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Perception Isn't So Simple

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Bernard, Gervais, Allen, Campomizzi, & Klein (2012) report an inversion effect only when participants viewed “sexualized” male body images as compared to “sexualized” female body images. Based on a belief that face and person recognition is subject to an inversion effect (Rossion, 2008; Yin, 1969), but that object recognition is not, the authors conclude that “at a basic cognitive level, sexualized men were perceived as persons, whereas sexualized women were perceived as objects”. The inference is that different visual recognition processes are applied to images of males and females. This conclusion is unwarranted on empirical, methodological, and logical grounds.

Empirically, the claim that object recognition is not affected by inversion is incorrect. There is an extensive literature demonstrating effects of planar rotation – and inversion – on both novel and familiar non-face/non-body stimuli (Jolicoeur & Milliken, 1989; Lawson & Humphreys, 1996; Tarr & Pinker, 1989). That inversion effects can and do occur for everyday objects is not in debate; what continues to be more complex are the conditions under which inversion effects occur or not (Tarr & Pinker, 1990). A wide range of factors have been implicated as exerting some influence on orientation effects (Biederman & Bar, 1999; Hayward & Tarr, 1997, 2000; Tarr, Bülthoff, Zabinski, & Blanz, 1997) and it is incumbent on Bernard et al. to establish whether any of these perceptual or task factors – that is, non-social components – might underlie the differential effects obtained for male and female images. Without knowing whether the male and female stimuli differed along perceptual dimensions one can not ascertain whether the sex of the stimulus images was the underlying cause of the obtained effects. For example, based on the presented stimulus images, the males may have shared similar hairstyles, while the females may have more varied hairstyles; similarly, the male body poses may have been more symmetrical relative to the female poses. More generally, the complexity of the silhouettes, the number of perceptual features, the distinctiveness of specific features, the number of viewpoint-invariant properties, and image symmetry may have all influenced visual recognition performance across inversion.

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Methodologically, as a dependent measure, Bernard et al. (2012) only report percent correct per condition. Without reaction times, it is impossible to determine whether participants were simply spending more time with inverted female images – possibly because of social factors – to achieve their higher levels of performance relative to inverted male images. Looking for such a speed-accuracy tradeoff is critical in that its existence would implicate a difference in response biases (for whatever reasons), not a difference in perceptual processing *per se* (Gauthier, Behrmann, & Tarr, 1999).

A second methodological issue concerns a failure to include non-sexualized, but otherwise equated, stimuli as controls (an issue the authors acknowledge). This control is essential for assessing whether their effects are attributable to the sexual nature of the images. If non-sexualized images produced a pattern similar to those for sexualized images, this finding would severely undermine the validity of the "sexualized-body-inversion hypothesis". This control's absence means there is no adequate way of interpreting the present results relative to plausible alternatives.

Logically, there is a question as to why inversion effects were not obtained for inverted female images given that the distractor images were left-right mirror images of the targets. Based on the extensive "mental rotation" literature in which discriminating between mirror images of otherwise identical stimuli consistently produces robust costs for stimulus rotation (Shepard & Cooper, 1982), one would expect reliable inversion effects regardless of the stimuli. The preferred explanation of Bernard et al. (2012) – that the female images have been "objectified" – sidesteps the fact that visual content does not significantly affect task performance when observers are asked to make a mirror-image discrimination (Folk & Luce, 1987). Indeed, the "analytic processing" that Bernard et al. (2012) associate with object recognition would be *incapable* of supporting mirror-image discriminations that necessarily rely on the spatial relations between parts. Thus, the authors should consider what perceptual processes might have enabled good task performance.

Another logical issue, and one that also offers an explanation for their failure to find an inversion effect for female images, revolves around the role of attention. A wide variety of societal factors may lead participants to attend more to the female images than to the male images. Assuming that performance for upright images is near ceiling for the particular experimental conditions used in this study, greater attention to female images would drive performance for inverted female images closer to ceiling – the exact pattern of results that is reported. Similar to the above concerns, the critical issue is that this account implicates a difference in encoding biases, but not a difference in perceptual processing.

In sum, two overarching issues cloud the interpretation of Bernard et al.'s (2012) results. First, non-social, perceptual factors may explain the failure to find inversion effects for female images. Second, to the extent that social factors do play a role, their influence may be exerted at a non-perceptual level, for example by biasing looking time or attention. Without better controlled stimuli, further data analyses, and more sophisticated experimental designs, it is premature – particularly given the claimed real-world implications of this work – to suggest that the observed differences between male and female images with respect to

inversion are attributable to “basic” visual or cognitive processes recruited in response to the “objectification” of females.

Of note, *Perspectives on Psychological Science* has recently published two articles voicing concerns about the “short report” format (Bertamini & Munafo, 2012; Ledgerwood & Sherman, 2012). In that Bernard et al.'s (2012) paper was published as a short report – which is briefer than the already-brief format popularized by journals such *Psychological Science* – one wonders if some of the concerns raised here could have been avoided in a longer article format.

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