

Accuracy and bias in first impressions of attachment style from faces

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Abstract

Objective: People gather important social information from subtle nonverbal cues. Given that one's attachment style can meaningfully affect the quality of one's relationships, we investigated whether people could perceive men's and women's attachment styles from photos of their neutral faces.

Method: In two studies, we measured targets' attachment styles then asked participants (total $N = 893$) to judge the male and female targets' attachment anxiety and avoidance from photos of their neutral faces (total $N = 331$) and to report their own attachment anxiety and avoidance.

Results: Participants detected men's attachment style from face photos significantly better than chance in an initial exploratory study and in a preregistered replication but did not consistently detect women's attachment style from their face photos. Moreover, participants' own attachment style biased these first impressions: Individuals with greater attachment anxiety viewed others as more anxiously attached.

Conclusions: People can detect some hints of unacquainted others' attachment styles from their faces but their own anxious attachment can bias these judgments.

KEYWORDS

accuracy, attachment style, face, person perception, projection

1 | INTRODUCTION

Selecting a partner ranks among life's most consequential decisions, shaping one's physical and psychological health (e.g., Baumeister & Leary, 1995; Holt-Lunstad, Smith, & Layton, 2010). Finding a suitable partner is therefore an especially important life goal for many people (Hendrick & Hendrick, 2000). With online dating applications proliferating, this important decision increasingly relies on others' facial appearance. Given other work showing some degree of accuracy in detecting personality traits from faces (e.g., Penton-Voak, Pound, Little, & Perrett, 2006), we investigated whether people could detect how others behave in relationships from their faces (i.e., their attachment styles).

People need close relationships (Baumeister & Leary, 1995; Gere & MacDonald, 2010). Individuals in satisfying close relationships tend to be happier; indeed, people regard

relationships as among the top sources of joy in life (Dubé & Le Bel, 2003; Myers, 2000). Conversely, relationship dissolution can be devastating and extended loneliness harms one's health and well-being, even shortening one's life (e.g., Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006; Frazier & Cook, 1993; Luo, Hawkley, Waite, & Cacioppo, 2012). It would therefore benefit individuals to efficiently identify other people whose characteristic style of relating matches their needs.

Attachment theory describes individuals' characteristic tendencies in relationships along two dimensions (Bartholomew & Horowitz, 1991; Fraley, Hudson, Heffernan, & Segal, 2015; Shaver & Mikulincer, 2002). The first, attachment anxiety, describes how much a person fears rejection and experiences relatively chronic negative affect in relationships. Individuals high in anxious attachment regulate distress by persistently seeking closeness and caregiving from

others, showing a greater tendency than more secure individuals to use controlling and clinging strategies. Anxiously attached individuals also more carefully attend to cues of abandonment or rejection, ruminate on negative emotions and thoughts when worrying about relationships, and struggle to quell their negative emotions. In contrast, individuals low in anxious attachment expect others to be available in threatening situations and expect to feel loved and valued.

The second dimension, attachment avoidance, describes how much one seeks independence and emotional distance, and how much one feels uncomfortable being close to others. Individuals high in avoidant attachment typically feel uncomfortable engaging with both negative emotion and intimacy, thus keeping attachment needs deactivated (e.g., Spielmann, Maxwell, MacDonald, & Baratta, 2013). Individuals low in avoidant attachment, in contrast, engage with intimacy easily, feel comfortable about depending on others for support, and have positive expectations of social reward when getting close to others.

Individuals high in both anxious and avoidant attachment display both styles: Though desiring closeness and worrying about others' intents, they can also push others away and deactivate in relationships—reflecting their conflicted fears and desires. Thus, these individuals exhibit fluctuations in behavior, cycling between intense neediness and intense fear of intimacy as a function of how their two attachment styles interact.

Finally, secure individuals (i.e., those low in both attachment anxiety and avoidance) harbor positive views of themselves as loved and valued, have positive expectations of social reward, and expect others to be available in threatening situations. Securely attached individuals therefore generate intimacy easily and comfortably allow others to help them.

Efficiently identifying individuals' attachment styles in a first impression would therefore benefit romantic decisions (e.g., deciding whether to continue past a first date). The ability to identify secure individuals may be particularly helpful. Secure relationships are typically characterized by more commitment, interdependence, satisfaction, and trust; detecting a potential partner's level of security would thus allow one to increase the chance of satisfying those needs (e.g., Brennan & Shaver, 1995; Hazan & Shaver, 1987; Simpson, 1990). The laudable qualities of secure long-term relationships notwithstanding, the ability to identify the full range of attachment styles may also prove useful. For example, if one prioritizes short-term mating, individuals not seeking commitment might be preferred (i.e., individuals higher in avoidance; e.g., Schmitt, 2005; Simpson & Gangestad, 1991). Because theories of social perception suggest that first impressions should be especially accurate for judgments relevant to one's goals, we therefore expected that people would be able to infer others' attachment styles from their faces (McArthur & Baron, 1983; Zebrowitz & Montepare, 2006).

Indeed, a wealth of research shows that people can infer important social characteristics from others' facial appearance, including their personality traits, affiliation with particular social groups, and intentions for short-term mating (e.g., Boothroyd, Jones, Burt, DeBruine, & Perrett, 2008; Penton-Voak et al., 2006; Tskhay & Rule, 2013). People use this information to make important decisions, such as whether to hire or criminally sentence someone (e.g., Rule, Bjornsdottir, Tskhay, & Ambady, 2016; Wilson & Rule, 2015). Yet, aside from research on attractiveness and masculinity (e.g., Valentine, Li, Penke, & Perrett, 2014; Walster, Aronson, Abrahams, & Rottman, 1966), very little work has examined how traits inferred from facial appearance may guide romantic decisions.

Some research suggests that attachment style is somewhat observable from just a brief interaction with a stranger (Banai, Weller, & Mikulincer, 1998; Nakao, 2011; Tucker & Anders, 1998). Such brief interactions usually begin with perceiving individuals' facial appearance (Zebrowitz & Montepare, 2006). Some research would suggest that people accumulate cues relevant to their attachment styles in their faces, particularly emotional habits related to their propensity for closeness and emotional volatility in relationships (e.g., degree of "smiling" in the neutral faces; Malatesta, Fiore, & Messina, 1987; Tucker & Anders, 1998). People may then use these emotional traces (etched into targets "neutral" faces) to automatically infer others' attachment styles (Adams, Nelson, Soto, Hess, & Kleck, 2012; Funder, 1995). We therefore investigated the accuracy of people's judgments of others' attachment styles based on minimal information isolated in facial cues.

Complementing the potential expression of attachment style in a target's face, attributes of the perceiver may also bias attachment-style judgments of the target. Studies on social projection consistently demonstrate that people project their own states, traits, attitudes, and behaviors onto others (e.g., Robbins & Krueger, 2005). Cognitive mechanisms and motivational reasons both underpin this process (e.g., the desire to validate one's identity by supposing similarity with important others; Bianchi, Machunsky, Steffens, & Mummendey, 2009; Marks & Miller, 1987). For instance, people project their physical states, study habits, voting intentions, and choices, opinions, and traits onto strangers to validate their identity, which is highly cognitively accessible when judging unacquainted others (Hodges, Johnsen, & Scott, 2002; Koudenburg, Postmes, & Gordijn, 2011; Ross, Greene, & House, 1977; Van Boven & Loewenstein, 2003).

Initial work suggests that attachment style influences projection as well. One study showed that anxiously attached individuals generally view imagined others as similar to themselves, presumably to promote closeness, whereas avoidantly attached individuals generally view imagined others as dissimilar to themselves, presumably to create

distance (Mikulincer & Horesh, 1999). This research examined whether people's attachment styles predict how much they project their general traits onto imagined others but not onto actual others. Another study that did examine attachment-style projection onto other people found that individuals project their attachment styles onto their romantic partners (Ruvolo & Fabin, 1999), leaving unknown whether people project their attachment styles onto unacquainted others. Assessing strangers' attachment styles may exert particular influence on relationship formation and self-maintenance of insecurity, enhancing the value of understanding such judgments. For instance, if insecure individuals repeatedly infer others' attachment styles incorrectly, they become vulnerable to initiating relationships with individuals not suitable for satisfying their needs, thus maintaining or exacerbating their insecurities. In addition to measuring the overall accuracy of judging attachment style from faces, we therefore also investigated whether anxious and avoidant individuals project their own attachment style onto others.

Overall, we sought to better understand the legibility of attachment style from others' nonverbal cues by isolating one rich nonverbal locus: the face. We hypothesized that individuals would be able to detect others' attachment styles from their faces given that other work has found some degree of accuracy in detecting personality traits from faces (e.g., Penton-Voak et al., 2006). If participants can detect others' attachment style from their faces, it would suggest a sensitive social perceptual ability for determining an important trait relevant to their relationships. To test this, we asked participants to judge strangers' attachment styles from photos of their faces. We also examined whether the perceivers' and targets' gender moderated our results, as commonly occurs in research on relationships—including the perception of others' relationship-related traits (e.g., Kirkpatrick & Davis, 1994; Stillman & Maner, 2009). We additionally hypothesized that participants would project their own attachment styles onto others, as in previous research showing attachment-style projection onto imagined or known others (Mikulincer & Horesh, 1999; Ruvolo & Fabin, 1999); thus, we measured participants' own attachment styles to investigate how perceiver effects might bias these judgments. We report how we determined our sample sizes, all data exclusions, all manipulations, and all measures in the studies.

2 | STUDY 1

In Study 1, we investigated whether people could detect others' levels of attachment anxiety and avoidance from photos of their neutral faces. To do so, we analyzed how well perceivers' ratings matched targets' self-reported anxiety and avoidance, and whether their own anxiety and avoidance biased their judgments.

2.1 | Method

2.1.1 | Targets

We recruited 131 students participating for partial course credit to serve as targets (73 female, 58 male; $M_{\text{age}} = 20.81$ years, $SD = 4.94$), instructing them to pose with a neutral facial expression while photographed in the lab. Later in the experimental session, each target completed the Attachment Style Questionnaire (ASQ; Feeney, Noller, & Hanrahan, 1994), which asks how much one agrees with 13 items relating to anxious attachment (e.g., “I worry a lot about my relationships”) and 16 items relating to avoidant attachment (e.g., “I prefer to depend on myself rather than other people”) from 1 (*Totally disagree*) to 6 (*Totally agree*). Because the ASQ measures anxiety and avoidance without referring to romantic partners, it proved ideal for respondents with the little dating experience common in our largely first-year undergraduate sample (Mikulincer & Shaver, 2007). We also measured the targets' Big Five personality traits using the 44-item Big Five Inventory (John, Donahue, & Kentle, 1991). We converted the photos to grayscale, cropped them just below the chin and around the head (ears and hair included), and standardized them in height before presenting them to perceivers.

2.1.2 | Perceivers

We next recruited 524 participants from Amazon's Mechanical Turk to serve as perceivers (313 female, 201 male, 1 “other,” 9 unreported; $M_{\text{age}} = 37.18$ years, $SD = 12.48$). This sample provided more than 95% power (assuming $\alpha = .05$) to detect an effect size of at least $r = .29$ (the average that Tskhay & Rule, 2013, found for interpersonal accuracy) in the association between perceivers' ratings and targets' self-reported attachment styles when measuring the accuracy of their judgments using one-sample t tests of sensitivity correlations. The sample also provided more than 95% power (assuming $\alpha = .05$) to detect an effect size of at least $r = .35$ (the average that Robbins & Krueger, 2005, found for social projection) in the association between perceivers' own attachment styles and their ratings of the targets when measuring perceiver effects. We excluded 15 perceivers' data because of conditions that precluded estimating correlations (i.e., missing data or identical ratings of all targets; see below).

Perceivers first reported their own anxiety and avoidance by completing the Experiences in Close Relationships Scale (ECR; Fraley, Waller, & Brennan, 2000), which asks for one's degree of agreement on 18 items assessing attachment anxiety (e.g., “I worry a lot about my relationships”) and 18 items assessing attachment avoidance (e.g., “I am nervous when partners get too close to me”) from 1 (*Strongly Disagree*) to

7 (*Strongly Agree*). They were then assigned to judge either the targets' anxiety (143 female, 116 male, 2 unreported, 1 "other") or avoidance (170 female, 85 male, 7 unreported).¹ Male and female targets appeared in random order in separate, counterbalanced blocks. In each case, we instructed participants using modified items from the ASQ and ECR. Participants in the anxiety condition read:

People act differently in relationships. Some people tend to be clingy and needy. These people often worry that they can't get as close to other people as they would like. Also, these people need a lot of reassurance that other people like them because they don't feel like they're enough. These people can drive other people away because they are so clingy and needy. You are going to be seeing photographs of different people and judging them from 1 (Not clingy/ needy) to 8 (Extremely clingy/needy). Don't think about the picture too much and just go with your gut feeling.

whereas participants in the avoidance condition read:

People act differently in relationships. Some people are uncomfortable with being close to other people. These people tend to be very independent and scared of opening up to other people. They are usually distant and are less likely to show affection. You are going to be seeing photographs of different people and will be asked to rate them from 1 (Not distant/unaffectionate) to 8 (Extremely distant/unaffectionate). Don't think about the picture too much and just go with your gut feeling.

The participants subsequently responded to questions about their basic demographic characteristics and relationship status (i.e., questions regarding the quality and nature of their current and last relationship).

2.1.3 | Analytic strategy

To estimate judgment accuracy, we correlated targets' self-reported ASQ score of interest (i.e., anxiety or avoidance) with the perceivers' corresponding ratings while adjusting for the other ASQ score (i.e., avoidance or anxiety). This produced two partial correlations for each perceiver: one indicating the degree to which their ratings of targets' anxiety correlated with the targets' self-reported anxiety independent of avoidance and one indicating the degree to which their ratings of targets' avoidance correlated with the targets' self-reported

avoidance independent of anxiety. We converted these partial correlations to Fisher's z scores to test whether they significantly differed from zero in one-sample t tests (i.e., no accuracy). We also calculated separate correlations for each perceiver's ratings of male and female targets, and explored how the perceivers' correlations related to their own gender.

To estimate projection of the perceivers' own attachment styles, we first computed each perceivers' average rating across all targets. This average rating corresponds to how anxious or avoidant they generally rated targets (depending on condition). We then regressed these average ratings onto participants' own anxiety and avoidance scores, as well as the interaction of the two.

2.2 | Results

2.2.1 | Accuracy

Perceivers detected men's anxiety ($M_z = .03$, $SD = .14$), $t(255) = 3.26$, $p = .001$, $r_{\text{effect size}} = .20$, 95% CI [.08, .31], and avoidance ($M_z = .05$, $SD = .12$), $t(252) = 6.69$, $p < .001$, $r_{\text{effect size}} = .39$, 95% CI [.28, .49], significantly better than chance. Perceivers did not detect women's anxiety ($M_z = -.01$, $SD = .13$), $t(257) = -1.92$, $p = .06$, $r_{\text{effect size}} = -.12$, 95% CI [-.24, .00], however, and, surprisingly, detected women's avoidance significantly worse than chance ($M_z = -.03$, $SD = .10$), $t(253) = 4.63$, $p < .001$, $r_{\text{effect size}} = -.28$, 95% CI [-.39, -.16]. After adjusting for targets' Big Five personality traits in estimating perceivers' accuracy, perceivers' judgments of men's anxiety and avoidance remained significantly above chance, judgments of women's anxiety fell significantly below chance, and judgments of women's avoidance did not differ from chance.

We also explored whether perceivers' gender related to their accuracy. Men and women achieved similar accuracy when judging anxiety overall, $t(254) = 0.53$, $p = .60$, $r_{\text{effect size}} = .03$, 95% CI [-.09, .15], and when judging avoidance overall, $t(253) = 1.06$, $p = .29$, $r_{\text{effect size}} = .07$, 95% CI [-.05, .19]. Moreover, perceiver gender did not interact with target gender when predicting accuracy for either anxiety, $F(1, 253) = 1.62$, $p = .20$, $\eta_p^2 = .003$, 90% CI [.00, .03], or avoidance judgments, $F(1, 243) = 0.38$, $p = .53$, $\eta_p^2 = .00$, 90% CI [.00, .02].²

2.2.2 | Bias

We also analyzed whether perceivers' own anxiety and avoidance predicted how anxious and avoidant they judged the targets, on average (i.e., projection). Results showed perceiver effects for anxiety but not avoidance: Perceivers who self-reported higher levels of anxious attachment rated targets as

more anxious but not as more or less avoidant. Perceivers' self-reported avoidant attachment levels did not significantly relate to their ratings, however (Table 1).³

2.3 | Discussion

To summarize, people accurately judged men's anxiety and avoidance from photos of their neutral faces independent of their Big Five personality traits. Conversely, they were significantly inaccurate in judging women's avoidance. More specifically, people misidentified women who were lower on avoidance as being higher on avoidance—a potential artifice effect (i.e., when one appears opposite to their true disposition; Zebrowitz & Collins, 1997; see also Hall & Goh, 2017). Moreover, perceivers with a tendency toward anxious attachment judged other people as having higher attachment anxiety as well. This accords with anxiously attached individuals' predilection to provide excessive care because they tend to overperceive others' distress (Bartholomew & Horowitz, 1991; Fraley et al., 2015; Shaver & Mikulincer, 2002). Conversely, more or less avoidant people did not differ in judging others' anxiety or avoidance.

3 | STUDY 2

In Study 1, we found that perceivers could accurately judge men's anxiety and avoidance from photos of their neutral faces. Surprisingly, perceivers judged women opposite to their true avoidance (i.e., seeing highly avoidant women as low in avoidance). Moreover, more anxious individuals generally believed that other people were more anxious, though

TABLE 1 Standardized regression coefficients and *T* values from two multiple regressions (for each outcome variable) predicting projection in perceptions of targets' anxiety and avoidance from perceivers' own anxiety and avoidance (Study 1)

Predictors	Outcome variables			
	Targets' perceived anxiety		Targets' perceived avoidance	
	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>
Perceivers' anxiety	.25	3.74***	-.02	-0.28
Perceivers' avoidance	-.08	-1.14	.10	1.43
Perceivers' anxiety × Perceivers' avoidance	-.08	0.05	.03	0.56

Note: *N* = 262.

****p* < .001.

more avoidant individuals did not view others as more avoidant. We examined the robustness of all of these findings using a preregistered replication with new samples of perceivers and targets (<https://osf.io/kqde6>) and by aggregating the results across Studies 1 and 2 in a mini meta-analysis.⁴

3.1 | Method

3.1.1 | Preregistered analytic strategy

We preregistered the following predictions based on the findings in Study 1:

- Perceivers would accurately detect men's anxiety.
- Perceivers would accurately detect men's avoidance.
- Perceivers would not accurately detect women's anxiety.
- Perceivers would not accurately detect women's avoidance.⁵
- Anxious perceivers would rate others as more anxious.
- Avoidant perceivers would not rate others as more avoidant.

We recruited a new sample of 200 undergraduates to participate as targets for partial course credit (107 female, 93 male; $M_{\text{age}} = 19.14$ years, $SD = 1.64$). We then recruited 392 perceivers from Amazon's Mechanical Turk, assigning 297 of them (183 female, 112 male, 2 unreported) to rate targets' anxiety, which afforded 95% power to test both the anxiety projection effect observed in Study 1 and the accurate judgment of the targets' anxiety. The remaining 95 assigned participants (43 female, 52 male) judged the targets' avoidance, affording 95% power to test the accurate judgment of targets' avoidance. We did not plan the power analysis for the avoidance projection effect because the effect size observed in Study 1 was negligible. Perceivers followed the same procedure as in Study 1 except that we accidentally omitted the Big Five Inventory. We excluded six participants' data for rating all targets identically.

3.2 | Results

3.2.1 | Accuracy

We examined participants' accuracy for each target gender. Replicating Study 1, participants detected men's anxiety ($M_z = .03$, $SD = .11$), $t(290) = 4.54$, $p < .001$, $r_{\text{effect size}} = .26$, 95% CI [.15, .36], and avoidance ($M_z = .04$, $SD = .10$), $t(94) = 3.81$, $p < .001$, $r_{\text{effect size}} = .37$, 95% CI [.18, .53], better than chance. Also consistent with Study 1, participants judged women's anxiety at chance ($M_z = -.00$, $SD = .10$), $t(286) = -0.42$, $p = .68$, $r_{\text{effect size}} = -.02$, 95% CI [-.14, .10]. In contrast to Study 1, however, participants judged women's avoidance significantly better than chance ($M_z = .07$, $SD = .08$), $t(93) = 8.10$, $p < .001$, $r_{\text{effect size}} = .64$, 95% CI [.50, .75].

Male and female participants judged overall anxiety, $t(289) = 0.50, p = .61, r_{\text{effect size}} = .03, 95\% \text{ CI} [-.09, .14]$, and avoidance, $t(93) = 1.15, p = .25, r_{\text{effect size}} = .12, 95\% \text{ CI} [-.08, .31]$, with similar accuracy. Participant gender interacted with target gender for anxiety judgments, $F(1, 282) = 6.18, p = .01, \eta_p^2 = .01, 90\% \text{ CI} [.002, .06]$: Whereas men and women judged women's anxiety with similar inaccuracy, $t(282) = 1.23, p = .22, r_{\text{effect size}} = .07, 95\% \text{ CI} [-.05, .19]$, women judged men's anxiety more accurately than men did, $t(282) = 2.45, p = .02, r_{\text{effect size}} = .14, 95\% \text{ CI} [.02, .25]$. Participant and target gender did not interact for avoidance judgments, $F(1, 92) = 0.05, p = .82, \eta_p^2 = .00, 90\% \text{ CI} [.00, .03]$.

3.2.2 | Bias

Replicating Study 1, more anxious perceivers generally judged targets as more anxious but not as more or less avoidant. In contrast to Study 1, more avoidant perceivers judged others as less avoidant but not as more or less anxious (Table 2).

3.2.3 | Aggregated results

Because some results were inconsistent across Studies 1 and 2, we conducted fixed effects meta-analyses of the accuracy and attachment projection effects to better understand their overall robustness (Table 3). This showed that men's anxiety and avoidance were reliably detected but women's anxiety and avoidance were detected no better than chance when the two sets of results were meta-analytically combined. Anxiety projection was also emerged as a reliable effect, whereas the inconsistent avoidance projection results across Studies 1 and 2 aggregated to a null effect when meta-analytically combined.

Finally, we also analyzed whether perceivers' attachment styles predicted their accuracy across Studies 1 and 2, finding no significant correlations ($|r| < .11, p > .08$) except

for perceivers' anxiety predicting their detection of women's avoidance in Study 1, $r(252) = .16, p = .01$.

3.3 | Discussion

In summary, we replicated our finding that people can accurately judge men's anxiety and avoidance from photos of their neutral faces, and cannot accurately judge women's anxiety. We also again observed that anxious individuals view others as anxious too. Nevertheless, some of our original results did not replicate: Whereas women's avoidance was judged significantly inaccurately in Study 1, it was perceived accurately in Study 2. Moreover, avoidant perceivers judged others as less avoidant in Study 2 (in contrast to no projection observed in Study 1).

Whereas avoidant perceivers did not view others as more or less avoidant in Study 1, they did view others as less

TABLE 2 Standardized regression coefficients and *T* values from two multiple regressions (for each outcome variable) predicting projection in perceptions of targets' anxiety and avoidance from perceivers' own anxiety and avoidance (Study 2)

Predictors	Outcome variables			
	Targets' perceived anxiety ^a		Targets' perceived avoidance ^b	
	β	<i>t</i>	β	<i>t</i>
Perceivers' anxiety ^a	.17	2.71**	.22	1.72
Perceivers' avoidance ^b	-.01	-0.16	-.28	-2.18*
Perceivers' anxiety × Perceivers' avoidance	-.06	-1.19	-.03	-0.32

Note: Sample sizes differ because of different portioning of statistical power.

^a*N* = 297.

^b*N* = 95.

p* < .05; *p* < .01.

TABLE 3 Meta-analysis of the accuracy and projection results from Studies 1 and 2

Result	<i>k</i>	Weighted <i>M_r</i>	95% CI	<i>Z</i>	<i>Q</i>
Detecting men's anxiety	2	.23	[.15, .32]	5.50***	0.54
Detecting men's avoidance	2	.38	[.30, .51]	7.50***	0.04
Detecting women's anxiety	2	-.07	[-.15, .02]	-1.57	1.35
Detecting women's avoidance	2	-.01	[-.12, .10]	-0.17	73.05
Anxiety projection	2	.19	[.11, .27]	4.49***	0.71
Avoidance projection	2	.01	[-.10, .11]	0.12	6.60

Note: *K* = number of contributing effects, *Q* = heterogeneity statistic.

****p* < .001

avoidant in Study 2. Although most of our analyses had 95% power for the effect sizes we designated, it is possible that the true effect size is smaller; thus, future research may wish to replicate these findings with greater power to potentially detect a smaller effect size.

4 | GENERAL DISCUSSION

Given the rise of online dating applications, people increasingly make important relationship decisions based on others' facial appearance. Because attachment style can meaningfully affect the quality of one's relationships (e.g., Brennan & Shaver, 1995) and because theories of social perception argue that first impressions tend to be more accurate for judgments relevant to one's goals, we investigated whether people can infer an important relationship trait—attachment style—from others' facial appearance (McArthur & Baron, 1983; Zebrowitz & Montepare, 2006).

Across two studies, we found that men's attachment avoidance and attachment anxiety are visible from their neutral faces (and independent of their Big Five personality traits in Study 1). Whereas women's anxiety was judged at chance in both studies, the accuracy of judging their avoidance varied (significantly inaccurate in Study 1 and above chance in Study 2; meta-analytically null). At least two reasons might explain this difference in judging men versus women.

First, perceivers may apply valid strategies when judging men's attachment style more consistently than when judging women's attachment style (Goh, Ruben, & Hall, 2019). For instance, certain ephemeral changes in women's appearance may invalidly signal certain attachment styles (e.g., makeup), thus misleading perceivers. Conversely, men's daily grooming or accumulated expressive habits (e.g., Malatesta et al., 1987) may either converge with valid stereotypes that perceivers hold about men's expression of their attachment style (e.g., anxious men's chronic expression of sadness may etch onto their face and be used by judges accordingly) or simply just not factor into perceivers' attachment style judgments. Second, men's facial cues may express their attachment style more consistently and robustly than women's facial cues do (Hall & Goh, 2017). Future research should confirm whether women's attachment styles are visible from their facial appearance and subsequent investigation of the mechanisms that enable accurate judgments of men's and women's attachment style would surely prove useful.

In addition to accuracy, perceivers also showed bias in their judgments of others' attachment styles. Namely, anxious perceivers viewed unacquainted others as relatively anxious. As far as we know, this is the first direct demonstration that individuals project their anxiety onto strangers. By incorrectly judging others as higher on anxiety, anxious individuals may

maintain or exacerbate their insecurities. For instance, they may be prone to overperceive how much care a dating partner needs even though the relationship has only just started; when the partner recoils because the person is not as anxious as expected, this may promote anxious individuals' view that they are unloved (Bartholomew & Horowitz, 1991; Feeney & Collins, 2001). Similarly, anxious individuals may overestimate how hurt a romantic prospect or new partner feels in response to a minor transgression, then defensively withdraw investment from that relationship to protect themselves from the withdrawal they anticipate from their partner (Murray, Holmes, & Griffin, 2000). Conversely, individuals did not project their avoidance in Study 1 but did in Study 2. Given that we did not power Study 2 to test this effect (but did have sufficient power for this test in Study 1), it seems more likely that individuals' avoidance does not bias their judgments of others, as our meta-analysis of the two results shows. Nevertheless, future research should attempt to replicate this result. If the negative projection we observed in Study 2 emerges again (i.e., more avoidant individuals see others as less avoidant), it would join other research suggesting that more avoidant individuals view others as dissimilar to themselves to create distance (Mikulincer & Horesh, 1999).

Thus, we demonstrate some consistent evidence that anxious and avoidant attachment styles manifest in people's faces, and that perceivers' anxiety biases their ability to detect them. Nevertheless, our study is not without limitations. First, we did not control for targets' grooming or makeup, which may have contributed to inconsistent judgments of women's anxiety and avoidance (as discussed above). Second, our target sample consisted primarily of 18–21-year-old university students, individuals who likely have relatively little experience with long-term romantic relationships. Future research into the legibility of attachment style from the faces of older individuals' faces who have more relationship experience therefore seems warranted. For instance, because chronically experienced emotions can etch onto facial appearance over time, the cues to anxiety and avoidance may become more visible as individuals age and gain greater experience in dating (Malatesta et al., 1987). Finally, the targets only displayed neutral emotional expressions, whereas profile photos on online dating applications likely display emotional expressions. Even more, neutral faces usually display subtle emotional expressions⁶; thus, the targets' resting facial emotions could have thus contributed to their perceived attachment styles (e.g., Adams et al., 2012). Future work could therefore illuminate whether emotional expressions alter the perception and legibility of anxiety and avoidance from faces. Much of this is to say that examining first impressions of attachment styles should also be investigated in more ecologically valid contexts; indeed, future research should investigate how first impressions of potential partners' attachment styles guide further interactions and dating outcomes.

Our data suggest that men's anxious and avoidant attachment styles are robustly visible in their neutral faces whereas women's are not. This research helps to expand present understanding of how traits inferred from others' facial appearance may affect decisions regarding relationship formation.

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CONFLICT OF INTERESTS

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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ENDNOTES

¹Measures of participants' and targets' attachment styles demonstrated good reliability across Studies 1 and 2 (all Cronbach's α s \geq .83).

²We report 90% confidence intervals here because 95% confidence intervals can sometimes erroneously suggest a nonsignificant result for F tests (Smithson, 2001).

³In additional analyses using cross-classified models, we tested projection again but adjusted for targets' attachment styles; results remained identical to the multiple regression results reported in Studies 1 and 2.

⁴We preregistered zero-order correlations for analyzing accuracy but report partial correlations here because the latter allow adjusting for targets' avoidance (anxiety) when testing the effect of their anxiety (avoidance). Results are identical across Studies 1 and 2 regardless of which analysis we use, except for women's avoidance in Study 1 (zero-order correlations demonstrate significant accuracy, partial correlations demonstrate significant inaccuracy).

⁵Note that a research assistant's error in data cleaning resulted in our initial analyses demonstrating no accuracy for women's anxiety and avoidance in Study 1. We therefore preregistered the prediction that we would replicate this null result in Study 2. Because we discovered this error after commencing Study 2, we naturally reported the result of the correct analysis in Study 1 and provide this explanation to ameliorate any confusion regarding our preregistered hypothesis.

⁶Ratings of the ostensibly neutral target faces from Study 2 on emotional expression ($-3 = \text{Negative}$, $0 = \text{Neutral}$, $+3 = \text{Positive}$) showed slight but consistent positive affect, on average ($M = .84$, $SD = .57$), $t(199) = 20.60$, $p < .001$, $r_{\text{effect size}} = .83$.

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