



Functional Inferences of Formidability Bias Perceptions of Mental Distress

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Abstract

Humans infer men's formidability through their facial width-to-height ratio (fWHR), subsequently eliciting perceptions of men's capability to engage in aggressive physical conflict. Inferring formidable men as being particularly resistant to mental distress from physical conflict may pose downstream consequences, such as biasing mental health assessments that impede optimal treatment recommendations. Participants assessed potential mental distress of hypothetical military service members who varied in fWHR and indicated their willingness to assess and treat these symptoms. Formidable men were inferred as mentally tough, further biasing perceptions of them as not experiencing mental distress and not receiving subsequent care. We further replicated infrahumanization effects surrounding formidable men demonstrating individuals perceive them as less capable of feeling complex emotions, though treatment recommendations were driven by mental toughness perceptions rather than infrahumanization. Results are framed from an evolutionary perspective of affordance judgments. We discuss translational implications for clinical mental health.

Keywords Facial width-to-height ratio · Face perception · Infrahumanization · Mental toughness · Mental health

Humans demonstrate considerable perceptual acuity toward physical features connoting aggression. This acuity would serve to identify, and avoid, conspecifics most capable of inflicting physical harm (Neuberg et al., 2011). Despite the potential physical risks imposed by these conspecifics in group living, employment of interpersonally dominant men for intergroup conflict could prove advantageous, as they could form coalitions affording success in combat against outgroups and ensuring ingroup safety and access to finite resources (Brown et al., 2017, 2021a; Lukaszewski et al., 2016; McDonald et al., 2012). These formidability inferences could be rooted in recognizing both these men's fighting capability in addition to their capability of aggression (Sell et al., 2008, 2012; Zilioli et al., 2015). Humans' historic necessity for face-to-face communication seemed to facilitate an evolution of formidability inferences occurring through facial structures to identify whether others' goals

were congruent with the perceiver's goals (Zebrowitz & Montpere, 2006).

One discrete facial characteristic from which individuals infer another's formidability is facial width-to-height ratio (fWHR), or the ratio of bizygomatic width with upper face height, derived from skeletal structures. High-fWHR men are both aggressive and perceived as interpersonally threatening (e.g., Carré et al., 2009; Geniole & McCormick, 2015). These findings further converge with individuals preferring high-fWHR men for hypothetical intergroup conflicts over low-fWHR men, particularly for coalitional roles involving frontline combat and operating heavy artillery (Brown et al., 2021b; Hehman et al., 2015). Concomitant with these inferences are perceptions of heightened physical toughness and reduced fearfulness in high-fWHR men, even displaying fearful expressions (Deska & Hugenberg, 2018; Deska et al., 2018a). These perceptions correspond with heightened social boldness oft conceptualized as fearlessness (Geniole et al., 2014). These inferences could implicate high-fWHR men as optimal combatants in conflicts. However, formidability inferences have recently been associated with downstream consequences of dehumanization toward high-fWHR men that is not rooted in a veridical assessment of boldness (Deska & Hugenberg,

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2018; Deska et al., 2018b). Such formidability inferences could translate into formidable men receiving inadequate mental health care following engagement in combat (i.e., returning from military deployment) due to perceptual impediments in identifying mental distress. This could suggest a mental component of superhumanization, wherein perceivers imbue greater tolerance to physical pain toward conspecifics deemed formidable (Hoffman et al., 2016; Waytz et al., 2015). This study sought to identify how functional inferences bias perceivers against recognizing distress in men's faces and how it could impede subsequent decisions for postconflict care.

Formidability Inferences and Affordances

The immediacy of face-to-face interactions throughout humans' evolutionary history has led to facial features having primacy in first impressions. Subsequent attitudes from these inferences typically form within 100 ms of initial meeting (Willis & Todorov, 2006), with many of these inferences being particularly accurate. Such inferences include accurate assessments of political orientation through features connoting dominance (e.g., Rule & Ambady, 2010) and mental health through features that would ostensibly connote negative affect (e.g., Kleiman & Rule, 2013).

From these impressions, humans demonstrate considerable perceptual acuity toward formidability in men's faces through various structural features. Such inferences are frequently made though masculinized facial structures appear to serve as putative cues of male aggression that are relatively hard to fake compared to less static formidability cues (e.g., posturing; Sell et al., 2008). These masculinized features appear associated with androgenic programming during fetal development and augmented through pubertal androgen surges, resulting in broad middle faces and lowered foreheads (Whitehouse et al., 2015; Windhager et al., 2011). Widened male faces could subsequently become a component of their fWHR. Although fWHR is neither sexually dimorphic nor a putative cue to testosterone (e.g., Bird et al., 2016; Lefevre et al., 2012; Özener, 2012), several components of this ratio could have been sexually selected that could result in a downstream configuration from which humans infer formidability (see Dixson, 2018; Hodges-Simeon et al., 2021). Cross-cultural and archaeological evidence indicate men's fWHR is predictive of formidability, as high-fWHR men are more likely to survive violent encounters (e.g., Christiansen & Winkler, 1992; Stirrat et al., 2012). Formidably faced men are additionally more interpersonally dominant and capable of winning more readily in physical conflict (Goetz et al., 2013; Třebický et al., 2015; Zilioli et al., 2015; but see Richardson et al., 2021).

This interpersonal dominance appears to be accurately inferred by perceivers. High-fWHR male faces are perceived interpersonally threatening (Carré et al., 2009), intimidating (Hehman et al., 2013), and less ingratiating (Brown et al., *in press*). Such inferences correspond with perceptions of such men as particularly effective in combat (Třebický et al., 2015; Zilioli et al., 2015), which could be associated with humans' capability of inferring upper body strength through facial structures (Holzleitner & Perrett, 2016). High-fWHR men additionally exhibit higher levels of fearless dominance, a behavioral repertoire of psychopathy typified by emotional callousness that could leave individuals less susceptible to strong emotional reactions to aversive situations (Geniole et al., 2014; Lilienfeld et al., 2012). In fact, this work indicates the basis of high-fWHR men's engagement in antagonistic behavior is partially explained by such an emotional response. These associations with actual formidability implicate men's fWHR as a veridical cue to dominance, with selection favoring those utilizing this cue to determine whether to engage formidably faced men. Ancestral men with formidable faces would have benefited from appearing intimidating, which would have afforded the opportunity to benefit from dominant interpersonal strategies. Recognizing one's own formidability could thus calibrate individuals toward aggression (Eisenbruch et al., 2018). Such self- and other-perceived formidability would implicate high-fWHR men as particularly valuable coalition members for physical conflict, as individuals readily selected high-fWHR men for intergroup competitions requiring physicality and assign them to these coalitional roles more than low-fWHR men (Brown et al., 2021b; Hehman et al., 2015). This desirability in these tasks, and their exhibited boldness, could implicate high-fWHR men as critical to successful military operations.

Consequences of Formidability Inferences

Despite evidence implicating fWHR as diagnostic of physical prowess, such affordance judgments appear limited in their role as an honest cue to behavior. Large-sample studies found fWHR unassociated with antagonistic behavioral repertoires outside of combat (Wang et al., 2019). The discrepancy in findings appears part of a mismatch between ancestral bases of formidability and modern contexts (Li et al., 2018). Inferring men's formidability through fWHR could represent an ancestral basis to how humans identify threats that may have less relevance in modern contexts imposing more constraints on physical conflict and antagonistic behaviors (Stirrat et al., 2012), given the criticality of face-to-face interactions in human sociality that led to the evolution of sensitivity to facial features diagnostic of threat (Neuberg et al., 2011).

As this ancestrally derived perceptual process shapes perceptions of formidability, it would seem likely that several downstream inferences would emerge from these perceptions that would create stereotypes out of the affordances from fWHR (e.g., Neuberg & Sng, 2013), which may not be based in kernels of truth (Jussim et al., 2015). Perceivers may conflate accurate stereotypes of fighting ability and dominance with concomitant perceptions not based in the actual affordances. Recent findings indicate that high-fWHR men are more perceived as angrier than low-fWHR men, which further corresponds with a perception of high-fWHR men as appearing less fearful through this facial structure (Deska et al., 2018a). This inferred emotional restriction toward fear may correspond with inferences that such men are fearless in combat, making them desirable coalition partners (Hehman et al., 2015). Although high-fWHR men indeed exhibit more callousness that could implicate them as optimal coalitional allies more tolerant of the distress inherent in combat (Geniole et al., 2014), this callousness is nonetheless unrelated to the manifestation of post-traumatic stress disorder symptoms among military members (Anestis et al., 2017). Despite the potentially accurate assessment of social affordances of boldness and formidability among high-fWHR men, these ancestrally derived inferences may not correspond to accurate identification of psychological distress and could elicit erroneous beliefs that formidable men have an enhanced capacity for distress tolerance.

Several consequences emerge from functional inferences of formidable men. First is that perceivers ascribe less mental sophistication in high-fWHR men, as if they were less human (Deska et al., 2018b), an inference that emerges despite large-scale studies demonstrating there to be no association between fWHR and cognitive abilities, thereby providing limitations to the signal value of fWHR in accurate inferences (Kosinski, 2017). Formidable men could be similarly perceived as incapable of experiencing complex emotions typically designated as “human” and thus unlikely to experience trauma from the interpersonal conflict in which social groups would elect them to engage (Brown et al., 2021a, b; Leyens et al., 2000). Second, when considering affective states, formidable men’s utility in combat could elicit affordance judgments of particularly strong constitutions.

High-fWHR men are indeed perceived as tolerant to physical pain (Deska & Hugenberg, 2018), which could suggest a concomitant tolerance of mental distress. Despite many health decisions being made in relation to bodily cues (e.g., body weight dictating medication dosages) and previous research indicating individuals demonstrate above-chance accuracy in identifying mental distress in faces (Kleiman & Rule, 2013), the basis of mental health professionals’ treatment decisions is likely not intended to be an affordance judgment of fWHR. Formidability inferences may impede

this perceptual acuity in identifying distress in high-fWHR men, which could ultimately impede adequate treatment for mental health symptoms. These potential affordance judgments through emotional displays could foster reluctance from perceivers in providing certain postconflict care, which could include mental health treatment in modern settings (Deska et al., 2020).

Current Research

Given the functional inferences of formidability through men’s fWHR (e.g., Zilioli et al., 2015), which elicits a downstream consequence of perceiving formidable men as particularly tolerant toward pain (Deska & Hugenberg, 2018), we sought to determine whether these ancestral stereotypes could impede perceptions of vulnerability to mental illness symptoms. This study tasked participants with assessing the mental states of hypothetical combatants with varying degrees of formidability in their facial structures, including interest in providing certain treatments in which recommendation could be impeded by these formidability inferences.

In extending previous findings demonstrating perceptions of high-fWHR men as physically tough, we predict such men would also be perceived as mentally tough and thus elicit a disadvantage in receiving mental health assessments and medication. We were additionally interested in identifying which consequences of formidability inferences could serve as a mechanistic basis for between formidability assessments and subsequent interpersonal decisions for care. We considered both inferred affective state of targets through assessments of perceived mental distress, which we further predicted high-fWHR men would be perceived as less distressed. We further assessed perceptions of dispositional capability to experience emotion, namely, primary emotions, typically deemed more basal, and secondary emotions regarded as more complex (Leyens et al., 2004), with the prediction being high-fWHR men would be perceived as more capable of primary emotions than secondary emotions. Data and materials for this study are provided: <https://osf.io/bc4w2>.

Method

Participants

We recruited 104 undergraduates from a public university in Southeastern USA in exchange for course credit (89 women, 15 men; $M_{Age} = 20.97$, $SD = 4.55$; 45.2% Black, 39.4% White; 15.4% Other). The notable participant sex asymmetry is not a limitation, as previous findings show men and women infer formidability similarly in the stimuli utilized

for this study (Brown et al., *in press*). A sensitivity analysis indicated that we were adequately powered for small effects ($d_z = 0.27$, $1 - \beta = 0.80$). We did not exclude any data from final analyses.

Materials and Procedure

Target Faces. Participants were tasked to imagine themselves as mental health professionals providing an evaluation of 20 normed White male faces from the Chicago Faces Database (Ma et al., 2015; Fig. 1). Targets naturally varied in fWHR and were selected for possessing the 10 highest and 10 lowest fWHRs from this database in the service of amplifying differences in stimulus categories (Deska & Hugenberg, 2018), which resulted in a substantial difference between stimuli ($d = 6.32$). Faces were neutrally expressive to reduce potentially additive effects of concomitant emotions in influencing perceptions of distress, such that participants' assessments would be based more readily on their structures. Targets presented in color and did not differ in attractiveness across both categories.

Participants were instructed to imagine themselves as physicians at a local Veterans' Affairs hospital, wherein former military personnel have sought help about feelings of uneasiness, an intentionally ubiquitous description for distress that would not create demand characteristics in participants. They were tasked with making an immediate assessment of symptom severity using only the image each target person to assess to the best of their ability. Targets were presented in a randomized order.

Assessments. Participants assessed each targets' overall formidability through a strength assessment (1 = not at all strong; 7 = very strong) and the likelihood each target was mentally tough (1 = not at all likely; 7 = very likely) along single face-valid scales. We additionally tasked participants with assessing the extent targets exhibited potential mental distress (i.e., appearing depressed, appearing anxious, exhibiting severe symptoms, appearing suicidal) across four items (1 = not at all; 7 = very much), which were subsequently aggregated across categories ($\alpha_s > 0.93$). Participants further indicated the extent that they would give a hypothetical

Table 1 Mean assessments of relevant study variables (and standard deviations) with inferential statistics and effect sizes

	High-fWHR	Low-fWHR	<i>t</i>	<i>d</i>
Formidability	4.10 (1.33)	3.38 (0.84)	9.69**	0.95
Mental toughness	3.71 (0.76)	3.48 (0.77)	4.04**	0.39
Mental distress	3.18 (1.00)	3.38 (0.88)	- 4.15**	- 0.40
Assessment	3.07 (1.17)	3.44 (1.01)	- 6.13**	- 0.60
Medication	3.43 (1.23)	3.59 (1.17)	- 2.39*	- 0.23

* $p < 0.05$; ** $p < 0.001$

suicide assessment to targets and the likelihood that they would recommend medication for each target using single-item measures (1 = not at all likely; 7 = very much likely).

Emotional Capacity. We assessed targets' perception of the extent each had the capacity to experience various emotional states (Demoulin et al., 2004), a measure frequently employed to assess perceptions of outgroups deemed hostile (Motyl et al., 2010). We assessed perceptions of capability to experience both primary emotions, which are typically conceptualized as basal emotions that are experienced by individuals across species (e.g., fear, anger), and secondary emotions that are typically conceptualized as complex and uniquely human (e.g., hope, nostalgia). There were seven items assessing the capacity for primary and secondary emotions, which were subsequently treated as two different levels of a within subject factor (1 = not at all; 7 = very much). Each category of emotional capacity was comprised of highly reliable items, which prompted us to aggregate across them as singular constructs ($\alpha_s > 0.97$).¹

Results

Primary Analyses

Our initial analyses served as both a manipulation check for our study variables and initial evidence for the proposed effects. Results from these analyses are reported in Table 1. Consistent with previous findings, participants perceived high-fWHR targets as more formidable than low-fWHR

Fig. 1 Example high- (left) and low-fWHR targets



Table 2 Mean assessments of primary and secondary emotion capabilities (and standard deviations)

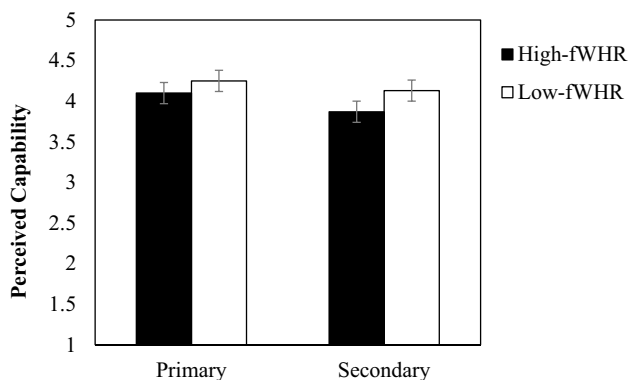
	High-fWHR	Low-fWHR
Primary Emotion	4.11 (0.95)	4.25 (1.37)
Secondary Emotion	3.87 (1.32)	4.13 (1.32)

targets. This corresponded with a conceptual replication by demonstrating that high-fWHR targets were further perceived as mentally tougher than low-fWHR targets, $t_s > 2.38$, $p_s < 0.050$, $d_s > 0.22$. Additional analyses further indicated participants perceived high-fWHR targets as experiencing less mental distress, while also being less likely to recommend a suicide assessment or prescribe medication for presented symptoms.

Infrahumanization

We further submitted our infrahumanization data to a 2 (target fWHR: high vs. low) \times 2 (emotion: primary vs. secondary) repeated ANOVA (Table 2). A target fWHR main effect indicated that low-fWHR targets were perceived as more capable of experiencing emotion ($M = 4.19$, $SD = 1.34$) than high-fWHR targets ($M = 3.98$, $SD = 1.32$), $F(1, 103) = 22.97$, $p < 0.001$, $\eta_p^2 = 0.182$. An emotion main effect further indicated that targets were perceived as more capable of experiencing primary emotions ($M = 4.17$, $SD = 1.35$) than secondary emotions ($M = 4.00$, $SD = 1.34$), $F(1, 103) = 22.67$, $p < 0.001$, $\eta_p^2 = 0.180$.

Effects were qualified by a target fWHR \times emotion interaction, $F(1, 103) = 11.05$, $p = 0.001$, $\eta_p^2 = 0.097$ (see Fig. 2). Simple effect tests indicated low-fWHR targets that were perceived as more capable of experiencing primary emotion than high-fWHR targets, $F(1, 103) = 13.04$, $p < 0.001$, $\eta_p^2 = 0.112$. Low-fWHR targets were further perceived as more capable of experiencing secondary emotion than

**Fig. 2** Perceived capability for high- and low-fWHR targets to experience primary and secondary emotions (with standard error bars)

high-fWHR targets at a larger magnitude, $F(1, 103) = 28.53$, $p < 0.001$, $\eta_p^2 = 0.217$ (see Table 3 for descriptive statistics).

Mediation Analyses

Our next step was to identify a potential mechanistic basis for how inferred mental toughness of high-fWHR men interferes with subsequent judgments and actions. We were particularly interested in determining which of the three affordance judgments of formidable men could mediate this link between formidability assessments and judgments, which would assess both state (inferred mental distress) and trait levels of affordances (primary and secondary emotions). We first conducted preliminary bivariate correlations between the predictor and outcomes with the proposed mediators to ensure more focused final analyses. Variables were composites of high- and low-fWHR targets calculated through difference scores between high- and low-fWHR targets with higher scores indicating high-fWHR being perceived as having higher values.

Perceived mental toughness of high-fWHR men was associated with reduced perceptions of mental distress, but not such men's capacity for primary or secondary emotions. Additionally, perceived mental distress was associated with both an interest in a suicide assessment and recommending medication. Neither assessments of emotion capacities were associated with these outcomes. Nonetheless, individuals' capacities to experience primary and secondary emotion were both associated with perceived mental distress, aligning with previous research suggesting distress is associated with greater emotional complexity (Deska & Hugenberg, 2018). Results from these correlations prompted us to focus on inferences of mental distress exclusively in our mediation model (see Table 3).

We finally used a pair of mediation analyses using toughness as the predictor and perceived mental distress as the mediator while considering participants' interest in conducting a suicide assessment and their interest in recommending medication for potential symptoms as outcomes. Final analyses were conducted using model 4 of process (Hayes, 2013) with 10,000 bootstraps. The heightened perceived mental toughness was associated with perceptions of less mental distress in high-fWHR targets. Perceived mental distress was additionally associated with greater intention to conduct a suicide assessment and intention to recommend medication for targets. A significant direct effect emerged for suicide assessment, 95% CI ($-0.36, -0.05$), but not for medication recommendation, 95% CI ($-0.20, 0.13$). Nonetheless, tests of indirect effects indicated that inferences of lessened mental distress served as a significant mediator for both intentions to conduct a suicide assessment, 95% CI ($-0.30, -0.01$), and recommending medication, 95% CI ($-0.33, -0.01$). These results suggest that formidable

Table 3 Bivariate correlations between outcome variables

	Mental distress	Primary	Secondary	Assessment	Medication
Mental toughness	- 0.22*	0.12	- 0.05	- 0.34	- 0.18†
Mental distress		0.22*	0.26**	0.67***	0.67***
Primary			0.78***	0.08	0.16
Secondary				0.06	0.13
Assessment					0.55***

Scores based on difference scores between high- and low-fWHR targets

† $p < 0.06$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

facial structures were associated with impediments in mental health assessments (see Fig. 3).

Discussion

The findings in this study extend previous work demonstrating how formidability inferences impede perceptions of emotional states and thus judgments of potentially appropriate treatments for social targets by considering mental health domains (e.g., Deska & Hugenberg, 2018). Specifically, high-fWHR men were inferred as being less likely to experience mental distress than low-fWHR men, with perceivers subsequently being less likely to assess them for suicide risks and to recommend they receive medication for their symptoms. High-fWHR men's perception of being less fearful could implicate them as optimal coalition members for physical conflict and ultimately less affected by combat

(e.g., Brown et al., 2021a, b; Deska et al., 2018a; Hehman et al., 2015). Although this feature is a putative cue to success in physical conflict (e.g., Stirrat et al., 2012; Zilioli et al., 2015), individuals' perceptions of fWHR may nonetheless represent a mismatch with ancestral environments given the limitations of this feature in predicting psychological states (Li et al., 2018; Wang et al., 2019). Results from this study indicate that ancestrally derived inferences consequently shape biases in modern contexts.

These findings further clarified previous work demonstrating a parallel inference of infrahumanization toward high-fWHR men who were perceived as dispositionally less capable of experiencing complex emotion (Deska et al., 2018b), although this perception of reduced emotional complexity did not serve as a basis for subsequent care decisions. Alternatively, perceptions of emotional capacities could be less relevant to the observed affordance judgments compared to inferences of men's proclivity to display particular

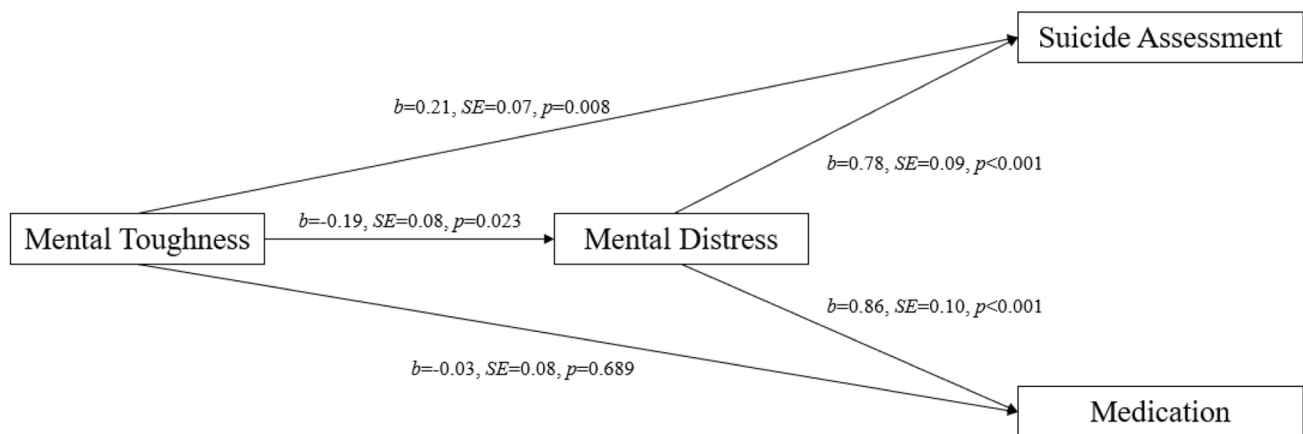


Fig. 3 Mediation pathways for formidability assessments and perceived mental distress on suicide assessments and medication recommendations. We conducted an item-level analysis for each of the 14 target emotions to identify potential granularity in the emotions for which high- and low-fWHR targets appear most capable of experiencing. We set our significance level to $\alpha = 0.001$, given the number of comparisons we made. Paired-sample t -tests indicated that low-fWHR targets were perceived as significantly more capable of experiencing

every emotion compared to high-fWHR targets, except for desire, repentance, and anger. High-fWHR targets were perceived as more capable of anger than low-fWHR targets. However, because of the overall reliability these items exhibited across both categories, we found it prudent to consider these capabilities as singular constructs of primary and secondary emotions. Results from this analysis are available as a supplementary file in the OSF link

emotions, which could partially explain reduced perceptions of distress among high-fWHR targets. Future research could task perceivers with identifying the likelihood individuals would most frequently experience various emotional states, which could form the basis of subsequent affordance judgments in conjunction with perceptions of formidability.

This study suggests that postconflict care appears rooted in perceptions of affective displays instead of trait inferences, which could be a consequence of formidability inferences leading to superhumanization of formidable conspecifics (Waytz et al., 2015). The lack of association between ascriptions of emotional complexity and postconflict care for formidable men deviates from recent work demonstrating disinterest in providing care for dehumanized individuals (Deska et al., 2020). However, these findings provide nuance insofar as they address care to valued coalitional allies rather than an ostensible interpersonal threat. Future work would benefit from clarifying the degree to which such mind ascription toward formidable conspecifics influences care decisions based on the designation of being either an ally or threat.

Limitations and Future Directions

The current study presents several limitations that necessitate future research. Most notably, although previous findings suggest that lay populations' perceptual acuity toward mental illness cues is no different from that seen in mental health professionals (Kleiman & Rule, 2013), the current sample's reliance on undergraduates prevents us from determining whether mental health professionals are similarly impeded in their assessments of distress from the presence of formidable facial features. Previous findings suggest that physicians' assessments of discomfort in patients are partially rooted in stereotyping (Hoffman et al., 2016), which could suggest similar stereotyping could be possible.

Although fWHR is a veridical cue to physical formidability and fearless dominance in men that is accurately inferred by perceivers (Geniole et al., 2014; Zilioli et al., 2015), it remains unclear that these assessments of mental toughness are accurate inferences or downstream stereotypes. Future research could develop face databases that include assessments of tolerance to physical and psychological distress. Such information would afford researchers the opportunity to task participants with inferring distress tolerance in faces from which researchers could identify which physical features are veridical cues to various forms of toughness that could subsequently inform interventions to address potential biases most effectively.

Another limitation concerns the identification of specific affective displays that would lead to the affordance judgments identified in the current study. Perceivers are less quickly to categorize high-fWHR men as fearful, even when

such men are displaying a fearful expression, and biased in perceiving such men as angrier than low-fWHR men (Deska et al., 2018a). Recognizing the specific components of targets' affective displays would be advantageous in future research to determine which emotional inferences could serve as the basis of affordance judgments. Additional studies could explore whether explicit affective displays of social targets could facilitate or impede effects.

Additional concomitant affordance judgments could have been influential in perceptions of high-fWHR targets. Alongside the formidability inferred through their faces, high-fWHR appears highly exploitative (Matsumoto & Hwang, 2021). These affordances could inspire research to determine which aspects of fWHR are most diagnostic of inferred emotional restrictiveness. Studies could utilize social targets that vary in degrees of facial trustworthiness to identify convergence with the effects observed as a function of formidability (Slepian et al., 2012).

Despite static facial features connoting myriad social information quickly and efficiently about others' behavioral repertoire that becomes the basis of subsequent engagement (Sacco & Brown, 2018; Montepare & Zebrowitz, 2006), our focus on these features represents a singular component of relevant affordance judgments. It could be possible that behavioral displays of dominance from formidable men could be more or similarly diagnostic of distress. For example, researchers could focus on gait, given the additional social information it provides perceivers. Men's physical strength is accurately inferred through their gait, with physically strong men being perceived as more dominant than weak men (Fink et al., 2016). Conversely, men who report having been previously victimized display cues to vulnerability in their gaits (Wheeler et al., 2009). Future research would benefit from presenting movement information among physically strong men displaying vulnerable behavior.

Translational Implications

Understanding if mental health professionals display a bias in their suicide risk assessments for male patients with high-fWHR is especially important for suicide prevention efforts. Specifically, aggression and fearlessness about death have been identified as crucial factors that may help explain why some people transition from suicidal ideation to a suicide attempt (Dhingra et al., 2015; Nock et al., 2015), with the latter being a central construct in many modern theories of suicide (Klonsky & May, 2015; O'Connor, 2011; Van Orden et al., 2010). Therefore, high-fWHR men may indeed be more at risk due to higher rates of aggression and fearlessness (Geniole et al., 2014; Haselhuhn et al., 2015) and could have additional risk if clinicians display bias in assessing these individuals as lower risk/less likely to need a full suicide risk assessment. Future work would benefit from specifically

tasking mental health professionals to assess targets with differing fWHR for comparisons with lay populations.

As researchers seek to understand various routes to mitigate the influence of these ancestral stereotypes, several potential interventions seem viable. One possible method could be to disrupt configural processing necessary for affordance judgments of fWHR. That is, previous findings indicate that disrupting typical perceptual processes toward the face (frequently through inversion) impede perceivers' capability of ascribing mind-based stereotypes toward social targets (Hugenberg et al., 2016). Although impractical to present inverted images of patients to clinicians in actual mental health settings, future research could nonetheless identify ecologically valid measures that would disrupt the configural processing implicated in formidability inferences. Alternatively, researchers could make professionals aware of these biases to reduce associations between fWHR and various negative stereotypes that have previously been advantageous in mitigating bias against facial structures typically deemed untrustworthy (Chua & Freeman, *in press*).

Conclusion

Human evolution has afforded individuals the opportunity to identify environmental threats through physical features diagnostic of another's prowess. Nonetheless, such inferences frequently invite downstream consequences in modern contexts that could create disparities in health treatment for individuals as a function of their appearance. The current study contributes to a growing body of research demonstrating how functional formidability inferences through fWHR undermine an understanding of mental distress.

Author Contribution MB and BWB conceived the study and programmed it. MB conducted primary analyses. DFS and DWC consulted on study design. MB wrote primary draft of the paper, with all coauthors providing commentary.

Data Availability https://osf.io/bc4w2/?view_only=52db65ddbae14017927b6cbfa9cf5ca3

Declarations

Ethics Approval This study obtained IRB approval.

Consent to Participate Participants provided informed consent.

Conflict of Interest The authors declare no competing interests.

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