facial maturity may be perceived as more experienced and poised, and better able to cope with complex business environments and challenges. As a result, they may be rewarded with higher salaries and incentives that reflect their value in company management and strategy development.

However, it is important to note that facial aesthetics is only one factor that affects compensation; other factors such as an individual's performance, company performance, and industry competition can also have an impact on compensation. Therefore, linking facial aesthetics directly to compensation requires a combination of factors and more in-depth research and analyses to determine the exact relationship between them.

3.4. Limitations and Future Research

There are a number of limitations to examining the impact of facial aesthetics on compensation of Chinese CEOs. First, existing studies are limited by sample selection, as only a small number of samples are involved and the samples are from specific industries and regions, which limits the generalizability of the results. Secondly, facial aesthetics is only one factor that affects pay; other factors such as individual job performance and company performance also have an impact on pay. Therefore, these factors need to be controlled for in the study in order to more accurately assess the impact of facial aesthetics on pay.

In addition, there is some subjectivity and inconsistency in the definition and assessment of facial attractiveness and maturity. Different researchers have different criteria and methods for assessing facial features, which can lead to inconsistent results. Therefore, future studies need to establish more objective and standardized assessment methods to ensure reliability and reproducibility of results.

Future studies could adopt a longitudinal research design that tracks changes in facial aesthetics and compensation for the same group of CEOs in order to more accurately assess the impact of facial aesthetics on compensation over time. Additionally, an experimental research design is a promising approach to determine causality by experimentally controlling for other factors, targeting facial attractiveness and sophistication in an intervention, and observing their effects on compensation. Finally, conducting cross-cultural comparative studies is also a meaningful direction, where comparing the relationship between facial aesthetics and pay across different cultural contexts can reveal the influence of cultural factors on this relationship. Through these methods, the impact of facial aesthetics on compensation can be more comprehensively understood and provide more in-depth reference and guidance for corporate management and talent evaluation.

4. Conclusion

In conclusion, the research sheds light on the previously understudied relationship between facial aesthetics and CEO compensation in China. Through the use of advanced measurement methods such as the ResNet50 deep convolutional neural network, Three-Dimensional Stereo-Photogrammetry, and Visual Analogue Scales, this paper is able to quantitatively assess facial attractiveness and maturity and their impact on CEO compensation. Our findings reveal that facial aesthetics, particularly attractiveness, play a significant role in determining CEO compensation. Black CEOs with baby-faced features were found to receive higher compensation and lead more prestigious companies compared to their mature-faced counterparts. Similarly, CEO attractiveness was positively correlated with compensation, with more attractive CEOs receiving higher salaries and incentives, especially in certain industries like banking.

These results have important implications for both academia and industry. For academia, the study contributes to the understanding of the complex factors influencing executive compensation, highlighting the importance of facial aesthetics as a determinant of pay. For industry practitioners, our findings suggest that attention to CEO appearance may be beneficial for firms seeking to enhance their reputation and market position. Furthermore, the research underscores the need for more comprehensive and standardized assessment methods for facial aesthetics in future studies.

Looking ahead, future research in this area should address several limitations identified in the study. Longitudinal research designs tracking changes in facial aesthetics and compensation over time, experimental interventions to establish causality, and cross-cultural comparative studies will provide deeper insights into the relationship between facial aesthetics and CEO compensation across different contexts. By continuing to explore this topic, researchers can contribute to a more nuanced understanding of executive compensation and inform corporate management and talent evaluation practices in the future.

Authors Contributions

All the authors contributed equally and their names were listed in alphabetical order.

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