Received: 16 January 2020 | Revised: 6 April 2020 | Accepted: 27 April 2020

DOI: 10.1111/jjns.12351

JAPAN JOURNAL OF NURSING SCIENCE WILEY

ORIGINAL ARTICLE

Professional framing and emotional stability modulate facial appearance biases in nursing students

Edita Fino[1] | **Serena Di Campli**[2] | **Giulia Patrignani**[3] | **Michela Mazzetti**[1]

[1]Department of Experimental, Diagnostic and Specialty Medicine (DIMES), Alma Mater Studiorum - University of Bologna, Bologna, Italy

[2]Dipartimento Cardio-toraco-vascolare, Sant'Orsola-Malpighi Polyclinic, Bologna, Italy

[3]Dipartimento della Donna, del bambino e delle malattie urologiche, Sant'Orsola-Malpighi Polyclinic, Bologna, Italy

Correspondence
Edita Fino, Department of Experimental, Diagnostic and Specialty Medicine (DIMES), Alma Mater Studiorum - University of Bologna, Viale Berti Pichat 5, 40127, Bologna, Italy.
Email: edita.fino@unibo.it

Abstract

Aim: Providing the same standard of care to all patients alike, regardless of race, gender, age or any other irrelevant characteristic is imperative in the healthcare profession. In this study we examined whether and to what extent unintentional evaluations based on facial appearance of others affect nursing students' readiness to approach them and provide nursing care.

Method: A cross-sectional study was conducted from November 2018 to July 2019. Nursing students (N = 160) enrolled in the Nursing Degree Course of School of Medicine of Bologna University, completed a self-report questionnaire assessing personality traits and evaluated photographs of trustworthy, untrustworthy and neutral-looking male and female faces, while indicating their own approach behavior in a series of social interaction and caretaking scenarios.

Results: Trustworthy faces elicited a higher approach readiness than untrustworthy and neutral ones across scenarios. Nonetheless, the nursing care scenario facilitated the approach toward others perceived as untrustworthy. Emotional stability trait further enhanced the approach of untrustworthy-looking others and provision of impartial care.

Conclusion: Present findings suggest that facial appearance bias among nursing students may be downregulated by activating cognitive representations of their professional role as future caretakers and their caretaking motivation. This speaks of the need to integrate as early as possible into existing nursing education programs simulation scenarios aimed to increase emotional awareness and model nursing students' future relational and caring skills.

KEYWORDS

nursing students, caretaker biases, facial appearance, trustworthiness, personality traits

1 | INTRODUCTION

Providing the same standard of care to all patients alike, regardless of race, gender, age or any other irrelevant characteristic is imperative in the nursing profession (FitzGerald & Hurst, 2017). However, as humans we are not impervious to perceptual and inferential biases that may affect judgment and manifest in action tendencies toward others (Bar, Neta, & Linz, 2006; Wolffhechel et al., 2014). Not surprisingly, caretaking professionals like physicians and nurses manifest the same degree of bias as the general population with serious consequences for (e)quality of clinical care provision (FitzGerald & Hurst, 2017). Perception bias refers to both favorable and

unfavorable evaluations that are automatically activated upon simple observation of the other person and operate largely outside one's awareness or intentional control (Ambady, Bernieri, & Richeson, 2000; Ambady & Rosenthal, 1992; Bar et al., 2006). A well-known example are first impressions based on inferences of positive or negative characteristics that people tend to make drawing solely on information from such facial features like pleasantness, trustworthiness, and so forth, which consequently impact behavior toward others in important ways, engaging either approach or avoidance tendencies (Ballew & Todorov, 2007; Todorov, Olivola, Dotsch, & Mende-Siedlecki, 2015; Willis & Todorov, 2006). Research on face processing (Halberstadt, Goldstone, & Levine, 2003; Zebrowitz & Montepare, 2008) shows that, as the most salient of all social stimuli, faces encapsulate valence-related information and are automatically evaluated on this dimension, with judgments of trustworthiness being the closest approximation (Oosterhof & Todorov, 2008; Todorov, Said, Engell, & Oosterhof, 2008). That is, faces perceived as trustworthy are evaluated as more pleasant compared to faces perceived as untrustworthy, with important implications for consequent behavior. Generally, pleasant features tend to activate approach (appetitive system), whereas unpleasant ones are more associated with avoidance actions (defensive system; Bradley & Lang, 2007; Lang & Bradley, 2013; Lang, Bradley, & Cuthbert, 1997).

In the healthcare context, attending to the patients' individual characteristics (i.e., age, gender, or health condition) is crucial in order to implement a patient-centered and increasingly personalized approach to care. However, healthcare professionals must also be aware of potential disparities in care provision that may stem from unintentional favorable or unfavorable evaluations of others based on such individual characteristics. Precisely because such evaluations may be below the threshold of one's aware control, as exemplified by the research on "first impression" effect, they can influence care provision in ways that remain largely unnoticed. (FitzGerald & Hurst, 2017). Indeed, there is a concerning relationship between quality of patient care and caregiver bias such that disparities in care provision of which caregivers are not aware of are reportedly persistent (Clair, Daniel, & Lamont, 2016; Cooper et al., 2012). Countering effects of implicit biases in the healthcare setting is not easy (Burgess, van Ryn, Dovidio, & Saha, 2007; Stone & Moskowitz, 2011) and as demonstrated by recent research, automatic evaluations based on facial features can significantly curb caring inclinations of nurses, privileging more patients that are perceived as trustworthy (Mattarozzi, Colonnello, De Gioia, & Todorov, 2017). However, Mattarozzi et al. (2017) also reported an increased effort among professional nurses, identifying in senior professionals a care that balances first impression effects. Another study (Colonnello, Mattarozzi, & Russo, 2019 showed how medical students' capacities to accurately recognize emotions of patients was affected by their facial characteristics, Authors also reported that the facial appearance bias could be weakened by (caring) framing techniques that leverage on medical students' affective, relational and representational resources. Building on this research, we aimed to identify potential strategies and individual traits that can contribute to contrasting facial appearance biases among future nurses. In the present study we investigated whether cognitive framing techniques based on students' own representations of their professional role as future nurses could in fact modulate unconscious first impression bias. Specifically, we examined nursing students' readiness to approach persons with different facial features (i.e., perceived as trustworthy, untrustworthy or neutral-looking) in different settings such as simple social exchange or professional/nursing interactions. In line with previous research we expected a higher approach readiness toward others perceived as trustworthy across scenario settings, but that such bias would be more attenuated in the professional nursing care scenario. Furthermore, we aimed to identify the personality traits that most likely contribute to facilitating the approach and provision of care, especially to others perceived as untrustworthy.

2 | MATERIALS AND METHODS

2.1 | Participants

The study population consisted of nursing students (N = 250) enrolled in the first year of the Nursing Degree Course of School of Medicine and Surgery, University of Bologna, Italy. Inclusion criteria were age range between 19 and 35, living in Italy, ability to read and understand Italian language and no prior exposure to nursing practice. A total of 160 (64%) freshmen students (33 male, 127 female) participated in the study.

2.2 | Procedure

The study was conducted at Bologna University, from November 2018 to July 2019. Participants were first informed about the study objectives and procedure while stressing that participation would be on a voluntary basis only. The study involved administration of the Big Five Questionnaires (BFQ, Caprara, Barbaranelli, Borgogni, & Perugini, 1993, see Personality Traits Measures) and

presentation of 18 photographs of Caucasian individuals from the Karolinska faces database (Lundqvist, Flykt, & Ohman, 1998, see Stimuli). Participants were first asked to fill in the questionnaire and then view each of the pictures carefully, while they were prompted to imagine themselves in three different interaction scenarios with the target faces. Then they reported on a paper and pencil response sheet their readiness to approach target faces in each imagined situation (see Readiness to Approach Measures section). Pictures were presented in a pseudo-randomized order and projected centrally on a screen in front of the subject for 6 s with the size of the slide image being approximately 1.2 m × 1.8 m. The task started with one practice trial for the participants to familiarize with the procedure. The entire procedure (filling the questionnaire, viewing and evaluating the pictures) lasted about 40 min.

2.3 | Measures

2.3.1 | Personality traits measure

Personality was assessed by means of the BFQ (Caprara et al., 1993). The BFQ is one of the most widely used measures of the Big Five personality dimensions in the Italian context and is aligned with other Big Five measures (Barbaranelli, Caprara, & Maslach, 1997). The short form of the BFQ, used in the present study, consists of 60 items, with 12 items for each dimension: (a) Energy/Extraversion, comprising activity, assertiveness, and self-confidence; (b) Agreeableness, including sympathy, kindness, and sensitiveness toward others; (c) Conscientiousness, pertaining to self-regulation in both proactive and inhibitory modes; (d) Emotional Stability, pertaining to the ability of copying/controlling anxiety and emotions; (e) Openness, pertaining to the propensity for having wide interests and for being imaginative and insightful. Respondents indicate the extent to which each item describes themselves on a 5-point scale ranging from complete disagreement (1 = very false for me) to complete agreement (5 = very true for me).

2.3.2 | Stimuli

The stimuli consisted of 18 pictures of Caucasian individuals from the Karolinska faces database (Lundqvist et al., 1998; Stimuli indexes: AF21; AM57; AM38; AF02; AF19; AM58; AF30; AF33; AM66; AM45; AF20; AM67; AF16; AF31; AM39; AM53; AM37; AF17). All pictures depicted individuals displaying direct gaze and neutral facial expression but differing in terms of perceived facial trustworthiness (see Supplementary material). Selection of the picture set was based on standardized average (z score) of face trustworthiness ratings as per the study by Oosterhof and Todorov (2008). Three sets of six photographs (three male faces, three female faces) were used. Specifically, based on standardized average (z score), we selected the most trustworthy-looking faces ($z = 0.78$, $SD = 0.19$), neutral faces ($z = 0.01$, $SD = 0.05$), and the most untrustworthy-looking faces ($z = -0.98$, $SD = 0.04$). One additional trustworthy female face (trustworthiness z scores: 1.35) was used as practice trial.

2.3.3 | Readiness to approach measures

Three scenarios were constructed aimed at evaluating students' approach behaviors in simple social exchange or a professional nursing-care situation with the patient. To make sure that scenarios depicting professional interactions with the patient, such as nursing maneuvering requiring physical contact were clearly differentiated from other types of social interactions (involving verbal or physical exchange with the patient) which may nevertheless arise in the healthcare context, two social-interaction scenarios (with and without physical contact) and one nursing care scenario involving physical maneuvering of the patient were constructed. Participants were asked to evaluate their readiness to interact with target faces in the given scenarios by responding on the following questions: (a) how easy/likely would it be for you to strike a conversation with the target face (conversation readiness); (b) how easy/likely would it be for you to shake hands, or give a pat on the shoulder to the target person during social interaction (physical contact readiness); and, (c) how easy/likely would it be for you to perform a nursing maneuver such as measuring blood pressure, taking a blood sample or preparing the person for the operation room (nursing-care readiness). Responses were provided on a 9-point scale, ranging from 1 (not at all) to 9 (extremely) in a paper and pencil response sheet in front of them.

2.4 | Data analysis

The statistical analysis was performed with IBM SPSS (v.24.0) statistical program. To examine the effect of face-based bias on the readiness to approach others in a social versus nursing care context, we performed multivariant analyses of variance (MANOVAs) with Facial Appearance (Trustworthy, Neutral, and Untrustworthy) as a within-subject factor and approach readiness measures (Conversation, Physical contact, Nursing care) as dependent variables; the significance of within factor was

further analyzed using pairwise comparisons (with Bonferroni correction). The factor "Gender" was initially included as a between subjects factors, but because no significant main or interaction effects of Gender were found (all $p > .05$), the analysis was repeated with Gender excluded from the statistical model. Additionally, to further examine if the approach readiness toward untrustworthy faces could be facilitated in the nursing care context, a differential index was calculated by subtracting the physical contact readiness score from the nursing care readiness score, for each facial category. Thus, a new dependent variable was obtained (i.e., Nursing Care Index, NCI) as a synthetic index of readiness to provide nursing care and was submitted to a repeated measures ANOVA, with Facial Appearance (trustworthy, untrustworthy and neutral faces) as within subjects factor, followed by pairwise comparisons (with Bonferroni correction). Higher levels on the NCI would indicate a higher readiness to provide care to target faces and a more enhanced approach tendency compared to the social interaction scenarios. More importantly, the higher the NCI for Untrustworthy faces, the more capable one is to overcome, in the nursing context, negative effects stemming from first impression. Finally, in order to examine personality traits that modulate students' readiness to provide nursing care, correlation coefficients (Pearson's r, $p < .05$) were computed between the NCI obtained on the three facial categories and individual scores on BFQ scales.

2.5 | Ethical consideration

Approval for the study was granted by the institutional ethics review board. Written informed consent was obtained by participants who were informed that anonymity of personal information would be guaranteed and that they were free to decline participation or withdraw from the study at any moment they saw fit without any negative consequence.

3 | RESULTS

3.1 | Demographic data

The sociodemographic data of our sample are presented in Table 1. There was no significant age differences between male and female students ($F_{(1,158)} = 0.372$; $p = .543$, $\eta p^2 = .002$). The sample included 15 foreign students, mainly from Eastern Europe (five from Albania, six from Romania, one from Ukraine), France (one student) and Russia (two students), who had been living in Italy for at least 2 years, spoke Italian fluently and shared their daily life and education with their Italian colleagues. The gender distribution was the same for Italian and foreign students ($\chi^2 = 0.004$; df = 1; $p = .950$).

TABLE 1 Sociodemographic data of participants (N = 160)

	Male	Female
Gender, n	33	127
Age, mean ± *SD*	20.42 ± 1.35	20.18 ± 2.18
Nationality, n		
Italian	30	115
Non-Italian	3	12
Education, n		
General high school	31	123
Professional high school	2	4
Marital status, n		
Single	30	120
Married	3	7

3.2 | Readiness to approach measure

The MANOVAs showed that Facial Appearance significantly affected the general readiness to approach others in our sample (Wilks' Lambda = 0.274; $F_{[6,154]} = 67.937$; $p < .001$, $\eta p^2 = .726$). Subsequent ANOVAs showed a significant effect of Facial Appearance on Readiness to initiate a Conversation ($F_{[2,318]} = 261.455$; $p < .001$, $\eta p^2 = .622$), Readiness to have Physical Contact ($F_{[2,318]} = 192.730$; $p < .001$, $\eta p^2 = .548$) and Readiness to provide Nursing Care ($F_{[2,318]} = 148.329$; $p < .001$, $\eta p^2 = .483$). Pairwise comparisons showed that trustworthy faces received significantly higher ratings compared to the other two categories on all dependent variables, and neutral faces in turn, received significantly higher ratings than untrustworthy ones. As shown in Table 2, the scores obtained in Nursing Care are higher than in the other two approach behaviors, regardless of facial appearance and, more interestingly, differences between facial appearance categories seem to be smaller in this scenario compared to the other two.

To further explore whether professional framing (nursing care scenario) could significantly facilitate the readiness to approach unknown others, especially those perceived as untrustworthy, a differential index (i.e., NCI) was calculated by subtracting scores obtained on the readiness to approach others in the social interaction scenario from those obtained on the readiness to approach others in the professional nursing scenario, for each facial category. The readiness to approach others in

TABLE 2 Mean scores ± *SD* reported by nursing students (N = 160) on approach measures per each facial category

	Approach readiness		
	Conversation	***Physical contact***	***Nursing care***
Facial appearance			
Trustworthy	5.84 ± 1.19	5.97 ± 1.46	6.37 ± 1.28
Neutral	5.45 ± 1.27	5.63 ± 1.58	6.15 ± 1.34
Untrustworthy	4.42 ± 1.39	4.65 ± 1.66	5.35 ± 1.54

Note: For all three readiness to approach measures, Trustworthy faces received significantly higher ratings compared to the Neutral and Untrustworthy ones, and Neutral faces received significantly higher ratings than Untrustworthy ones (all $p < .001$).

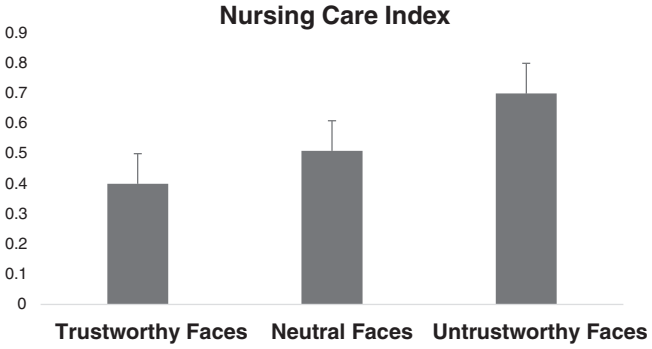

FIGURE 1 Graphic display of nursing care index (NCI) per each facial category

the social (not healthcare context) can be assumed as a baseline to measure the readiness to approach others independently from the healthcare scenario and professional frame. If we hypothesize that in the healthcare context, due to adherence to standards of (e)quality of care, nurses are able to minimize the effect of facial appearance, then subtracting the readiness to approach others in the social context (baseline) from the readiness to approach them in nursing scenario allows us to more stringently evaluate the contribution of the healthcare context and professional frame in overcoming the first impression effect. Indeed, if this hypothesis is correct, the differential value (i.e., NCI) for untrustworthy faces should be higher compared to the differential value obtained for neutral and trustworthy ones. NCI was then submitted to a repeated measures ANOVA, with Facial Appearance (trustworthy, untrustworthy and neutral faces) as within subjects factor, followed by pairwise comparisons (with Bonferroni correction). Results showed a significant effect for Facial Appearance ($F_{[2,318]} = 16.733$; $p < .001$, $\eta p^2 = .095$): the NCI was significantly higher ($p < .05$) for untrustworthy faces ($M = 0.70$, $SD = 1.26$) than for trustworthy and neutral ones ($M = 0.40$, $SD = 1.20$ and $M = 0.51$, $SD = 1.25$, respectively). No significant difference in the NCI were found between trustworthy and neutral faces ($p = .09$) (see Figure 1).

3.3 | Personality

In line with previous validation studies, Cronbach alpha values (Cronbach, 1951) obtained in the present study for all BFQ subscales indicated moderate to high internal consistency (.71 for Energy, .76 for Agreeableness, .80 for Conscientiousness, .87 for Emotional Stability, .74 for Openness).

To examine whether individual differences in personality dimensions modulate the readiness to approach others, correlation coefficients (Pearson's r, $p < .05$) were computed between individual scores on BFQ subscales and the approach measures (Readiness to initiate a Conversation, Readiness to have Physical Contact and Readiness to provide Nursing Care) relative to the three Facial Appearance categories (i.e., Trustworthy, Untrustworthy and Neutral Faces) (means and *SD* scores are reported in Table 3). Emotional Stability was positively correlated with Readiness to provide Nursing Care for both

TABLE 3 Mean scores ± *SD* obtained on BFQ subscales (N = 160)

	Minimum	Maximum	Mean ± *SD*
Energy	2.58	3.83	3.20 ± 0.27
Agreeableness	2.25	3.83	3.11 ± 0.27
Conscientiousness	2.42	3.83	3,05 ± 0.25
Emotional stability	2.33	4.17	3.12 ± 0.27
Openness	2.25	3.67	2.89 ± 0.25

Abbreviations: BFQ, Big Five Questionnaire.

untrustworthy and trustworthy faces (r = .172, p = .029 and r = .210, p = .008, respectively); an almost significant positive correlation was also found for neutral faces (r = .149, p = .060); on the other hand, Energy showed a negative correlation with Readiness to initiate a Conversation for untrustworthy faces (r = −.167; p = .035).

4 | DISCUSSION

In the present study we examined the effect of facial appearance bias on the readiness to approach others and provide nursing care in a sample of nursing students. Our results consistently showed that faces perceived as trustworthy elicit higher approach readiness than untrustworthy and neutral ones across contexts considered, which is in line with previous literature in this domain (Mattarozzi et al., 2017). Importantly, in the nursing care scenario scores on approach readiness, these were significantly higher than in the social interaction ones regardless of facial appearance. Furthermore, differences in readiness to approach others were smaller between facial categories in the nursing care scenario compared to the social interaction ones, indicating a possible facilitation of approach behavior toward untrustworthy faces in the professional setting. This was further corroborated by analysis performed on the NCI representing the difference between readiness to approach others in the nursing versus social interaction situation: the higher the NCI scores, the higher the propensity (and awareness) to care for unknown others, which is specifically geared toward (caretaking) action tendencies that can be significantly different in a caring compared to social interaction setting. While analysis performed on approach readiness variables revealed that facial appearance bias is present both in the social and nursing care settings, further analysis carried out on the NCI importantly highlighted that in the nursing care scenario, putatively due to activation of professional framing and caretaking motivation, nursing students were able to at least partially recognize and actively contrast such bias resulting by incrementing their effort to approach potentially unpleasant target faces. This result is in line with Mattarozzi et al. (2017), who found that professional experience and seniority in nursing practice could mitigate biases against untrustworthy-looking targets in the direction of a more sensitive and impartial caretaking approach. They are also consistent with Colonnello et al. (2019), who found that medical students can modulate avoidance/approach responses to emotion expressions of untrustworthy people by means of an aware activation of their own relational resources in the healthcare professional context. Finally, results from correlations with personality traits allow us to identify individual characteristics of caretaking professionals that could facilitate or pose barriers to the provision of impartial care, consistent with the personality modulation of emotional reactions of nursing students we previously found in an earlier study (Fino, Di Campli, Patrignani, & Mazzetti, 2019). This is especially important for untrustworthy-looking patients who would trigger, most likely involuntarily, untrusting and avoidant behaviors in the caretaker. Not surprisingly, the trait Emotional Stability plays a positive role in implementing a more aware and efficient caretaking approach, albeit its effects are not limited to those perceived as untrustworthy but are also referred to trustworthy and neutral-looking targets more generally. High emotional stability individuals have a higher capacity to control their emotions as well as their anxiety, hence they are more impervious to the emotional modulation of seemingly unpleasant and untrusting facial features of others and may experience less fear and/or avoidance from close contact with patients regardless of their facial appearance.

In summary, the present findings suggest that facial appearance bias among nursing students may be down-regulated by activating cognitive representations of their professional role as future caretakers, which speaks of the need to integrate as early as possible into existing nursing education programs simulation scenarios aimed to increase emotional awareness and model nursing students' future relational and caring skills.

5 | LIMITATIONS OF THE STUDY

It should be noted that although we did not find significant gender effects, our sample was not gender balanced, probably reflecting the female predominance in the nursing student and professional workforce more generally (Yi & Keogh, 2016). Future research should further examine individual differences in face-based perceptual biases and related approach readiness in bigger samples of nursing students with an equal distribution of female and male subjects. Furthermore, future studies should examine whether such biases are influenced by professional practice and seniority and whether educational and training programs can contribute to actively counteract the human tendency of biased perception in nursing professionals in favor of facilitating approach behaviors and impartial caretaking toward all patients alike regardless of facial appearance or other irrelevant characteristics.

6 | CONCLUSION

Unintentional evaluations by caretaking professionals can undermine the provision of quality and impartial

care with implications for all involved, be them at the caretaking or the care-receiving end. Our findings confirm previous evidence by showing that facial-based inferences are indeed insidious and permeate all contexts alike. However, they also highlight the relevance of professional framing and caretaking motivation in countering such biases to the aim of facilitating an impartial provision of care. Findings also advance our understanding of the individual characteristics of caretaking professionals that are most successful in modulating effects of perceptual biases in the direction of an increasingly aware and unbiased care provision. A series of implications can be drawn from our findings.

- Integrating in the early stages of nursing education, scenario specific or simulations of clinical interactions with patients of different characteristics (including facial features) may contribute to an increased awareness of first impression biases as well as to their active downmodulation.
- It is crucial that formal education programs include specific skill building training to enhance the capacity of recognizing and regulating one's own emotions, to enhance emotional stability in order to contrast perceptive biases and their negative effects in terms of quality of care and patient neglect.
- Our findings highlight the importance of a potential alliance between research and education, indicating the possibility to integrate in existing (continuous) education curricula experimental situations and simulations that reflect detailed, realistic (i.e., of high ecological validity) caretaking scenarios that allow students to acquire practical skills in a controlled, standardized and professionally safe environment.

ACKNOWLEDGMENTS

The authors would like to express their gratitude to the nursing students participating in the study for their precious contribution.

CONFLICT OF INTEREST

The authors declare they have no conflicts of interest.

AUTHOR CONTRIBUTIONS

Study conception and design M.M. Data collection S.D.C., G.P. Data preparation, statistical expertise, analysis and interpretation M.M., E. F. Manuscript preparation and critical revision of the paper E.F., M.M.

ORCID

Edita Fino https://orcid.org/0000-0001-8904-9086

REFERENCES

Ambady, N., Bernieri, F. J., & Richeson, J. A. (2000). Toward a histology of social behavior: Judgmental accuracy from thin slices of the behavioral stream. *Advances in Experimental Social Psychology*, *32*, 201–271. https://doi.org/10.1016/S0065-2601(00)80006-4.

Ambady, N., & Rosenthal, R. (1992). Thin slices of expressive behavior as predictors of interpersonal consequences: A meta-analysis. *Psychological Bulletin*, *111*, 256–274. https://doi.org/10.1037/0033-2909.111.2.256.

Ballew, I. I., Charles, C., & Todorov, A. (2007). Predicting political elections from rapid and unreflective face judgments. *Proceedings of the National Academy of Sciences USA*, *104*, 17948–17953. https://doi.org/10.1073/pnas.0705435104.

Bar, M., Neta, M., & Linz, H. (2006). Very first impressions. *Emotion*, *6*, 269–278. https://doi.org/10.1037/1528-3542.6.2.269.

Barbaranelli, C., Caprara, G. V., & Maslach, C. (1997). Individuation and the five factor model of personality traits. *European Journal of Psychological Assessment*, *13*(2), 75–84. https://doi.org/10.1027/1015-5759.13.2.75.

Bradley, M. M., & Lang, P. J. (2007). Emotion and motivation. In J. T. Cacioppo, L. G. Tassinary, & G. Berntson (Eds.), *Handbook of psychophysiology* (pp. 581–607). Cambridge: Cambridge University Press.

Burgess, D., van Ryn, M., Dovidio, J., & Saha, S. (2007). Reducing racial bias among health care providers: Lessons from social-cognitive psychology. *Journal of General Internal Medicine*, *22*, 882–877. https://doi.org/10.1007/s11606-007-0160-1.

Caprara, G. V., Barbaranelli, C., Borgogni, L., & Perugini, M. (1993). The "big five questionnaire:" A new questionnaire to assess the five factor model. *Personality and Individual Differences*, *15*, 281–288. https://doi.org/10.1016/0191-8869(93)90218-R.

Clair, M., Daniel, C., & Lamont, M. (2016). Destigmatization and health: Cultural constructions and the long-term reduction of stigma. *Social Science and Medicine*, *165*, 223–232. https://doi.org/10.1016/j.socscimed.2016.03.021.

Colonnello, V., Mattarozzi, K., & Russo, P. M. (2019). Emotion recognition in medical students: Effects of facial appearance and care schema activation. *Medical Education*, *53*, 195–205. https://doi.org/10.1111/medu.13760.

Cooper, L. A., Roter, D. L., Carson, K. A., Beach, M. C., Sabin, J. A., Greenwald, A. G., & Inui, T. S. (2012). The associations of clinicians' implicit attitudes about race with medical visit communication and patient ratings of interpersonal care. *American Journal of Public Health*, *102*, 979–987. https://doi.org/10.2105/AJPH.2011.300558.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*, 297–334. https://doi.org/10.1007/BF02310555.

Fino, E., Di Campli, S., Patrignani, G., & Mazzetti, M. (2019). The modulating role of gender and aggression in emotional reactions of nursing students: A cross sectional study. *Journal of Advanced Nursing*, *75*(7), 1462–1472. https://doi.org/10.1111/jan.13936.

FitzGerald, C., & Hurst, S. (2017). Implicit bias in healthcare professionals: A systematic review. *BMC Medical Ethics*, *18*, 19. https://doi.org/10.1186/s12910-017-0179-8.

Halberstadt, J., Goldstone, R. L., & Levine, G. M. (2003). Featural processing in face preferences. *Journal of Experimental Social Psychology*, *39*, 270–278. https://doi.org/10.1016/S0022-1031(02)00526-7.

Lang, P. J., & Bradley, M. M. (2013). Appetitive and defensive motivation: Goal-directed or goal-determined? *Emotion Review*, *5*, 230–234. https://doi.org/10.1177/1754073913477511.

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1997). Motivated attention: Affect, activation and action. In P. J. Lang, R. F. Simons, & M. T. Balaban (Eds.), *Attention and orienting: Sensory and motivational processes* (pp. 97–136). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Lundqvist, D., Flykt, A., & Öhman, A. (1998). The Karolinska Directed Emotional Faces - KDEF, CD ROM from Department of Clinical Neuroscience, Psychology section, Karolinska Institutet, ISBN 91-630-7164-9.

Mattarozzi, K., Colonnello, V., De Gioia, F., & Todorov, A. (2017). I care, even after the first impression: Facial appearance-based evaluations in healthcare context. *Social Science and Medicine*, *182*, 68–72. http://doi.org/10.1016/j.socscimed.2017.04.011.

Oosterhof, N. N., & Todorov, A. (2008). The functional basis of face evaluation. *PNAS*, *105*, 11087–11092. https://doi.org/10.1073/pnas.0805664105.

Stone, J., & Moskowitz, G. B. (2011). Non-conscious bias in medical decision making: What can be done to reduce it? *Medical Education*, *45*, 768–776. https://doi.org/10.1111/j.1365-2923.2011.04026.x.

Todorov, A., Olivola, C. Y., Dotsch, R., & Mende-Siedlecki, P. (2015). Social attributions from faces: Determinants, consequences, accuracy, and functional significance. *Annual Review of Psychology*, *66*, 519–545. https://doi.org/10.1146/annurev-psych-113011-143831.

Todorov, A., Said, C. P., Engell, A. D., & Oosterhof, N. N. (2008). Understanding evaluation of faces on social dimensions. *Trends in Cognitive Science*, *12*, 455–460. https://doi.org/10.1016/j.tics.2008.10.001.

Willis, J., & Todorov, A. (2006). First impressions: Making up your mind after 100ms exposure to a face. *Psychological Science*, *17*, 592–598. https://doi.org/10.1111/j.1467-9280.2006.01750.x

Wolffhechel, K., Fagertun, J., Jacobsen, U. P., Majewski, W., Hemmingsen, A. S., Larsen, C. L., Lorentzen, S. K., & Jarmer, H. (2014). Interpretation of appearance: The effect of facial features on first impressions and personality. *PLoS ONE*, *9*(9), e107721. https://doi.org/10.1371/journal.pone.0107721.

Yi, M., & Keogh, B. (2016). What motivates men to choose nursing as a profession? A systematic review of qualitative studies. *Contemporary Nurse*, *52*(1), 95–105. https://doi.org/10.1080/10376178.2016.1192952.

Zebrowitz, L. A., & Montepare, J. M. (2008). Social psychological face perception: Why appearance matters. *Social Personality Psychology Compass*, *2*, 1497–1517. https://doi.org/10.1111/j.1751-9004.2008.00109.x.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

How to cite this article: Fino E, Di Campli S, Patrignani G, Mazzetti M. Professional framing and emotional stability modulate facial appearance biases in nursing students. *Jpn J Nurs Sci*. 2020;17: e12351. https://doi.org/10.1111/jjns.12351