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Hacking attractiveness biases in hiring? The role of beautifying photo-filters

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Abstract

Purpose

Physically less attractive job applicants are discriminated against in hiring decisions. In a U.S. context, we tested whether appearance-altering photo filters can exploit this bias, focusing on the moderating role of job type, gender and race as well the mediating role of two major dimensions of person perception (warmth and competence).

Methodology

In Study 1, 223 managers evaluated White mock applicants presented with or without a beautifying filter for either a position as a social worker or an IT specialist. In Study 2, 212 managers evaluated Black and White mock-applicants with or without beautifying filters for an HR specialist position.

Findings

In Study 1, beautifying filters increased perceived hireability irrespective of job type, but especially when applicants were female. Both male and female applicants whose photos were filtered were perceive as more competent, but only male applicants were perceived as warmer. In Study 2, beautifying filters increased the hireability only slightly for White female applicants, followed by White and Black male applicants, and substantially for Black female applicants. The filters increased the perceived competence of Black (and especially Black female) applicants but not of White applicants and increased the perceived warmth of all groups except for White females. Warmth and competence partially mediated the observed effects on hireability in both studies.

Originality

In the context of widely available technological advances, we show that beautifying photo filters can exploit attractiveness biases, at least at an early hiring stage. The results emphasize the importance of intersecting factors such as gender and race.

Keywords: applicants, attractiveness, filter, gender, hiring, race, prejudice

Hacking attractiveness biases in hiring? The role of beautifying photo-filters

Dion, Berscheid and Walster (1972) were among the first to report that less attractive individuals were ascribed fewer positive characteristics than more attractive individuals. A large body of research has since supported the existence of this bias, showing that physically less attractive individuals are evaluated as less socially and intellectually competent, dominant and mentally healthy (Shapir and Shtudiner, 2021; Nault, Pitesa, and Thau, 2020; Solano-Gómez, and Smith-Castro, 2017; Shtudiner, 2019; Feingold, 1992; Hosoda, Stone-Romero and Coats, 2003). The attractiveness bias influences most domains of interpersonal interaction (Westfall, Millar, and Walsh, 2016; Feingold, 1992), and the occupational domain is no exception. Relatively less physically attractive people receive lower starting salaries and raises (Nault, Pitesa, and Thau, 2020; Frieze, Olson and Russel, 1991) and worse performance evaluations (Drogosz and Levy, 1996). Moreover, less attractive job applicants are evaluated more negatively and are less likely to get hired (Shapir and Shtudiner, 2021; Dipboye, Fromkin and Wiback, 1975; Chiu and Babcock, 2002; Pansu and Dubois, 2002; Dubois and Pansu, 2004; Hosoda, Stone-Romero and Coats, 2003). Importantly, this bias has also been documented in samples of practicing HR professionals (Hosoda, Stone-Romero and Coats, 2003).

Although the role of attractiveness in HR seems well-established, less is known about the role of the modern photo-editing software that most mobile phone users can nowadays access. Many popular social media sites have built-in features, which allow users to edit their appearance in photos with relatively little effort (Lee and Lee, 2019). A majority of adults in the U.S. reported using such editing features prior to posting photos, often in an attempt to alter and enhance their appearance on social media sites (Renfrew Center Foundation, 2014).

One way in which photo-editing becomes connected to personnel selection is through HR professionals' increasing use of social media to screen applicants (JobVite, 2018). As two

billion people are actively using social media sites, such as Facebook, LinkedIn and Instagram (Statista, 2020), HR professionals have the opportunity to use these sites to gather general impressions about applicants. Indeed, surveys by career organizations reveal that 77% of HR professionals are using LinkedIn and 63% Facebook in the hiring process (JobVite, 2018). It follows from the photo-altering features of social media sites, that HR professionals are often exposed to photo-edited images of the applicants on these platforms; additionally, it is common in many countries to include a photo on resumes or job applications and these photos may also have been altered (Rodriguez, 2017). Consequently, given that attractiveness biases hiring decisions (Hosoda, Stone-Romero and Coats, 2003; Maestripieri, Henry, and Nickels, 2017), applicants who utilize photo-editing programs provided by applications and social media sites may use this bias in their favor. However, this area is widely understudied and the effectiveness of the use of edited/enhanced photos on hireability is yet to be tested.

Whereas the effects of beautifying filters on hiring decisions currently remains unknown, conditions that may qualify (i.e., moderate) these effects also deserve attention. Attractiveness might not affect the hiring chances of all applicants equally. Intersecting factors such as the gender and race of applicants and the job type at hand likely play a role (Eaton, Saunders, Jacobson & West 2020; Heilman and Saruwatari, 1979; Johnson, Podratz, Dipboye, and Gibbons, 2010; Paustian-Underdahl and Walker, 2016).

To address these gaps, we investigated how beautifying photo filters influence managers' evaluation of male and female applicants (Studies 1 and 2) from different racial groups (Study 2). In doing so, our research responds to the aims of the special issue "Prejudice at work: What we understand and what we still need to learn" in various ways. Specifically, we present results from two controlled experiments that simulate a highly consequential work

setting (i.e., hiring), thereby contributing to the broader research area of work-related prejudice. Theoretically, we integrate frameworks from social psychology (i.e., the stereotype content model; Cuddy, Fiske and Glick, 2008; Fiske, 2018) with management science (e.g., work on attractiveness biases).

Gender, Race, Job Type and the Stereotype Content Model

Some studies showed that attractiveness can be detrimental, especially for females applying for male-typed jobs (the so-called "beauty-is-beastly effect"; Heilman and Saruwatari, 1979; Johnson et al., 2010; Paustian-Underdahl and Walker, 2016; but see Hosoda, Stone-Romero and Coats, 2003; Ahuja and Pundir, 2019). Heilman and Saruwatari (1979) explained these findings with a lack-of-fit model. This model argues that, for an applicant to be rated as suitable for a job, there has to be a fit between the presumed characteristics of the applicant and the requirements of the job. Whereas attractive female job applicants may be stereotyped more in terms of female-associated traits (e.g., caring, helpful), attractive males may be perceived to possess more male-associated traits (e.g., power, efficacy). It has been argued that managerial positions are often stereotypically perceived to require masculine traits, while non-managerial positions are perceived to require both masculine and feminine traits (Johnson, and Chan, 2019; Heilman and Saruwatari, 1979). As such, attractive females who activate these female trait perceptions may be seen as more fitting with a female-typed job and less fitting with a male-typed job (also see Johnson et al., 2010). Moreover, men tend not to be victims of this lack of fit as both attractive and unattractive men often are presumed to possess the traits needed to be successful in both male- and female-typed positions (Ruffle and Shtudiner, 2015; Heilman and Saruwatari, 1979). Accordingly, the attractiveness bias in hiring is not absolute. Rather, the job role expectations and perceived gender-associated assumptions may play a role.

Furthermore, hiring decisions are also affected by race and its intersectionality with gender and attractiveness. Applicants' race often explains differences in offered starting salaries, the judgment of skills and hireability, and pre-interview impressions (Rattan, Steele, & Ambady, 2019; O'Brien & Kiviat, 2018; Marshall, Stamps & Moore, 1998). Recent research from the U.S. suggests that the effect of attractiveness on occupational outcomes such as earnings is more marked for Black Americans than White Americans (Monk, Esposito, & Lee, 2021). Crucially, especially for Black American women, attractiveness is predictive of earnings, arguably because it counters racist stereotypes regarding the physical appearance of minority women (Araújo, Meira, & Almeida, 2016; Lemi & Brown, 2020). As such, it is possible that photo filters may influence the perceived hireability of Black women in particular.

The process by which gender, race and job type interactively influence hiring may be explained by the stereotype content model (Fiske, 2018; Cuddy, Glick and Beninger, 2011), which argues that people use the two major dimensions of warmth and competence when evaluating others. The warmth dimension involves judgments of traits such as friendliness, trustworthiness and empathy, whereas the competence dimension involves traits such as intelligence, power, efficiency and skill. Conceivably, warmth and competence may mediate the effect of attractiveness, or the lack thereof, on hireability. Different lines of work have shown that (a) unattractive individuals of both genders are perceived as less warm and competent (Nault, Pitesa, and Thau, 2020; Cash, Begley, McCown and Weise, 1975; Feingold, 1992), and (b) that warmth and competence influence hiring decisions (Strinić, Carlsson, and Agerström, 2021; Agerström, Björklund, Carlsson and Rooth, 2012). Yet, the extent to which this is the case may depend on whether the perceived trait fits the job description. Whereas warmth may have a stronger impact for female-typed jobs, competence may have a stronger impact for male-typed jobs (Strinić, Carlsson, and Agerström, 2020;

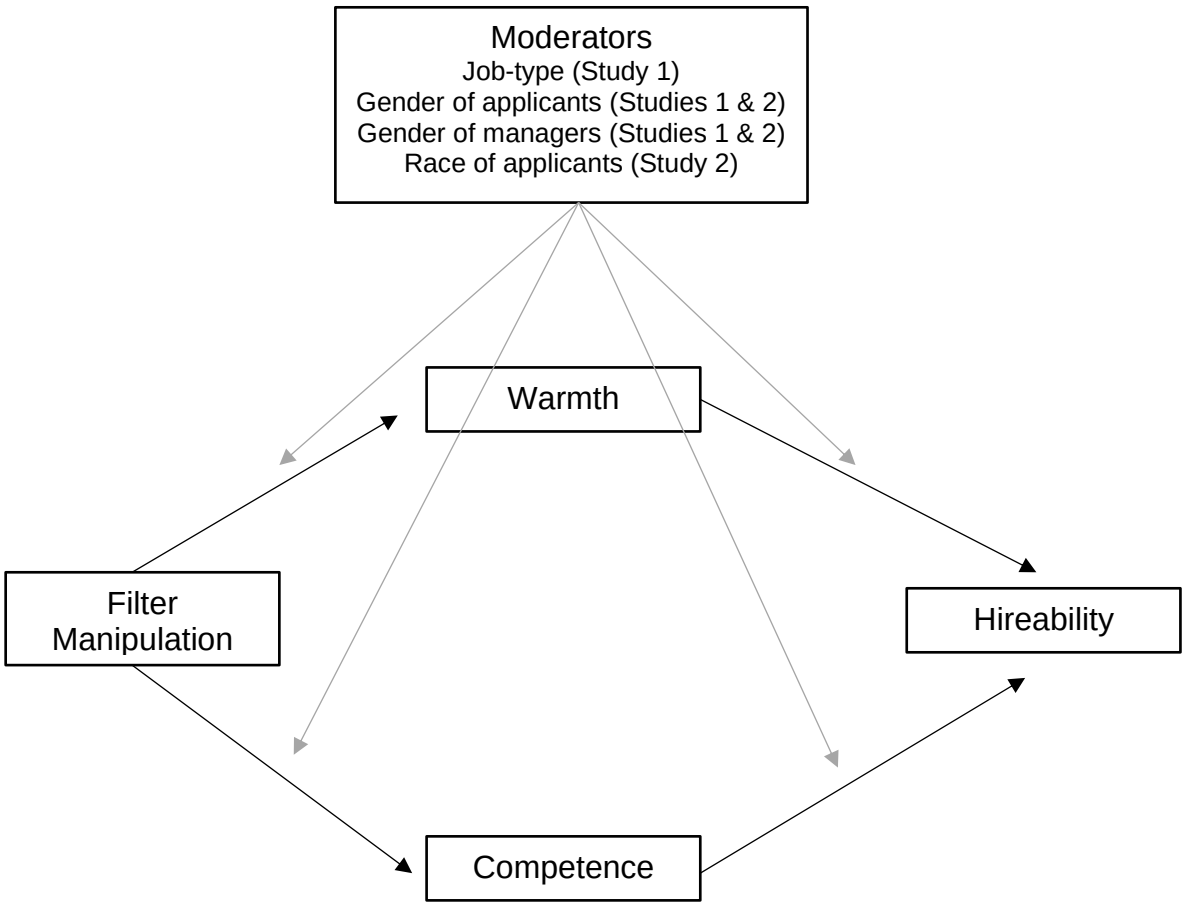
Cuddy, Glick, and Beninger, 2011; Rudman and Glick, 1999). Moreover, given that warmth and competence is often more ascribed to high-status racial groups (e.g., Whites in the U.S.) than low-status racial groups (e.g., Black Americans), it is possible that the race of applicants moderates such effects (Fiske, Bergsieker, Russell and Williams, 2009).

The Present Research

In two studies, we experimentally tested whether the use of edited/enhanced photos can increase the perceived hireability of job applicants. In the first study, we tested the moderating roles of gender and job type, and in the second study the moderating roles of gender and race. In both studies, we tested the potential mediating role of warmth and competence and whether effects depended on the gender of the managers. Please see Figure 1 for the theoretical moderated mediation model that was tested.

Figure 1

Conceptual Moderated Mediation Model Tested in the Studies



Study 1

Methods

Participants

Data were collected from 229 participants working in a management position in the United States through Amazon Mechanical Turk. Participants were compensated at a rate equivalent to $7 per hour. Out of all responses, 223 participants provided complete data and were included in the analyses (M_{age}= 40.93, SD_{age} = 11.04; 109 women, 114 men, and 1 other). Most respondents were White (84.8%), followed by African Americans (7.1%), Hispanics (4.5%), and Asians (2.7%). The most frequent income was $50.000-100.000 (39.3%) and $20.000-50.000 (34.8%).

Procedure

Each participant was informed that the study dealt with how we evaluate individuals in work-related settings. They were instructed to imagine being part of a job committee that decides whom to hire for a specific job. Half of the participants were randomly assigned to a condition in which the job was a social worker (female-typed job condition), and the other half to a condition in which it was a specialist of computer and information (male-typed job condition). We selected these jobs based on Paustian-Underdahl and Walkers' (2016) research showing that both differed in terms of which gender they were most typical of but were similarly rated in terms of the importance of appearance.

The participants read that all the applicants they would see were equally qualified for the position (having the required work experience, qualifications, and education). Participants saw a total of 12 female and 12 male applicants. Each applicant was presented on a separate page, and participants rated them on various dimensions adapted from previous research (He, Kang, Tse and Toh, 2019; Dubois and Pansu, 2004; Dion, Berscheid and Walster 1972). First, they rated how likely they were to hire the persons they saw on the photos (i.e., the

dependent variable) from 1 (*not likely at all*) to 10 (*very likely*). Next, they rated all images in terms of how competent (1 *not at all competent* to 10 *very competent*) and warm (1 *not at all* to 10 *very much*) they perceived them to be (i.e., the mediators). These mediators were presented after the dependent variable to not prime participants with the concepts before rating the applicants' hireability. Finally, they rated the attractiveness of each person (i.e., the manipulation check) on a scale from 1 (*not at all attractive*) to 10 (*very attractive*). The presentation order of the images was randomized for each rating dimension. Importantly, for each image participants saw, we manipulated whether it was photo-edited or not. Hence, the study followed a mixed 2 (within-participants, photo filter: yes vs. no) x 2 (between-participants, job type: male vs. female typed) x 2 (within-participants, gender of applicants: male vs. female) design.

Stimuli Creation

We selected photos of White individuals from the Chicago Face Database (Ma, Correll, and Wittenbrink, 2015). Photos of individuals who were smiling were selected because this comes closest to photos normally used in job applications. This selection left a total of 28 female photos and 29 male photos. Given that attractiveness was one of the experimental factors of this design, for both genders we selected four photos each from individuals whose attractiveness had been rated as high, medium or low in the databases' norming data. No differences in attractiveness or age were observed between both genders (see SOM at https://osf.io/nm4ca/?view_only=9b922cd1a85e4796ae1d49c1b7075180 for details). The age of all applicants was in the 20s and 30s, as our goal was to isolate the effect of the filter manipulation from factors such as age, which therefore was held constant. We return to this point in the general discussion.

To manipulate the attractiveness of the photos, FaceApp 3.6.11 was used. At the time of conducting the study, the app had a photo filter called "Hollywood" that alters the face and

is supposed to make the person more attractive. This photo filter has four different levels of altercations, and we used the highest level, thereby maximizing the change in attractiveness. Please note that although the same filter was applied for all faces, it leads to different changes depending on the automatically detected gender of the face. The filter removes acne and redness of the skin and makes the skin look smooth, clear and glowing. For females, it adds make-up around the eyes. Further, the filter whitens and straightens the teeth.

Analyses

As our data represented a repeated-measurement design with both between-subjects (i.e., job type) and within-subjects (i.e., gender, photo filter manipulation) factors, mixed models were estimated using the LME4 package in R (Bates, Mächler, Bolker and Walker, 2015). One advantage of mixed models over conventional regression approaches is that they control for the correlations between measurements within participants. In the present case, this is important because the hireability ratings that a participant gives to the 24 applicants likely are correlated. Moreover, mixed models allow for the test of random effects (e.g., accounting for potentially different strengths of effects for each participant). In the analyses, the intercept was allowed to be random for applicants as well as participants and the slopes of the predictors to be random for participants. These models were used to test the success of the photo filter manipulation on the manipulation check (i.e., attractiveness), the dependent variable (i.e., hireability), and the proposed mediators (i.e., competence and warmth). The effects of the mediators on the dependent variables were tested following a similar procedure. Here, we in Step 1 estimated models that tested for the main effects of both mediators (i.e., competence and warmth) on the dependent variable (hireability), and in Step 2 whether the effects of the mediators were moderated by the applicants' gender and the job type.

All models followed the same steps. In the first step, the main effects of the predictor on the respective outcome variable were assessed. In the second step, two-way interactions

among the predictor variable, job type and applicant gender were added. In the third step, the three-way interaction between these variables was added. To test for mediation, indirect effects were calculated using a Monte Carlo algorithm (Falk and Biesanz, 2016). Mixed models were also estimated to explore whether the effects of the manipulation differed depending on the baseline (unfiltered) attractiveness of the applicants. Due to space limitations, we present the most central test statistics in the text, whereas full model results can be found in the supplementary online materials. All data are available at https://osf.io/nm4ca/?view_only=9b922cd1a85e4796ae1d49c1b7075180.

In terms of data visualization, we present violin charts with boxplots to maximize insights into the data and their distribution. In these figures, the shape of the violin plots represents the distribution of the variable (i.e., how frequent responses are at different levels of the variable, similar to a histogram). The upper and lower horizontal lines indicate the interquartile range (75th to 25th percentile). These lines provide further information about the spread of the responses. The bold horizontal line represents the median. The two vertical lines indicate the largest value within 1.5 times of the interquartile range above the 75th and below the 25th percentile, respectively. Please note that we in addition present means and standard deviation in the main text.

Results

Manipulation Check

Applicants with photo filtered images were rated as more attractive than applicants with unfiltered images, $b = 1.34$, $SE = .07$, $t(218.59) = 19.57$, $p < .001$, $d_{rm} = 0.96$. However, as indicated by a significant interaction between the photo filter manipulation and the applicants' gender, $b = 0.49$, $SE = 0.08$, $t(4741.00) = 6.06$, $p < .001$, $d_{rm} = 0.96$, this effect tended to be somewhat stronger for female, $M = 7.23$, $SE = 0.25$ vs. $M = 5.64$, $SE = 0.25$, $z =$

19.96, $p < .001$, $d_{rm} = 1.14$, than male applicants, $M = 6.07$, $SE = 0.25$ vs. $M = 4.97$, $SE = 0.26$, $z = 13.84$, $p < .001$, $d_{rm} = 0.79$.

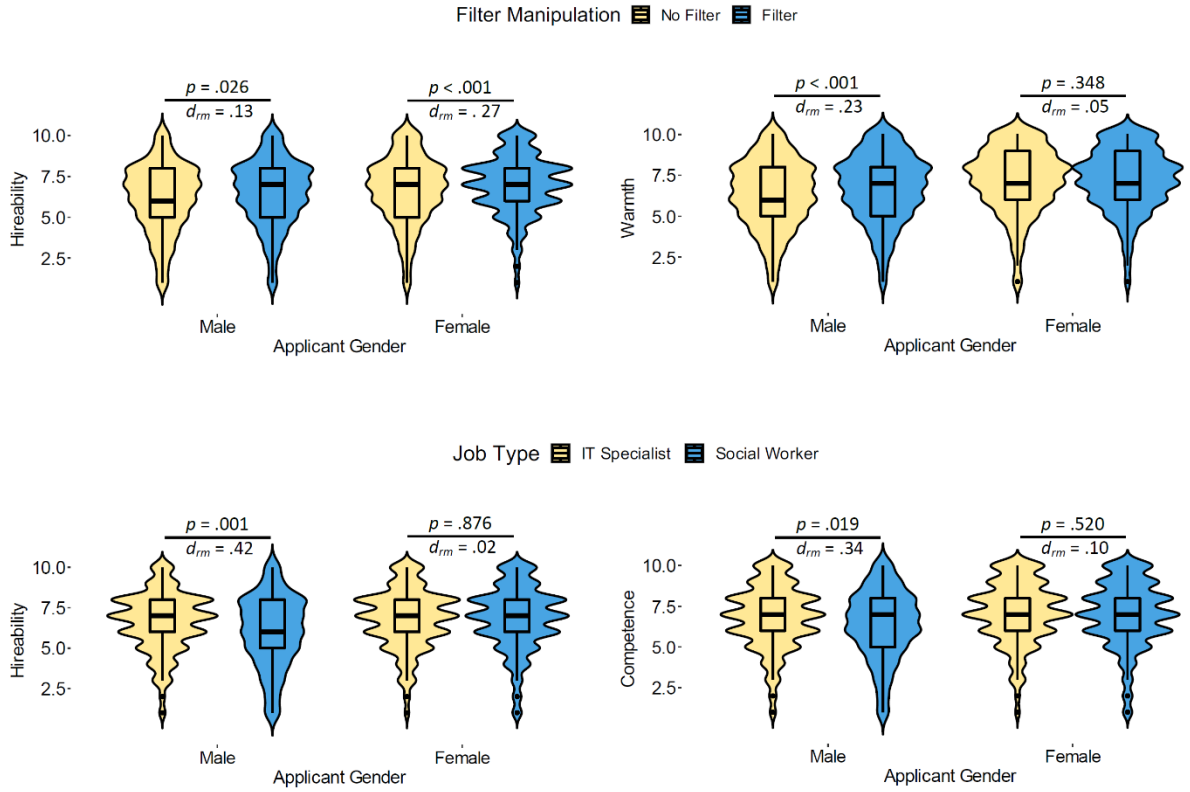
Effects on Hireability

The manipulation increased hireability compared to control, $b = 0.27$, $SE = 0.07$, $t(218.26) = 4.07$, $p < .001$, $d_{rm} = 0.20$. In addition, hireability was generally higher for female than male applicants, $b = 0.50$, $SE = 0.22$, $t(25.98) = 2.25$, $p = .033$, $d_{rm} = 0.36$. Moderation analyses revealed a significant interaction between the photo filter manipulation and the gender of applicants, $b = 0.19$, $SE = 0.08$, $t(4779.05) = 2.47$, $p = .014$. The effect of the photo filter manipulation on hireability was more significant and of larger size for female, $M = 6.98$, $SE = 0.18$ vs. $M = 6.61$, $SE = 0.18$, than male applicants, $M = 6.39$, $SE = 0.18$ vs. $M = 6.21$, $SE = 0.18$. In addition to means presented in text, further insights into these differences are provided by the violin plots in Figure 2. Compared to the control condition, the median score was higher in the filter condition for male applicants whereas the interquartile range was smaller and comprised on average higher values for female applicants.

In addition, a significant interaction was observed between job type and the gender of applicants, $b = 0.60$, $SE = 0.14$, $t(220.26) = 4.27$, $p < .001$. Male applicants were seen as less qualified for the social worker job than the IT specialist job, $M = 6.01$, $SE = 0.19$ vs. $M = 6.59$, $SE = 0.20$, whereas no statistical difference was observed for female applicants, $M = 6.81$, $SE = 0.20$ vs. $M = 6.78$, $SE = 0.20$.

Figure 2

Visualization of all Significant Interactions in Study 1



Effects on the Mediators

Competence. The photo filter manipulation increased perceived competence, M = 6.91, SE = 0.14, as compared to control, M = 6.70, SE = 0.14, b = 0.21, SE = 0.06, t(219.01) = 3.25, p = .001, d_{rm} = .16. This effect was not moderated in the next steps of the model. In addition, applicant gender had a main effect, b = 0.46, SE = 0.21, t(25.98) = 2.23, p = .035, d_{rm} = .35, with female applicants, M = 7.03, SE = 0.17, being seen as more competent than male applicants, M = 6.57, SE = 0.17.

In the second step of the model, the two-way interaction between job type and applicant gender was significant, b = 0.32, SE = 0.14, t(220.06) = 2.35, p = .020. As displayed in Figure 2, whereas male applicants were seen as significantly less competent for the social worker job than the IT job, M = 6.35, SE = 0.19 vs. M = 6.80, SE = 0.19, no such difference was observed for female applicants, M = 6.97, SE = 0.19 vs. M = 7.09, SE = 0.19.

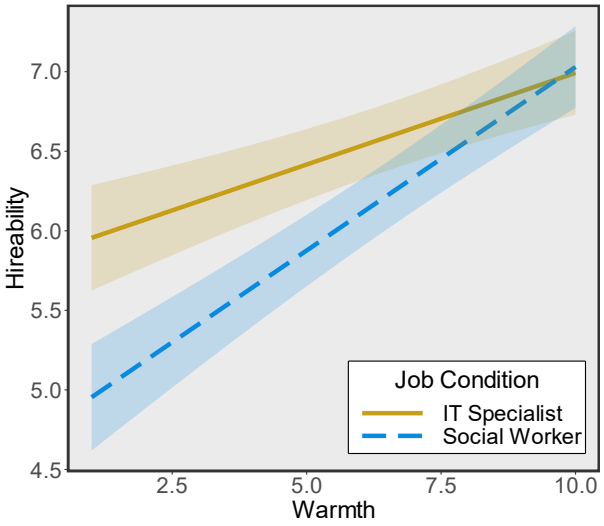
Warmth. The photo filter manipulation increased warmth in the first step of the model, $b = 0.20$, $SE = 0.07$, $t(220.18) = 2.96$, $p = .003$, $d_{rm} = .14$, see Figure 2. In addition, female applicants were rated as warmer than male applicants, $b = 0.67$, $SE = 0.25$, $t(23.84) = 2.64$, $p = .014$, $d_{rm} = .49$. In the second step of the model, the interaction between the photo filter manipulation and the gender of applicants was significant, $b = -0.25$, $SE = 0.08$, $t(4799.71) = -3.16$, $p = .002$. The photo filter significantly increased the perceived warmth of men, $M = 6.69$, $SE = 0.20$ vs. $M = 6.37$, $SE = 0.20$, but not women, $M = 7.24$, $SE = 0.20$ vs. $M = 7.16$, $SE = 0.20$ (see Figure 2).

Effect of the Mediators on Hireability

In the first step, warmth, $b = 0.19$, $SE = 0.01$, $t(5168.25) = 14.78$, $p < .001$, and especially competence, $b = 0.45$, $SE = 0.01$, $t(5258.21) = 33.26$, $p < .001$, positively predicted hireability. In the second step, the effect of warmth was further moderated by job type, $b = 0.15$, $SE = 0.02$, $t(5264.00) = 6.08$, $p < .001$. As displayed in Figure 3, warmth was related to a higher hireability when the job was IT specialist, $b = 0.11$, $SE = 0.02$, $p < .001$, but especially when it was social worker, $b = 0.29$, $SE = 0.02$, $p < .001$. We also conducted a third step, testing for three-way interactions between the mediators, the gender of the applicants and the job type, but these did not reach significance (see SOM).

Figure 3

Slopes Showing the Effect of Warmth on Hireability in the Social Worker and IT Specialist Conditions in Study 1



Note. Ribbons represent 95% confidence intervals.

Indirect Effects Mediated by Competence and Warmth

Competence. Given that none of the main effects involved in the competence mediation was moderated by job type or applicant gender, indirect effects were calculated across these conditions. Results indicated a positive indirect effect of the filter manipulation, which indirectly increased hireability as it increased the mediator competence (see Table 1).

Warmth. As applicant gender moderated the effect of the filter manipulation on warmth ratings, and as job type moderated the effect of warmth on hireability, indirect effects of the filter manipulation on hireability as mediated by warmth were broken down by gender and job type. As displayed in Table 1, the indirect effect of the filter manipulation through warmth was non-significant for female applicants regardless of the job in question. However, the results indicated a significant positive indirect effect of the filter manipulation on hireability that was mediated by warmth for male applicants in both job conditions but especially so when the job in question was social worker (see Table 1).

Table 1

The Indirect Effect of the Filter Manipulation on Hireability Through Warmth for Females and Males in the Social Worker Position and the IT Specialist position in Study 1

Mediator	Job Type	Applicant Gender	*b*	95% CI	*p*
Competence	Across	Across	0.09	[0.02 – 0.15]	.001
Warmth	IT Specialist	Male	0.04	[0.02 – 0.06]	< .001
Warmth	IT Specialist	Female	0.01	[-.01 – .03]	.334
Warmth	Social Worker	Male	0.09	[0.05 – 0.13]	< .001
Warmth	Social Worker	Female	0.02	[-.02 – .06]	.347

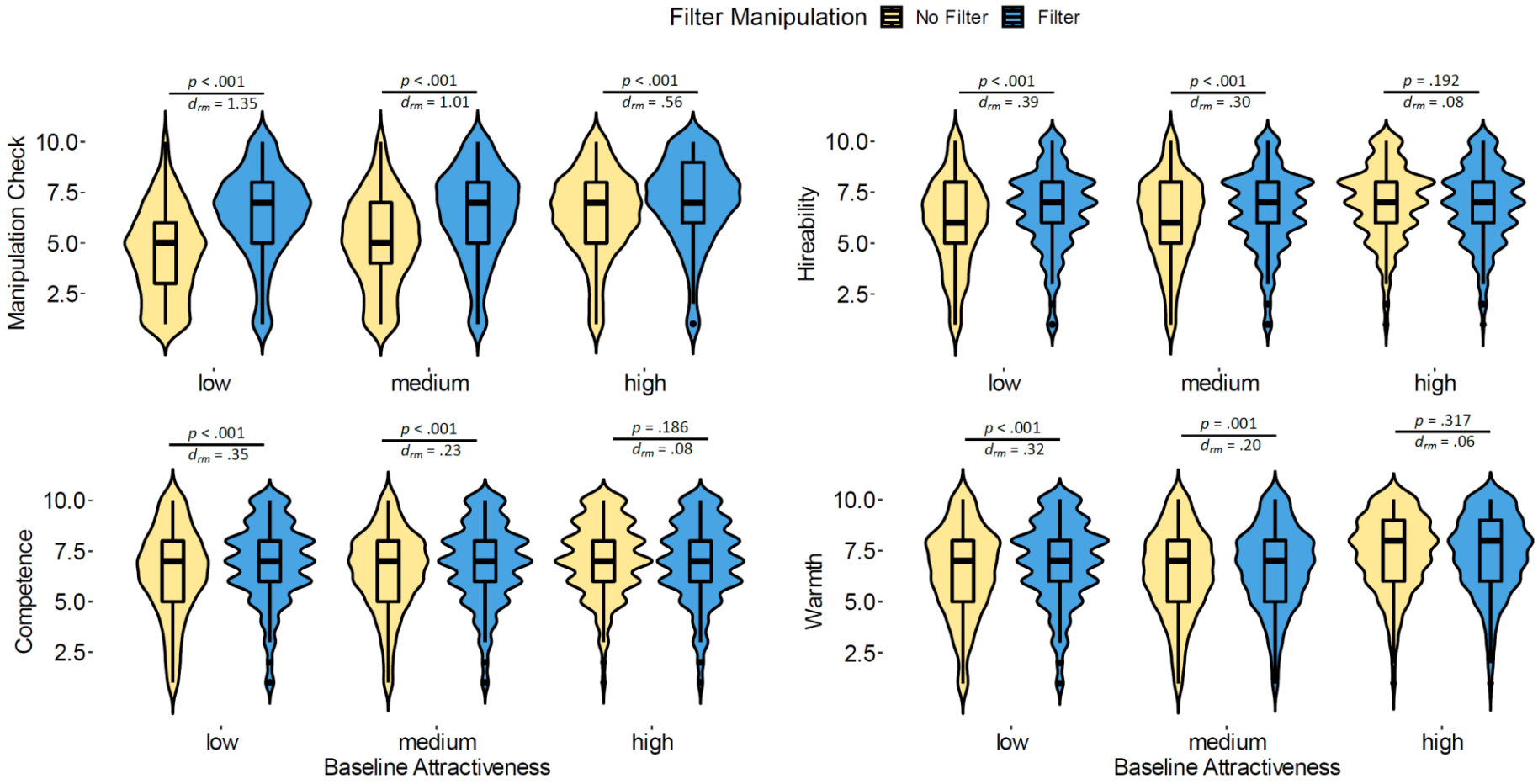
Note. 95% CI = confidence intervals for unstandardized coefficients, displaying unstandardized coefficients: *b.*

The Role of Baseline Attractiveness

We explored whether the baseline attractiveness of applicants (low, medium, high) would moderate the experimental effects. As displayed in Figure 4, the interaction between baseline attractiveness and the photo filter manipulation was significant for all variables, all *Fs* > 16.22, *ps* < .001 (see SOM for details). The photo filter manipulation increased the attractiveness in each group, but especially so in the medium and low attractiveness groups. In terms of hireability, competence and warmth ratings, the effects were strongest in the low attractiveness group, followed by the medium group, and non-significant in the high attractiveness group.

Figure 4

Effect of the Photo Filter Manipulation on the Manipulation Check (Perceived Attractiveness), Hireability, Warmth and Competence at Different Levels of Baseline Attractiveness in Study 1



The Role of Participants' Gender

As only one participant indicated a different gender than women or men, this participant was excluded from analyses testing for the role of participants' gender. A significant interaction between the filter manipulation and participants' gender was observed for competence, b = -0.29, SE = 0.13, $t(215.72) = 2.23$, p = .027. Male participants rated the photo filtered applicants as significantly warmer, M = 7.12, SE = 0.16, than applicants with unfiltered images, M = 6.77, SE = 0.17, z = 3.84, $p < .001$, d_{rm} = .27. Among female participants, no significant difference was observed between photo filtered, M = 6.69, SE = 0.16, and unfiltered images, M = 6.62, SE = 0.17, z = 0.72, p = .469, d_{rm} = .05.

Preliminary Discussion

As hypothesized, beautifying photo filters made a sample of managers more inclined to hire potential applicants. This effect was especially pronounced for female applicants, arguably because the photo filter increased the perceived attractiveness of this gender in particular or alternatively because women are evaluated more based on their attractiveness than men. Applicants were perceived as more competent when their photo was filtered. Only for men, however, did the photo filter, in addition, increase their perceived warmth. Consequently, perceived competence mediated the effect of the photo manipulation on hireability across both genders, whereas perceived warmth mediated this effect only among men.

We found no evidence for the effect on hireability being moderated by job type. Thus, our findings are inconsistent with the beauty-is-beastly effect (Heilman and Saruwatari, 1979; Johnson, Podratz, Dipboye and Gibbons, 2010; Paustian-Underdahl and Walker, 2016). There are, however, important differences between our first study and previous work that can help elucidate this inconsistency. Studies demonstrating the beauty-is-beastly effect often used college students as participants (Heilman and Saruwatari, 1979; Paustian-Underdahl and

Walker, 2016); when the participants where managers, the beauty is beastly effect was attenuated (Paustin-Underdahl and Walker, 2016). HR professionals, like those in the present study, may arguably be more aware of beauty stereotypes for certain job positions and may have corrected for such potential biases. However, future research is needed to directly test this possibility.

By altering the appearance of the same individuals, the present work replicated previous work, while also offering insights into the potential processes underlying the observed effect. Specifically, in this first study, both male and female applicants whose photos were beautified profited from an increase in perceived competence. Competence in turn was related to higher hireability levels, regardless of the job in question or the gender of the applicants. For warmth, however, various moderations were observed. First, the photo filters only provided a significant increase in warmth for men. It is possible that the filter's algorithm changes different aspects of men and women. Yet, given that it increased attractiveness more among women, one could have expected a stronger effect on warmth for women as well. Warmth, in turn, was positively associated with hireability especially when the job in question was female-typed (i.e., social worker), which suggests that participants saw warmth to be more relevant for the female- than the male-typed job.

Exploratory analyses further showed that effects were most pronounced among less attractive individuals. Indeed, very attractive applicants did not profit from the photo filter at all. Moreover, only male participants perceived photo-filtered applicants as more competent. This suggests that male managers rely more on superficial cues in their judgements than female managers.

Whereas this first study provided important insights into the role of beautifying filters in hiring decisions, it did so by focusing only on White applicants. The results can hence only speak to the hiring of applicants from this racial group. As race is a well-known factor

influencing hiring decisions (Eaton, Saunders, Jacobson & West 2020), we in the next study aimed to replicate the results with both Black and White applicants. Because job type played only a minor role in the first study and to limit the analytic complexity, we focused on hiring for one type of job. In addition to assessing hireability, competence and warmth, we also assessed to what extent the filters may change how Eurocentric (i.e., typically White appearance) or Afrocentric (i.e., typically Black appearance) applicants were perceived to look. This was important because photo filters sometimes make people of color look more "White" (Ryan-Mosley, 2021; Lomas, 2017), and given that phenotypic prototypicality is known to influence hiring decisions (Maddox & Perry, 2017).

Study 2

Methods

Participants

We recruited a sample of 230 managers from the United States through Prolific Academic. We switched to this platform because it allows researchers to use pre-screening criteria free of charge. Participants were compensated at a rate equivalent to £8 per hour. Of these participants, 212 confirmed that they currently were involved in hiring decisions at work and were retained for analyses (M_{age}= 35.74, SD_{age} = 10.03; 101 women, 119 men and 1 other). Most respondents were White (71.2%), followed by Hispanics (11.3%), Asians (6.1%), and African Americans (4.2%). Most participants reported an income of $50.000-100.000 (42.5%), $20.000-50.000 (26.9%), or $100.000 or more (21.7%). They on average had 7.26 years of hiring experience (*SD* = 7.45).

Procedure

The design followed the same setup as in Study 1, with some important differences. First, participants were asked to evaluate a set of job applicants for a single job type, namely "HR professional." This job type was chosen because it has been previously rated as being

relatively typical for men as well as women and because appearance has been rated as moderately important for it (Paustian-Underdahl & Walkers, 2016).

Crucially, instead of the between-subjects job type factor in Study 1, the racial group membership of applicants was manipulated as a within-subjects factor. Specifically, participants were asked to evaluate twelve Black and twelve White applicants, with an equal number of men and women in each group. Each applicant was presented in random order on a separate page and participants rated them on the same dimensions as in Study 1. In addition to these dimensions, as in previous research (Kunst, Onyeador, & Dovidio, 2019), participants rated how typically White/Eurocentric (1 *not at all* – 10 *very much*) and how typically Black/Afrocentric (1 *not at all* – 10 *very much*) they perceived the applicants' appearance to be. As in Study 1, for each image that participants saw, we manipulated whether it was photo-filtered or not. Hence, the study followed a 2 (within-subjects, photo filter: yes vs. no) x 2 (within-subjects, race of applicants: White vs. Black) x 2 (within-subjects, gender of applicants: male vs. female) design.

Stimuli Creation

As in Study 1, we selected photos from the Chicago Face Database (Ma, Correll, and Wittenbrink, 2015). Because effects were less pronounced for attractive applicants, we focused on applicants who were rated close to the average attractiveness based on the database's norming data. Moreover, applicants had to have been unambiguously ($\geq$ 90%) categorized to their self-ascribed racial group and to be between 20 and 30 years old. Based on these criteria, we selected six White men, six White women, six Black men, and six Black women. The selection of images did not differ in terms of attractiveness or age between gender or race or when testing the interaction of both factors (see SOM).

To manipulate the attractiveness of the photos, FaceApp 6.1.1 was used. This version of the app has a photo filter called "Hollywood 3" that is supposed to make the person more

attractive. The filter was chosen because it has four different levels of altercations, so that we again could use the highest level, maximizing the change in attractiveness.

Analyses

The data were analyzed using the same procedure as in Study 1 and are available at https://osf.io/nm4ca/?view_only=9b922cd1a85e4796ae1d49c1b7075180.

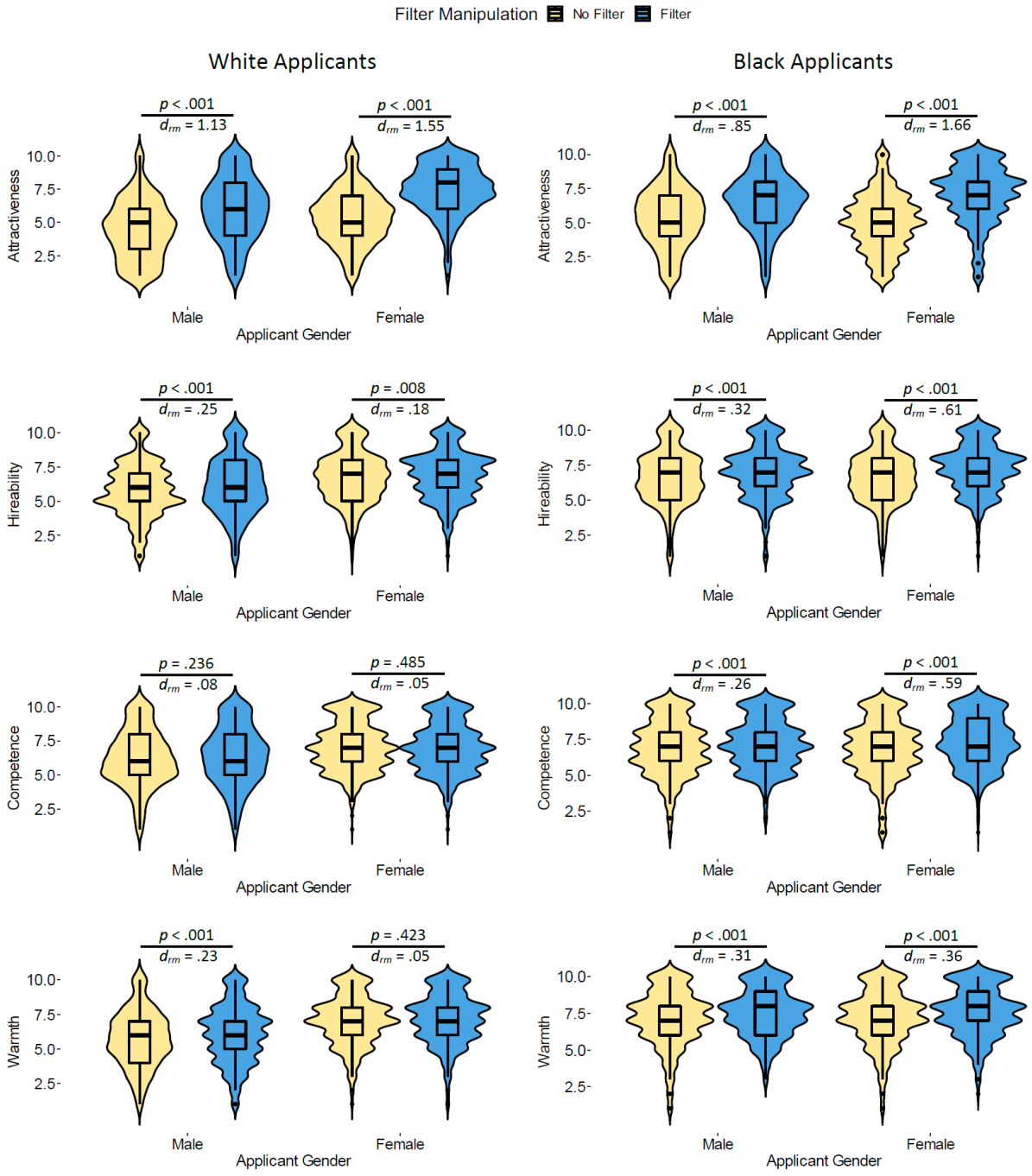
Results

Manipulation Check

The photo filter manipulation increased the perceived attractiveness of the applicants, $b = 1.67$, $SE = 0.07$, $t(208.53) = 22.29$, $p < .001$, $d_{rm} = 1.28$. Moreover, female applicants were rated as more attractive than male applicants, $b = 0.62$, $SE = 0.29$, $t(22.76) = 2.13$, $p < .044$, $d_{rm} = .48$. Importantly, a three-way interaction between the manipulation, applicants' gender and race was observed, $b = -0.50$, $SE = 0.15$, $t(4464.41) = -3.31$, $p = .001$. As displayed in Figure 5, for White applicants, the photo filter increased the attractiveness more for female, $M = 7.39$, $SE = 0.29$ vs. $M = 5.41$, $SE = 0.29$, than male applicants, $M = 5.96$, $SE = 0.29$ vs. $M = 4.50$, $SE = 0.29$. However, this difference in effects on the perceived attractiveness of female, $M = 7.09$, $SE = 0.29$ vs. $M = 4.97$, $SE = 0.30$, and male applicants, $M = 7.23$, $SE = 0.25$ vs. $M = 5.64$, $SE = 0.25$, was especially marked for Black applicants.

Figure 5

Visualization of the Three-Way Interactions in Study 2



Effects on Hireability

The photo filter manipulation increased hireability, $b = 0.37$, $SE = 0.05$, $t(209.11) = 7.52$, $p < .001$, $d_{rm} = .34$. Moreover, female applicants were perceived as more, $b = 0.52$, $SE = 0.18$, $t(24.33) = 2.90$, $p = .008$, $d_{rm} = .47$, and White applicants as less hireable, $b = -0.49$, $SE = 0.18$, $t(26.66) = -2.70$, $p = .012$, $d_{rm} = .45$. Crucially, a significant three-way interaction between the filter manipulation, applicant gender and race was observed, $b = -0.39$, $SE = 0.13$, $t(4462.12) = -3.01$, $p = .003$. As displayed in Figure 5, for White applicants, the effect of the photo filter was slightly less pronounced for female, $M = 6.90$, $SE = 0.19$ vs. $M = 6.70$, $SE = 0.19$, than male applicants, $M = 6.07$, $SE = 0.19$ vs. $M = 5.80$, $SE = 0.20$. By contrast, for Black applicants, the effect was more pronounced for female, $M = 7.27$, $SE = 0.19$ vs. $M = 6.61$, $SE = 0.19$, than male applicants, $M = 6.96$, $SE = 0.19$ vs. $M = 6.60$, $SE = 0.20$.

Effects on the Mediators

Competence. The picture manipulation increased the extent to which applicants were perceived as competent, $b = 0.23$, $SE = 0.05$, $t(206.43) = 4.61$, $p < .001$, $d_{rm} = .22$. Moreover, female applicants were perceived as more, $b = 0.39$, $SE = 0.19$, $t(23.74) = 2.10$, $p = .047$, $d_{rm} = .37$, and White applicants as less competent, $b = -0.40$, $SE = 0.19$, $t(25.53) = -2.11$, $p = .045$, $d_{rm} = .38$. The three-way interaction between the photo filter manipulation, applicants' gender and race was significant, $b = -0.49$, $SE = 0.13$, $t(4455.93) = -3.94$, $p < .001$, $d_{rm} = .47$. As displayed in Figure 5, the filter manipulation increased the perceived competence of male, $M = 7.18$, $SE = 0.20$ vs. $M = 6.91$, $SE = 0.21$, and especially female Black applicants, $M = 7.41$, $SE = 0.20$ vs. $M = 6.78$, $SE = 0.21$. No significant difference was observed for White male, $M = 6.35$, $SE = 0.20$ vs. $M = 6.27$, $SE = 0.21$, and female applicants, $M = 7.00$, $SE = 0.20$ vs. $M = 7.05$, $SE = 0.20$.

Warmth. The picture manipulation increased perceived warmth, $b = 0.28$, $SE = 0.05$, $t(207.36) = 5.32$, $p < .001$, $d_{rm} = .24$. Moreover, women were perceived as more, $b = 0.62$, SE

= 0.21, $t(22.79) = 2.98$, $p = .007$, $d_{rm} = .54$, and White applicants as less warm, $b = -0.84$, SE = 0.21, $t(25.18) = -3.93$, $p = .001$, $d_{rm} = .73$. Different to the previous variables, the three-way interaction was only marginally significant, $b = -0.27$, $SE = 0.14$, $t(4493.38) = -1.95$, $p = .051$. However, to streamline the presentation of results, we present the results broken down by target and race in Figure 5 as we did for the other variables. As can be seen in the figure, for all types of applicants except for White Women did the photo filter manipulation increase perceived warmth.

Eurocentrism and Afrocentrism. The three-way interactions between the photo filter, target race and target gender were significant for Eurocentrism, $b = -0.36$, $SE = 0.08$, $t(4479.94) = -4.30$, $p < .001$, and Afrocentrism, $b = 0.20$, $SE = .07$, $t(4614.66) = 2.75$, $p = .006$.

For Black male applicants, significant differences were observed for Afrocentrism, $b = -0.08$, $SE = 0.04$, $z = -2.07$, $p = .038$, $d_{rm} = .12$, but not for Eurocentrism, $b = 0.08$, $SE = 0.04$, $z = 1.81$, $p = .070$, $d_{rm} = .11$. Black male applicants with photo filtered images were perceived as slightly less Afrocentric, $M = 9.49$, $SE = 0.08$, than those with unfiltered images, $M = 9.56$, $SE = 0.08$.

For Black female applicants, significant differences were observed for Afrocentrism, $b = -0.19$, $SE = 0.04$, $z = -5.28$, $p < .001$, $d_{rm} = .32$, and for Eurocentrism, $b = 0.23$, $SE = 0.04$, $z = 5.28$, $p < .001$, $d_{rm} = .32$. Black female applicants with filtered images were perceived as less Afrocentric, $M = 9.25$, $SE = 0.08$ vs. $M = 9.45$, $SE = 0.08$, and more Eurocentric, $M = 1.63$, $SE = 0.10$ vs. $M = 1.40$, $SE = 0.10$, than those with unfiltered images.

No significant differences were observed for White male applicants in terms of Afrocentrism, $b = -0.01$, $SE = 0.04$, $z = -0.37$, $p = .715$, $d_{rm} = .02$, and Eurocentrism, $b = 0.01$, $SE = 0.04$, $z = -0.20$, $p = .838$, $d_{rm} = .01$. For White female applicants, significant differences were observed for Eurocentrism, $b = -0.20$, $SE = 0.04$, $z = -4.45$, $p < .001$, $d_{rm} = .28$, but not

for Afrocentrism, $b = 0.07$, $SE = 0.04$, $z = 1.83$, $p = .067$, $d_{rm} = .11$. While female applicants with photo filtered images were perceived as less Eurocentric, $M = 9.11$, $SE = 0.09$, than those with unfiltered images, $M = 9.31$, $SE = 0.09$.

Effect of the Mediators on Hireability

Warmth but especially competence was significantly and positively associated with hireability. Also, Afrocentrism and Eurocentrism both had weak and positive associations with hireability (i.e., the more Afrocentric or Eurocentric the different faces were rated to look, the higher they scored on hireability). In extended models testing for interactions (see SOM), only the three-way interaction between target race, target gender and Eurocentrism reached significance, $b = 0.13$, $SE = 0.06$, $t(4829.51) = 2.18$, $p = .030$. Following up on this effect, Eurocentrism was related to slightly more hireability only for White female applicants, $b = 0.01$, $SE = 0.03$, $t(990.00) = 2.45$, $p = .015$ (*ps* for other groups > .072).

Given the negligible influence of Afrocentrism and Eurocentrism in predicting hireability in our models, we focused the mediation analyses on the two main mediators of interest: competence and warmth. As displayed in Table 2, for Black applicants, the photo filter manipulation indirectly led to more hireability as it increased competence and warmth. While the indirect effect going through warmth was comparable for Black male and female applicants, the indirect effect going through competence was more pronounced for Black female applicants. In terms of White applicants, only for male applicants did the filter manipulation indirectly increase hireability by increasing perceptions of warmth. No other indirect effects reached significance for White applicants.

Table 2

The Indirect Effects of the Filter Manipulation on Hireability in Study 2

Applicant Race	Applicant Gender	Mediator	*b*	95% CI	*p*
Black	Male	Competence	0.11	[0.05 – 0.17]	< .001
Black	Male	Warmth	0.08	[0.04 – 0.11]	< .001
Black	Female	Competence	0.25	[0.19 – 0.31]	< .001
Black	Female	Warmth	0.09	[0.05 – 0.12]	< .001
White	Male	Competence	0.04	[-0.02 – 0.09]	.236
White	Male	Warmth	0.06	[0.03 – 0.09]	< .001
White	Female	Competence	0.02	[-0.42 – 0.08]	.484
White	Female	Warmth	0.01	[-0.02 – 0.05]	.422

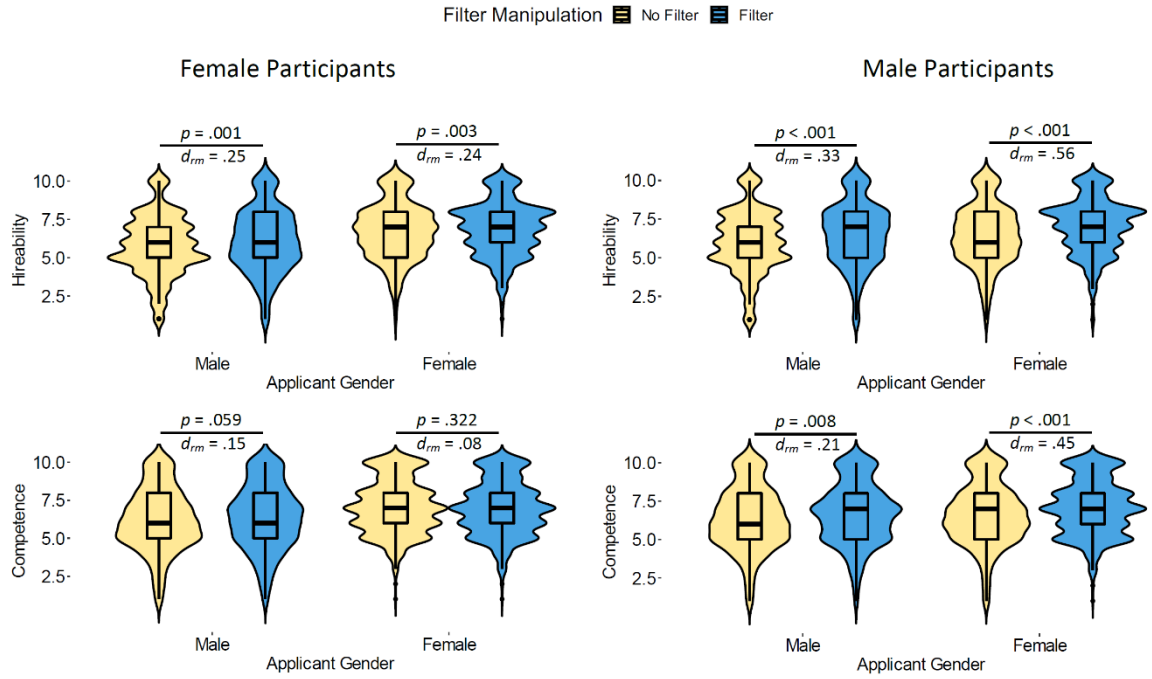
Note. 95% CI = confidence intervals for unstandardized coefficients, displaying unstandardized coefficients: *b.* Three decimals are provided for estimates below 0.005.

Moderation by Participants' Gender

As only one of the applicants indicated "other" as their gender, we focused analyses on self-identified female and male participants. Three-way interactions between the photo filter manipulation, the gender of applicants and the gender of participants were significant for hireability, $b = 0.27$, $SE = 0.13$, $t(4440.62) = 2.12$, $p = .034$, and competence, $b = 0.34$, $SE = 0.13$, $t(4433.09) = 2.69$, $p = .008$. As displayed in Figure 6, the effect of the photo filter manipulation on hireability was particularly pronounced when male participants rated the applicants and especially when they rated female applicants. In terms of competence, only when male participants rated the images did the photo filter manipulation lead to more perceived competence, and again, especially when applicants were women.

Figure 6

Visualization of Significant Three-Way Interactions with Participant Gender in Study 2



Preliminary Discussion

As in Study 1, the photo filter manipulation led to more positive evaluations of the mock applicants. However, underlining the importance of race as moderating factor, most effects differed significantly between Black and White applicants.

Male and female applicants from both races were rated as more hirable when they were presented with filtered images. However, this effect was stronger for Black applicants and especially for Black female applicants, whereas it was weakest for White female applicants. Potentially explaining these differences, the photo filter manipulation increased the perceived competence (the dimension most predictive of hireability) only for Black applicants and especially for Black female applicants. Moreover, the manipulation led to higher ratings of warmth for all groups except for White female applicants. These differences are striking because the manipulation increased White female applicants' attractiveness similarly strongly as that of Black female applicants and given that the manipulation seemed

to have the smallest effect on the attractiveness of Black males. Hence, our results suggest that, at least in the context of the present study, managers seemed to use a "beauty is good" heuristic, especially for Black applicants and especially when these were female.

In the presence of several interactions with the applicants' race, it is important to note that most participants were White and that we did not have the statistical power to test for moderations by participants' race. Hence, for most participants, Black Americans were a racial out-group and this intergroup context was likely made salient by asking participants to rate Black and White applicants in random order. Yet, a previous study has suggested that attractiveness biases are far *less* pronounced for ethnic/racial out-group members than they are for in-group members (Agthe, Strobel, Spörrle, Pfundmair, and Maner, 2016). What then could explain why we found the opposite pattern of results in the present research? In the study by Agthe et al. (2016), the hypothesized motives behind the attractiveness biases were mating, social comparison and competitiveness. Thus, the different context of the present study (i.e., primarily White managers evaluating the hireability of potential Black and White applicants) may have mitigated these motivations while activating others.

Previous work shows that, although attractiveness predicts labor market outcomes substantially across races, it does so more for Black than White individuals and especially for Black females (Monk, Esposito, and Lee, 2021). Minority members, and here especially women, tend to be stereotyped negatively in terms of their appearance (Araújo, Meira, and Almeida, 2016; Lemi and Brown, 2020). Being perceived as more attractive by primarily White managers may thus counter racist beauty standards and notions, thereby offsetting some of the disadvantages one's racial group membership entails during the hiring process.

Consistent with Study 1, some evidence indicated that especially the judgements of male managers were influenced by changes in attractiveness. That is, the photo filter led to higher ratings of hireability, especially among male managers and when applicants were

female. Moreover, in terms of competence, only male managers' perceptions were influenced by the photo filter manipulation. Some previous work suggests that attractiveness biases are especially pronounced toward opposite-gender individuals (see Agthe, Strobel, Spörrle, Pfundmair, and Maner, 2016 for a review), which could explain why male managers showed an attractiveness bias, especially toward female applicants. One reason why we did not observe this opposite-gender effect among female managers may be that they were more aware of attractiveness biases that disproportionally target members of their gender (Alaei, Deska, Hugenberg, and Rule, 2021), and may therefore have been motivated to reduce the influence of it on their judgements.

The photo filter made Black applicants, and here especially female applicants, look somewhat less Afrocentric and, for female Black applicants, also more Eurocentric. This finding suggests that photo filters may change minority-group members' appearance to look more like beauty ideals shared by the majority group. However, whereas no effect was observed for White males, the filter also made the White female applicants look less Eurocentric. It is also important to note that Afrocentrism and Eurocentrism did not impact hireability ratings to a noteworthy extent. Nevertheless, our findings are limited to a specific mobile application and different findings may be observed with different applications that alter the racial appearance of applicants to a larger extent. It is also important to note that, given that the intergroup context was very salient in this study, social desirability may have influenced the results.

Discussion

The present research contributes to the special issue through the synthesis of theory (i.e., the stereotype content model with work on attractiveness in hiring decisions) that was tested in the context of controlled experiments. In the context of novel technological advances, we demonstrate how attractiveness influences hiring decisions by shifting

perceptions of warmth and competence. We find supportive evidence that photo filters may offer a competitive advantage during the hiring process. Given that less attractive applicants often are discriminated against in hiring (Maestripieri, Henry and Nickels, 2017; Hosoda, Stone-Romero and Coats, 2003), one may thus argue that photo filters partially level the playing field by offsetting this discrimination, at least in the early stages of the application process. Still, our research did not investigate the potential unintended effects of applying with a photo-edited picture of oneself and then taking part in an offline job interview. It is possible that increasing the attractiveness of one's image may be risky and lead to negative reactions when the image deviates too much from reality.

Another main contribution of the present research involves the role of intersecting variables. In both studies, effects differed by applicant gender and in Study 2 by applicant race. In other words, our research demonstrates the importance of intersectional perspectives for understanding hiring biases in diverse societies and contexts. Notably, our results were somewhat inconclusive, urging the need for future research. For instance, in Study 1, the filter manipulation increased the hireability of White female applicants more than of White male applicants, whereas the opposite was the case in Study 2. Moreover, in Study 2, the filter manipulation significantly increased the hireability of Black applicants and, in particular, Black females. Future research is needed to replicate the role and consistency of these intersecting variables.

Our findings also have implications for management practice. In line with previous research (Araújo, Meira, and Almeida, 2016; Lemi and Brown, 2020; Monk, Esposito, and Lee, 2021), especially the work-related judgments of minority women were influenced by the attractiveness manipulation. Efforts are needed to counter this bias through training and awareness-raising to ensure the fair evaluation of minority women who may be more reduced to their looks than other applicants. Moreover, effects to some extent depended on the gender

of the participating managers, with the judgements of male managers being most influenced by the filter manipulation. Thus, interventions may be especially tailored toward male managers.

To isolate the effect of the manipulation from other factors influencing hiring decisions, we compared applicants from the same age group. Whereas this strengthened the results' internal validity, it may have weakened their external validity. One may argue that evaluating equally qualified applicants from the same age group may be a rather rare hiring situation. Still, especially at late stages where all applicants are more or less equally qualified, attractiveness biases may come into play (Dubois and Pansu, 2004). Nevertheless, we note that future research is needed to replicate our findings in less controlled environments. Here, it would be particularly interesting to test for the moderating role of age and competence. Older job applicants are often advised to look young in their applications. Hence, research should test whether beautifying filters may reduce this ageist bias.

We only measured self-reported hiring intentions. Although it for ethical and practical reasons may be difficult to conduct this study design with behavioral outcomes, to what extent ratings in our study translate into behavior remains uncertain. Further, the choice of the participants in our study may limit the generalizability of our findings as we used samples of managers recruited through online panels.

While we did find statistically significant effects, the effect sizes were mostly small. The use of a repeated measurements design may have somewhat decreased the effect size while increasing the statistical power as compared to a pure between-subjects design. Furthermore, given that participants rated many applicants on several dimensions, our study relied on single item indicators. Multi-item measures can provide higher construct validity, and therefore be more reliable, compared to single-item measures.

Finally, we would like to note that, although the same filter was applied to male and female faces, it led to different types of visual alterations depending on the applicants' gender. These differences were likely due to different beauty ideals for men and women and may have explained stronger changes in the perceived attractiveness of female applicants. However, the filter condition did not lead to consistently stronger effects on the hireability, warmth and competence of female applicants across the studies, meaning that the effects we observed cannot be conclusively attributed to different strengths of the filter. Nevertheless, future studies may aim to compare the effect of filters that manipulate beauty characteristics that are relatively gender-independent (e.g., smooth skin, white teeth) versus characteristics that are linked to gendered beauty standards (e.g., make-up).

Conclusion

Physical attractiveness biases hiring decisions in favor of more attractive applicants, challenging the goal of non-discriminatory hiring practice. The present research showed that applicants may use beautifying photo filters to profit from this effect, at least at the early stages of the selection process. However, several effects were moderated by the applicants' race and gender and to some extent by the gender of the managers. Hence, the degree to which beautifying filters increase one's chances on the job market depends on various intersecting factors.

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