The Face of Humanity: Configural Face Processing Influences Ascriptions of Humanness

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The face of humanity:

Configural face processing influences ascriptions of humanness

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Abstract

Across three studies, we test the hypothesis that the perceived ‘humanness’ of a human face can have its roots, in part, in low level feature-integration processes typical of normal face perception – configural face processing. In short, we provide novel evidence that perceptions of humanness/dehumanization can have perceptual roots. Relying on the well-established face inversion paradigm, across three experiments we demonstrate that disruptions of configural face processing also disrupt the ability of human faces to activate concepts related to humanness (Experiment 1), disrupt categorization of human faces as human (but not animal faces as animals, Experiment 2), and reduce the levels of human-like traits and characteristics ascribed to faces (Experiment 3). Taken together, the current findings provide a novel demonstration that dehumanized responses can arise from bottom-up perceptual cues, which suggests novel causes and consequences of dehumanizing responses.

Keywords: face perception, configural processing, dehumanization, mind perception

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Ascribing personhood to, or withholding personhood from, another human is perhaps *the* most essential act of social cognition (Dennett, 1996). The consequences of ascribing or withholding humanity are extraordinary. Ascribing humanity brings others into the moral community (Opotow, 1990), forestalling harmful treatment and facilitating fairness and empathy (Čehajić, Brown & Gonzalez, 2009), whereas withholding humanity leads to the converse. Dehumanization can trigger discrimination (Pereira, Vala, & Leyens, 2009) and aggression (Viki, Osgood, & Phillips, 2013). Moreover, when humanity is withheld, persons are not ascribed the full human range of emotions (Leyens et al., 2003). Perhaps not surprisingly, the tendency to withhold humanity from others occurs can facilitate intergroup conflict and harmful treatment (Haslam, 2006).

Despite major developments in theory on dehumanization and related phenomena (infrahumanization, objectification, mind perception; see Bain, Vaes, & Leyens, 2014), most recent work focuses on ascribing personhood as a motivated, top-down process, with beliefs and motives about the self and others influencing ascriptions of humanness. In the current work, we link the ascription of humanity to bottom-up *perceptual* processes – we demonstrate that ascribing humanity to others can also have its roots in the perceptual processes employed in normal face encoding. We hypothesize that *configural face processing*, a feature-integration process typically reserved for the faces of ingroup members (Hugenberg & Corneille, 2009; Michel, Rossion, Han, Chung, & Caldara, 2006; see also Ratner & Amodio, 2013), may serve as a trigger for ascriptions of humanity: when a face is processed configurally it is experienced as more human.

Dimensions of Humanness: Ascribing and Withholding Humanity

Whereas the consequences of dehumanization are troubling, the cognitive processes underlying ascribing and withholding personhood have only recently received scrutiny. A review of the theories of ascribing humanlike faculties is beyond the scope of the current work (see Haslam, 2006, 2014). However, there is some consistency in how multiple research traditions – including the infrahumanization (Leyens et al., 2000, 2007), dehumanization (Haslam, 2006), and mind perception (Waytz, Gray, Epley, & Wegner, 2010) literatures – explain ascriptions of humanity. These perspectives focus on how humans are seen as possessing *sophisticated capacities* that are distinct from other animals (e.g., dogs), while having an *emotional responsiveness and experiential capacity* that makes humans distinct from inanimate objects, such as automata or machines.

This distinction between 'unthinking' animals and 'unfeeling' machines is reflected in how people are dehumanized. Humans who are seen as being emotionally responsive and socially engaged, but lacking rationality, morality and civility are seen as animal-like (animalistic dehumanization), whereas humans who are seen as being rational and civil, but lacking in emotional responsiveness and interpersonal warmth are seen as machine-like (mechanistic dehumanization; Loughnan & Haslam, 2007). Importantly, these ascriptions of dimensions of humanity are sensitive to top-down factors, such as perceivers' motivational states, such as a desire for social connection (Epley et al., 2007), or a motivation to derogate others or distance from others (Haslam, 2014).

In the current research, we propose that signals of others' humanness can also arise from the bottom-up perceptual process of configural face encoding. The possibility of perceptual or bottom-up effects in the perception of personhood are absent from most models of dehumanization, and receives little discussion in well-established models of mind perception (see Epley et al., 2007). In the current work, we predict that perceptual processes employed in face perception can generate just such signals of humanity, illustrating that not just that bottom-up effects can occur, but also a specific process by which they emerge: configural face processing.

Configural Processing of Faces

Faces are special. Humans process faces in a manner dissimilar from virtually all other stimuli by integrating the individual features of the face into a unified Gestalt, a process known as configural face encoding (Maurer, Le Grand, & Mondloch, 2002)[1]. Objects and non-human faces are not processed configurally in most situations (Tanaka & Gauthier, 1997). This integration of facial (but not object) features into a single Gestalt can help explain why humans have such facility with recognizing human faces, in spite of the fact that faces share an eyes-over-nose-over-mouth configuration and differ only slightly in feature location and shape (Tanaka & Gordon, 2011).

Various techniques have been used to investigate configural face processing, but the gold standard in the scientific literature is the *face inversion* technique (see Figure 1). In Yin's (1969) groundbreaking demonstration, face inversion undermined memory for faces, but not for non-face objects such as aircraft and houses. Inverting a face maintains the features in the face (the eyes, nose, and mouth still exist), but disrupts the eyes-over-nose-over-mouth configuration of the features, making it well suited to isolate the effects of configural processing (see Rossion & Gauthier, 2002; Valentine, 1988).

In this work, we relied extensively on face inversion to manipulate configural processing. This paradigm affords multiple advantages, not the least of which is that it is the best-validated means of manipulating configural face processing. It also affords the advantage of disrupting configural processing without actually disrupting the features of the face itself (c.f., scrambled features or composite face techniques; see Zhao et al.,

[1] Following Maurer et al. (2002) we define holistic processing as a subset of configural processing.

2014, Richler, Cheung, & Gauthier, 2011 for examples). Although such techniques do manipulate configurality, scrambling features and splitting a face also disrupt its humanness. Humans do not exist with eyes where a chin should be, and humans with a bifurcated skull are lacking key components of humanness (e.g., their life). However, an inverted human is still, logically speaking, fully human.

Configural Face Processing as a Cue for Humanity

Although the act of ascribing or withholding humanlike capacities is multiply determined, we propose the novel hypothesis that these ascriptions can have perceptual roots. Because no stimulus is more uniquely human than the human face, and because the face is a focal point in social cognition (Macrae & Quadflieg, 2010), we argue that face processing is inextricably bound with humanness. Specifically, because human faces are processed configurally, in a manner distinct from other objects, we argue that configural processing is strongly associated with humanity, and may therefore serve as a *cue for humanity*. Though to our knowledge there are no direct tests of this hypothesis, there is converging indirect evidence that configural face processing may cue humanity, and conversely that a lack of configural face processing may trigger dehumanization.

Dehumanized faces are not processed configurally. There is indirect evidence from multiple sources that faces of dehumanized groups or individuals may not be processed configurally. First, whereas configural processing typically does occur for human faces, not all human faces are processed configurally to the same extent. Instead, different types of faces are afforded differential levels of configural processing. One consistent finding is that racial outgroups are afforded less configural face processing than are racial ingroups (e.g., Michel et al., 2006). Similarly, facially stigmatized individuals may also elicit less configural face processing. Facial stigmas attract visual attention to the specific stigmatizing feature (feature-based processing; Madera & Hebl, 2012), which can undermine perceivers' ability to process the face

(Ackerman et al., 2009). Thus, our hypotheses begin with the observation that configural processing is attenuated for racial outgroups and for members of stigmatized groups – the very groups who are likely to be dehumanized in naturalistic contexts (e.g., Goff et al., 2008).

Second, research also supports the link between dehumanization and processing people as objects. For example, Harris and Fiske (2006) demonstrated that the faces of stigmatized groups elicit lowered levels of activation of the medial prefrontal cortex, a brain region that mediates social judgments (but not object judgments; Harris et al., 2007). Recently, Bernard and colleagues (2012) extended the link between person-versus-object processing and dehumanization to the objectification of women. Using an inversion paradigm, they demonstrated that sexualized women were processed more like objects and less like humans, as compared to sexualized men. Though this work uses bodies rather than faces, Bernard and colleagues' evidence is consistent with the notion that objectified women are not processed like people typically are.

Configural processing triggers ascriptions of humanity. There is also indirect evidence across disciplines that configural face processing may trigger ascriptions of humanity. Making non-human stimuli appear face-like spontaneously elicits ascriptions of humanlike traits to those stimuli (Epley et al., 2007). This tendency for face-like stimuli to be anthropomorphized has been demonstrated in scientific literatures ranging from robotics to consumer preferences. Extensive literature in human-robot interactions, which indicates that robots with face-like characteristics are typically ascribed more humanlike traits than are robots without them (see Duffy, 2003). Further, manipulations that disrupt configural processing of robot faces also interferes with the anthropomorphism of robots. Osawa and collegaues (2010) found that robots with an face-like configuration were visually scanned like faces typically are (with a joint focus on eyes and mouth), whereas inverted face orientation directed participants' gaze toward the mouth of the robot (i.e., feature-based processing). This is an important observation given that eyes appear important in triggering configural processing (Young, Slepian, Wilson, & Hugenberg, 2014) and attention to the eyes predicts superior face encoding (Kawakami et al., 2014).

In consumer research, generating face-like product stimuli also appears to elicit spontaneous anthropomorphic responses. For example, the front end of automobiles, which commonly resemble faces – headlights mapped to eyes; grills mapped to mouths – elicit responses similar to faces. Headlight-to-grill relationships resembling mature faces elicit anthropomorphized trait inferences of power relative to headlight-to-grill relationships resembling immature faces (Windhager et al., 2012). In short, when non-human stimuli are presented with face-like configurations, they elicit spontaneous anthropomorphizing responses.

Current Research.

In the current research, we directly investigate how configural face processing can trigger ascriptions of humanity. When faces are processed configurally, we propose that this can trigger the activation of human-related concepts, facilitate the categorization of targets as human, and even lead perceivers to believe an individual has more humanlike characteristics. Conversely, when that typical method of processing faces is disrupted, we hypothesize that this may fail to trigger the experience of 'humanness,' leading to (relative) dehumanization of others.

Notably, this configural-to-humanity hypothesis differs from other face-trait or face-category links in the literature. There are multiple demonstrations that specific facial characteristics (e.g., intra face-ratios) trigger ascriptions of specific personality traits. For example, the literature on babyfacedness demonstrates that immature facial structures (round face, large eyes) can trigger the ascription of babyish personality characteristics (see Zebrowitz, 1997) and emotions (Sacco & Hugenberg, 2009). As another example, Todorov and colleagues have demonstrated that faces differ on structural dimensions that spontaneously trigger inferences about trustworthiness and dominance (Oosterhov & Todorov, 2008). Although such models demonstrate that specific facial characteristics can trigger ascriptions of specific traits, the current work is distinct from this past work in hypothesizing that basic mechanisms of face perception – configural processing – can activate concepts related to humanness, leading to general ascriptions of humanity.

Experiment 1

Experiment 1 was designed as an initial test of the hypothesis that disrupting configural face processing can disrupt the activation of concepts related to humanity. In this experiment, participants underwent a modified Lexical Decision Task (LDT). In each trial, participants first saw a face presented either upright or inverted for 100ms, followed immediately by a letter string that was either a word or a pronounceable non-word. Critically, we manipulated within-subjects whether the words in the LDT were related to humans or machines. Drawing on our hypothesis that configural face processing triggers humanness, we predicted that upright faces, but not inverted faces, would facilitate recognition of human-related words, but not machine-related word or non-words.

Method

Participants and Design. Fifty-one White undergraduates completed a study with a 3(word type: human, machine, non-word) $\times$ 2(face prime orientation: upright, inverted) within-subjects design.

Stimuli. Five images of the faces of White, college-aged males displaying neutral expressions and direct gaze were rendered into grayscale and were presented either upright or inverted (upside-down).[2]

Twelve words served as targets for the LDT. Six words related to humanity (human, person, individual, soul, personality, people) and six words related to machines (machine, computer, robot, device, engine, locomotive) were used. These were matched across condition for average length (7 letters per word), and pretested on a 7-point scale of relatedness to the concept 'human' (1="Not at all"; 7="Very much"). Pretesting (*N*=10) indicated that the human-related words were more human-related (*M*=6.07, *SD*=.80) than were the machine-related words (*M*=1.82, *SD*=.63), $t(9)=15.97$, $p<.001$. We also employed 12 pronounceable non-words, matched for average length with the words (afes, bemeraastanem, esorme, frar, gregen, herigis, prisruos, rediop, sedesan, somcosspa, splarsul, tementre).

Procedure. After rendering informed consent, participants completed a modified LDT via computer. This task consisted of 192 trials. Each trial began with a fixation cross (1000ms), which was occluded by a 100ms face prime, after which a letter string was presented. Letter strings remained onscreen until participants responded. Participants' indicated whether the letter string presented was a word or non-word via keystroke, as quickly and accurately as possible. Face prime orientation was manipulated within-subjects, creating 96 upright face and 96 inverted face trials. Word

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[2] Given the White participant population, it was important to use same-race (White) faces across all studies because of robust race effects in configural face processing (Michel et al., 2006) and general deficits in cross-race face perception (Hugenberg & Wilson, 2013).

type was also manipulated within-subjects, creating 96 word and 96 non-word trials. In the 96 word trials, half of the words presented were related to humans and half were related to machines.

Results and Discussion

Of interest was whether face inversion affected the activation of human-related concepts, but not machine-related concepts. To test this, we first eliminated response latencies for incorrect responses, latencies faster than 300ms, and latencies slower than 1500ms (eliminating a total of 10.2% of trials), based on *a priori* criteria (see Boucher & Rydell, 2012 for similar criteria). We then averaged response latencies into the six different trial types of the 2x3 design, separately for each participant.

Given that face inversion disrupts spontaneous configural processing, of interest was whether inverted faces elicit slower responses to human-related words (but not machine or non-words), relative to upright faces. To investigate this, the response latency data were submitted to a 3(word type)×2(face prime orientation) repeated-measures ANOVA. As seen in Figure 2, this ANOVA revealed the predicted 2-way interaction, $F(2,100)=3.48$, $p=.035$, $\eta_p^2=.065$.

Decomposing this interaction separately for word type indicates that, as predicted, human-related words, were classified more quickly after upright face primes ($M=586.08$, $SD=64.62$) than after inverted face primes ($M=602.12$, $SD=70.23$), $F(1,50)=12.39$, $p=.001$, $\eta_p^2=.199$. However, there was no effect of face prime orientation on machine words, $F(1,50)=.11$, $p=.738$, $\eta_p^2=.002$, or on non-words, $F(1,50)=.13$, $p=.717$, $\eta_p^2=.003$. Alternately, decomposing the interaction separately for upright and inverted face primes indicates that human-related words were facilitated relative to machine words in the upright, $F(1,50)=14.11$, $p<.001$, $\eta_p^2=.22$, but not the inverted condition, $F(1,50)=.85$, $p=.36$, $\eta_p^2=.017$. As is common in LDTs, responses to human-related and machine words (i.e., actual words) were faster than responses to non-words in both conditions, *p*s<.001.

In Experiment 1, we found that face inversion (Yin, 1969) – the gold standard manipulation of configural face processing – influences the activation of human-related words. Even brief exposures to upright faces (faces that are spontaneously processed in a configural manner) activated human-related words moreso than did inverted faces. Further, given the failure of face orientation to influence response latencies to either machine words or non-words, this is not easily explained by upright faces being processed more easily, which would predict facilitated responses for all trials preceded by upright faces. Similarly, the specificity of the findings to the human-related words is also difficult to explain by arguments that inverted faces arrest attention thereby inhibiting subsequent responding. Further, the response latencies for the human-related and the machine words only differ in the upright condition, indicating that upright faces likely activate humanness, rather than inverted faces inhibiting humanness. Finally, the fact that inverted faces elicit equivalent response latencies for both human-related and machine words is telling. This indicates that inverted faces, at least in terms of early concept activation, may fail to differentially activate human- and object-related concepts.

Experiment 2

Experiment 1 supports the notion that processing human faces configurally activated human-related concepts, relative to faces that cannot be processed configurally. However, one reasonable counterargument to the findings of Experiment 1 is that perhaps inverting human faces makes them appear less human, but that this may be true for a variety of related stimuli.

Experiment 2 was designed to conceptually replicate and extend the findings Experiment 1, while also ruling out this alternative explanation. In Experiment 2, we sought to extend this configural-to-humanity link to categorization, using a speeded face categorization task. If the activation of human-related concepts is stronger for upright relative to inverted human faces, then upright human faces should be more easily categorized as human than their inverted counterparts. However, we also predict that this inversion effect should have unique effects on stimuli that are processed configurally – human faces – and not on stimuli that are not typically processed in a strongly configural manner (e.g., animal faces).

To test this hypothesis, participants completed a speeded categorization task wherein they categorized human and chimpanzee faces, presented both upright and inverted, as either ‘human’ or ‘animal’ as quickly and accurately as possible. We hypothesized that inverting human faces would slow the categorization of human faces as ‘human’ because it disrupts the signal of humanness generated by configural processing. The signal of ‘animal-ness’ however, was not predicted to be generated by configural face processing, presumably the signal of chimp-ness is easily extracted from cues other than configurality. Supporting this, Dahl, Rasch, and Chen (2014) found that only own-species upright faces are afforded strong levels of configural processing, whereas inverted faces of all types (own- and other-species faces) are processed piecemeal. Thus, inverting non-human animals (including chimpanzee faces) should not interfere with the ability to categorize them as animals.

We predicted an interaction of species and orientation in categorization latencies. Whereas face inversion was predicted to disrupt the categorization of human faces as humans, face inversion was not predicted to disrupt the categorization of chimpanzee faces as animals.

Participants. Twenty-one White undergraduates completed a study with a 2(face species: human, chimpanzee) × 2(face orientation: upright, inverted) within-subjects design.

Procedure. After rendering informed consent, participants competed a speeded human-versus-animal categorization task for human and chimpanzee faces via computer. Face species and orientation were manipulated orthogonally across trials; participants were presented with an equal number of upright and inverted human and chimpanzee faces. The "animal" faces were grayscale images of 20 neutral expression chimpanzee faces. The human faces were grayscale images of 20 neutral expression White males. All stimuli faced the camera, provided direct eye gaze, and were sized to approximately 200x300 pixels.

Participants first completed 8 practice trials, and then completed 80 experimental trials (20 upright and 20 inverted for each face species); faces were presented in a random order. Trials began with a fixation cross (1000ms), followed by either a human or chimpanzee face, which remained onscreen until participants categorized the face via keystroke. Reaction times (RTs) were the primary dependent measure.

Results and Discussion

Of interest was whether inversion disrupted categorization of human, but not animal faces. To test this, we first calculated mean categorization latencies separately or each of the four experimental conditions. Errors and RTs greater 3 SDs from participants' mean were removed prior to analyses (< 1% of all trials).

Mean response latencies were submitted to a 2(face species: human, animal) x 2(face orientation: upright, inverted) repeated-measures ANOVA. This ANOVA revealed main effects of face species, $F(1,20)=8.17$, $p=.01$, $\eta_p^2=.29$ and face orientation, $F(1,20)=6.72$, $p=.017$, $\eta_p^2=.25$. As predicted, these main effects were qualified by a Species × Orientation interaction, $F(1,20)=6.21$, $p=.023$, $\eta_p^2=.24$.

As seen in Figure 3, inversion slowed categorization of human faces as human (M=449, SD=181) relative to upright human faces (M=383, SD=139), $t(19)=2.83$, $p=.01$, $d=.69$. However, for chimpanzee faces, orientation had no impact on categorization times, $t(20)=1.04$, $p>.3$, $d=.09$. Comparing across face species, upright human and chimp faces were categorized with similar ease, $t(20)=.34$, $p=.74$, $d=.05$, whereas inversion slowed the categorization of human faces relative to chimp faces, $t(20)=3.42$, $p=.003$, $d=.45$. Put simply, human faces seem uniquely sensitive to orientation in this species categorization task, with the categorization of human faces being impaired by inversion. However, for the chimp faces, categorization as an animal was not influenced by face orientation. Given the central role of face orientation in the configural processing of human faces (Valentine, 1988; Yin, 1969), these data provide consistent evidence that the configural processing of human faces influences decisions about others' humanity.

The design of Experiment 2 builds on the findings of Experiment 1 in important ways. The current results indicate that the concept activation that was generated by configural face processing in Experiment 1 can have consequences for categorization. Although the specific relationship between categorization and concept activation was not tested, conceptual models of person construal rely on the interplay between activated concepts in constraining categorization (Freeman & Ambady, 2011). Second, whereas Experiment 1 employed a human-versus-machine comparison, Experiment 2 employed a human-versus-animal comparison. Our model is agnostic as to whether configurality triggers "uniquely human" or "human nature" characteristics (see Haslam, 2006, 2014). However, given that well-established models rely on this distinction, it is noteworthy that the current work has demonstrated that configurality appears to trigger humanness relative to both machines and animals.

Importantly given that these data demonstrate unique effects for human faces, but not for animal faces, they are not easily explained away by arguing that by changing the typical orientation of stimuli in general, this reduces accessibility of the category. Were this explanation to be true, one would predict that both human and chimpanzee faces would demonstrate sensitivity to the inversion effect. Given the interaction demonstrating effects uniquely for the human face, this is clearly not the case here. This argument is further bolstered by the finding that upright human and chimpanzee faces elicit equivalent latencies in categorization; upright chimp faces aren't more difficult to categorize than human faces, indicating that at baseline, this is an equivalently difficult task for the most familiar orientation (i.e., upright) of the faces. Instead, the findings of Experiment 2 clearly implicate configural processing in a human face specific effect, whereby disrupting configural processing of human faces reduces the spontaneous activation of human-like concepts.

Experiment 3

Experiments 1 and 2 yield direct evidence that face orientation – the gold standard manipulation of configural face processing – influences both concept activation and categorization of humanness. Experiment 3 was designed to extend these effects to a consequence of this spontaneous activation: the deliberate ascription of humanlike characteristics. In Experiment 3, participants rated upright and inverted human faces on a number of traits indicative of humanness, taken from the mind perception and dehumanization literatures. We hypothesized that inverted faces would be rated as lower on these dimensions indicative of humanness, relative to upright faces.

Method

Participants and Design. Twenty-nine White undergraduates (17 women) participated for partial course credit. The face orientation (upright versus inverted) was manipulated within-subjects. The dependent measure was average ratings on five traits indicative of humanness.

Procedure. Participants were instructed that people often show accuracy in personalities ratings of others' at zero acquaintance. All participants then viewed 40 White male faces (20 upright; 20 inverted; see Experiment 2 for stimulus properties) via computer. Orientation was counter-balanced across face identity such that each face was equally likely to be seen upright or inverted.

Participants indicated how thoughtful, empathetic, considerate, creative, and humanlike each face appeared on a scale from 1="Not at all" to 7="Very much". These five traits were selected from a larger pool of traits that we extracted from relevant literature on dehumanization (Haslam, 2006) and mind perception (Gray, Gray, & Wegner, 2007), and have been used in other research investigating ascriptions of humanity (See & Hugenberg, 2015). Each face was displayed at the center of the screen for 500ms, which was then occluded by a gray box for 250ms, after which a trait appeared onscreen, along with the rating scale. Participants rendered ratings via keystroke.

Results and Discussion

Of interest was whether face inversion influenced trait ratings indicative of humanness. To test this, ratings were averaged into separate upright and inverted means (Cronbach's αs>.71), separately for each participant. Consistent with predictions, a paired-samples *t*-test indicated that participants ascribed significantly lower levels of humanlike traits to the inverted faces (M=3.79, SD=.62) than to the upright faces (M=4.05, SD=.58), $t(28)$=3.83, p<.001, d=.43.

This experiment provides evidence that even explicit ratings of the humanness of faces were influenced by configural face processing. Notably, the high reliability indicated that our dimensions of humanness hung together well; however, an analysis of even our most face valid dimension of humanity – humanlike – yielded identical results: upright faces (M=5.34, SD=1.25) were rated as more 'humanlike' than were inverted faces (M=5.05, SD=1.31), $t(28)$=2.30, p=.029, d=.23. Further, the fact that face inversion influenced explicit ratings may seem somewhat surprising given that an inverted face is still logically human. And yet, the data clearly indicate that even trait ratings, which can be susceptible to naïve theories and attempts at correction (Wegener & Petty, 1997), were influenced by face inversion.

General Discussion

The current research tested the hypothesis that that configural face processing is causally linked to perceptions of humanness. Across three studies, we provide novel evidence that the activation of human-related concepts, the categorization of faces as human, and the ascription of humanity are sensitive to face inversion, which reliably disrupts the spontaneous configural processing typical of upright faces.

Whereas past research has focused on either the effects of ascribing humanness (e.g., moral judgments) or on top-down, motivated processes in deciding individuals and groups are fully human (e.g., self-protective processes when dehumanizing outgroups), the goal of the current work was to demonstrate that the ascriptions of humanness can have their roots in purely *perceptual* processes. Thus, not only does the current research provide a novel empirical demonstration, but the current work also provides a novel theoretical contribution as well. Indeed, the premise that perceived humanness can be the product of bottom-up perceptual processes has received relatively short shrift in the expanding literatures on ascriptions of humanness and mind perception.

This work has important connections to multiple literatures as well, including work on autism, facial stigma, and face perception. First, autism is associated both with impairments in theory of mind (Baron-Cohen, 1995) and with abnormal face processing, including failures to configurally process faces (Behrmann et al., 2006). The social cognitive impairments linked to autism share features of (mechanistic) dehumanization (Haslam, 2006), suggesting that theory of mind deficits central to autism may be related to face processing. From our perspective, it may not be happenstance that those with chronic inabilities to process the complex mental states of others also have chronic inabilities to processes faces in a manner distinct from objects.

The current research can also inform literature on facial stigma. Goffman's (1963) seminal work on stigma included so-called 'abominations of the body' as primary type of stigma, which can cause others to be 'discredited' and treated as less-than-human. Although many physical conditions can cause atypical physiques, even in Goffman's original work placed a special focus is placed on facial stigma (facial scarring, harelips). Given that facial stigma often violate the typical configuration of features, one possibility is that the stigmatizing nature of facial scarring may actually generate from a violation of otherwise 'normal' face perception processes (see Young, Sacco, & Hugenberg, 2011, for a related argument). Thus, the stigmatizing nature of facial scarring may be an emergent property of both bottom-up processes (configural violations) and of top-down processes (stereotypes).

Finally, given that the current research has employed the most commonly used manipulation of configural processing in the face perception literature, and has found consistent effects on inferences about humanness of targets, this does broach the provocative question about whether some configural face effects observed in the literature might not be mediated by perceptions of humanness. For example, past research has demonstrated that ingroups are configurally processed more than outgroups (Hugenberg & Corneille, 2009; Michel et al., 2006). Given the findings that devalued social groups are not processed as fully human (Harris & Fiske, 2006), this raises the provocative possibility that this ingroup-outgroup difference may be due, in part, to differential perception of the groups as human.

Conclusion

The current work provides clear, novel evidence that configural face processing – a feature-integration process that distinguishes face from object perception – influences the activation, the categorization, and the ascription of humanness. Configural face processing is a perceptual gateway for perceptions of humanness and dehumanization: perceiving faces as human depends on configural processing.

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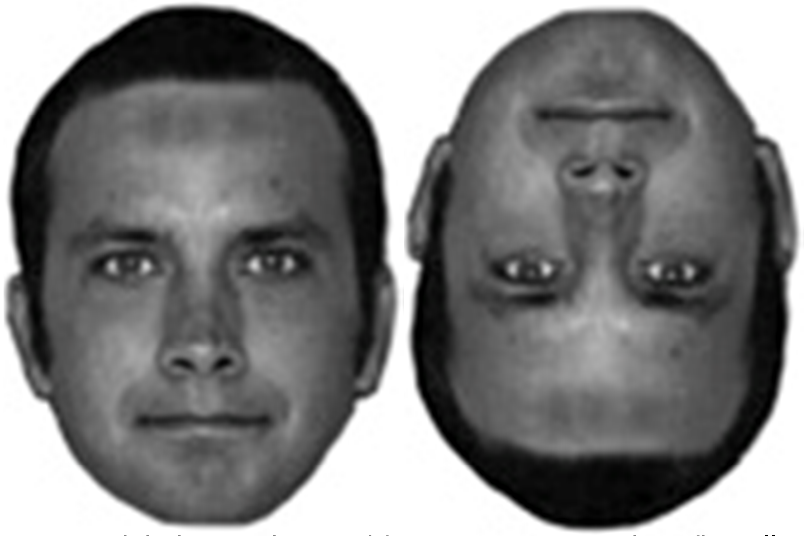

Figure 1: Upright but not inverted faces are processed configurally

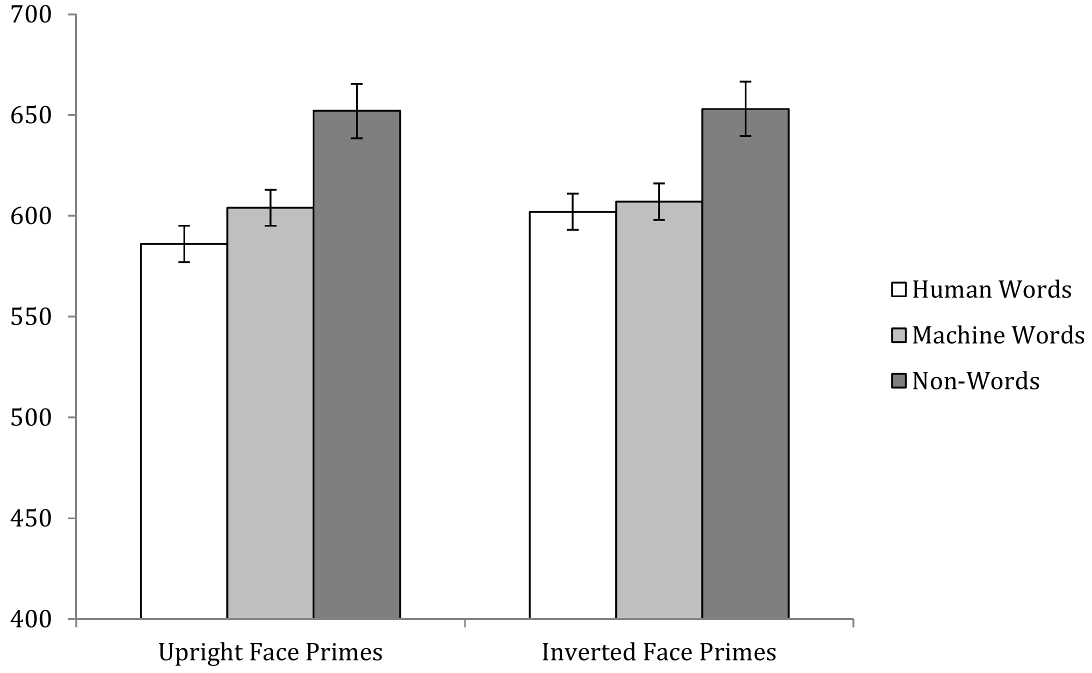

Figure 2: Lexical Decision Task response latency data from Experiment 1; Upright faces facilitate the activation of human-related concepts, but not machine-related concepts. Error bars represent Standard Error of the Mean.

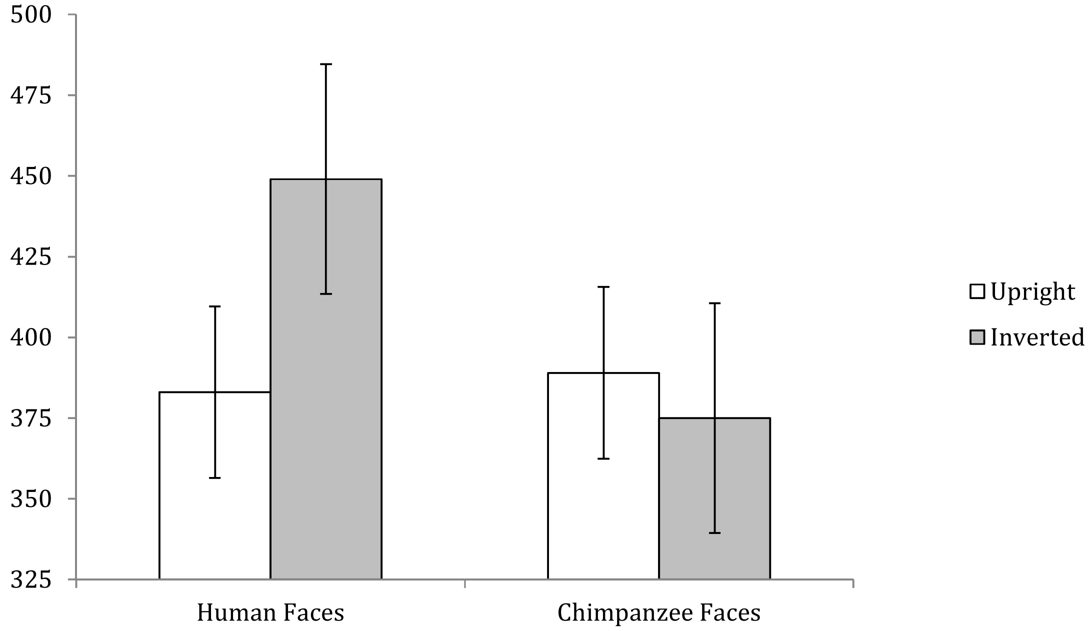

Figure 3: Categorization latency data from Experiment 2; Face inversion inhibits the categorization of human faces but not chimpanzee faces. Error bars represent Standard Error of the Mean.