Perceived trustworthiness is associated with position in a corporate hierarchy

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**Abstract**

Faces provide cues about an individual’s social, economic, and reproductive success. Here we examined the relationship between perceived trustworthiness, dominance, attractiveness, and position within a corporate hierarchy in mid- to top-level managers. Position in a hierarchy was operationalized as the difference in the number of subordinates and superiors controlling for firm size. It did not correlate with perceived attractiveness and dominance but was positively correlated with perceived trustworthiness. Geometric morphometrics revealed facial features associated with the perception of trustworthiness. When facial shape was tested against corporate position we found no statistically significant effect. The facial width-to-height ratio, a metric previously shown to be correlated with traits such as dominance and (decreased) trustworthiness, was unrelated to the managers’ position in the corporate hierarchy. Implications and limitations are discussed.

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1. Introduction

The association between social success and facial appearance is a widely discussed topic. Previous research shows that the physical appearance of leaders influences election outcomes (Hall, Goren, Chaiken, & Todorov, 2009; Little, Burriss, Jones, & Roberts, 2007; Olivola & Todorov, 2010). CEOs whose faces look more competent, dominant, and mature are employed within companies that tend to be more profitable (Rule & Ambady, 2008). Competent look is priced into CEO compensation more than attractive appearance (Graham et al., 2014). Based on this evidence, it was not clear whether more successful companies select CEOs with particular appearance or whether individuals with a competent appearance tend to be more effective CEOs. People rate large-firm (i.e., higher sales revenue) CEOs as more competent-looking than small-firm CEOs, suggesting that competent-looking CEOs are primarily selected and employed by companies that were already more profitable (Graham et al., 2014).

First impressions of social traits such as attractiveness, trustworthiness, and dominance were shown to be reliable even when perceived from highly variable images and their consequences for social encounters are well-evidenced (Todorov, Olivola, Dotsch, & Mende-Siedlecki, 2015; Vernon, Sutherland, Young, & Hartley, 2014). Trustworthiness is associated with perception of several desirable characteristics such as trustworthiness, intelligence, competence, and health (Eagly, Ashmore, Makhijani, & Longo, 1991; Kleisner, Kočnar, Rubešová, & Flegr, 2010; Todorov et al., 2015). Moreover, more attractive individuals are treated more positively (Langlois et al., 2000) and have higher mating success (Barber, 1995; Jokela, 2009; Rhodes, Simmons, & Peters, 2005), and stronger possibility to achieve higher social status (Anderson, John, Keltner, & Kring, 2001; Langlois et al., 2000).

Perceived trustworthiness may also play an important role in successor CEO selection (Gomulya, Wong, Ormiston, & Boeker, 2015). Facial shape analysis showed that perceived trustworthiness correlates with perceived happiness while untrustworthy faces are considered to be angrier (Kleisner, Priplatova, Frost, & Flegr, 2013; Todorov, 2008). Trustworthiness based on facial appearance affects the decision to approach or avoid the target (Oosterhof & Todorov, 2008, 2009) and is correlated negatively with perceived dominance but positively with attractiveness (Kleisner et al., 2013).

Dominant-looking animals and human beings may have an advantage moving up within status hierarchies (Mazur, 2005). In humans, dominant appearance seems to be especially important in male societies such as armed forces but its importance for corporate societies is questionable. The facial dominance of West Point cadets was positively correlated with their military rank in early and late careers (Mazur, Mazur, & Keating, 1984; Mueller & Mazur, 1996). Facial dominance may have special significance in the context of leader–follower relations: For instance, people prefer dominant leaders especially under group-related human (as opposed to non-human) threats and to the extent that they hold a conservative political ideology. However, when

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looking for a friend, people prefer those that are not dominant, irrespective of ideology or social environment (Laustsen & Petersen, 2015).

The facial width-to-height ratio (FWRH) is a morphological trait associated with a wide array of features such as self- and other-perceived dominance, anti-social behaviour, perceived aggressiveness, actual aggression, physical performance, and reproductive success (Carré & McCormick, 2008; Carré, McCormick, & Mondloch, 2009; Lefèvre & Lewis, 2014; Loehr & O’Hara, 2013; Mileva, Cowan, Cobey, Knowles, & Little, 2014; Stirrat & Perrett, 2010; Tsuji & Banissy, 2013; Třebický, Havlíček, Roberts, Little, & Kleiner, 2013). Companies headed by CEOs with relatively wider faces attain superior financial performance particularly within firms whose leadership teams demonstrated lower cognitive complexity (Wong, Ormiston, & Haselhuhn, 2011). Men with broader (vs. narrower) faces were more likely to exploit their counterparts’ trust in economic games and players were more likely to entrust their money to males with longer and narrower faces (Stirrat & Perrett, 2010). Lower FWRH tends to be associated with higher perceived trustworthiness and lower perceived dominance.

Most of the studies on social rank perception were carried out on styled photographs (election photos, cadet yearbooks, etc.), which are usually highly variable in features such as head position, smile, and gaze direction. This makes the measurement of static facial traits complicated and may also significantly influence the overall perception of target characteristics. Therefore, the current study was conducted in the corporate environment with male CEOs controlling for variation in facial features.

First impressions about a stranger frequently influence future interactions with the person and are strongly affected by physical appearance (Uleman & Saribay, 2012). Previous research suggests that higher attractiveness and competence might distinguish business leaders from leaders in other domains such as an army and sports (Olivola, Eubanks, & Lovelace, 2014). In modern, fast-moving societies with project-oriented employment careers, individuals often change their social environments, collaborators, and sub- and superordinates. Every change brings the risk of being rejected by the new environment, especially when trying to dominate individuals in an already established hierarchy. Also, individuals acting as superiors inevitably engage in risk-taking behaviour such as delegation of responsibility, sharing organizational plans, and inviting others’ involvement in critical decisions.

In the current study, we tested the connection between achieved position within a corporate structure and perceived facial dominance, trustworthiness, and attractiveness. If corporate hierarchies are driven by individuals’ struggle for success (because higher position gives access to more resources) and if the mentioned characteristics are linked to social success, then one of these characteristics or their combination should influence an individual’s position within a corporate hierarchy. We suggest that perceived trustworthiness is one of the most favoured characteristics in personnel promotion in corporations, especially when choosing an employee/collaborator from an unknown group of people. We hypothesize that attractive and trustworthy-looking men might be more successful (i.e., more likely to rise up) within a corporate hierarchy. While it is possible that facial dominance plays a similar role in corporations, based on the extant literature (e.g., Mazur et al., 1984), we argue that dominance should be preferred more strongly within military societies than corporations. In the current study, we focus exclusively on the corporate domain and predict that perceived trustworthiness, compared to dominance, should play a greater role in predicting a male’s likelihood of rising within a corporate hierarchy. We used geometric morphometrics and FWRH measurement to determine facial traits associated with perceptual dimensions that might affect the position in a corporate hierarchy.

2. Methods

2.1. Photographs

We took photographs of 48 male managers (mean age = 40.35, SD = 6.95, range: 25–59) from the Czech Republic on occasion of CEO Golf Tour and by individual meetings. All managers were employees of different companies. Models were instructed to assume neutral expressions and to avoid any face decorations. Portrait photographs were taken by a Nikon D80 camera. All photos were cropped so that the eyes were horizontally at the same height and a standard length of neck was visible. The background colour was changed into grey using Adobe Photoshop 6.0. Each photographed man was instructed to report his age, number of superiors, number of subordinates, and total number of employees in their company. The number of subordinates is the number of employees inferior to the superordinate for which he has a direct responsibility (in the case of CEO all of the company’s employees were considered as subordinates). The number of superiors is the number of hierarchical levels above the level of an employee (not the total number of superordinate employees at all superordinate levels). All personal data and firm specifications were anonymized.

2.2. Rating of photographs

One hundred and eighty-seven (109 females) university students, aged 21.75 years on average, SD = 2.12, range = 19–37 (females: M = 21.6, SD = 2.45, range: 19–37; males: M = 22, SD = 1.36, range: 19–27), were invited to volunteer to judge the photographs on trustworthiness, attractiveness, and dominance. Photos were rated for trustworthiness by 47 males and 77 females and a separate group of 31 males and 32 females rated the photos for dominance. A week later the same group of 31 males and 32 females judged photos for attractiveness. Each person rated the whole set of 48 photos, one at a time, for one of the characteristics on a scale from 1 (very untrustworthy/submissive/unattractive) to 7 (very trustworthy/dominant/attractive) without time limits. Raters saw images on a liquid crystal screen with 1280 × 1024 pixel resolution.

2.3. Facial width-to-height ratio

Photos of 48 managers were measured by means of the ImageJ software. Using the same methodology as in previous studies (Carré & McCormick, 2008; Třebický et al., 2014), we measured the distance between the upper lip and brow (height of upper face) and between left and right cheekbones (zygomatic width). FWRH was calculated as width divided by height. All distances were measured twice to assess measurement reliability. Reliability was high for all measures: distance between left and right cheekbones (r = 0.936, p < 0.001); distance between the upper lip and brow (r = 0.935, p < 0.001); and the width-to-height ratio (r = 0.901, p < 0.001).

2.4. Statistics

The correlations between perceived trustworthiness, dominance, attractiveness, FWRH, and position in occupational hierarchy were measured by Pearson’s correlation coefficient. The ratings of all photographs by one rater were converted to z-scores to eliminate the influence of individual differences between raters, and each of perceptual characteristics was calculated for each photo as its average z-score. The position in occupational hierarchy (M = 51.83, SD = 82.33, range = 5–510) was operationalized as the difference in the number of subordinates and superordinates statistically controlling for firm size (total number of employees). Inter-rater reliability of attractiveness, dominance, and trustworthiness ratings was measured by Cronbach’s alpha.

2.5. Geometric morphometrics

Photographs of 48 males were analysed by geometric morphometrics to investigate variability in face shape associated with perception of trustworthiness. The 60 landmarks (including 24 semilandmarks) were digitized in tpsDig2 software, ver. 2.14 (Rohlf, 2009a). Landmarks are represented as points that are anatomically (or at least...
geometrically) homologous while sliding semilandmarks serve to denote curves and outlines. The definitions of landmark and semilandmark locations on human faces were adopted from previous studies (Kleiner et al., 2010; Kleiner et al., 2013; Trebický et al., 2013). All configurations of landmarks and semilandmarks were superimposed by Generalized Procrustes Analysis (GPA) using the “gpgagen” function involved in the geomorph package in R (Adams & Otrola-Castillo, 2013).

For testing the effects of perceived characteristics, we performed permutational multivariate analysis of variance using distance matrices with 9999 permutations (the Adonis function in the Vegan package in R; Oksanen et al., 2013); the Euclidean method was used as a distance measure. We ran a multiple multivariate regression with shape coordinates as the response variable and with scores of ratings as explanatory variables. We built two models: (1) the regression of shape coordinates on trustworthiness with and without control for attractiveness and (2) the regression of shape coordinates on position in corporate hierarchy. The shape changes associated with perceived trustworthiness were visualized by a thin-plate spline interpolation function, available in the tpsRegr (Version 1.36; Rohlf, 2004) using the original photographs of managers that were unwarped to fixed configuration represented by the estimates of shape regressions.

3. Results

Cronbach’s alpha values showed high inter-rater agreement for trustworthiness (0.947), dominance (0.895), and attractiveness (0.959). All correlational analyses included the full photoset (N = 48). The judgements of male and female raters were highly correlated for perceived trustworthiness (r = 0.94, p < 0.001), attractiveness (r = 0.84, p < 0.001), and perceived dominance (r = 0.74, p < 0.001). Therefore, we decided to analyse the ratings of both sexes together. We considered the manager’s age as a potential confounding variable. There was no significant correlation between the manager’s age and perceived trustworthiness (r = 0.048, p = 0.746) and between age and perceived dominance (r = 0.066, p = 0.666) but we found a significant negative correlation between attractiveness and age (r = -0.41, p = 0.004). Attractiveness was positively correlated with trustworthiness (r = 0.821, p < 0.001), but there were no significant correlations between perceived dominance and attractiveness (r = 0.068, p = 0.65) or between perceived dominance and perceived trustworthiness (r = -0.012, p = 0.933). The manager’s position in a corporate hierarchy was not correlated with the total number of employees in the firm (r = -0.012, p = 0.936). This suggests that no sampling bias was associated with the size of the company (e.g., managers from big companies could more likely occupy the higher position in the hierarchy).

We did not find any significant correlations between position in occupational hierarchy and dominance (r = 0.144, p = 0.331) and between position and attractiveness (r = 0.061, p = 0.681). The latter result remained non-significant when we controlled for age (r = 0.248, p = 0.092). However, we found a significant correlation between perceived trustworthiness and position in occupational hierarchy (r = 0.303, p = 0.036). Perceived trustworthiness may be confounded by attractiveness. When we statistically controlled for the effect of attractiveness on the association between perceived trustworthiness and position the correlation was still significant: r = 0.44, p = 0.001. Position in occupational hierarchy thus showed a significant positive correlation with perceived trustworthiness: the higher the number of subordinates and the smaller the number of superiors, the higher the perceived trustworthiness (see Fig. 1).

Next, we built a linear model with perceived trustworthiness as the response variable, position in corporate hierarchy as the predictor, and total number of employees (firm size) and attractiveness as covariates. There was a significant relationship between perceived trustworthiness and position in corporate hierarchy (F(1,44) = 10.787, p = 0.002, R² = 0.197, β = 0.254). The effect of attractiveness was significant (F(1,44) = 101.804, p < 0.001, R² = 0.698, β = 0.804) but not the effect of firm size (F(1,44) = 0.005, p = 0.944, R² < 0.001, β = −0.006). The proportion of variance explained by the overall model was 72% (adjusted R² = 0.721).

3.1. Facial width-to-height ratio

Facial WHR was unrelated to position in occupational hierarchy (r = −0.062, p = 0.674). The positive correlation between FHWR and perceived dominance was not significant (r = 0.2, p = 0.175). The negative correlation between FHWR and perceived trustworthiness was also not significant (r = −0.26, p = 0.075).

3.2. Geometric morphometrics

We used multivariate regressions to test for possible associations among perceived trustworthiness, position in corporate hierarchy, and facial configuration. The effect of perceived trustworthiness on facial shape was not significant (F(1,46) = 1.764, p = 0.071, R² = 0.037). Controlling for the effect of attractiveness, we found that the perceived trustworthiness was significantly associated with facial shape (F(1,45) = 2.065, p = 0.0323, R² = 0.043) whereas the effect of attractiveness was not significant (F(1,45) = 1.349, p = 0.196, R² = 0.027). The regression of shape coordinates on position of corporate hierarchy was not significant (F(1,46) = 0.570, p = 0.844, R² = 0.012).

To detect facial traits associated with perceived trustworthiness, we used the TPS interpolation function to visualize the results of shape regression on trustworthiness both without and with control for attractiveness effect (Fig. 2 and Fig. 3, respectively). When the effect of attractiveness was not controlled (Fig. 2), grid deformations associated with the perception of trustworthiness target especially the area of eyes, mouth, and nose. Trustworthy-looking faces tend to be vertically prolonged having narrower lips with corners oriented upwards, longer nose, and eyes that are relatively larger with less massive and shorter eyebrows. An untrustworthy looking face is generally broader and oval, being characterized by massive lips with corners oriented downwards, shorter nose, and smallish eyes with massive eyebrows closer to each other. When the shape variation responsible for attractiveness was statistically removed (Fig. 3), the deformation affects the same facial traits, the shape of the mouth and brows especially. Lips tend to

![Fig. 1. Relationship between perceived trustworthiness and position in corporate hierarchy in managers. The y-axis shows residuals of perceived trustworthiness after statistical control for attractiveness (expressed by z-scores). The x-axis shows logarithmized values representing the position of a manager in corporate hierarchy.](image-url)
be thinner and horizontally prolonged with corners turned upwards in trustworthy-looking faces while horizontally constricted and vertically massive in untrustworthy-looking faces. Brows are horizontally shorter and less developed in trustworthy-looking faces.

4. Discussion

The current study showed that facial trustworthiness was statistically associated with managers' position within occupational hierarchies—an effect that emerged controlling for attractiveness. However, we did not find any effect of facial attractiveness and dominance on the position within an occupational hierarchy. Some previous studies focused on electoral success showed that the effects of perceived trustworthiness are minor or sex specific (Berggren, Jordahl, & Poutvaara, 2010; Poutvaara, Jordahl, & Berggren, 2009). However, this might be due to differences in expectations and purposes for which the candidates are selected as well as by whom they are selected. Fruhen, Watkins, and Jones (2016) recently showed that attractiveness, trustworthiness, and dominance affect the remuneration of managers. Nevertheless, salaries at distinct managerial levels are differently affected by these facial evaluations: attractiveness had a stronger effect on remuneration of lower-ranked (shop-floor) managers than senior managers, whereas perceived trustworthiness and perceived dominance had significantly stronger links with the income of senior managers (Fruhen et al., 2016). This seems not to contradict our results because (1) low-ranked (shop-floor) managers were not present in our sample and (2) promotion to a higher level position may be affected more by perceived trustworthiness than dominance in situations where the managers are selected by a current boss who needs to trust and collaborate, but not fight or compete, with his immediate subordinates.

In contrast to Wong et al. (2011), we did not find any correlation between managers' success (at least as represented by his position) and fWHR. The correlation between fWHR and perceived trustworthiness shows a trend towards significance and a similar association was already observed in previous studies (Stirrat & Perrett, 2010; Kleisner et al., 2013). Most previous studies on CEOs are based on pictures that were downloaded from the web and might have thus been modified or styled in ways that may affect perception, even though the researchers followed suggested guidelines for selecting photos (e.g., Carré & McCormick, 2008). In contrast, we used standardized portrait images with neutral expression that were acquired specifically for purposes of the current study and allowed the application of more sophisticated morphological measurements.

Morphometric analysis revealed that facial features were associated with the perception of trustworthiness per se when the shape variation responsible for the effect of attractiveness was statistically controlled. We did not find any statistical association between managers’ facial features and their position within corporate hierarchies. Though there seems to be no immediate information about managers' position inscribed in facial shape we suggest that the corporate position is influenced indirectly via traits of trustworthiness present in managers' faces such as a broader mouth with thinner lips and upward-pointing corners and shorter, less massive eyebrows. A similar facial pattern was shown for the perception of intelligence and competence (Kleisner, Chvátalová, & Flegr, 2014; Todorov, Dotsch, Porter, Oosterhof, & Falvello, 2013).

Of course, trustworthy-looking individuals may or may not be actually trustworthy, intelligent, and competent for their position (see Rule,
Krendl, Ivcevic, & Ambady, 2013). However, if facial trustworthiness is seen as a valid marker of actual trustworthiness and competence and these characteristics are advantageous within business societies, high perceived facial trustworthiness could facilitate the promotion process of managers within their corporation. The managers may be favoured within corporate hierarchies for their ability to make a first impression of trustworthiness during job interviews, in the eyes of the prospective boss or the evaluation committee. Moreover, information sharing between the top and the middle management is necessary for efficient functioning of a company. As veridical sharing of information is facilitated among individuals who trust each other, perceived facial trustworthiness might significantly facilitate interpersonal relations and thus information sharing.

Managers might be able to hold their position also for their ability to impress other people. Managers are, more than any other organizational role, expected to effectively use their social cognitive skills to shape interpersonal interactions among their subordinated employees, potential customers, stakeholders, and so forth. If so, one should test whether the managers from sales, public relations or human resource departments show higher facial trustworthiness than their colleagues from more technical departments such as IT or logistics.

The current results are prone to possible limitations. We cannot assume that managers at different level positions who took part at the CEO golf tournament are each a random sample of all male managers at that level. The fact that the photographs were collected at a particular golf tournament may also have caused some restriction in the range of managerial positions that we sampled. We are aware that managers’ position within companies, calculated by subtracting the number of ranks above a manager from the number of employees working underneath him, is only a proxy to the real position in a corporate hierarchy and might not fully reflect the relative position in the overall corporate structure. The current study, and most of the recent research on formation of first impressions, focuses on judgments from a single modality, such as static photographs with neutral facial expression or standardized voice recordings. In contrast, real life encounters usually involve multiple modalities. Thus, future studies may concentrate on the combinatorial effect of thin slices of information from multiple modalities. Despite these limitations, the current study is (to our knowledge) the first of its kind from the Czech Republic or any other similar culture. We conclude that in corporate structures a trustworthy face is an important asset and individuals perceived as trustworthy have better chances to be the desired candidate for promotion. Future research should focus on female managers and domains other than business, such as military and sports teams.

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