Perceptual & Motor Skills: Perception
2013, 117, 1, 1-4. © Perceptual & Motor Skills 2013

CREATING A FRAMEWORK FOR EXPERIMENTALLY TESTING EARLY VISUAL PROCESSING: A RESPONSE TO NURMOJA, *ET AL.* (2012) ON TRAIT PERCEPTION FROM PIXELIZED FACES[1, 2]

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Summary.—Nurmoja, Eamets, Härma, and Bachmann (2012) revealed that strongly pixelated pictures of faces still provide relevant cues for reliably assessing the apparent (i.e., subjectively perceived) traits of the portrayed. The present article responds to the paper by developing the outline of a framework for future research to reveal certain steps in processing complex visual stimuli. This framework combines the approach of degradation of the stimuli with the so-called microgenetic approach of percepts based on presentation time limitations. The proposed combination of a particular kind of stimulus manipulation and a specific experimental procedure allows testing targeted assumptions concerning visual processing, not only in the domain of face perception, but in all domains involving complex visual stimuli, for example, art perception.

Nurmoja, Eamets, Härma and Bachmann (2012) reported that even highly degraded pictures of faces, as generated by so-called 'pixelation' (see Lander, Bruce, & Hill, 2001), provide the participants with enough facial cues to reliably assess the (subjectively perceived) 'traits' of the portrayed persons. Specifically, the authors showed that perceived criminality and trustworthiness, as well as (to a lesser extent) suggestibility, can be reliably retrieved from strongly pixelated images of faces (i.e., 10 horizontal pixels per face).

Does this mean that personality can be "read" from the face? First of all, it has to be stressed that many research papers in the realm of face processing do not clearly differentiate between *perceived* and *real* personality aspects; the paper of Nurmoja, *et al.* (2012) draws the important distinction that the authors were explicitly addressing the *perceived* aspects. It is wise to do so because there is a clear lack of data concerning the *validity* of inferences on personality traits from facial cues. Initial research in this domain, conducted by no less a scientist than Sir Francis Galton, failed to provide evidence for according "criminality" assessments to be valid (Galton, 1878). Later research

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[2]The author would like to thank Vera M. Hesslinger for proofreading the manuscript and the reviewers in providing very valuable suggestions for the improvement of the manuscript.

DOI 10.2466/24.22.PMS.117x12z8 ISSN 0031-5125

efforts mostly focused on reliability measures on the basis of test–retest or inter-rater reliabilities (Willis & Todorov, 2006), often neglecting the validity issue: to analyze whether the participants' assessments are also valid (see Stirrat & Perrett, 2010). Considering this lack of validity studies, it would be highly problematic to qualify *perceived* criminality or trustworthiness as predictors for real "personality-traits." Although Nurmoja, *et al.* (2012) did not claim such a direct connection between perceived and real properties, the reader should remember that any such inferences without further validation will be inadequate. Further, one should keep in mind that neither "criminality" nor "trustworthiness" are part of any of the canonical or accredited personality theories, and that they should be maximally qualified or labeled as personality-related variables or variables based on "directed visual processing" (Bruce & Young, 1986, p. 312), which is also much more in accord with current models in cognitive psychology. Despite the importance of clearly differentiating between *perceived* and *real* characteristics, and the fact that variables such as "criminality" or "trustworthiness" are not considered personality traits, both variables could be considered as situational or state variables (see Ellis, Beaver, & Wright, 2009). Therefore, any reference to trait properties should at least be discussed critically. One should even try to avoid (or always clearly qualify) phrases such as 'trait' when it comes to mere *perceived* aspects.

Systematic degradation of images by pixelation seems to be an interesting technique for further research on the higher cognitive variables mentioned by Nurmoja, *et al.* (2012). Below are outlined opportunities for further research using this approach with regard to early processing of visual stimuli, extending the current perspective from faces to any other complex stimuli. Pixelation and blurring both decrease high-spatial frequency information (Lander, *et al.*, 2001) in particular while low-spatial frequencies are comparatively unaffected. By combining such stimulus manipulations with presentation time-limitation techniques (e.g., Bachmann, 2000; Carbon, 2011), further insights into the processing of complex visual stimuli may be attained. This would help to identify different stages in the microgenetic process of perception. It would be possible to experimentally test general theories of perception (Marr, 1982) as well as, for example, specific steps of face perception assumed by functional face processing models (Bruce & Young, 1986).

Last but not least, the combination of stimulus degradation and presentation time limitation within one experimental paradigm is certainly not limited to the area of face research. For instance, experiments applying microgenetic procedures of percepts (e.g., Bachmann & Vipper, 1983; Augustin, Leder, Hutzler, & Carbon, 2008) have already demonstrated the power of the microgenetic procedure to reveal micro-steps

in processing complex visual stimuli, such as artworks. In combination with specific kinds of degradation of the stimuli, e.g., pixilation, decrease of saturation, or blurring, it may be possible to qualify the relevance of certain information at different processing stages. This would provide systematic insights into the processing of complex stimuli and indicate the relevance of different types of visual information at different (microgenetic) steps of processing toward a Gestalt (see Wagemans, Feldman, Gepshtein, Kinchi, Pomerantz, van der Helm, *et al.*, 2012).

Research in this direction would also allow drawing conclusions on the more fine-graded processing stages, and the specific quantities of information needed and used at these processing stages. Knowledge of potential inter-dependences of different types of processing could be gained, such as expression and identity analysis for faces that are claimed to be independent (Bruce & Young, 1986). For instance, by combining the presentation of systematically degraded stimuli (e.g., by pixelation) at different processing times, specific characteristics of a stimulus could be identified as relevant at different processing stages to assess specific stimulus qualities and which information is not of additional value for such a task. Additionally, interdependences of sub-processes could be investigated at different processing stages by systematically degrading specific stimulus characteristics that are relevant at different presentation times for one task, but not the other. Using reaction time (RT) paradigms could then reveal processing dependencies by changes in RTs.

Taken together, the framework can build a basis for interesting and important future research focused on processes underlying the perception of complex visual stimuli.

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Accepted July 3, 2013.