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# I care, even after the first impression: Facial appearance-based evaluations in healthcare context



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## ABSTRACT

**Purpose:** Prior research has demonstrated that healthcare providers' implicit biases may contribute to healthcare disparities. Independent research in social psychology indicates that facial appearance-based evaluations affect social behavior in a variety of domains, influencing political, legal, and economic decisions. Whether and to what extent these evaluations influence approach behavior in healthcare contexts warrants research attention. Here we investigate the impact of facial appearance-based evaluations of trustworthiness on healthcare providers' caring inclination, and the moderating role of experience and information about the social identity of the faces.

**Method:** Novice and expert nurses rated their inclination to provide care when viewing photos of trustworthy-, neutral-, and untrustworthy-looking faces. To explore whether information about the target of care influences caring inclination, some participants were told that they would view patients' faces while others received no information about the faces.

**Results:** Both novice and expert nurses had higher caring inclination scores for trustworthy-than for untrustworthy-looking faces; however, experts had higher scores than novices for untrustworthy-looking faces. Regardless of a face's trustworthiness level, experts had higher caring inclination scores for patients than for unidentified individuals, while novices showed no differences.

**Conclusions:** Facial appearance-based inferences can bias caring inclination in healthcare contexts. However, expert healthcare providers are less biased by these inferences and more sensitive to information about the target of care. These findings highlight the importance of promoting novice healthcare professionals' awareness of first impression biases.

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Daily social exchanges strongly rely on nonverbal cues, and faces are among the most salient nonverbal social stimuli (Zebrowitz, 2006; Farah et al., 1998). Faces rapidly yield information about identity, social category, and mental and emotional states. Even a glimpse of an unknown face is enough to infer a range of complex personality traits (e.g., trustworthiness, competence, and dominance). Though not necessarily accurate, such inferences affect behaviors and decisions (Todorov et al., 2015). For example, facial appearance-based inferences predict a variety of social outcomes

including electoral success (Sussman et al., 2013; Todorov et al., 2005), occupational success (Fruhen et al., 2015; Rule and Ambady, 2008), economic decisions (Tingley, 2014; Rezlescu et al., 2012; Van'tWout and Sanfey, 2008), and sentencing decisions and judgments of guilt (Wilson and Rule, 2015; Blair et al., 2004). Although people make a variety of inferences from faces, studies indicate that faces are automatically evaluated on valence, and that judgments of trustworthiness are the best approximation of this evaluation (Oosterhof and Todorov, 2008; Todorov et al., 2008; Sutherland et al., 2013).

It is yet to be explored whether inferences of trustworthiness based on facial appearance influence interactions between healthcare professionals and patients. Several factors are involved in healthcare provider–patient interactions, and initial appearance-based evaluation may be one of them. Investigating factors involved in healthcare provider–patient relationships is

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particularly important given that the quality of such relationships is a good predictor of the diagnostic accuracy of medical decisions (Makoul and Curry, 2007), doctors' job satisfaction and work-related stress (Mikesell, 2013; Maguire and Pitceathly, 2002), and patients' compliance and therapeutic outcomes (Benedetti, 2013; Zolnieriek and Dimatteo, 2009; Buckman, 2002). Health practitioners' implicit biases are one of the many factors involved in healthcare provider-patient interactions and can contribute to healthcare disparities (Clair et al., 2016; Burgess et al., 2004; van Ryn and Fu, 2003). Specifically, health practitioners' behavior and clinical decisions may be affected by their inferences from patients' characteristics, such as race (Cooper et al., 2012), age (Uncapher and Arean, 2000), body weight (Phelan et al., 2014), and gender (Borkhoff et al., 2008). For example, physicians' racial biases have been linked to disparities in communication quality (Cooper et al., 2012), clinical decision-making (Green et al., 2007; Dovidio et al., 2002), and the physician-patient talk time ratio during medical interactions (Hagiwara et al., 2013).

Here we investigate the influence of facial appearance-based inferences – specifically, inferences of trustworthiness – on nurses' caring inclination toward unknown individuals. As mentioned above, judgments of trustworthiness are the best approximation of general valence evaluation of faces. People make such judgments from facial appearance after less than 100 ms exposure to unfamiliar faces (Todorov et al., 2009, 2010). Data-driven computational models of these judgments show that they are based on subtle similarity to facial expressions and masculinity/femininity of the faces (Oosterhof and Todorov, 2008). Generally, feminine faces with positive expressions are evaluated more positively. These attributions of trustworthiness are highly correlated with approach/avoidance decisions (Adolphs et al., 1998; Todorov and Duchaine, 2008). The act of indicating concern for others, otherwise known as caring inclination, is known to be related to approach behavior. We expected that the apparent trustworthiness of faces would affect the caring inclinations of healthcare providers.

How facial appearance-based inferences influence social outcomes depends on a host of interpersonal and contextual factors (Todorov et al., 2015; Olivola et al., 2014; Johns and Shephard, 2011; Funk, 1997). Therefore, we further explored whether nurses' caring inclination is influenced by their professional experience and the availability of specific person information (patient vs. unidentified individual) about the depicted target of care. Because expertise affects the impact of facial appearance (Johns and Shephard, 2011; Funk, 1997), we predicted that experts would be less influenced by facial appearance than novices. Finally, given the influence of contextual information on facial appearance-based evaluations (Falvello et al., 2015; Mattarozzi et al., 2015; Todorov and Uleman, 2004), and given that prosocial behavior is increased by available information about the target of care (Genevsky et al., 2013), we predicted that caring inclination would be stronger toward individuals presented as “patients” than toward unidentified individuals. To the extent that experts are more likely to associate professional caring behavior with individuals identified as “patients”, we expected that this effect would be stronger in experts than in novices.

## 1. Method

### 1.1. Participants

The novice group consisted of 96 freshmen students (19 men, 77 women, age range: 19–39 years,  $M = 21.96$ ;  $SD = 3.70$  years) recruited from the 110 students attending the first academic semester of Nurse Studies at the School of Medicine, University of Bologna, Italy. All nurse students attending the Cognitive

Psychology course were invited to voluntarily participate in a study on face perception and first impression. At the time of study participation, the freshmen nurse students had never had direct professional experience with patients.

The expert group consisted of 55 nurse practitioners with at least two years of professional experience (16 men, 39 women, age range: 24–62,  $M = 40.53$ ;  $SD = 9.44$  years; experience level: 2–38 years,  $M = 16.44$ ;  $SD = 9.70$ ) recruited from the emergency unit of the multi-campus University Hospital. We decided to recruit nurse practitioners working at the emergency unit because it is more likely that they have short interactions with patients and have to make rapid decisions. All participants were Caucasians.

Prior to participation in the study, all participants gave written informed consent. All participants were fully debriefed at the conclusion of the study. The experimental procedures were approved by the institutional review board (IRB) of the University of Bologna.

### 1.2. Stimuli

The stimuli were 36 photographs of Caucasian individuals from the Karolinska faces database (Lundqvist and Litton, 1998). The photographs were selected based on standardized average ( $z$  score) of their trustworthiness ratings collected in a previous study conducted by Oosterhof and Todorov (2008). Three sets of 12 photographs (6 male faces, 6 female faces) were used. Specifically, based on standardized average ( $z$  score), we selected the most trustworthy-looking faces ( $z = +0.74 \pm 0.22$ ), neutral faces ( $z = -0.02 \pm 0.11$ ), and the most untrustworthy-looking faces ( $z = -0.68 \pm 0.042$ ). One additional trustworthy female face (trustworthiness  $z$  scores: 1.35) was used for a practice trial. All photographs depicted individuals displaying direct gaze and neutral facial expression, but differing in perceived facial trustworthiness (see Fig. S1).

### 1.3. Caring inclination measure

For the development of the caring inclination measure, a psychologist and a research assistant conducted a focus group with 10 nurses working in emergency units who were not involved in the present study. Based on their experience, the nurses answered open-ended questions about what they considered as central aspects of caring professions. The focus group participants' answers were reworded and further discussed in the focus group to identify 10 questions comprising the Caring inclination measure (see Table S1). Of note, the responses to the questions were highly inter-correlated (internal consistency based on the sample from the subsequent study:  $\alpha = 0.93$ ), indicating that the questions likely measure the same construct. Participants in the study answered each question using a 9-point Likert scale (1 = “not at all” and 9 = “extremely”). The measure of caring inclination was computed by averaging the scores for all 10 questions (following inversion of reverse-keyed questions indicated by an asterisk in Table S1). Higher scores indicate higher caring inclination.

### 1.4. Procedure

All novices and experts were individually tested in dedicated quiet experimental rooms in the Nurse Department of the University Medical School and in the Emergency Unit, respectively.

Participants were seated in front of a computer monitor, instructed to view faces, and answer a set of related questions. E-Prime software (<http://www.pstnet.com/>) was used to present stimuli and record participants' responses. Faces were displayed at the center of the screen in a pseudorandom order for perceived

trustworthiness and gender of faces; that is, no more than 2 faces from the same category (trustworthiness and gender) were presented consecutively. The experiment consisted of 1 practice trial and 36 task trials.

Within each group (novices and experts), participants were randomly assigned to either the “patient” Identity condition or the “unidentified” Identity condition. Participants assigned to the patient condition (novice-patient,  $n = 51$ ; expert-patient,  $n = 25$ ) were told that they were going to view photographs of patients, while participants assigned to the unidentified condition (novice-unidentified,  $n = 45$ ; expert-unidentified,  $n = 30$ ) received no information regarding the identity of the pictured individuals.

Each stimulus trial was preceded by a 3-s fixation period. While viewing the photographs, participants answered 10 questions (Table S1) about their inclination to administer care to the target individual. To reduce the influence of social desirability biases, participants were asked to rate their ease/difficulty of providing care/approaching the target person rather than their attitude or ability to provide care to the depicted person.

Participants were instructed to rely on their first impression and to answer as quickly as possible. Each individual question was presented below the photograph. Participants responded by using a 9-point Likert scale (“not at all” – “extremely”). Face stimuli and questions were presented in a pseudorandom order without response-time constraints. Each task lasted about 20 min.

The independent variables in this procedure were Facial Appearance, Experience, and Identity, while the dependent variable was the average score on the caring inclination measure.

### 1.5. Statistical analyses

The caring inclination score for each set of stimuli was analyzed using a mixed-measures ANOVA with Experience (novice vs. expert) and Identity (unidentified individual vs. patient) as between-subject factors and Facial Appearance (trustworthy, neutral, and untrustworthy) as a within-subject factor, followed by Tukey’s procedure for post-hoc pairwise comparisons. The factor “Age” was initially included as a covariate, but because no significant main or interaction effects of Age were found (all  $p_s > 0.05$ ), the analysis was repeated with Age excluded from the statistical model. There were no missing data due to participants’ dropout or to technical problems during data collection.

## 2. Results

As predicted, Facial Appearance,  $F(2, 294) = 120.27$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.45$ , affected participants’ caring inclination score. Post-hoc analysis revealed a significant difference ( $p < 0.05$ ) between facial stimuli: trustworthy faces ( $M = 5.88$ ,  $SD = 0.92$ ) induced higher caring inclination than did neutral ( $M = 5.55$ ,  $SD = 0.91$ ) and untrustworthy faces ( $M = 4.99$ ,  $SD = 1.09$ ); neutral faces induced higher caring inclination than untrustworthy faces.

Experience,  $F(1, 147) = 0.52$ ,  $p = 0.47$ ,  $\eta_p^2 = 0.003$ , and Identity alone,  $F(1,147) = 3.40$ ,  $p = 0.07$ ,  $\eta_p^2 = 0.02$ , had no significant effect on caring inclination. However, the interaction of Facial Appearance and Experience was significant,  $F(2, 294) = 34.85$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.19$  (see Fig. 1), indicating that the effect of facial appearance was weaker for experts than novices.

In addition, a significant Experience by Identity interaction was found,  $F(1,147) = 5.43$ ,  $p = 0.02$ ,  $\eta_p^2 = 0.04$ , Fig. 2, indicating that while novices do not differ in their scores for unidentified individuals and patients, experts do. Specifically, experts were more inclined to provide care to patients. Facial Appearance  $\times$  Identity,  $F(2,294) = 0.06$ ,  $p = 0.94$ ,  $\eta_p^2 = 0.0004$ , and Facial Appearance  $\times$  Experience  $\times$  Identity,  $F(2,294) = 1.19$ ,  $p = 0.30$ ,

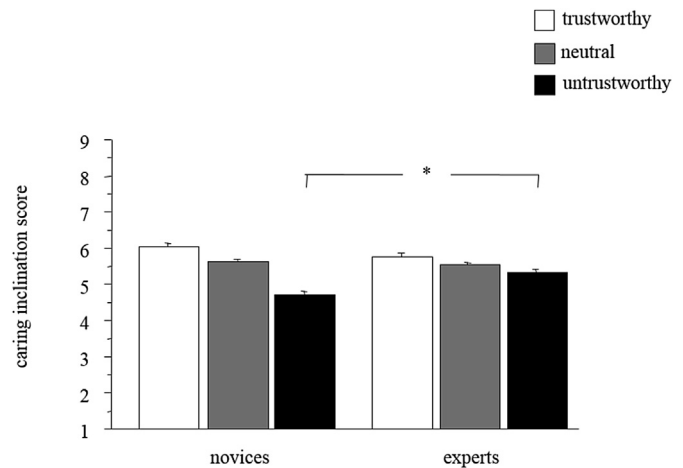


Fig. 1. Mean  $\pm$  SE of Caring inclination score of novices and experts for trustworthy-, neutral- and untrustworthy-looking faces. \* $p < 0.05$ .

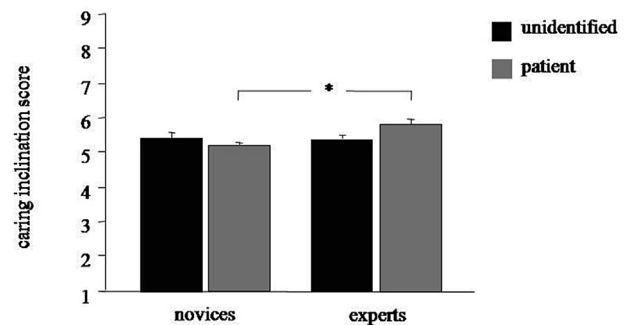


Fig. 2. Mean  $\pm$  SE of Caring scores of novices and experts for patient and unidentified individuals. \* $p < 0.05$ .

$\eta_p^2 = 0.008$ , interactions were not significant.

## 3. Discussion

Prior studies have demonstrated that facial appearance-based evaluations affect important social outcomes (Todorov et al., 2015; Sussman et al., 2013; Lenz and Lawson, 2011; Zarkadi et al., 2009; Gorn et al., 2008; Rule and Ambady, 2008; Eberhardt et al., 2006; Blair et al., 2004), and that healthcare providers’ implicit inferences based on patients’ appearance influence the quality and the content of clinical practice (Feagin and Bennefield, 2014; Cooper et al., 2012; Dovidio et al., 2002). However, the effects of first impressions (i.e., face-based evaluations of trustworthiness) have not been directly tested in healthcare context. We set out to investigate whether caring inclination, as reported by nurses, is influenced by first impressions, and whether professional experience and information about the social identity of the faces influences possible first impression biases.

Our results suggest that the perception of trustworthiness in unknown faces affects caring inclination. Specifically, the participants were less inclined to provide care to untrustworthy-looking faces than to trustworthy-looking faces, but this bias was mitigated by professional experience. Though trustworthy-looking

faces induced higher caring inclination than did untrustworthy-looking faces in both novices and experts, this appearance bias was weaker in experts. Experts showed a relatively reduced prejudice against untrustworthy-looking people. This result cannot be explained by age, because although the experts were older than the novices, age had no influence on participants' responses under the present experimental conditions. This finding resonates with previous studies showing that implicit biases about patients' appearance-based characteristics are common among students entering medical professions. For example, first-year medical students have been found to show implicit preference for not obese individuals (Phelan et al., 2014) and for white and upper class individuals (Haider et al., 2011).

Our results corroborate previous correlational studies suggesting that individuals with limited knowledge and rare exposure to relevant experience are more influenced by inferences from facial appearance (Todorov et al., 2015; Lenz and Lawson, 2011; Johns and Shephard, 2011; Funk, 1997) and highlight a causal relationship between face-based trustworthiness attributions and approach behavior. In addition, the present findings indicate that experience specifically reduces the effects of facial appearance-based evaluations of faces signaling a potential threat and activating defensive motivational system.

Of note, appearance-based evaluation of faces is thought to emerge from an overgeneralization of perceptions of facial features resembling emotional expressions (Todorov et al., 2015; Montepare and Dobish, 2003; Secord, 1958). We can speculate that experts' caring approach toward individuals with untrustworthy-looking faces is due to their exposure to a variety of affectively negative situations in daily work and learning of strategies to care effectively and professionally for others, regardless of their appearance. As independent neuroimaging studies have reported, repeated exposure to negatively valenced faces induces a habituation effect in healthy individuals (Fischer et al., 2003; Breiter et al., 1996). Further, learning of strategies to regulate emotions seems to be common in healthcare professionals (Larson and Yao, 2005). The ability to focus on others' needs is fundamental in daily empathic, prosocial behavior (Mikulincer et al., 2001) and in physician–patient relationships (Epstein et al., 2007; Larson and Yao, 2005). Thus, future research should explore whether experts' likelihood to care for others, regardless of inferences from facial appearance, is associated with increased ability to switch from self-related concerns (i.e., evaluations of personal “safety” based on first impressions) to other-related needs.

Though the expert participants in our study were less influenced by their first impressions from facial appearances, they were influenced by access to information about the faces: Knowing that a face belonged to a patient rather than to an unidentified individual increased caring inclination in experts but not in novices. This effect is most likely due to the fact that the social category of patients is more self-relevant and salient for experts than for novices. In experts, such information can more easily activate professional responsibility and approach behavior, given that care is their primary task.

This result is consistent with previous studies suggesting that prosocial behavior is influenced by available information regarding the target of care (Genevsky et al., 2013). It also invites future studies aimed at elucidating the mechanisms involved in novices' and experts' representations of their patients, and their own professional identity, as well as of themselves in relation to care-elicitors. In addition, while no measure of participants' burnout was collected in the present study, future research should investigate whether experts' burnout level is a predictor of reduced inclination scores towards untrustworthy-looking individuals.

### 3.1. Limitations

Several limitations of the present study should be noted. First, the sample size was relatively small. Second, the participants were mainly women. Although this gender ratio parallels the one found in national samples of healthcare providers, we were not able to evaluate possible gender differences in first impression biases because of the small sample. Third, no additional measures of participants' attitudes and biases towards patients were taken. Moreover, the degree of similarity between participants and the individuals depicted in the photographs is unknown, although both were Caucasian. Thus, there is no information about additional potential biases influencing the participants' caring inclination. Finally, because all experts were emergency department nurses, the present findings may not be as informative in other healthcare departments. Further, the findings are not generalizable to contexts in which facial cues are not available, such as most online provider–patient interactions.

### 3.2. Conclusions

Taken together, the results indicate that inferences from facial appearance affect the caring inclination of emergency department nurses. In particular, nurses are less likely to express caring inclination toward individuals who evoke negative first impressions, although the magnitude of this bias depends on their professional experience and the available information regarding the care-elicitors. Thus, our study increases understanding of motivational biases in healthcare contexts.

These findings highlight the importance of specific programs to increase healthcare professionals' awareness of first impression biases, especially in the early phases of health professions education. The healthcare provider–patient relationship plays a central role in doctor job satisfaction (Mikesell, 2013; Maguire and Pitceathly, 2002), diagnostic accuracy (Makoul and Curry, 2007), and healthcare disparities (Hagiwara et al., 2013), and may even contribute to destigmatization (Clair et al., 2016). Given the complexity of these real-world interactions, our findings emphasize the importance of further studies into the effects of initial nonverbal cues on that relationship.

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### Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.socscimed.2017.04.011>.

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