

Do Facial Characteristics Influence Acceptance of Health And Safety Messages?

Ian Parker¹, Ass. Prof Jacques Oosthuizen¹ and Dr Leesa Costello¹

Abstract

Physiognomy is the art of judging temperament and character from outward appearance. The aim of this study was to legitimize the expectations of facial physiognomy in audience interpretation and recall of safety related messages. Mixed methods were utilized to describe and analyse data for free facial and image description and the recall of facts presented in the image testimonial. Facial physiognomy was explored along four dimensions ranging from more trustworthy/less trustworthy and more dominant/less dominant dimensions and these images were introduced along with a printed message on electrical safety (n=100). Remarkable interactions between a source-credibility subscale and perceived dominance scale suggests that there is an innate frame of reference used by humans whereby decision judgments are made based on another person's facial physiognomy. Furthermore, there is an atypical innate and perhaps evolved, or socialized, response with respect to whether humans will approach or avoid another person based on their facial physiognomy and people *do* make decision judgments based on dominance, trustworthiness, approach or avoidance behaviour and recall of information differs based on somatic facial characteristics when presented with an avatar of a human face in a workplace safety advertisement. The physiognomic appearance of an endorser can influence the believability and attitude components of potential target audiences; and thus, the impact of the intended message.

Keywords: Physiognomic, workplace safety messages

Introduction

Physiognomy is described as the art of judging temperament and character from outward appearance. Thus, the study of physiognomy is the practice of looking to another person's outward facial appearance to unmask the inner character of that person.

¹ Edith Cowan University, School of Exercise and Health Sciences.

The study of physiognomy has had a diverse historical impact within art, medicine, theology, anthropology, law, criminology, political history, psychology, psychiatry, and popular culture, since it was conceptualized in Greece during the 4th and 5th centuries B.C. (Physiognomy, 1999-2009, 2009a). Aristotle, the prominent Greek philosopher, penned many chapters on physiognomic properties and touched upon strength/weakness, genius/stupidity, and other trait characteristics and their opposites in so far as such characteristics were associated with facial form (Physiognomy, 2006, 2009b).

In modern times, facial recognition and evaluation of faces has been seen as a function of human development that has significance with regard to approach/avoidance behavior (Oosterhof & Todorov, 2008). The evaluation of emotionally neutral avatar faces can be explained by judgment of two traits, facial trustworthiness and dominance. The belief is that people possess the ability to read the character of another person from facial expressions and facial appearance and they make trait judgments based on facial physiognomy (Highfield, Wiseman, & Jenkins, 2009). Facial physiognomy is also involved when people make social judgments to infer another person's ability to harm or the ability to cause harm and there is a claim that such judgments trigger approach/avoidance behavior (Oosterhof & Toderov, 2009; Oosterhof & Todorov, 2008).

This pilot study investigated the influence of facial physiognomy on the interpretation of a workplace safety message by 100 undergraduate psychology students. The aim of this study was to legitimize the expectations of facial physiognomy in audience interpretation and recall of safety related messages. Mixed methods were utilised to describe and analyze data for free facial description (Oosterhof & Todorov, 2008), free image description (Burke & Srull, 1988), and recall of facts presented in the image testimonial (Burke & Srull, 1988). This pilot study tested an adapted data collection instrument (American Association for Health Education, National Commission for Health Education Credentialing, & Society for Public Health Education, 1999) for administration in occupational cohorts. Data from both qualitative and quantitative sources were compared and interpreted as a whole juxtaposed with underlying theory.

Method

Research Question

To what extent does facial evaluation influence the effectiveness of a promotional image used to communicate a workplace safety message?

Sub Questions

1. Do changes in the dominance and trustworthiness dimensions of facial physiognomy of a message presenter influence perceptions of the validity of a workplace safety message?
2. Does facial physiognomy influence recall of information presented in a workplace safety message?

Permission to conduct the study was obtained from the Edith Cowan University (ECU), Human Research Ethics Committee and from all participants in the study. Permission was also obtained from Princeton University to utilise five images of faces, that were manipulated on a dominance and trustworthiness scale (Oosterhof & Todorov, 2008). Facial physiognomy was explored along four dimensions ranging from more trustworthy/less trustworthy and more dominant/less dominant dimensions and these images were introduced along with a printed message on electrical safety. The source-credibility scale (Ohanian, 1990) for evaluating endorser attractiveness, trustworthiness, and expertise was utilized to add a further dimension to the study. Endorser dominance was measured with the perceived dominance scale (Manusov, 2005). These measurement scales were selected as they offer validity to the dimensions related to the study, i.e., trustworthiness and dominance, along with expertise and attractiveness.

The advertising believability scale was utilized as a primary measure of advertisement validity (Beltramini, 1988). There appears to be general consensus that the focus of the advertising believability scale is not on the endorser but rather on the content of the message or social issue and thus this measurement tool assessed the validity and reliability of the printed message.

This scale has been used to establish validity as a measure of advertising believability through various social marketing campaigns including anti-smoking (Beltramini, 1988) and alcohol warning labels (Andrews, Netemeyer, & Durvasula, 1990). A secondary scale to measure advertisement validity, the 'attitude toward the testimonial' scale developed by Feich and Higie (1992) was also administered.

Subjects

A group of 100 undergraduate psychology students at ECU were recruited to participate in the study. The group consisted of 27 males and 73 females. The mean age of respondents was 25 years with a mean of 13 years of education including primary to tertiary. English was the first language of 85% of the cohort.

Procedure

Five different versions of the structured survey questionnaire were administered during normal class contact time, immediately prior to a scheduled break. All instructions to participants were given in English both verbally and in print form. Five versions of the survey questionnaires (5 groups of 20) were handed out to participants randomly according to the questionnaire sequencing based on five different facial physiognomy conditions which were manipulated by dominance and trustworthiness.

Results

Quantitative Data

Upon analysis of the facial physiognomy group data the less dominant ($M = 42.6$) and less trustworthy ($M = 42.3$) groups scored higher on the advertising believability scale than the other groups, namely; more dominant ($M = 39.3$), more trustworthy ($M = 38.9$), and neutral ($M = 39.5$). The plot in

Figure 1 shows a positive relationship to the source-credibility subscale trustworthiness.

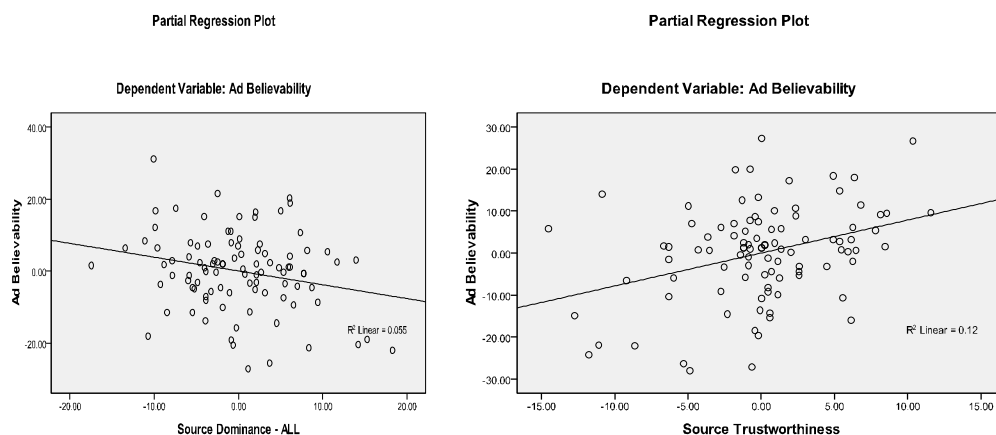


Figure 1: Partial Plots Showing the Relationships for Perceived Dominance and Trustworthiness to Advertisement Believability

The mean decision judgments for the advertisement believability scale concepts highlight some interesting differences between the facial physiognomy groups. Overall there was a swing to the positive scale concepts, such as likely, honest, reasonable, and believable and there was also a tendency to swing to certain negative scale concepts, such as; not authentic, inconclusive, and questionable. For the remaining concepts, not credible / credible, not convincing / convincing, untrustworthy / trustworthy, the means fell around the central value. The partial plot shows a negative relationship to perceived dominance with no obvious outliers. The cluster of dots is evenly spaced indicating homoscedasticity.

The results of this pilot study therefore support the hypothesis that the dominance and trustworthiness dimensions of facial physiognomy of a message presenter influence perceptions of the validity of a workplace safety advertisement. The overall Cronbach's Alpha was $\alpha = 0.88$ which is good compared with $\alpha = 0.94$ reported by Beltramini (1988). The corrected item-total correlations for the advertisement believability scale were all above 0.3 which is encouraging, indicating good internal consistency for the advertisement believability scale items, and that all the items relate to each other. Only one item increased the Cronbach's Alpha by $\alpha = 0.01$ when it is deleted for the scale concept dishonest/honest.

A comparison of the means of the facial physiognomy groups for attitude toward the testimonial scale shows that there is an interaction between the dominance and trustworthy groups which was not evident for advertisement believability. The less trustworthy group scored highest, $M = 15$, compared to the more trustworthy group, $M = 13.3$. The more dominant group score was higher than the less dominant group, $M = 14.3$ and $M = 14$ respectively.

For the attitude toward the testimonial measure, the scale of reliability was good (Cronbach's Alpha $\alpha = 0.84$). Corrected item-total correlations were above 0.3 indicating that all items correlate well with the total score from the questionnaire. No item, when deleted, increased the Cronbach's Alpha (see

Figure 1). Source-credibility scale results were split into four sections: the total source-credibility scores, and the three subscales, attractiveness, trustworthiness, and expertise,

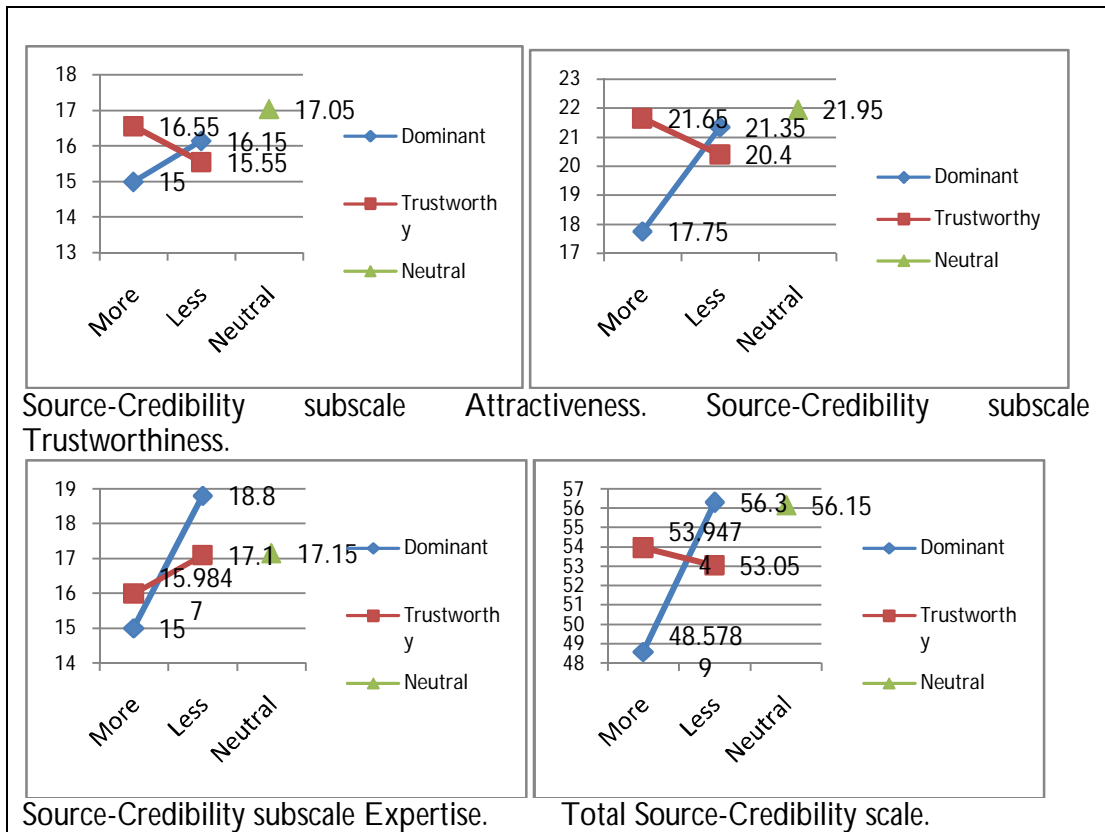


Figure 1: This Graph Shows Four Line graphs of the Mean Difference between Facial Physiognomy groups for Source-Credibility and the Subscales Attractiveness, Trustworthiness, and Expertise

Overall, the graphs show an interaction between the dominant facial physiognomy groups and the trustworthiness facial physiognomy groups. The subscale of primary interest in this study was trustworthiness. This subscale shows that the more trustworthy group scored higher than the less trustworthy group and the less dominant group scored higher than the more dominant group, indicating that the more dominant group were perceived as less trustworthy. There is a similar pattern for the subscale of attractiveness, however, the overall scores were slightly lower for this subscale ranging from $M = 15$ to $M = 17$, whereas the trustworthiness subscale ranged from $M = 18$ to $M = 22$. When comparing the means for the expertise subscale, the less dominant group scored higher than the more dominant group and in contrast to the previous 2 scales, the less trustworthy group scored higher than the more trustworthy group.

Mean scores for the expertise subscale were also lower than the trustworthiness subscale ranging from $M = 15$ to $M = 19$. Finally, the graph for source-credibility shows that the more dominant group scored lowest for this measure whereas the less dominant group scored highest, $M = 49$ and $M = 56$ respectively. The trustworthy groups show interaction with the more trustworthy group scoring marginally higher, $M = 54$, than the less trustworthy group, $M = 53$.

Mean decision judgments on all three subscales show that the trustworthiness concepts fall around the middle of the scales while the attractiveness and expertise subscales lean more to the left. A Cronbach's Alpha of $\alpha = 0.89$ was computed for the source-credibility scale. Deletion of any concepts did not increase reliability. The corrected item-total correlation shows that all items are above .3 which is encouraging.

A factor analysis of the source-credibility scale was performed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy as an alternative to calculating the adequacy of the sample size (Kaiser, 1974). The KMO for this pilot study sample was 0.8. All the communalities were above 0.5 ranging up to 0.7 thus suggesting that the sample is adequate to perform a factor analysis. The anti-image correlations ranged from 0.7 through to 0.9 which is considered a good result. Bartlett's test of sphericity was highly significant ($p < 0.001$), therefore the factor analysis is deemed appropriate. The source-credibility scale was factor analyzed using the method of principal components and the factors rotated with the varimax method. Three factors were extracted. The rotated factor matrix in **Error! Reference source not found.** shows the first factor as trustworthiness.

The second factor shown is for attractiveness with one concept also loading on trustworthiness with the absolute values suppressed at 0.4. The third factor shown is for expertise and this factor shows that two items also load on the trustworthiness factor. These overlapping factors in the pilot study data are not a major concern.

Table 1: Rotated Factor Loadings for the Source-Credibility Scale with Absolute Values Less than 0.4 Suppressed

Rotated Component Matrix^a

	Component		
	1	2	3
Un/Dependable	.784		
Un/Trustworthy	.772		
Dis/Honest	.750		
Un/Reliable	.734		
In/Sincere	.618		
Plain/Elegant		.769	
Un/Attractive		.765	
Beautiful/Ugly		.698	
Not/Sexy		.652	
Not/Classy	.472	.591	
Un/Qualified	.425		.736
Un/Knowledgeable	.473		.673
Un/Skilled			.672
Not an Expert			.667
In/Experienced			.662

Extraction Method: Principal Component Analysis.

a. Rotation converged in 6 iterations.

The first factor accounted for 40.333% of the total variance explained compared to 12.93% for factor 2 and 8.59% for factor 3. After rotation the percent of variance explained for factor 1 reduced to 23.99%, while for factor 2 it was increased to 19.08%, and factor 3 increased to 18.78%. These three factors accounted for an accumulative 61.85% of the variance explained.

To test the facial physiognomy of the more/less trustworthy and more/less dominant groups, the perceived dominance scale was utilized (Manusov, 2005).

Relationships between the means for the facial physiognomy groups are shown in

Figure 2. The more dominant group scored higher ($M = 35.4$) than the less dominant group ($M = 32.6$).

The less trustworthy group was higher ($M = 33.8$) compared with the more trustworthy group ($M = 33.1$). The neutral trustworthy group was slightly higher ($M = 34.3$). As expected, there was an interaction between the groups when juxtaposed with the source-credibility subscale for trustworthiness.

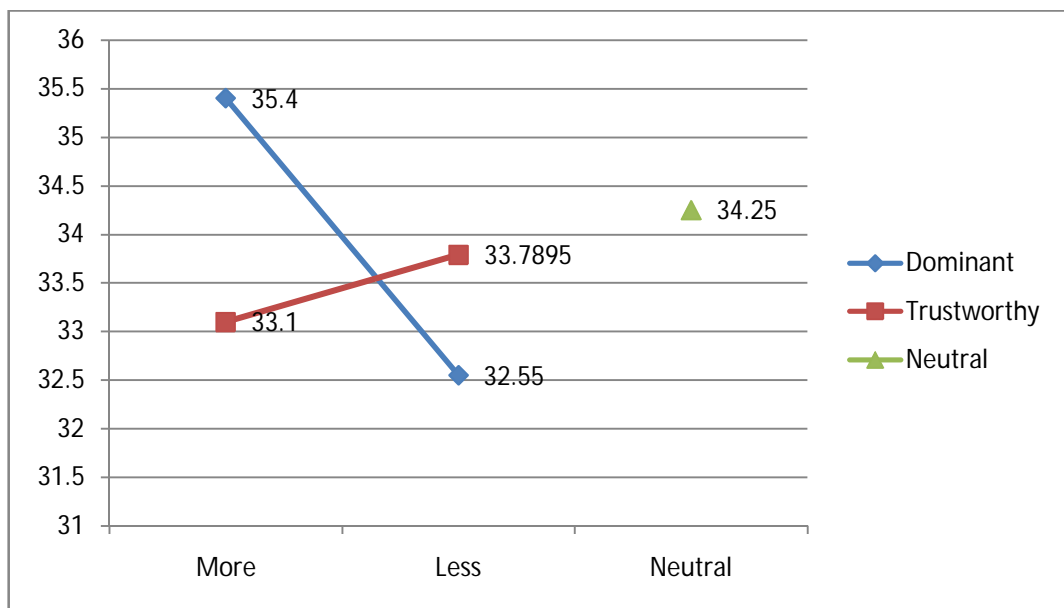


Figure 2: Graph Showing the Mean Differences between Facial Physiognomy Groups and Perceived Dominance

The mean profiles for the perceived dominance scale concepts show there was wide variation around the middle of the scale for the physiognomy groups when asked to make a judgment decision between the awkward/poised, meek/aggressive, and submissive/dominant semantic differentials. A factor analysis for the perceived dominance scale identified two dimensions, however, for this pilot study the scale has been used uni-dimensionally. The two factor dimensions accounted for 59.14% of the total variance explained. The scale attained good reliability, with a Cronbach's Alpha of $\alpha = 0.83$. One perceived dominance scale concept loaded on the factors, dynamic / passive identified two dimensions of dominance: the first factor is more related to influence, or persuasiveness, while the second factor is more related to control or confidence.

An interesting finding of this pilot study is shown in

Figure 3. Participants were asked to agree/disagree on a 1 to 7 scale whether they would be likely to approach or avoid the person shown in the images of the hypothetical advertisement, four being the midpoint of the semantic differential scale.

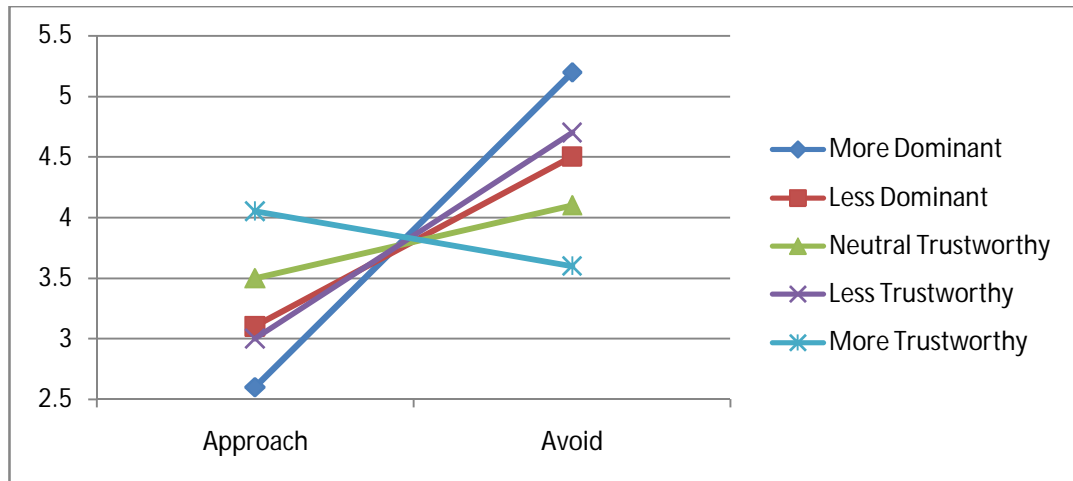


Figure 3: Graphical Display of the Differences between Facial Physiognomy Group and Likelihood to Approach/Avoidance in Real Life

The notion that there is a function of evolution at play, be that genetic or social evolution, when people make a decision to avoid others who are perceived to be a threat or may cause harm and to approach others who appear to be more trustworthy and happy (Oosterhof & Todorov, 2008) is supported by the findings demonstrated in

Figure 3. The more trustworthy facial physiognomy group was judged to be most approachable and least likely to be avoided. For all the other facial physiognomy groups the trend was the opposite and faces were judged to be more likely to be avoided in real life than approached. The greatest difference was for the more dominant facial physiognomy group. This group was judged most likely to be avoided and least likely to be approached.

This pilot study addressed the issue of belief in physiognomy. Only 11 % of respondents indicated that they did not believe it possible to know any character traits from looking at another person's face. Seventy percent stated that it was possible to know a few character traits, 17 % believe many traits can be identified and 1 % stated that it is possible to know all character traits from a persons face.

Qualitative Data Analysis

Three open ended questions were included in the survey. The qualitative data or text from these three questions was coded into numbers for each testimonial category by each physiognomy group and similarities were studied across texts; in keeping with a post-positivist constructionist approach to content analysis (Sherry, 1991). Content analysis is defined as a “research technique for making replicable and valid inferences from texts (or other meaningful matter) to the context of their use” (Krippendorff, 2004, p. 18). The key dimensions drawn out for free recall of information presented in the testimonial are shown in **Error! Reference source not found..**

Table 2: Recall of the Categories for the Research Testimonial by Facial Physiognomy Group

Research Testimonial Category	More Dominant	Less Dominant	Neutral	Less Trustworthy	More Trustworthy
human body conducts electricity	7	9	16	10	11
electricity moves dangerously fast through water	5	4	6	3	7
human body is 70 percent water	8	7	14	7	12
be very careful around electricity	8	10	11	8	13
Total	28	30	47	28	43

A selection of the responses corresponding with the research testimonial shows that, overall, for the neutral group, participants recalled more testimonial categories, followed by the more trustworthy group. Moreover, the results support the research hypothesis that facial physiognomy influences recall of information in the delivery of workplace safety messages.

As can be seen in

Figure 4 the study findings suggest that there was greater recall for the neutral trustworthy faces.

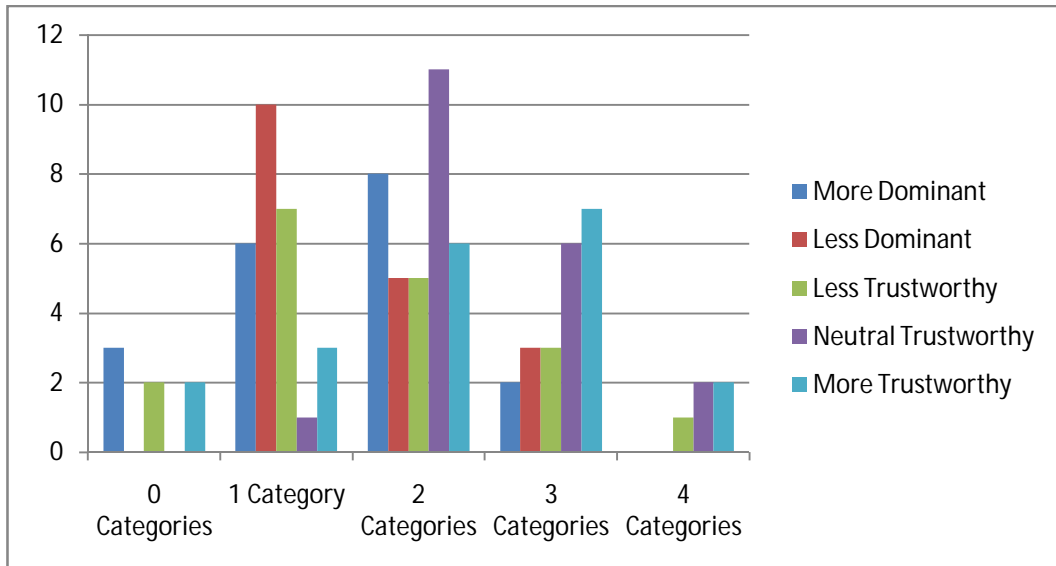


Figure 4: Response Rates by Number of Recalled Categories and Facial Physiognomy Group

Specifics of the free image description and conditions, which the respondents considered as important elements, included the black background, the cloud of writing (thought bubble coming from the man’s head), the endorser description, the endorser’s head looking like a light bulb (hence relation to electricity), male gender, and the use of the testimonial to attract attention.

For each or the five physiognomic manipulation groups, respondents were asked to freely describe the person in the advertisement. As a reference point, the researcher allocated the responses to one of four groups, behavioral, emotional, physical, and other. shows the responses for this free face description.

Table 3: Factors drawn out from the free Face Description by Physiognomy Group Matrix

Facial Description Category	More Dominant	Less Dominant	Neutral	Less Trustworthy	More Trustworthy	Total
Behavioral	13	10	10	13	12	58
Emotional	1	3	3	2	1	10
Physical	12	7	17	16	14	69
Other	10	6	13	9	11	49

All the experimental groups had a low response for the emotional category with the most common theme being 'emotionless'. One respondent stated that the more dominant face displayed anger and seriousness. Sixty nine respondents described the physical aspects of the faces, such as; bald, white, male, eye color, skin tone, and mouth shape. For the behavioral category, 58 respondents offered interpretations about the likely occupation of the endorser image (e.g. scientist, thug, criminal, policeman, bad boy, murderer, gangster, swimmer, bad actor) and commented on aspects which tell something of their interpretation of the message. For example they described the endorser as; thinking about electrical safety, deep in thought, looking up, disconnected in thought, preoccupied, indifferent, and pondering. Other free facial descriptors incorporated comments which positioned the endorser as an animated human being, lacking in realness and authenticity or as computer generated and air brushed. Other comments pointed to the abstract nature of the picture in relation to the real danger of electricity, and others were focused on why the endorser was bald and if it might be linked to cancer or as a matter of personal expression.

Discussion

The data generated by participants in this study, rating semantic differential concepts on seven point scales, suggest that there is a kernel of truth to the claim that people do make decision judgments based on another's facial physiognomy, including facial images displayed in a public health communication context. The remarkable interactions between the source-credibility subscale and perceived dominance scale suggests that there is an innate frame of reference used by humans whereby decision judgments are made based on another person's facial physiognomy. Furthermore, there is an atypical innate and perhaps evolved, or socialized, response with respect to whether humans will approach or avoid another person based on their facial physiognomy. It cannot be refuted that only 11 % of respondents did not accept the notion that it is possible to know some aspects of another person's character from their facial physiognomy as demonstrated in the literature (Oosterhof & Todorov, 2009; Oosterhof & Todorov, 2008; Todorov, Said, Engell, & Oosterhof, 2008).

One recommendation/observation arising from the factor analysis of source-credibility scale relationships is that a larger scale study utilizing a sample drawn from the working population would better demonstrate the three factors.

The utility of larger samples will allow for a stronger basis to test hypotheses related to the differences between facial physiognomy groups, in particular the influence of trustworthy and dominant physiognomic facial characteristics on public health communications and likeliness to approach or avoid the endorser and hence the message.

The use of a mixed method design in this study has proved to be encouraging and appropriate for future studies which apply facial physiognomy to safety and health communications. The questionnaire is of a convenient length and it appears to be capable of capturing the dimensions related to facial trustworthiness, facial dominance, and validity (e.g. believability). Survey questionnaires are commonly utilized by health professionals interested in health promotion and health education. The utility and development of data gathering instruments such as for this pilot study by health professionals, and the confirmation of the instruments validity and reliability. Given that survey questionnaires are commonly utilized by health professionals, this study has contributed to the utility and development of data gathering instruments in this field (American Association for Health Education, et al., 1999).

The argument laid out in this pilot study supports the literature and the notion that people *do* make decision judgments in the short term about dominance, trustworthiness, approach or avoidance behavior (Oosterhof & Todorov, 2008; Todorov, et al., 2008). Results support the hypothesis that recall of information differs based on somatic facial characteristics when presented with an avatar of a human face in a workplace safety advertisement (Burke & Srull, 1988; Highfield, et al., 2009).

Conclusion

The question that arises from this pilot study is whether a similar result can be obtained by using a real public health advertisement with a real face. In a proposed follow-up study a real face will be morphed to characterize more/less dominant and more/less trustworthy facial features which is likely to provide a more valid assessment. The outcomes of such an investigation will make a contribution to the safety of workers by providing good evidence of the impact of endorser utility in communication safety related messages in the workplace.

The physiognomic dichotomies dominance v. passiveness and trustworthiness v. untrustworthiness have major implications for advertising and other communications contexts, particularly for those which target important health and safety issues. The physiognomic appearance of an endorser can influence the believability and attitude components of potential target audiences; and thus, the impact of the intended message.

References

- American Association for Health Education, National Commission for Health Education Credentialing, & Society for Public Health Education. (1999). *A Competency-Based Framework for Graduate-Level Health Educators*. Allentown, PA: NCHEC.
- Andrews, J. C., Netemeyer, R. G., & Durvasula, S. (1990). Believability and attitudes toward alcohol warning label information: the role of persuasive communications theory. *Journal of Public Policy & Marketing*, 9, 1-15.
- Beltrami, R. F. (1988). Perceived believability of warning label information presented in cigarette advertising. *Journal of Advertising* Retrieved 13 May, 2009, from <http://www.tobaccolabels.ca/health/usa1988p>
- Burke, R. R., & Srull, T. K. (1988). Competitive interference and consumer memory for advertising. *The Journal of Consumer Research*, 15(1), 55-68.
- Feick, L., & Higie, R. A. (1992). The effects of preference heterogeneity and source characteristics on ad processing and judgements about endorsers. *Journal of Advertising*, 21(2), 9-24.
- Highfield, R., Wiseman, R., & Jenkins, R. (2009). How your looks betray your personality. *New Scientist*, 201(2695), 28-32. doi: [http://dx.doi.org/10.1016/S0262-4079\(09\)60447-4](http://dx.doi.org/10.1016/S0262-4079(09)60447-4)
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*(19), 31-36.
- Krippendorff, K. (2004). *Content analysis: an introduction to its methodology*. Thousand Oaks, CA: Sage Publications.
- Manusov, V. L. (2005). *The sourcebook of nonverbal measures: Going beyond words*. Hillsdale, NJ: Lawrence Erlbaum.
- Ohanian, R. (1990). Construction and validation of a scale to measure endorsers' perceived expertise, trustworthiness, and attractiveness. *Journal of Advertising*, 39(4), 39-52.
- Oosterhof, N. N., & Todorov, A. (2009). Shared perceptual basis of emotional expressions and trustworthiness impressions from faces. *Emotion*, 9(1), 128-133.
- Oosterhof, N. N., & Todorov, A. (2008). The functional basis of face evaluation. *Proceedings of the National Academy of Sciences*, 105(32), 11087-11092. doi: 10.1073/pnas.0805664105
- Physiognomy. (1999-2009). Answers Corporation Retrieved 12 April, 2009, from <http://www.answers.com/topic/physiognomy>
- Physiognomy. (2006). In *Love-to-know 1911 classic encyclopædia* Retrieved 1 May, 2009, from <http://www.1911encyclopedia.org/Physiognomy>
- Physiognomy. (2009a). In *Merriam-Webster online dictionary* Retrieved April 6, 2009, from <http://www.merriam-webster.com/dictionary/physiognomy>
- Physiognomy. (2009b). In *Encyclopædia Britannica* Retrieved 5 June, 2009, from *Encyclopædia Britannica Online*: <http://www.britannica.com/EBchecked/topic/458823/physiognomy>
- Sherry, J. F. (1991). Postmodern alternatives: The interpretive turn in consumer research. In T. S. Roberson & H. Kassarian (Eds.), *Handbook of consumer behavior* (pp. 548-591). Englewood Cliffs, NJ: Prentice Hall.
- Todorov, A., Said, C. P., Engell, A. D., & Oosterhof, N. N. (2008). Understanding evaluation of faces on social dimensions. *Trends in Cognitive Sciences*, 12(12), 455-460. doi: <http://dx.doi.org/10.1016/j.tics.2008.10.001>