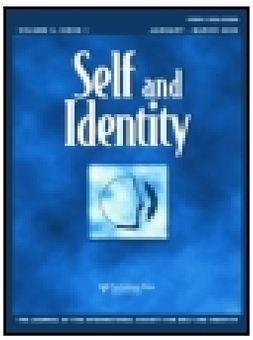

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Detecting biracial identity strength: Perceived phenotypicality is inaccurate

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ABSTRACT

Past work on Black and Latinx individuals demonstrates that observers can accurately predict an individual's racial identity strength based on the observers' perceptions of the individual's phenotypic prototypicality (how much someone looks like a prototypical member of their racial group). However, the growing Biracial demographic varies considerably in racial identification, suggesting a monoracial approach to infer racial identity strength may not translate to Biracial individuals. In three studies, Biracial Black/White participants were photographed and completed a racial identity strength scale. Subsequently, we had raters judge the Biracial targets' phenotypic prototypicality and perceived levels racial identity strength. Overall, perceivers could not accurately predict Biracial individuals' racial identity strength via their phenotypic prototypicality.

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Biracial; identity; phenotypicality; face perception

"What are you?" is a question that people with multiple racial backgrounds often face (e.g., Gaither, 2015; Gaskins, 1999; Rockquemore & Brunsma, 2002; Tsai et al., 2021) and a question that afflicts perceivers who try to identify individuals who belong to multiple racial categories (e.g., Chen & Hamilton, 2012; Freeman et al., 2010; Willadsen-Jensen & Ito, 2006). This question not only represents the difficulty that a perceiver faces when trying to racially categorize a mixed-race individual who often (but not always) appears racially ambiguous (e.g., Freeman & Ambady, 2011; Gaither et al., 2018a; Pauker et al., 2018), but it also reflects a discrepancy that often exists between perceiver's racial categorizations and a mixed-race individual's self-identification (e.g., the racial label one chooses; Tran et al., 2016). For instance, Saperstein (2006) found that perceivers accurately categorized over 97% of self-identified monoracial Black and White individuals. In contrast, only 50% of those who self-identify as Biracial/Multiracial were categorized accurately (i.e., in line with their self-identification).

Indeed, for mixed-race individuals, impressions made about their racial identification are often inaccurate (Feliciano, 2016; Ho et al., 2011; Peery & Bodenhausen, 2008; Remedios & Chasteen, 2013), and these types of misidentifications feed into a prominent type of racial discrimination that these individuals face – identity denial or

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identity invalidation (Albuja et al., 2019; Franco et al., 2021). While most past work has concentrated on racial categorization by others or self-identification of mixed-race individuals (and the consequences of a discrepancy between the two), another important aspect of the multidimensional construct of racial identity is an individuals' identity strength (Ashmore et al., 2004). Here, we build on recent research examining correlates of Multiracial identity strength (Norman & Chen, 2020) and examine the extent to which perceivers can infer a mixed-race individuals' identity strength. By measuring both others' perceptions of Biracial identity strength and Biracial individuals' self-reported identity strength, the current work explores the congruence (or lack of congruence) between other's perceptions and self-perceptions. Specifically, we aim to empirically validate the variability that exists for people with multiple racial backgrounds in their racial identity strength, and expand our understanding of the social construction of race.

Reliance on phenotype as an identity cue

People typically use physical appearance (i.e., facial features, hairstyle, skin tone) to make judgments about people's social identities along numerous dimensions such as racial group membership, gender, sexual orientation, social class, and even political group membership (e.g., Bjornsdottir & Rule, 2017; Blair et al., 2002; Eagly et al., 1991; Freeman & Ambady, 2011; Freeman et al., 2011; Maddox, 2004; Maddox & Gray, 2002; Paul et al., 2022; Rule & Ambady, 2008, 2010). Yet, most studies focus on social categorization (i.e., is this person Black) rather than the more complex judgment of someone's identity strength (i.e., how strongly this individual identifies as Black). For many monoracial individuals, social categorization outcomes (e.g., judging someone as Black) is often in line with the individuals' self-identification (e.g., the person identifies as Black), though there may be variability in how strongly that person identifies with that racial identity (e.g., their racial identity strength). This raises a question about whether similar cues can be used to inform both categorization and strength of identity. Past work has demonstrated that phenotypic prototypicality or how much someone looks like a prototypical member of their racial group (a cue typically used for categorization) is associated with individuals' self-reported identity strength for Black and Latinx individuals or their sense of belonging to their racial groups (Brown et al., 1999; Wilkins et al., 2010). Specifically, Wilkins et al. (2010) asked Black and Latinx individuals to self-report the strength of their racial identities (e.g., "I am proud of my racial group membership"), and a separate group of perceivers were asked how they thought these Black and Latinx individuals answered the same questions about their racial identity strength. These perceivers were accurate in guessing how those Black and Latinx individuals responded (Wilkins et al., 2010). But does this process of using phenotypic prototypicality to accurately infer Black and Latinx people's racial identity strength generalize to mixed-race individuals who are known to vary significantly in both their phenotypic prototypicality and their racial self-identification?

Correlates of biracial or multiracial identity strength

Not all individuals with more than one racial background choose to self-identify as Multiracial, as some may choose a singular monoracial identity (e.g., Black) and some shift in their self-identification over time (Doyle & Kao, 2007). In fact, reports show

that only 39% of mixed-race individuals identify as "Multiracial" (Pew Research Center, 2015). Recent research by Norman and Chen (2020) found that social feedback from others about appearing racially ambiguous (e.g., being questioned about their race) and discrimination from ingroup members were the strongest predictors of whether individuals identified strongly as "Multiracial". In other words, when Multiracial individuals got feedback from others that their appearance did not match their self-identification, they were more likely to report a strong Multiracial identity. Similarly, Multiracial individuals who reported experiencing more discrimination from other ingroup members (specifically White ingroup members) reported greater Multiracial identity strength (Norman & Chen, 2020). In other work, Multiracial individuals who reported perceiving more discrimination toward Multiracial individuals also reported stronger Multiracial identification, along several dimensions (e.g., felt more committed to the Multiracial ingroup, rated themselves as more similar to other Multiracial group members, and saw Multiracial people as having more in common with one another; Giamo et al., 2012). These findings illustrate, at least in part, that appearance-based cues (e.g., whether someone is racially ambiguous) predict Multiracial identity strength. But they also highlight the way in which inferring Multiracial identity strength is complex. Specifically, knowing that those who identify as Multiracial are not categorized as Multiracial (Norman & Chen, 2020), it may be difficult for perceivers to conceptualize the strength of an identity that does not even register as an initial possibility. Also, a mixed-race individual may identify with more than one group (including or not including Multiracial) and shift their self-identification over time, which does not fit well with how perceivers (at least monoracial perceivers) typically conceptualize race (e.g., as stable and a single category; Feliciano, 2016; Pauker et al., 2018). Thus, measuring racial identity strength for a Multiracial individual may include identity strength of multiple groups and the relevance of particular groups may be variable across time and contexts. This more complicated conceptualization of racial identity strength does not fit well within most perceivers' general schema to see race in a stable and categorical way. Thus, we were interested in examining the link between perceivers' judgments of Multiracial individuals' identity strength as compared to Multiracial individuals' *actual* identity strength, and predicted that perceivers would not be able to accurately infer Multiracial individuals' identity strength.

We focus on self-identified Black/White Biracial Americans in this study, who are one of the most commonly studied Biracial populations regarding Biracial categorizations (e.g., Pauker et al., 2018; Young et al., 2021). The Biracial samples in our studies likely reflect more strongly Biracially-identified individuals since they all responded to study advertisements recruiting Biracial participants. This is important to note since there are many mixed-race individuals who do not claim a Biracial identity. Thus, the results presented here are only reflective of those who claim a Biracial identity as opposed to individuals who have ancestry from multiple racial groups but do not identify as Biracial. Including Biracial samples in research on racial identity provides a novel opportunity to push discussions surrounding how racial categorization (based on outward perceivers' judgments) and resultant societal treatment (e.g., experienced discrimination) may differ from components of racial identity, such as identity strength.

Consequences of detecting identity strength

Possible inaccuracies between how people perceive a Biracial individuals' identity strength as compared to a Biracial individuals' actual identity strength have consequences. Being accurate about a person's racial identity can act as one way to positively recognize an individual's sense of self (Franco et al., 2021). Past work suggests that Biracial individuals often struggle with developing a positive sense of self (e.g., Gaither, 2015; Shih & Sanchez, 2005). It is possible that constant inaccurate perceptions of their racial identity strength by perceivers could be a contributing factor to this struggle. Therefore, it is no surprise that Biracial individuals prefer to interact with people who are accurate in knowing that they are, in fact, Biracial (Remedios & Chasteen, 2013; Swann & Read, 1981). And yet, research has not investigated whether perceivers are actually accurate in detecting the strength of an individual's Biracial identity. As previously mentioned, past work has shown that perceivers can accurately infer the racial identity strength of Black and Latinx people by using perceived phenotypic prototypicality (Wilkins et al., 2010). In other words, if a target appears more prototypic of the category, phenotypically, perceivers believe the target is also strongly identified with that category and they are often correct. Prototypic exemplars of a category are perceived to experience more discrimination (Skinner & Nicolas, 2015), and notably there is a link between perceived identity strength and discriminatory treatment (Kaiser & Pratt-Hyatt, 2009). More specifically, when perceivers believe a target is more strongly identified, they are more likely to act discriminatory toward that target. Thus, perceivers may use prototypic racial appearance as a cue for the likelihood that person will experience discrimination and may infer racial identity strength from this likelihood.

Since this work linking phenotypic prototypicality to racial identity strength has only been conducted with Black and Latinx people (Wilkins et al., 2010), it is unclear: a) whether people will use a similar approach when trying to detect a Biracial individuals' racial identity strength; and b) whether this approach will result in an accurate inference. Given the variability in self-identifications that exists within the mixed-race population (e.g., Brunsma & Rockquemore, 2001; Gaither, 2015; Gaskins, 1999; Pauker et al., 2018), we propose that detecting a Biracial person's strength of racial identity may be complicated. Specifically, we investigate whether using phenotypic prototypicality to determine a target's strength of racial identity serves as an effective method for inferring how strongly a Biracial individual identifies with their various racial group memberships.

We expect that appearance (levels of phenotypic prototypicality) will not predict Biracial individuals' racial identity strength due to the known variability and complexity that surrounds self-identification for the Biracial demographic (Gaither, 2015; Rockquemore et al., 2009; Townsend et al., 2012). In support of this prediction, past work has found that a Biracial person's phenotypicality did not shape whether Biracial individuals claimed their White or Black identity after having one of their racial identities primed over the other, suggesting Biracial identities are not necessarily connected to individuals' physical appearance (Gaither et al., 2015). However, based on past work with Black and Latinx people, we predict that perceivers will still use a monoracial approach in judging levels of perceived Biracial identity. In other

words, we expect that the more prototypically Black, Biracial, or White a person looks, the more a perceiver will assume that they identify strongly with that racial group. Therefore, we argue that perceivers will apply a more fixed or static view of race grounded in understanding race from a monoracial perspective (i.e., assuming racial categorization = racial identity), which will not necessarily be applicable to Biracial individuals who belong to multiple racial groups simultaneously (Gaither, 2015, 2018; Pauker & Ambady, 2009; Shih & Sanchez, 2009; Townsend et al., 2012). We anticipate that perceivers will not be accurate in predicting a Biracial person's actual racial identity strength nor will perceivers' ratings of phenotypic prototypicality be associated with Biracial individuals' actual identity strength.

Study overview

Study 1 explores these questions by comparing self-reported and perceived levels of Biracial identity strength for Biracial Black/White individuals where we expected a lack of accuracy in perceiving Biracial identity strength. Study 2 aims to replicate Study 1 by comparing self-reported and perceived levels of White, Black, and Biracial identity strength to address the limitation that perhaps the "Biracial" category is cognitively less accessible than monoracial categories (Chen & Hamilton, 2012). More specifically, a lack of cognitive accessibility could make it difficult to infer a Biracial person's racial identity strength if the Biracial category does not readily come to mind in the first place. We predict that perceivers would not be able to infer Biracial individuals' identity strength with accuracy, nor would perceived phenotypicality be correlated with actual identity strength. Finally, in Study 3, we rule out the possibility that information about the Biracial individuals' racial background influenced participants' judgments of racial identity strength. Furthermore, Study 3 also examines whether perceiving a target as racially ambiguous and categorizing a target as Biracial would map onto perceivers' inferences of racial identity strength. We hypothesized that given evidence that Multiracial individuals who have more experiences of racial incongruity more strongly identify as Multiracial (Norman & Chen, 2020), we would see a correlation between perceived racial ambiguity and Biracial identity strength. However, we expected that despite how perceivers categorized Biracial targets, that their categorizations would not necessarily be correlated with their actual identity strength. We report all measures, manipulations, and exclusions in these studies. None of the studies were preregistered, but all data are available at https://osf.io/2entq/?view_only=4ebb0799df164e3eb8b21f5c99779314. By studying racial identity strength inferences for a population that have more complex and varying ways of self-identification this research has possible implications for how inaccurate perceptions of racial identity strength could lead to potentially harmful treatment of Biracial individuals. Moreover, this work also sheds light on the nuances of social categorization more broadly when moving from a singular racial identity framework to considering a Biracial identity framework (Gaither, 2018; Kang & Bodenhausen, 2015; Richeson & Sommers, 2016).

Study 1

Method

Stimuli, biracial identity strength, and phenotypic prototypicality

Self-identified Biracial Black/White participants (N = 33; 22 female, 11 male; M_{age} = 24.73, SD = 10.07) who were recruited for other studies were given the option to be photographed and to consent to their photographs being used as stimuli for future research studies (note: all of those who consented are reflected here). Using methods adapted from Wilkins et al. (2010), these photos were head-and-shoulder still shots on a white background. The photos were cropped to exclude everything but the head and the top of the shoulders and were shown in color. Participants were asked not to wear any large accessories or heavy make-up, but the clothes and accessories were not standardized. We explicitly did not control for this variable in order to examine perceptions of these Biracial individuals as they naturally present themselves, thus increasing external validity.

These participants also completed Luhtanen and Crocker's (1992) four-item racial identity centrality subscale using a 1 (*not at all*) to 7 (*very much*) scale (e.g., In general, belonging to my racial/ethnic group is an important part of my self-image) to measure racial identity strength. It is important to note that these Biracial participants responded to an ad explicitly asking for Biracial participants, meaning they likely claimed a Biracial identity when they completed the scale. However, we did not specify to participants to think about their Biracial identity. Rather, the Biracial participants simply responded to the Luhtanen and Crocker scale as written with the term "racial/ethnic identity." Thus, it is possible that participants were thinking of their Biracial identity, Black identity, White identity, or some other racial identity (a limitation that could explain the low reliability on this scale). Average racial identity strength scores were computed for each Biracial individual (α = .58) with scores ranging from 1.00–6.50 (M = 4.27, SD = 1.19) with higher scores indicating a stronger racial identity. Since the Biracial category does not have a defined appearance as it may relate to phenotypic prototypicality, combined with the fact that past work has only used monoracial labels for measuring phenotypic prototypicality, Biracial participants were also asked to self-report their phenotypic prototypicality on a scale of 1 (*very White*) to 7 (*very Black*) with phenotypic prototypicality scores ranging from 1.00–7.00 (M = 4.24, SD = 1.48). A sensitivity power analysis was conducted and found that with n = 33, 80% power, and α = .05, we would be able to detect an effect of r = .46.

Perceived prototypicality

To rate perceived phenotypic prototypicality, participants were recruited from Mechanical Turk to rate all 33 photos of the Biracial individuals who were previously recruited with a goal of 25 participants. Data was collected in May 2012 on MTurk, with individual HITs for 10 participants posted one at a time[1] and closed once we reached out target n. This resulted in a final sample of 27 participants (22 female, 5 male; M_{age} = 33.63, SD = 11.84; 22 White, 4 Asian, 1 Black). This sample significantly surpassed the sample size (n = 5) for phenotypic prototypicality judgments in Wilkins et al. (2010), and no participants were excluded from analyses.

All photos were randomly displayed using Qualtrics, and participants were asked to rate the photos using a 1 (*not at all*) to 7 (*very much*) scale regarding perceived attractiveness, affect (how happy, how angry), and phenotypic prototypicality (i.e., 1 *very White*, 7 *very Black*). Participants received the following instructions: "All of the photographs in this set are real people who came into our lab for a previous study. Some of these individuals have features that are more typical of African Americans, and some have features that more typical of White Americans in terms of skin color, hair, eyes, nose, cheeks, lips, etc. Please rate the following photos to the best of your ability using your gut or instinctual responses" (adapted from Blair et al., 2002; Wilkins et al., 2010). Average ratings of phenotypic prototypicality were highly reliable across participants with scores ranging from 1.45–6.92 ($M = 4.50$, $SD = 1.27$; $\alpha = .88$). The score for each Biracial target was averaged across all participant raters.

Perceived racial identity strength

To rate perceived racial identity strength, an additional sample of online participants was recruited from Mechanical Turk in May 2012 to rate all 33 photos with a goal of 50 participants for a within-subjects design; this sample size also surpasses the sample size ($n = 8$) used by Wilkins et al. (2010). The HIT was left up until 50 participants had completed the HIT. Three extra participants completed the HIT before it was closed, resulting in a final sample of 53 participants (18 female, 35 male; $M_{age} = 30.06$, $SD = 12.61$; 35 White, 3 Asian, 2 Black, 5 Latinx, 3 Biracial, 5 race not specified). No participants were excluded. Participants received the following instructions (adapted from Wilkins et al., 2010): "Today, we're asking you to look at pictures of Biracial individuals, and then provide your guess about how they would think about themselves. There are no right or wrong answers; we're simply interested in your gut response." Each photo was shown individually, and participants were asked to answer the questions based on how they thought the person in the photo would respond to the questions when thinking about their Biracial identity. Participants reported these inferences about each Biracial target individual's racial identity strength using the same Luhtanen and Crocker (1992) four-item identification centrality subscale with scores ranging from 2.97–5.24 ($M = 4.34$, $SD = .56$; $\alpha = .62$). Similar, to our measure of perceived phenotypicality, the score for each Biracial target was averaged across all participant raters. Please see, Table 1 for all reported correlations.

Table 1. Correlations across all measures in study 1.

Variables	1	2	3	4	5	6	7	8
1. Biracial accuracy	–							
2. Self Biracial ID	.39[a]*	–						
3. Self PP	−.22[c]	−.02	–					
4. Perceived Biracial ID	.11[b]	.05	.67***	–				
5. Perceived PP	.06[c]	−.03	.81***	.86***	–			
6. Angry	−.009[c]	.04	−.11	−.13	.03	–		
7. Happy	−.02[c]	.10*	−.15	−.07	−.08	−.60***	–	
8. Attractive	.05[c]	−.06	.02	.02	.10	−.49**	.46**	–

*$p < .05$. **$p < .01$. ***$p < .001$.
[a]Correlations were conducted controlling for perceived identity strength
[b]Correlations were conducted controlling for self-reported identity strength
[c]Correlations were conducted controlling for both self-reported and perceived identity strength

Results

Identity accuracy

To compute accuracy scores, we subtracted perceived racial identity scores from targets' actual identity scores. A perfect match would result in a score of 0. We then used the absolute values of this mean difference and subtracted them from 1 such that scores closer to 1 indicated greater accuracy, with a possible range of −5 to 1. For example, if the Biracial target reported a 4 for their identity strength and the participant perceived their identity strength as a 4, this would result in a difference score of 0. Subtracting that score from 1 would then compute an identity accuracy score of 1. However, if a participant perceived the target's identity strength as a 6, this would result in a difference score of 2. Subtracting that score from 1 would then compute an identity accuracy score of −1.

When examining the relationship between identity accuracy and self-reported identity strength or perceived identity strength, we conducted partial correlations controlling for the variables included in the calculation of identity accuracy (a difference score between self-reported and perceived identity strength). For example, when examining the relationship between Biracial identity accuracy and self-reported Biracial identity strength, reported below, we controlled for perceived Biracial identity strength.

Identity accuracy ranged from −2.54–0.96, M = .01, SD = .81. Perceivers were more accurate at inferring Biracial identity strength for targets who were more strongly identified as Biracial (controlling for perceived Biracial identity strength), $r(30)$ = .39, p = .03. Perceived Biracial identity strength was not significantly related to Biracial identity accuracy (controlling for self-reported identity strength), $r(30)$ = .11, p = .56. Biracial identity accuracy was not significantly related to any of our other variables, ps > .23.

Phenotypic prototypicality is not correlated with actual racial identity strength

To test whether phenotypic prototypicality (i.e., higher numbers equate to looking more Black) was associated with racial identity strength, targets' self-reported phenotypic prototypicality and perceived phenotypic prototypicality were correlated with Biracial individuals' actual racial identity strength. Unlike for Black and Latinx people (Wilkins et al., 2010), analyses revealed no correlation of either self-reported phenotypic prototypicality ($r(31)$ = −.02, p = .93) or perceived phenotypic prototypicality ($r(31)$ = −.03, p = .87) with racial identity strength. Levels of perceived affect (how happy, how angry) and attractiveness also were not correlated with racial identity strength (all rs < .10, all ps > .58) or with self-reported or perceived phenotypic prototypicality (all rs < .15, all ps > .39). However, based on recent research (Norman & Chen, 2020) it is possible that those with a more racially ambiguous appearance (i.e., rated at the middle of the phenotypic prototypicality scale) were most likely to identify strongly with their racial identity. To test this possibility, we centered the perceived phenotypic prototypicality ratings at the midpoint (M = 4.50, SD = 1.27) and took the absolute value of those ratings, such that scores closer to 0 were more ambiguous. Correlations using this this new variable were also not associated with actual racial identity strength, $r(31)$ = −.15, p = .40. We did the same analyses with self-reported phenotypic prototypicality ratings and similarly found no association, $r(31)$ = −.18, p = .32. Thus, these results indicate that looking more or less Black or more

or less racially ambiguous is not associated with the strength of a Biracial Black/White individual's racial identity.

Phenotypic prototypicality is correlated with perceived racial identity strength

To investigate if phenotypic prototypicality of Biracial individuals is used by perceivers to infer a Biracial person's racial identity strength, correlations were run between perceived phenotypic prototypicality scores and perceived racial identity strength. These two variables were significantly positively correlated, $r(31) = .86$, $p < .001$. An additional significant positive correlation between self-reported phenotypic prototypicality and perceived racial identity strength was also found, $r(31) = .67$, $p < .001$. Moreover, perceived and self-reported phenotypic prototypicality were also significantly positively correlated, $r(31) = .81$, $p < .001$. Again, neither perceived affect nor attractiveness was correlated with perceived racial identity strength (all rs < .13, all ps > .47). This evidence suggests that perceivers are using the same approach for Biracial-identified individuals that they use for monoracial-identified individuals – they use Black or minority phenotypic prototypicality to infer the strength of a Biracial person's racial identity. In other words, the more Black a Biracial (Black/White) person looks physically, the stronger perceivers expect that Biracial person to identify racially. In other words, perceivers use skin tone (and other phenotypic markers of race) to infer racial identity strength, even for Biracial individuals.

Judges do not accurately infer racial identity strength

Finally, to examine whether perceivers could accurately infer racial identity strength for Biracial individuals, perceived racial identity strength scores were correlated with Biracial individuals' actual racial identity strength scores. Analyses showed that perceivers were, in fact, not accurate in judging the strength of a Biracial person's racial identity, $r(31) = .05$, $p = .79$.

Discussion

This study is the first to show that perceivers are not accurate in judging the strength of Biracial individuals' self-reported racial identities. Perceivers use the same approach they use with Black and Latinx individuals to infer Biracial individuals' racial identity strength. Specifically, they utilize phenotypic prototypicality to infer racial identity strength for Biracial individuals, which is shown to be an inaccurate tactic. Furthermore, these results also expand existing research about Biracial identity by empirically demonstrating the variability that exists in Biracial individuals' actual racial identity strength, in addition to variability in both self-reported phenotypic prototypicality and perceived phenotypic prototypicality for this demographic. Specifically, both Biracial participants and perceivers used the full range of the 7-point scales provided (1.00–7.00 for Biracial participants and 1.45–6.92 for perceivers) when indicating racial identity strength. Past research stresses the importance of perceived racial identity strength in shaping cross-race interaction outcomes since perceiving someone as more strongly racially identified often negatively impacts the treatment of those individuals (Dovidio et al., 2010; Kaiser & Pratt-Hyatt, 2009). Moreover, as stated earlier, Biracial individuals also prefer to socially interact with

people who acknowledge their actual racial identity (Remedios & Chasteen, 2013). Here we show that, on average, perceivers are not accurate in inferring the strength of a Biracial person's racial identity.

However, this study had several limitations: it did not use the same raters for both perceived phenotypic prototypicality and perceived racial identity strength, and the reliability for the racial identity strength measure was relatively low. Additionally, this study only asked perceivers to rate perceived racial identity with a Biracial identity in mind. Past research has shown that the Biracial category is less cognitively accessible compared to monoracial categories. In other words, the average person does not readily think about the Biracial group as a category compared to more established and accepted monoracial groups (Chen & Hamilton, 2012). Thus, it may have been difficult for perceivers to rate Biracial individuals' racial identity strength. Moreover, it is also possible that the Biracial targets may have implicitly answered the racial identity scale with other racial identities in mind. We aimed to address these limitations in Study 2.

Study 2

Here we aim to replicate Study 1 with a new sample of Biracial individuals to aid in the generalizability of our findings while also measuring actual and perceived White, Black and Biracial identity strength to more directly test whether having a specific racial identity in mind influences not only how a Biracial person identifies but also how others perceive them. We measured self-reported phenotypic prototypicality using a more implicit measurement by asking Biracial individuals to select their actual photo from an array of skin-tone edited photos of themselves.

Methods

Stimuli, racial identity strength, and phenotypic prototypicality

Self-identified Biracial Black/White participants ($N = 44$; 35 female; $M_{age} = 20.35$, $SD = 4.42$) were recruited to be photographed for use as stimuli for future research studies (note: all who were recruited are reflected here). Participants were photographed with a neutral facial expression and standardized as described in Study 1. These participants also completed Luhtanen and Crocker's (1992) four-item identity centrality subscale measure of racial identity strength. Average racial identity strength scores were calculated with scores ranging from 2.00–7.00 ($M = 5.43$, $SD = 1.21$, $\alpha = .81$) for Biracial identity, 2.00–7.00 ($M = 4.71$, $SD = 1.26$, $\alpha = .80$) for Black identity, and 1.00–6.75 ($M = 3.79$, $SD = 1.37$, $\alpha = .89$) for White identity.

To measure self-reported phenotypic prototypicality in a more nuanced way, we uploaded the picture of each individual to FaceGen Modeler (Version 3.4) and varied the apparent race of each participant's face on a White/Black continuum. This software provides 3D morphing based on anthropometric parameters of the human population and thus can create fine-tuned variations in how prototypically White or Black a face appears while keeping the individual identity of the face constant (Blanz & Vetter, 1999). Biracial participants were presented with a morphed continuum of their faces (varying in phenotypic prototypicality) and were asked to select the face that appeared to represent

them the best. Self-reported phenotypic prototypicality is measured by which photo the participant selected, which varied from −6 (*Very White)* to +6 (*Very Black)*. A sensitivity power analysis was conducted and found that with n = 44, 80% power, and α = .05, we would be able to detect an effect of r = .41.

Perceived phenotypic prototypicality and racial identity strength

To limit participant fatigue while also keeping sample size generally constant between both studies, across two separate sessions, we recruited 50 participants via Amazon's Mechanical Turk with a final N = 100 (50 female; 50 male; M_{age} = 35.24, SD = 11.75; 78 White, 9 Black, 4 Asian, 7 Latinx, 2 Native American). Data collection occurred in March 2017 and no participants were excluded from analyses. Participants in each session rated half of the photos of Biracial targets on the same items of perceived attractiveness, affect, and phenotypic prototypicality as reported in Study 1, and also rated perceived White (range = 3.72–4.29, M = 3.95, SD = .13, α = .70), Black (range = 3.79–4.89, M = 4.40, SD = .27, α = .92), and Biracial (range = 3.89–4.87, M = 4.42, SD = .22, α = .90) identity strength. There were no significant differences between the two sets of raters on any demographic variables (age, gender, or race of participant) and no significant difference in their ratings of the photos. Thus, we collapsed all ratings across the two sessions for a total of 44 photos rated, and no participants were excluded. As in Study 1, we averaged participant ratings within each Biracial target. Please see, Table 2 for all reported correlations.

Results

Identity accuracy

Scores for Biracial identity accuracy ranged from −1.83–0.95, M = −.34, SD = .84, for Black identity accuracy from −1.50–0.98, M = .004, SD = .76, and for White identity accuracy from −1.95–0.99, M = −.10, SD = .82. As in Study 1, we conducted partial correlations controlling for the variables included in the calculation of identity accuracy (a difference score between self-reported and perceived identity strength). While controlling for self-reported and perceived Biracial and Black identity, there was a significant relationship between Biracial identity accuracy and Black identity accuracy, r(38) = .52, p< .001, such that when perceivers were more accurate about inferring Biracial identity they were also more accurate at inferring Black identity. Biracial identity accuracy was not related to White identity accuracy, p = .75. When controlling for perceived Biracial identity, perceivers were more accurate at inferring Biracial identity for targets who were less strongly identified as Biracial, r(41) = −.78, p < .001. These findings suggest that perceivers are more likely to be accurate in regard to Biracial individuals who do not strongly identify as Biracial. All other variables were not significantly related to Biracial identity accuracy, *ps* >.10. When controlling for both self-reported and perceived Black and White identity, there was a relationship between Black identity accuracy and White identity accuracy, r (38) = .47, p = .002. In other words, if perceivers were more accurate at identifying Black identity strength, they were more likely to be accurate at identifying White identity strength. When controlling for both self-reported and perceived Black identity, perceived

Table 2. Correlations across all measures in study 2.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Biracial ID accuracy	–													
2. Black ID accuracy	.52[a]***	–												
3. White ID accuracy	.05[a]	.47[a]**	–											
4. Self Biracial ID	−.78[b]***	.16[d]	.09[d]	–										
5. Self Black ID	.21[d]	−.08[b]	−.19[d]	.58***	–									
6. Self White ID	.09[d]	.11[d]	.39[b]**	.36*	.27	–								
7. Self PP	−.04[d]	−.09[d]	.006[d]	.07	.12	−.34*	–							
8. Perceived Biracial ID	.13[c]	.33[d]*	.20[d]	.02	−.15	−.48**	.14	–						
9. Perceived Black ID	−.26[d]	−.20[c]	.14[d]	−.07	−.18	−.54***	.13	.92***	–					
10. Perceived White ID	.11[d]	.04[d]	.25[c]	.11	−.04	.23	−.13	−.09	−.17	–				
11. Perceived PP	.10[d]	.18[d]	.13[d]	−.16	−.19	−.56***	.14	.85***	.92***	−.25	–			
12. Angry	−.12[d]	.16[d]	.18[d]	.11	.02	.02	−.24	.05	.11	−.13	.03	–		
13. Happy	.04[d]	−.32[d]*	−.17[d]	−.23	.19	−.15	.30*	−.07	−.05	−.03	.07	−.74***	–	
14. Attractive	.08[d]	−.13[d]	−.14[d]	−.04	.13	.06	.12	.08	.15	.05	.23	−.56***	.62***	–

*$p < .05$. **$p < .01$. ***$p < .001$.
[a]Correlations were conducted controlling for both self-reported and perceived identity strength for both racial identities.
[b]Correlations were conducted controlling for perceived identity strength.
[c]Correlations were conducted controlling for self-reported identity strength.
[d]Correlations were conducted controlling for both self-reported and perceived identity strength.

happiness was related to Black identity accuracy, $r(40) = -.32$, $p = .04$, as well as perceived Biracial identity strength, $r(40) = .33$, $p = .04$. All other relationships were non-significant, $ps > .19$. When controlling for perceived White identity, White identity accuracy was related to self-reported White racial identity, $r(40) = .39$, $p = .01$. In other words, perceivers were more accurate when the targets had a stronger self-reported White identity. White identity accuracy was not significantly related to any other variables, $ps > .11$.

Actual racial identity strength

We first examined the variation in Biracial individuals' own racial identity strength by conducting a repeated measures one-way ANOVA on racial identity scores for participants' Biracial, Black, and White identity strength. Biracial individuals reported significantly stronger Biracial ($M = 4.42$, $SD = .22$) and Black ($M = 4.40$, $SD = .27$) identity as compared to White identity ($M = 3.95$, $SD = .13$; $F(2, 86) = 99.60$, $p < .001$, $\eta^2_p = .70$).

Phenotypic prototypicality is mostly not correlated with racial identity strength

To test whether phenotypic prototypicality was associated with racial identity strength, correlations were run for both self-reported phenotypic prototypicality and perceived phenotypic prototypicality with Biracial individuals' actual racial identity strength. Replicating Study 1, there was no correlation between either self-reported phenotypic prototypicality ($r(42) = .07$ $p = .64$ or perceived phenotypic prototypicality ($r(42) = -.18$, $p = .24$) and Biracial identity strength. Levels of perceived affect (how happy, how angry) and attractiveness also were not correlated with Biracial identity strength (all $rs < .23$, all $ps > .14$). Similarly, we found no relationships when we examined self-reported phenotypic prototypicality and perceived phenotypic prototypicality with Black identity strength (all $rs < .19$, all $ps > .21$). Levels of affect and attractiveness were also not correlated with Black identity strength (all $rs < .19$, all $ps > .21$). Self-reported phenotypic prototypicality was significantly correlated with White identity strength ($r(42) = -.34$ $p = .02$). Similarly, perceived phenotypic prototypicality was correlated with White identity strength ($r(42) = -.56$, $p < .001$), such that perceiving the target as being more phenotypically White (a negative score on the phenotypic prototypicality scale) was related to Biracial individuals' White identity strength. Levels of affect and attractiveness were not correlated with White identity strength, (all $rs < .15$, all $ps > .34$.

Phenotypic prototypicality is correlated with perceived racial identity strength

Replicating Study 1, perceived phenotypic prototypicality scores were significantly and positively correlated with perceived Biracial identity strength, $r(42) = .85$, $p < .001$. This suggests again that perceivers are thinking a strong Biracial identity means looking more Black or appearing less White phenotypically. Similarly, perceived phenotypic prototypicality scores were positively correlated with perceived Black identity strength, $r(42) = .92$, $p < .001$. Perceived phenotypic prototypicality was not significantly related to perceived White identity strength, $r(42) = -.25$, $p = .10$. Contrary to results in Study 1 there was no association between self-reported phenotypic prototypicality and perceived racial identity. This held true for perceived Biracial identity, $r(42) = -.14$, $p = .36$, Black identity, $r(42) = -.13$, $p = .42$, and

White identity, $r(42) = .13$, $p = .41$. Furthermore, self-reported phenotypic prototypicality was not significantly related to perceived phenotypic prototypicality, $r(42) = .14$, $p = .37$. Neither perceived affect nor attractiveness was correlated with perceived identity strength (all $rs < .15$ all $ps > .32$).

Judges do not accurately infer actual biracial identity strength

Replicating Study 1, perceivers were not accurate in judging a Biracial person's racial identity strength, $r(42) = .02$, $p = .91$. Perceived Black and White racial identity strength also did not correlate with their Biracial identity strength ($rs < .11$ and $ps > .50$). Furthermore, perceived Black, White, and Biracial identity strength did not correspond with Black identity strength ($rs < .15$, and $ps > .32$). Judges were, however, accurate in inferring White racial identity strength. Perceived Black identity strength was negatively correlated with Biracial individuals' White identity strength, $r(42) = -.54$, $p < .001$. Similarly, perceived Biracial identity strength was negatively correlated with Biracial individuals' White identity strength, $r(42) = -.48$, $p < .01$ Despite this finding, perceived White identity strength did not correlate with Biracial individuals' White identity strength, $r(42) = .23$, $p = .13$. While participants could infer White racial identity strength, such perceptions occurred via perceiving a less strong Biracial or Black racial identity.

Discussion

We replicated our findings from Study 1: perceivers could not accurately infer the Biracial individuals' self-reported Biracial racial identity strength. Contrary to Study 1, perceiver's accuracy about the target's Biracial identity strength was linked to targets who were weakly identified as Biracial. However, as an extension from Study 1, we found that judges could infer Biracial individuals' White identity strength but not their Black or Biracial identity strength through perceived phenotypic prototypicality. These results extend our understanding of the cues that individuals use for inferring racial identity, particularly that perceived phenotypic prototypicality is used by perceivers to accurately predict White identity strength for Biracial individuals. Extending our previous finding, perceived phenotypic prototypicality was significantly related to *perceived* Biracial and Black identity strength but weakly related (nonsignificant) to *perceived* White identity strength, suggesting that perceivers are using monoracial cues to infer minority racial identity strength in Biracial individuals. We did not replicate some findings from Study 1; specifically, self-reported phenotypic prototypicality and perceived phenotypic prototypicality were not correlated. Furthermore, self-reported phenotypic prototypicality did not relate to perceived racial identity strength. It is possible since we chose to measure phenotypic prototypicality in a new way (e.g., via participants' own photos), participants' self-reported phenotypic prototypicality was based on perceptual cues as opposed to self-reported feelings. Finally, we gain additional understanding of comparative levels of racial identity strength within a single individual. Specifically, on average, participants reported higher identity strength for their Biracial and Black identities than their White identities. Overall, our results show perceiving Biracial individuals is a complex task, in which people are often inaccurate. Utilizing monoracial cues such as phenotypic prototypicality is an unsuccessful tool for making judgments about Biracial individuals. These physical features may not map onto the Biracial individuals' own racial identity strength.

Study 3

Studies 1 and 2 focused primarily on perceived racial identity strength of Biracial Black/White individuals. Often, how people categorize monoracial individuals is highly correlated with how said individuals identify. However, for Biracial individuals, how others categorize them may not necessarily be linked to their own racial identity (Rockquemore et al., 2009), and they often experience identity denial because of this mismatch (e.g., Albuja et al., 2019). Thus, people interacting with Biracial individuals may use the same cues that they use to make a categorization (i.e., phenotypic prototypicality) as they do to infer racial identity strength, but these cues may not be valid cues to infer Biracial identity strength. Therefore, in Study 3, we had perceivers both make a racial categorization and rate perceived racial identity strength to tease apart the link between categorization and identity.

To examine this, we also asked perceivers to categorize the same Biracial target as either Biracial, Black, or White, in addition to rating the target's identity strength, in order to test whether or not categorization is linked to perceived racial identity strength. Furthermore, we also asked participants to rate how racially ambiguous the Biracial targets appeared. Given that Norman and Chen (2020) found that experiencing situations that convey a racially incongruent appearance (e.g., others express surprise when a multiracial individual shares their self-identification) was strongly linked to Multiracial identification, we expect that perceived racial ambiguity of a Biracial target – which could lead to a number of different racial categorizations by different perceivers that may or may not match the target's self-identification – will relate to perceiving a strong Biracial identification. Similarly, we expect that categorizing individuals as Biracial will also be linked to inferring a strong Biracial identification. To provide more nuance in understanding how perceivers are using appearance-based cues to judge identity, we also made a small change in this study to rate phenotypic prototypicality separately for Black, White, and Biracial prototypicality (whereas in the previous two studies, participants' ratings occurred on a single scale ranging from 1 *very White* to 7 *very Black*). To address potential confounds in Studies 1 and 2, we randomly assigned participants to either receive information about the targets' racial background or not. In both Studies 1 and 2, participants were given information about targets' multiple racial identities. It is possible that providing this information may have skewed participants' perceptions of targets' racial identities. Thus, we included a condition in which participants received no race-related information about each target's background to see if this information contributed to our initial findings. Finally, Studies 1 and 2 included participants from a variety of racial groups (though they were predominantly White). In Study 3, we purposefully recruited a White participant sample to compare our findings more directly to the extant literature on how White perceivers categorize and make judgments about Biracial Black/White individuals.

Methods

Identity disclosure

In order to manipulate the disclosure of the identities of the Biracial targets, we randomly assigned participants to either receive information about individuals' racial identities or no information. All participants received the following instructions, but participants who were given information about the targets' racial identities also received the information in brackets

prior to viewing faces: "All of the photographs in this set are real individuals that came into the lab for a previous study [who identify as Biracial. This means they have one parent that is Black and one parent that is White.] Please rate the following photos to the best of your ability."

Stimuli, racial identity strength, and phenotypic prototypicality

We included the same 44 Biracial Black/White Biracial targets from Study 2, including their self-reported Biracial, Black, and White identity strength and their self-reported phenotypic prototypicality.

Perceived phenotypic prototypicality, perceived racial identity strength, categorization, and ambiguity

We recruited N = 210 (103 females, 107 males; M_{age} = 41.80, SD = 20.20) White participants via Duke University (n = 40) and Amazon's Mechanical Turk (n = 170). Data collection occurred in March 2020 just prior to the Covid-19 lockdown in the U.S.[2] and no participants were excluded from analyses. Participants in each session rated half of the photos of Biracial targets on the same items of perceived attractiveness and affect as in Studies 1 and 2, and perceived Biracial, Black, and White identity strength as reported in Study 2. In the past two studies, we measured phenotypic prototypicality on a bipolar scale from White to Black. However, we chose to broaden our measure of phenotypic prototypicality in Study 3 by asking participants to rate how prototypically Black, White, and Biracial the targets appeared on a scale of 1 (*not at all prototypical*) to 7 (*very prototypical)*. We also asked participants to rate targets on how racially ambiguous they appeared on a scale from 1 (*not at all ambiguous*) to 7 (*very ambiguous*). Lastly, we had participants categorize each individual as either Black, White, or Biracial. We calculated the proportion of participants who categorized each target as either Black, White, or Biracial by summing the instances in which they were categorized as the target race divided by the total number of categorization trials (e.g., a score of .50 for Black categorization would mean that the target was categorized as Black approximately 50% of the time across all participants).

There were no significant differences between the two sets of raters on any demographic variables (age, gender) and no significant difference in their ratings of the photos. Thus, we collapsed all ratings across the two sessions for a total of 44 photos rated. Scores were averaged across participant raters within each Biracial target. Please see Table 3 for all reported correlations.

Results

Identity disclosure

We found no significant differences between those who received identity information about targets as compared to those who did not on all of our rating variables, $ps > .08$. This ruled out concerns that providing participants with explicit information about the targets' racial backgrounds served as a confound in Studies 1 and 2. Consequently, the following analyses reported below are collapsed across conditions.

Table 3. Correlations across all measures in Study 3

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Biracial ID accuracy	–																
2. Black ID accuracy	.62[a]***	–															
3. White ID accuracy	.08[a]	.42[a]**	–														
4. Self Biracial ID	−.86[b]***	.12 [d]	.09 [d]	–													
5. Self Black ID	.24 [d]	−.16[b]	−.21 [d]	.58***	–												
6. Self White ID	.17 [d]	.21 [d]	.54[b]***	.36*	.27	–											
7. Self PP	−.08 [d]	−.12 [d]	−.06 [d]	.07	.12	−.34*	–										
8. Perceived Biracial ID	−.03[c]	−.13 [d]	−.08 [d]	.33*	.23	−.26	.03	–									
9. Perceived Black ID	−.25 [d]	−.27[c]	−.19 [d]	−.04	.12	−.35*	.21	.29	–								
10. Perceived White ID	.16 [d]	−.01 [d]	−.07[c]	.18	.05	.37*	−.42**	−.04	−.45**	–							
11. Perceived Biracial PP	.31 [d]	.10 [d]	.10 [d]	.07	.09	.26	−.25	.15	−.41**	.29	–						
12. Perceived Black PP	−.19 [d]	−.06 [d]	−.11 [d]	−.15	−.08	−.48***	.23	.26	.79***	−.52***	−.61***	–					
13. Perceived White PP	.15 [d]	.00 [d]	.12 [d]	.22	.07	.48***	−.23	−.28	−.84***	.54***	.42*	−.93***	–				
14. Ambiguity	.31 [d]	.14 [d]	.09 [d]	.11	.13	.41**	−.28	−.03	−.50***	.40**	.91***	−.71***	.57***	–			
15. Biracial categorization	.27 [d]	.15 [d]	.09 [d]	.13	.13	.24	−.22	.16	−.38*	.28	.95***	−.60***	.41**	.90***	–		
16. Black categorization	−.25 [d]	−.10 [d]	−.13 [d]	−.18	−.13	−.44**	.25	.14	.76***	−.46**	−.76***	.95***	−.87***	−.83***	−.78***	–	
17. White categorization	.11 [d]	−.07 [d]	.09 [d]	.14	.08	.44**	−.16	−.40**	−.79***	.43**	.17	−.86***	.93***	.34*	.15	−.74***	–

*$p < .05$. **$p < .01$. ***$p < .001$.

[a]Correlations were conducted controlling for both self-reported and perceived identity strength for both racial identities.

[b]Correlations were conducted controlling for perceived identity strength.

[c]Correlations were conducted controlling for self-reported identity strength.

[d]Correlations were conducted controlling for both self-reported and perceived identity strength.

Identity accuracy

Scores for Biracial identity accuracy ranged from −1.77–0.99, $M = -.43$, $SD = .88$, for Black identity accuracy ranged from −1.47–0.99, $M = .05$, $SD = .72$, and for White identity accuracy ranged from −2.04–0.97, $M = -.10$, $SD = .86$. We conducted partial correlations controlling for the variables included in the calculation of identity accuracy (a difference score between self-reported and perceived identity strength). While controlling for both self-reported and perceived Biracial and Black identity, Biracial identity accuracy was related to Black identity accuracy, $r(38) = .62$, $p < .001$, such that when perceivers were accurate in inferring Biracial identity strength, they were also more accurate in inferring Black identity strength. Similarly, when controlling for both self-reported and perceived Black and White identity strength, Black identity accuracy was related to White identity accuracy, $r(38) = .42$, $p = .008$. When controlling for perceived identity strength, perceivers were more accurate at inferring Biracial identity for targets who were less strongly identified as Biracial, $r(41) = -.86$, $p < .001$. All other variables were not significantly related to Biracial identity accuracy, *ps* >.05. Black identity accuracy was also no significantly related to any other variables, *ps* > .18. White identity accuracy was significantly related to self-reported White identity strength (when controlling for perceived White identity strength), $r(41) = .54$, $p < .001$. Thus, perceivers were more accurate at inferring White identity strength when the targets were stronger in their self-reported White identity. All other variables were non-significant, *ps* > .18.

Perceived phenotypic prototypicality is mostly not correlated with racial identity strength

To test whether perceived Biracial, Black, or White phenotypic prototypicality was associated racial identity strength, correlations were run between perceived phenotypic prototypicality and Biracial individuals' actual racial identity strength.[3] Biracial ($r(42) = .07$, $p = .64$), Black ($r(42) = -.15$, $p = .35$), and White ($r(42) = .22$, $p = .15$) perceived prototypicality was not associated with Biracial identity strength. Similarly, Biracial ($r(42) = .09$, $p = .55$), Black ($r(42) = -.08$, $p = .61$), and White ($r(42) = .07$, $p = .64$) perceived prototypicality was not associated with Black identity strength. However, Black ($r(42) = -.48$, $p < .001$), and White ($r(42) = .48$, $p < .001$) perceived prototypicality was significantly associated with White identity strength. Biracial perceived prototypicality ($r(42) = .26$, $p = .09$) was not significantly associated with White identity strength.

Perceived racial ambiguity and racial identity strength

To test whether perceivers' ratings of racial ambiguity were associated with racial identity strength, correlations were run between ratings of ambiguity and Biracial individuals' actual racial identity strength. Perceptions of racial ambiguity were not associated with Biracial ($r(42) = .11$, $p = .50$) or Black ($r(42) = .13$, $p = .39$) identity strength. However, racial ambiguity was associated with White identity strength ($r(42) = .41$, $p = .006$).

Perceived phenotypic prototypicality and racial ambiguity correlated with perceived racial identity strength

Contrary to the results in Studies 1 and 2, ratings of Biracial, Black, and White perceived phenotypic prototypicality were not associated with perceived Biracial identity strength, *r*s < .28, *p*s >.07. Similarly, perceptions of racial ambiguity were not associated with perceived Biracial identity strength, $r(42) = -.03$, $p = .84$. Replicating Study 2, ratings of perceived Biracial ($r(42) = -.41$, $p = .006$), Black ($r(42) = .79$, $p < .001$), and White ($r(42) = -.84$, $p < .001$) phenotypic prototypicality were significantly associated with perceived Black identity strength. Furthermore, perceptions of racial ambiguity were negatively associated with perceived Black identity strength, ($r(42) = -.50$, $p < .001$). Lastly, only ratings of Black ($r(42) = -.52$, $p < .001$) and White ($r(42) = .54$, $p < .001$) perceived phenotypic prototypicality were significantly associated with perceived White identity strength. Biracial perceived phenotypic prototypicality was not significantly associated with perceived White identity strength, $r(42) = .29$, $p = .06$. Perceptions of racial ambiguity were positively related to perceived White identity strength, ($r(42) = .40$, $p = .007$).

We found that self-reported phenotypicality was not significantly related to perceived Biracial or Black identity, *p*s > .16. However, self-reported phenotypicality was related to perceived White identity, $r(42) = -.42$, $p = .005$. Self-reported phenotypicality was not significantly related to how ambiguous the target appeared, $p = .07$.

Categorization and racial identity strength

We examined the categorization rates of targets as either Black, White, or Biracial. Overall, Biracial Black/White targets were categorized as Biracial at the highest rate ($M = .47$, $SD = .20$), followed by Black ($M = .36$, $SD = .29$) and then White ($M = .17$, $SD = .18$). Perceived ambiguity of the target was related to how the target was categorized. Targets that appeared more ambiguous were more likely categorized as Biracial, $r(42) = .90$, $p < .001$, and less likely to be categorized as Black, $r(42) = -.83$, $p < .001$. Interestingly perceived ambiguity was also related to rates of categorization as White, $r(42) = .34$, $p = .03$, although notably weaker than its link to rates of categorization as Biracial.

Contrary to our expectations, being categorized as Biracial was not significantly related to the target's actual Biracial, Black, or White identity strength, *p*s > .12. Being categorized as Black was not significantly related to the target's Biracial or Black identity strength but was related to the target's actual White identity strength ($r(42) = -.44$, $p = .003$). Similarly, being categorized as White was not significantly related to the target's Biracial or Black identity strength, but was related to the target's actual White identity strength, $r(42) = .44$, $p = .003$.

Categorization and perceived racial identity strength

We then examined whether perceivers' categorizations mapped onto their perceptions of racial identity strength for the targets. Categorizing the target as Biracial was not significantly related to perceived Biracial identity, $p = .31$. However, it was negatively related

to perceived Black identity strength, $r(42) = -.38$, $p = .01$. Similarly, categorizing the target as Black was positively related to perceived Black identity strength ($r(42) = .76$, $p < .001$), and negatively related to a perceived White identity strength ($r(42) = -.46$, $p = .002$. Lastly, perceivers categorizing the target as White was negatively related to perceived Black identity strength ($r(42) = -.79$, $p < .001$) and Biracial identity strength ($r(42) = -.40$, $p = .008$), but positively related to perceived White identity strength ($r(42) = .43$, $p = .003$).

Judges sometimes accurately infer actual biracial identity strength

Contrary to Studies 1 and 2, perceivers accurately judged a Biracial person's Biracial identity strength via perceived Biracial identity, $r(42) = .33$, $p = .03$. However, much like Study 2, perceived Black and White racial identity strength were not significantly related to Biracial identity strength ($rs < .18$ and $ps > .24$). Perceived Black, White, and Biracial identity strength did not correspond with Black identity strength ($rs < .23$, and $ps > .13$). Replicating Study 2, judges were accurate in inferring White identity strength via perceived Black identity, $r(42) = -.35$, $p = .02$. Perceived White racial identity strength was also positively correlated with Biracial individuals' White identity strength, $r(42) = .37$, $p = .01$. However, perceived Biracial identity strength was not significantly correlated with Biracial individuals' White identity strength, $p = .09$.

Discussion

Surprisingly, unlike Studies 1 and 2, we found that perceived Biracial identity strength *did* map onto Biracial individuals' actual strength in Biracial identity. However, replicating Study 2 where the same exact stimuli was used, we find that perceiver's accuracy in inferring Biracial identity strength was only related to accuracy in inferring Black identity strength, and more accurate for targets who reported a weak Biracial identity. These findings again suggest that appearance-based cues may not be great predictors of accuracy when it comes to inferring a Black/White Biracial individuals' strength in racial identity.

We find more consistent evidence that perceived phenotypicality may not be correlated with Biracial individuals' actual identity strength, suggesting that a Biracial person's complex racial identities may be contributing to inaccurate identity strength perceptions. However, we did find again (as demonstrated in Study 2) that perceiving a target as less phenotypically Black and more phenotypically White was associated with Biracial individuals' actual White identity strength. Unlike Studies 1 and 2, we actually did not find a link between perceived phenotypic prototypicality and perceived racial identity in regard to Biracial identity. However, we replicate findings from Studies 1 and 2, in regard to Black identity. Perceiving Biracial individuals as less phenotypically Biracial and White was associated with perceiving the target as more strongly identified as Black. Self-reported phenotypically was not correlated with perceived Biracial or Black identity (replicating Study 2), but was related to perceived White identity in Study 3.

New to Study 3, we examined how perceived racial ambiguity would be related to perceptions of racial identity. Biracial individuals who were rated as more racially ambiguous were not perceived as more Biracially identified, but were perceived to be less identified as Black and more identified as White, further supporting the assertion that

perceivers may use a monoracial identity framework when considering a Biracial target. Additionally, Biracial individuals who reported a stronger White racial identity were also rated as more racially ambiguous.

Lastly, we looked at how categorization of Biracial individuals would map onto perceptions of racial identification. Consistent with Chen et al. (2018) findings, we did see that Biracial targets were most likely to be categorized as either Biracial or Black, with very low rates of White categorization, suggesting a minority bias in their categorizations. As expected, Biracial individuals who were rated as more racially ambiguous were more likely to be categorized as Biracial. Racially ambiguous individuals were also more likely to be categorized as White (though at a notably weaker rate than as Biracial). However, inconsistent with findings in Norman and Chen (2020), perceiving the target as racially ambiguous was not linked to a Biracial individuals' Biracial identity strength or perceiving the target as more strongly identified as Biracial. Biracial individuals who were more likely to be categorized as White (and not Black) were more strongly identified as White. Of interest, we did find that perceived racial ambiguity was related to both categorizations of the target as Biracial *and* White (and negatively related to categorization of the target as Black). These findings map onto Young et al. (2017) work showing that ambiguous physical appearances lead White perceivers to categorize Biracial targets as White more so than Black, supporting the notion that a White versus Black perceptual framework is often used in Biracial perceptions.

General discussion

Across three studies, which include two separate samples of Biracial Black/White individuals and three samples of (mostly White) perceivers, we show that using phenotypic prototypicality as a tool for inferring racial identity strength – the approach often used for inferring Black and Latinx people's levels of racial identity – is not an accurate approach for inferring a Biracial person's racial identity strength. More specifically, neither self-reported phenotypic prototypicality nor perceived phenotypic prototypicality from a separate set of raters accurately predicted the strength of Biracial Black/White individuals' Biracial identity. Furthermore, we also found that both self-reported phenotypic prototypicality and perceived phenotypic prototypicality did not predict the strength of the target's Black identity. Interestingly, perceivers were only able to predict Biracial individuals' White identity strength. In Studies 2 and 3, when perceivers perceived the targets as less prototypically Black (and more prototypically White) and less identified as Black, this did indeed relate to targets' White identity strength. We also found in Study 3 that targets who appeared more racially ambiguous and were more likely to be categorized as White were individuals who had a stronger White racial identity. Phenotypic cues were only related to both categorization *and* identity strength with regard to White identity. Looking less prototypically Black and more prototypically White was related to greater categorizations of the target as White. Similarly, looking less prototypically Black and more prototypically White was related to greater perceived and actual White identity strength. These findings illustrate how the link between appearance, categorization, and identity strength for Biracial individuals is not always aligned. It is important to note that in Studies 1 and 2 the perceivers were mostly White and in Study 3 we recruited only White perceivers to judge Biracial Black/White targets. Thus, it is possible that White

perceivers' expertise with White individuals, White prototypicality, and White racial identity may explain why our perceivers were able to infer Biracial Black/White targets' White racial identity, but not Black or Biracial identities. For a summary of findings across the three studies see Table 4.

While there is an established link between phenotypic features and identity strength for certain racialized groups (Wilkins et al., 2010), these findings illustrate that this link also occurs when detecting Whiteness and White identity strength. Perceivers (who were mostly White) are perhaps more sensitive to and practiced in judging White features and this could contribute to the accurate inferences of White identity strength in the current set of studies. One implication of this finding is that if perceivers use inferences about identity strength to guide treatment, these inferences may perpetuate colorism. The most obvious signal to Whiteness is skin color, and while skin tone is not the only feature that is associated with race, many argue that skin tone is one of the most important characteristics in racial categorization and treatment (see, Telles & Paschel, 2014). In fact, in a survey of Biracial Black/White individuals, those who reported being able to "pass" as White stated that most White people perceived them as White until told otherwise (Khanna, 2010). Biracial Black/White individuals who have reported "passing" as White have also reported having a Whiter social network, and living in more affluent neighborhoods (Davenport, 2016; Khanna, 2010; also see, Harris, 2018 for a review). These findings support the notion that the link between phenotype and identity strength have

Table 4. Summary of findings across studies.

Correlations	Study 1	Study 2	Study 3
Biracial accuracy with Self-reported Biracial identity	+	-	-
Biracial accuracy with Perceived Biracial identity	x	x	x
Biracial accuracy wtih Self-reported phenotypicality	x	x	x
Biracial accuracy with Perceived phenotypicality	x	x	x
Self-reported Biracial identity with Perceived Biracial identity	x	x	+
Self-reported Biracial identity with Self-reported phenotypicality	x	x	x
Self-reported Biracial identity with Perceived phenotypicality	x	x	x
Perceived Biracial identity with Self-reported phenotypicality	+	x	x
Perceived Biracial identity with Perceived phenotypicality	+	+	+
Black accuracy with Self-reported Black identity	n/a	x	x
Black accuracy with Perceived Black identity	n/a	x	x
Black accuracy with Self-reported phenotypicality	n/a	x	x
Black accuracy with Perceived phenotypicality	n/a	x	x
Self-reported Black identity with Perceived Black identity	n/a	x	x
Self-reported Black identity with Self-reported phenotypicality	n/a	x	x
Self-reported Black identity with Perceived phenotypicality	n/a	x	x
Perceived Black identity with Self-reported phenotypicality	n/a	x	x
Perceived Black identity with Perceived phenotypicality	n/a	+	+
White accuracy with Self-reported White identity	n/a	+	+
White accuracy with Perceived White identity	n/a	x	x
White accuracy with Self-reported phenotypicality	n/a	x	x
White accuracy with Perceived phenotypicality	n/a	x	x
Self-reported White identity with Perceived White identity	n/a	x	+
Self-reported White identity with Self-reported phenotypicality	n/a	-	-
Self-reported White identity with Perceived phenotypicality	n/a	-	-[a]
Perceived White identity with Self-reported phenotypicality	n/a	x	x
Perceived White identity with Perceived phenotypicality	n/a	x	+

x = no relationship
- = negative relationship
+ = positive relationship
[a]This denotes a negative relationship with perceived Black phenotypicality and a positive relationship with perceived White phenotypicality

important implications, not only for racialized identities (e.g., experiencing more discrimination), but also for White identities (e.g., experiencing more White privilege, greater inclusion with White communities). Moreover, the findings highlight the need for future work to recruit more diverse samples to test accuracy in ingroup racial identification for racial and ethnic minority groups.

Research has highlighted how physical features and appearance impact the social categorizations of others and inferences about their racial identity strength, in particular for People of Color (e.g., Blair et al., 2002; Brown et al., 1999; Maddox & Gray, 2002; Wilkins et al., 2010). Although mixed-race individuals have been studied quite extensively within face categorization studies (e.g., Chen & Hamilton, 2012; Ho et al., 2011), studies of their racial identity are much less prevalent (Gaither, 2015). The majority of work in this area has focused on the ultimate categorical decisions perceivers make about Multiracial individuals (e.g., Iankilevitch et al., 2020) or how Multiracial individuals feel about their sense of identity (e.g., Shih & Sanchez, 2009). While Giamo et al. (2012) and Norman and Chen (2020) did explore factors that shape Multiracial individuals' identity strength, their work only did so through self-report from Multiracial individuals and did not examine the link between both target and perceivers' perceptions. Additionally, the majority of past work regarding perceptions of mixed-race individuals has not used photos of actual mixed-race people (but see, Chen et al., 2021; Gaither et al., 2018b; Ma et al., 2021), nor has research empirically documented how much variation in both self-reported and perceived phenotypic prototypicality there is for Biracial Black/White individuals. Therefore, the current work provides needed nuance regarding variability in phenotypic prototypicality and how perceivers use phenotypic prototypicality to make judgments for one of the fastest-growing racial demographics in the U.S. – the mixed-race population. Moreover, although not tested directly here, these results provide some support for why it is that mixed-race individuals may face such high rates of social exclusion and discrimination – it could be due at least in part to this lack of accuracy in perceiving a mixed-race person's racial identity. An extension of this work should explore how this inaccuracy in determining racial identity strength for mixed-race individuals influences actual social, and behavioral outcomes in dyadic or group interaction settings. Work has shown that social interactions with a Biracial individual who is accurately categorized as Biracial (compared to thinking they are Black) are more positive (Gaither et al., 2018a), though this work focuses on accuracy in categorization/self-identification and not on identity strength.

These findings spark a needed discussion about whether existing models of racial identity and social categorization generalize to the mixed-race population. One of the most cited identification models, social identity theory (Tajfel & Turner, 1979), describes group membership as a simple ingroup/outgroup distinction. But mixed-race individuals belong to at least two racial ingroups, which perhaps contributes to why perceivers are not accurate in judging mixed-race individuals' racial identity strength. Additionally, the Biracial or Multiracial racial category has been shown to be difficult to process and think about (e.g., Chen & Hamilton, 2012; Freeman et al., 2010; Willadsen-Jensen & Ito, 2006). Perceivers tend to apply an either/or conceptualization of race, even when they are dealing with mixed-race individuals (e.g., Bodenhausen & Macrae, 1998; Chen & Hamilton, 2012; Jordan, 2014), and this approach is often not compatible with mixed-race individuals' more fluid racial identity. Our findings map onto Rockquemore et al.'s (2009) proposal of discontinuity in Multiracial identity theories, such that mixed-race

individuals may possess inconsistent racial categories (the racial identity chosen in a specific context), identities (an individuals' sense of identity), and identifications (how others categorize an individual). We show that this is exactly the case; perceivers' categorizations and inferences of identity (likely based upon appearance-based cues of phenotypic prototypicality) do not necessarily map onto a mixed-race individuals' sense of identity.

While results replicated across these three studies provide support for the notion that perceived phenotypic prototypicality is not a useful cue to detect Biracial identity strength, there were some limitations in this work. First, we only examined perceived phenotypic prototypicality when it comes to Black/White Biracial individuals; therefore, our data cannot generalize to other Biracial individuals with different racial compositions. For example, previous research on Asian/White Biracial individuals find that they are categorized more often and more easily as White, compared to Black/White Biracial individuals who are more often categorized as Black (Ho et al., 2011), likely due to phenotypic prototypicality and skin tone differences. Important factors such as perceived linked fate, skin tone, and experiences with discrimination may largely shape a Biracial individuals' strength in identification (Gonlin, 2022). Moreover, our Biracial sample is also likely reflective of those who more strongly identify as Biracial since they all responded to study advertisements explicitly asking for Biracial participants. It may be that phenotypicality is a poor predictor of identity strength for Biracial- or Multiracial-identified individuals, but that this may not generalize to all those with mixed-race ancestry. Thus, it is possible that for those with mixed-race ancestry who do not identify as Biracial or Multiracial, phenotypicality may map onto identity strength, in line with findings from research with Black and Latinx samples (Wilkins et al., 2010). Future work should investigate how self-identification in mixed-race individuals may shape the relationship between appearance and identity strength.

Secondly, a factor we did not thoroughly test was perceiver racial identity. In a meta-analysis, Young et al. (2021) found that White perceivers tend to show a stronger pattern of hypodescent in their categorization of Multiracial individuals (i.e., they categorize them as belonging to their lower status racial group), whereas this pattern is not clear in samples with racial minority perceivers. One primary difference between Studies 1 and 2 compared to Study 3 was the racial composition of our samples (with Study 3 including only White perceivers). Thus, some of the inconsistencies in our findings may be due to perceiver race. Moreover, since our Biracial targets were Black/White Biracial individuals, the role that sharing a racial ingroup (i.e., being part White) may play in shaping these judgments and perceptions is also left untested. Future research should more systematically test the impact of perceiver race on inferring identity strength by including more diverse perceiver and target samples in this work. Although the present paper focused on establishing inferences of Biracial identity strength, we did not examine other nonappearance based cues that may contribute to perceivers' accuracy in inferring racial identity strength. There are a host of factors that may influence perceivers' accuracy, such as exposure to Biracial individuals in their everyday life, the extent to which an individual endorses essentialist thinking (i.e., fixed thinking about social categories; Chao et al., 2013), or Biracial individuals' behaviors (see, Garay et al., 2019 for an example). Lastly, this paper focused on Biracial individuals who are part-White and White perceivers, which further contributes to the White-centering research practices that much of

Multiracial research suffers from (see, Garay & Remedios, 2021). Despite this limitation, we hope that our work helps to shed light on the potentially faulty strategies people use when making judgments about Biracial individuals, which contribute to negative psychological outcomes for this group.

This research extends our knowledge regarding the role phenotypicality plays in perceiving Biracial identity strength. Our findings support the notion that phenotypicality is not predictive of a Biracial individuals' identity strength. Thus, this work suggests that cues other than appearance, such as social cues, may be essential for accurately inferring a person's racial identity, especially for those belonging to the Biracial demographic. For example, future work can expand on research by Garay et al. (2019) that demonstrates behavioral cues that align with Multiracial individuals' racial minority identities (e.g., speaking up for Black lives) lead to perceivers believing they are more representative of that group. Similarly, Wilton et al. (2018) provide evidence that behaviors such as confronting racism, lead White perceivers to judge Biracial individuals as more phenotypically Black (as compared to White). Perhaps behavioral cues may provide more predictive information about how a Biracial/Multiracial individual identifies, rather than appearance-based cues alone. However, knowing the role that skin tone plays in racial categorization, future work should test these outcomes with other types of Biracial individuals such as Asian/White Biracial people, where skin tone might not be as readily used in comparison when judging a person's racial identity strength. Furthermore, we hope this work challenges monoracial-centered assumptions about how racial identity works for people who have multiple racial backgrounds.

Conclusion

Across three studies, we highlight the incongruence in perceived and actual racial identity strength for Biracial individuals. If perceivers are frequently guessing others' identities incorrectly, this inaccuracy could serve as negative and conflicting feedback for Biracial individuals. The experience of identity inaccuracy may contribute to some of the negative psychological consequences documented for Biracial individuals, such as identity invalidation, weakened ethnic identity, and the experience of microaggressions (e.g., Binning et al., 2009; Cheng & Lee, 2009; Meyers et al., 2020; Remedios & Chasteen, 2013; Sanchez & Bonam, 2009; Shih & Sanchez, 2009; Townsend et al., 2009; Tran et al., 2016). For example, recent work shows that dual identity populations such as bicultural and Biracial populations report higher rates of identity denial, increased depressive symptoms, and stress due to their increase experiences with social exclusion (Albuja et al., 2018, 2019; Franco, 2019). Therefore, future research should examine other cues that may be more predictive of accurate racial identity levels for Biracial individuals, such as nonappearance-based cues (e.g., behavior) and situational factors such as exposure to more Biracial individuals or racially diverse contexts. Importantly, we do not argue that a perceiver should never use phenotypic prototypicality to infer a person's racial identity since that has been shown to be accurate for some racial groups (Wilkins et al., 2010). Rather, we highlight that solely relying on phenotypic prototypicality as the only racial identity cue may not work equally well for all populations.

Notes

1. At the time of data collection, posting HITs in increments of 10 would allow researchers to avoid hefty MTurk fees and this was the rationale for this data collection method.
2. We had initially planned to pre-register this study, however with the Covid-19 lockdown becoming imminent we opted to begin data collection sooner than expected and did not pre-register this study.
3. Analyses for self-reported phenotypicality and racial identity strength are redundant variables from Study 2 and are not repeated here for brevity.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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