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Does facial physiognomy in the context of an occupational safety and health message predict outcomes?

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**Does facial physiognomy in the context of an
occupational safety and health message
predict outcomes?**

This thesis is presented for the degree of

Doctor of Philosophy

Ian James Parker

Edith Cowan University

School of Medical and Health Sciences

2018

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

Abstract

Physiognomy, the practice of looking to another person's outward facial appearance to unmask the inner character of that person, has had a diverse historical impact within art, medicine, theology, anthropology, law, criminology, political history, psychology, psychiatry, and popular culture, since it was conceptualised in Greece during the 5th and 4th 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 more modern times, facial recognition and evaluation of faces is seen as a function of evolution that has significance with regard to approach/avoidance behaviour (Oosterhof & Todorov, 2008). These authors found that evaluation of emotionally neutral faces can be explained by judgements of two traits, facial trustworthiness and facial dominance, and that these traits can be related to the facial expressions for happy and angry, respectively. Evidence from advertising, psychological, and neurobiological experiments show that facial physiognomy, the concept that a person's character can be revealed from their facial features, influences cognitive and emotional judgements. The belief is that people possess the ability to read the character of another person from facial expressions and facial appearance. People make trait judgements based on facial physiognomy (Highfield, Wiseman, & Jenkins, 2009). The exploration of facial physiognomy is an ever increasing endeavour, particularly when people make social judgements to infer another person's ability to harm or the ability to cause harm (Oosterhof & Toderov, 2009; Oosterhof & Todorov, 2008).

In this mixed method study, computer software was used to morph the facial physiognomy of an endorser, actor, model or spokesperson as shown in the context of an occupational safety and health promotional message. This study endeavoured to establish to what extent facial presentation, and the evaluation thereof, influences the effectiveness of health promotional images. Five versions of facial physiognomy were explored along trustworthy/untrustworthy and dominant/passive dimensions. The advertising believability scale was utilised as a primary measure of advertisement validity (Beltramini, 1988). For comparison purposes Ohanian's (1990) source-credibility scale for evaluating endorser attractiveness, trustworthiness, and expertise was also utilised as a measuring instrument. Endorser dominance was measured with the perceived dominance scale (Manusov, 2005).

Qualitative data was collected using semi-structured in-depth interviews to analyse the process of endorser selection. Transcribed interviews were coded and thematically analysed. These data were considered particularly useful to inform the creative strategy of marketing professionals in the development of visual domain advertising.

Quantitative data was collected with the aid of a structured questionnaire designed to measure recall of a safety message, agreement with the message, the likelihood of practicing the behaviours presented in the message, and belief of the information presented in the message. Quantitative data were analysed utilising descriptive statistics, advanced parametric statistics, tables, figures and graphs. Data from both qualitative and quantitative sources were compared and interpreted as a whole; juxtaposed against underlying theory.

This study contributes new knowledge to occupational safety and health promotion by examining endorser facial graphics in creative artwork and gauging

messages effectiveness in light of the facial representation. The research has utility for academics, advertising, marketing, health promotion, and occupational safety and health practitioners involved in the development of promotional materials through evidence-based practices, endorser selection, image enhancement, and advertising awareness. An original and significant contribution will be made to the occupational safety and health literature.

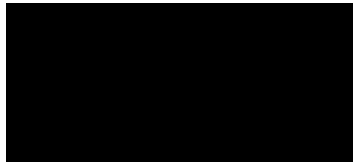
Declaration

I certify that this thesis does not, to the best of my knowledge and belief:

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Date 01 October 2018

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Chapter One: Introduction and General Overview

Background

The intention of this study was to investigate the effect of human facial physiognomy of a presenter, model, actor or endorser as shown in the context of a printed public health communication. Specifically, the research project investigated message audience opinions of an occupational safety and health message firstly promoting electrical safety, and secondly, an occupational safety and health message promoting the reporting of workplace injury. Furthermore, the study investigated the opinions of experts employed in the process of endorser selection for public health communications with the communications and advertising contract for the WA Health Department and others from general health advertising and health marketing. Moreover, the study explored the influence of facial physiognomy on the validity (believability and persuasiveness) and recall of printed public health communications and public health advertising for which endorsers are utilised. In summary, this study combined qualitative and quantitative methods to understand the effects of endorser physiognomic attributes on factors associated with public health advertisement effectiveness. This study analysed the opinions of both message creators and message recipients. Participants were drawn from a cohort of University students as well as a cohort of fly-in fly-out (FIFO) resources industry workers.

The starting point for this study stems from Todorov, Said, Engell, and Oosterhof (2008) who investigated the role of facial physiognomy for emotionally neutral computer generated male faces which were morphed for dimensions of trustworthiness and dominance. Their study found that “people reliably and automatically make personality inferences from facial appearance despite little evidence

for their accuracy” (p 455). In their research, specific trait inferences were represented in a two-dimensional space, valence or trustworthiness, and power or dominance. In a further study, inferences based on these two dimensions were represented according to the expressions signalling approach or avoidance behaviour. This was done through the exploration of computer generated composite pictures of white male faces where the facial characteristics had been modified to represent more/less dominance and more/less trustworthiness. Social media campaigns utilise similar techniques to promote public health issues when utilising an endorser, that is, the endorser is subjected to review by focus groups or prior market research of audience opinions.

Context

The effects of facial physiognomy in a workplace setting were explored through 4 separate studies, the first of which was a pilot study that investigated computer generated facial physiognomy through the creation of a hypothetical workplace health promotion message on the prevention of electrocution at work, and by extension, it’s consequences. In this pilot study the independent variable, that is, the manipulated face, was the major part of the display with a thought bubble for the message on a dark background. The thought bubble message remained the same for all variations of the independent variable. The second and third studies were extensions of the pilot study utilising a larger sample size and a message about reporting workplace injuries. The poster was produced by Worksafe British Columbia and the face of the endorser was manipulated as an independent variable. Nothing else on the poster was modified. The fourth study was a case study of an advertising company in Western Australia that had previously managed Department of Health (WA) media and advertising campaigns.

Injury prevention is categorised as a public health domain and is listed as a national priority activity for workplace health promotion by the National Public Health Partnership (2004). One of the principles listed in this report states that “injury prevention and safety promotion activity will be based on evidence of effective interventions and, where possible, good information about the political and social context in which interventions will be introduced” (p.11). This study was designed to demonstrate evidence-based planning as a guiding framework for developing workplace health promotion messages and effective public health communications (National Public Health Partnership, 2004). Deciding if a health promotion message is optimal required some consideration of the advertising and communications literature to develop a contextual model with enough functional connectivity and originality for a PhD study. A review of the literature highlighted the issue of facial physiognomic attributes of a message endorser and how these may be a consideration for public health advertising campaigns. It is anticipated that the research findings will help health promotion and marketing professionals to identify and select endorsers that will optimise the uptake of public health messages. It could also improve the effectiveness of health promotion materials utilised for social media campaigns. Powerful social marketing messages are most important when implementing occupational safety and health campaigns.

Overview of the Issues

The findings of previous cognitive psychological studies indicate that facial perception and physiognomy are important predictors of decision making and judgements about trustworthiness and dominance. Trait judgements are made within 100 milliseconds of exposure to an unfamiliar face. The extent to which these factors

influence judgements that are overgeneralised is said to be an evolved skill by which a person makes an inference about the emotion of the other and makes judgement as to the other persons' ability to cause harm. This overgeneralisation of other peoples' facial physiognomy is said to be an evolutionary survival related response of approach/avoidance behaviour. Recent studies that explore the influence of facial physiognomy on judgements use still photographs, morphed still pictures, or artwork resembling or outlining emotional dimensions of the face. (Bar, Neta, & Linz, 2006; Highfield et al., 2009; Todorov, 2008; Willis & Todorov, 2006).

The assertion that people's faces can reveal the person's character is practiced as both an art and science in Greece, Italy, China, India, Japan, and has an extensive history in Arabic and western civilisations (Jones, Laneyrie-Dagen, & Bolzoni, 2009; Marina, 2009; Oosterhof & Todorov, 2008).

According to Biggs, Dingsdag and Roos (2008) occupational safety and health strategies to prevent work related injuries and illness rely largely on workplace culture and communication processes. Their report supports a top down mode of communication to influence a safe workplace culture (Biggs et al., 2008). The aim of occupational safety and workplace health promotion is to emphasise change, in particular, the promotion of a safer workplace. From a public health communication model perspective, this study tested a hypothetical informational message, e.g. an advertisement, to establish if facial physiognomy has an influence on communication effectiveness. The basic model of communication is an element of promotion and can be conceptualised with a one way flow chart, i.e. sender → message → reciever. This model can be expanded as a representational process, with the addition of an information source as a message creator instead of a sender, i.e. information source → a message → the transmitter → the signal → the channel + noise → received signal →

the receiver → the received message → the receiver's cognitive perception or destination whereby a person consumes or cognitively processes a message (Shannon, 1948). This represents a prescriptive model, that is, a top down approach, where, for example, management represents the sender of a message and employees are the passive receivers. Foulger (2004) has expanded Shannon's model to include a feedback loop shown in Figure 1. According to Foulger, "the key concept associated with this elaboration is that destinations provide feedback on the messages they receive such that the information sources can adapt their messages".

The information source represents the creator of a message, e.g. the creative artist. The transmitter is the instrument used to convey the message, e.g. an advertisement or poster. The signal represents the common pattern of shared understanding of words or pictures which is then channelled via a media to a receiver. At the channel point which is represented in Figure 1 as the small box where noise, for example, facial physiognomy, might distort the message. In this study the "noise", or facial physiognomy, was manipulated as an independent variable. The final process is the destination where the message from the information source is processed and responded to (or not) by the recipient.

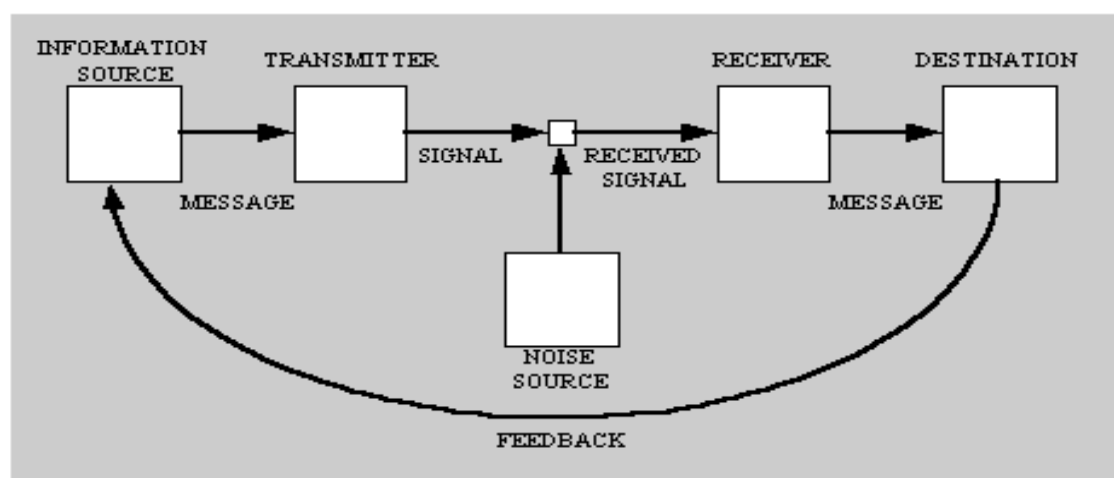


Figure 1. An interactive model of communication Source: (Foulger, 2004).

Current day communication campaigns take into consideration advances such as computers, notebooks, tablets and smart phones, all of which utilise different kinds of software. Based on these advanced methods of communication, Yousef and Cheng (2017), have proposed a model of communication that makes provision for the internet and machines used. The new model as shown in Figure 2 moves beyond conventional communication and requires a graphical user interface between person A and person B.

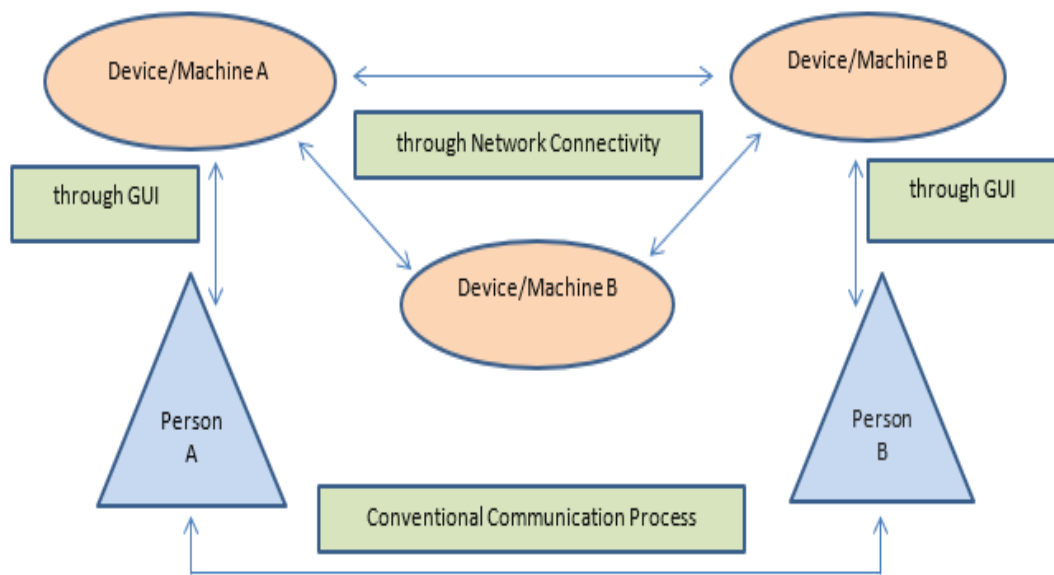


Figure 2. A proposed model of advanced communication.

A recent article by Highfield, Wiseman and Jennings (2009) gave a brief summary of the study, practice, and research into physiognomy. The authors' state that the centuries old issue of physiognomy, is back on the research agenda with questions arising out of investigations into the relationship between physiognomy and the physiological firing of neurons in the temporal and occipital cortex, and the amygdalae areas of the brain (Todorov & Engell, 2008; Todorov et al., 2008). The amygdalae are part of the limbic system and have a distinct role in processing the interpretation of

emotion, emotional reactions, and memory. The evolutionist argument that facial physiognomy can evoke an autonomic behavioural response suggests a simple stimulus → response relationship. The common sense reality is that there are a multitude of contiguous stimuli linked to studies where recruits are subjected to viewing and making judgements about another person's face. What these researchers have identified and argue is that a photograph of a computer morphed human face mediates a hard-wired response to this type of stimulus. The emotional overgeneralisation hypothesis has been posited as a possible explanation. Another possible explanation would be that hard-wired connections of unconditional reflexes (stimulus → response), for example, a happy face (unconditioned stimulus) generates a natural approach response (unconditioned response) whilst an angry face (unconditioned stimulus) generates a natural avoidance response (unconditioned response). The response to the stimulus is natural, automatic and hence predetermined. When these emotional expressions are paired with neutral character traits such as trustworthiness, a happy facial expression (unconditioned stimulus) or happy facial characteristics such as smiling (conditioned stimulus) generate an approach response. Similarly, an angry facial expression or angry facial characteristics such as upcurled mouth and frowning generate avoidance. These facial characteristics (conditioned stimulus) acquired through learnt social interactions to be associated with the unconditioned response (conditioned stimulus → unconditioned response). This behavioural learning theory view, known as classical conditioning (Burton, Westen, & Kowalski, 2009), presents a contiguous sign or stimulus that has been associated with the response behaviour. For the message recipient of a public health communication on electrical safety the advertisement or sign has replaced the electric shock, thus electrocution or electrical injury is avoided by obedience to the message or sign. As diagrammed in Figure 3. a secondary stimulus (Ss)

e.g. an advertisement, which is not the primary stimulus (Sp) e.g. electricity, is contiguous with the primary stimulus.

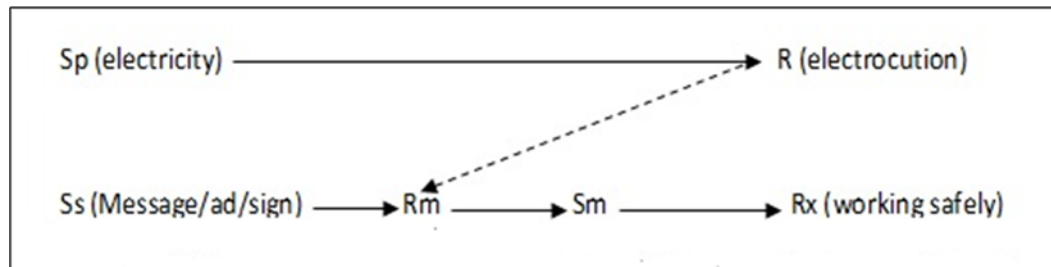


Figure 3. Symbolic representation of the mediated stimulus/response process. Source: Osgood et. al. (1957) p 7.

The message target is exposed to the secondary stimulus as part of the conditioning process without having experienced the primary stimulus directly. Through this process the message target acquires a mediated representation (Rm), according to one's own interpretation of the message or sign, which through a mediational process is self stimulating (Sm) and the outcome is a learned behaviour (Rx) by the message recipient which takes into account the consequences of the primary stimulus (Sp) and reaction (R) as shown with the dotted line as shown in Figure 3 (Osgood, 1957).

With repeated exposure to the message/ad/sign (conditioned stimulus) in the workplace the conditioned response is safer work practices and an enhanced corporate culture. Within this general sign-stimuli sign-mediated-response mediational-stimulus and reaction or response framework this study investigated the influence of facial physiognomy. The disposition and mediating process of the research study participant or subjects in the context of participating in a research project are three fractional parts of the stimulation that increment some portion of the behavioural response. This phenomenon is best described by the Hawthorne Effect whereby the workers' awareness of being studied had a greater effect on productivity than did variations in other conditions (Mayo, 2009). The validity of physiognomic inferences is a

phenomenon which may or may not apply for differing processes of facial appraisal and facial evaluation (Vuilleumier & Sander, 2008).

Research Questions

This research explored one of the questions for future research proposed by Todorov, Said, Engell, and Oosterhof (2008). That is, “to what extent does the context of decision affect the processes of face evaluation?” (p.469). Specific research questions developed to explore what influence context has on facial evaluation are presented in the methodology section of this thesis. Specifically, this research project explored the question ‘when applied to the context of a workplace health promotion message is there a difference in advertisement believability and persuasiveness between different facial physiognomic groups?’ Further, is this difference similar between different populations such as resource industry workers and university students? In addition to exploring a workplace health promotion message with recipients, message creators were interviewed to determine if facial physiognomic characteristics influenced their choice of model, actor, or spokesperson. These questions were developed by exploring the question proposed by Todorov et. al. in the context of a public health communication.

Statement of the Problem

Oosterhof and Toderov (2008) found that the morphing or manipulation of facial appearance influenced the perception of trustworthiness and dominance dimensions as measured on 7 point Likert scales for 150 computer generated faces. Participants regularly distinguished faces as more/less trustworthy and more/less dominant. Similarly, in a second experiment, respondents were asked to incrementally rate 200

computer generated faces as being less trustworthy (i.e. a score towards 1) or more trustworthy (i.e. a score towards 9). For example, as shown in Figure 4, more angular faces were associated with dominance as compared to their more rounded counterparts for this forced choice study. Similarly, it was found that trustworthiness increased as faces displayed less threatening characteristics (Oosterhof & Todorov, 2008; Todorov et al., 2008). While the belief in and practice of physiognomy has changed throughout history and across cultures, the outcome of dramatic and critical debate in the literature is that there are historical-cultural constants and inter-rater agreement in specific beliefs for the behavioural facial expression of emotion and decision judgements of facial characteristics (Ekman, 1994; Russell, 1994). This finding has relevance for studies in physiognomy in a multicultural nation such as Australia whereby we have a variety of belief systems.

Occupational safety and workplace health inductions, safety advertisements and workplace health promotion messages often show the faces of endorsers be they actors, models, athletes, or occupational health and safety professionals. What can be concluded from the research of Oosterhof and Todorov (2008) is that physiognomy of the endorser employed for such promotions may have an influence on recipients' interpretation of the message. This research study adds to the knowledge base into the impact of facial physiognomy when presenting subjects with promotional material. In the area of occupational safety and workplace health promotion audience specific communications need to be created which aim to influence positive safety related and injury prevention behaviour. Importantly, behaviour is a manifestation of how the whole content of the message has been cognized. This study conducted an experiment to test and evaluate the effectiveness, that is persuasiveness and believability, of a graphic channel of communication through the manipulation of facial physiognomic

characteristics of an endorser for a hypothetical electrical safety advertisement. The goal of the study was to focus on the role of facial physiognomy, in particular, the facial

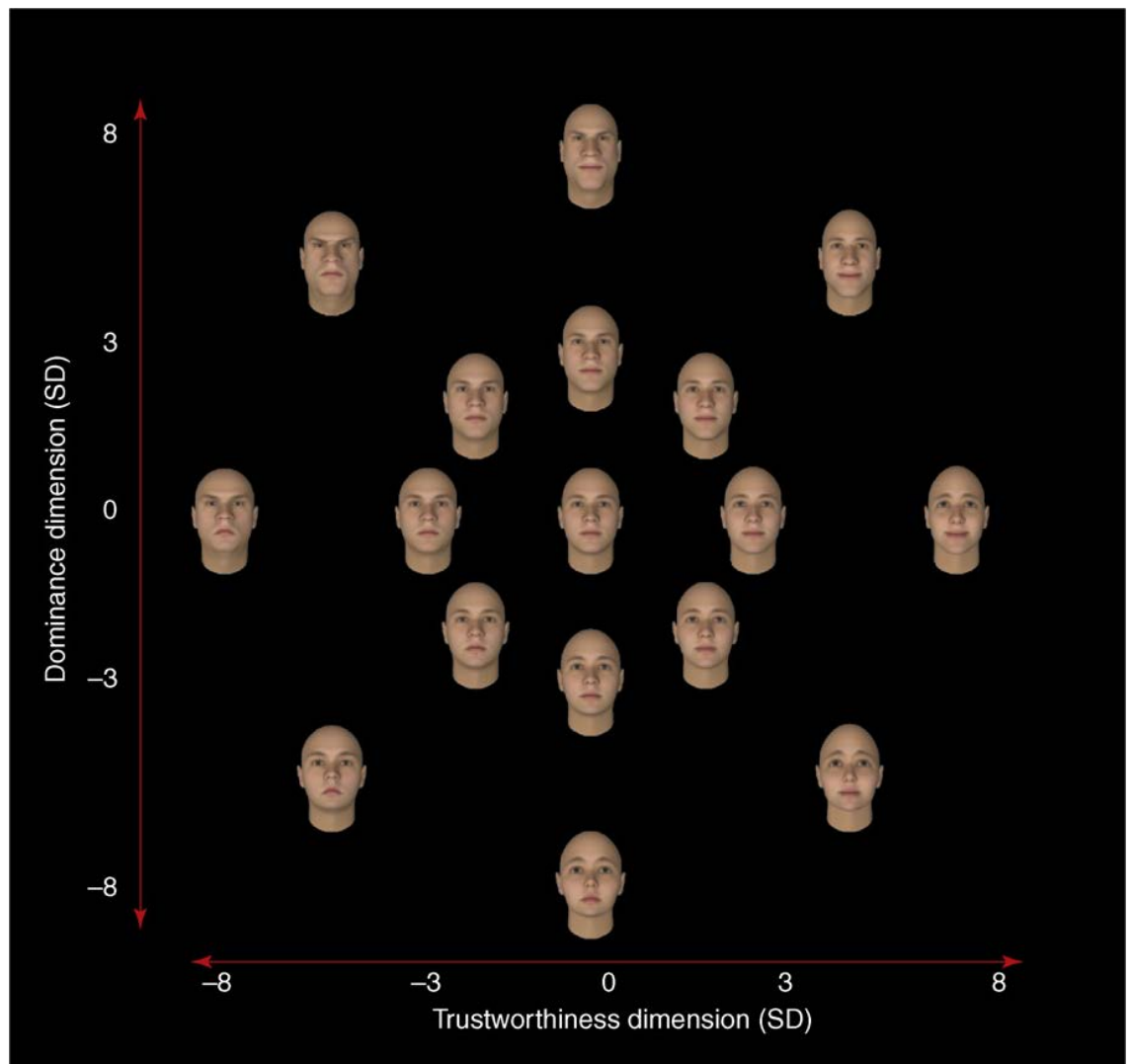


Figure 4. An expressively neutral face was morphed to show more/less dominant characteristics and more/less trustworthiness characteristics. Source: Todorov et. al. (2008) p 458.

characterisation of dominance and trustworthiness traits, when used in the context of a workplace electrical injury prevention message. Secondly, this study utilised a 'real' workplace poster which concerned the reporting of injuries to the relevant authorities. In this part of the study, the face of a male in the poster was again

manipulated along trustworthiness and dominance dimensions of facial physiognomy. Permission was obtained to make use of this poster from Worksafe British Columbia.

Purpose of the Study

This PhD study contextualised and hence extends a recent study by Todorov et. al. (2008) which sought to better understand facial physiognomy and its influence on the perception of dominance and trustworthiness trait dimensions (Todorov et al., 2008). These researchers investigated whether faces morphed with a computer program by trustworthiness and dominant character traits influenced respondents' judgements regarding these values and other emotion categories. This study investigated the influence of respondents' judgements using four morphed versions of one endorser's face in accord with the exaggerated extreme of trustworthiness and dominance dimension characteristics which was pioneered by Todorov et.al (2008). The study contributes utility to the development of health promotion, injury prevention, and public health communication strategies that utilise facial images, be they computer generated or real persons.

Conceptual and Theoretical Framework of the Study

The conceptual framework for this study is explicit, i.e. the influence of facial physiognomy on public health communications. The purpose of this section is to present a theoretical and conceptual framework and a preliminary model of influence after viewing a health poster and the completion of a mixed method forced choice and open-ended questionnaire. The final model is developed and presented in chapter three, followed by a preliminary research design in chapter four then an analysis of the data in chapter five. The theoretical and conceptual framework is based on the findings

presented in the literature reviewed in chapter two. The model provides the framework for the research design and data analysis. The following theories and theoretical frameworks serve as a foundation to the proposed model of influence of facial physiognomy and the ensuing discussion will highlight the relationship and the influence of these theoretical concepts in relation to the development of the model.

Two dominant concepts in the influence of facial physiognomy on participant perceptions and advertising literature are *dominance* and *trustworthiness*, which are key inputs in the model developed for the current study.

Conceptual clarifications.

The researcher's clarification and illumination of meanings of the concepts and their relationships are defined within this section of the thesis to help the reader to understand the study and the significance of the research questions. Some terms are defined as they emerge in the data and are presented in the data analysis and results chapter.

Theoretical Framework Underpinning the Investigation.

The Theoretical Framework is positioned within a public health communication domain looking at aspects from the creative process through to audience opinion. A framework provides an explicit explanation why the problem under study exists by showing how the variables are related to each other. Concepts from Oosterhof & Todorov (2008), Torodov et. al. (2008) and Torodov (2008) were used to provide a framework for research involving three study sites utilised in this PhD study. The framework was used to determine research questions and give direction to interviews and discussions to focus the research.

Research Design and Methodology

This research project utilised a mixed methods design and was conducted in two phases with three groups of participants. The first phase was a pilot study which utilised a pencil and paper survey with 100 ECU students, and face-to-face interviews with an expert in the advertising and marketing industry. The second phase consisted of a survey conducted with 500 students attending a Western Australian University, 500 Western Australian resource industry workers, and an interview survey with a Western Australian public health communication campaign expert.

Data Collection.

The pilot survey and interviews were conducted to ensure that data collected was aimed at answering the research questions, the type of data collected (both open ended questions and forced choice questions), and how the data would be analysed. The method of data collection consisted of paper and pencil questionnaires. An attempt to conduct the surveys using online internet facilities failed to produce any usable responses so this method was abandoned in favour of a face-to-face paper and pencil questionnaire survey. Out of 1000 flyers advertising the study with an internet link to complete the survey only 11 usable results were generated. This method may have failed because the participants were students and they may not have had time to connect to the internet survey page. Numerous emails to professionals in the marketing, and health sectors advertising the questionnaire internet link produced no responses. To control for existing knowledge, which could affect apparent recall of explanations, an original image and message was created. In addition, a neutral looking face was generated as a physiognomic control category.

Ethical Considerations

Participants in this study were given a Consent Form at the start of the survey. Face to face surveys and interview participants were informed that they did have the choice to refuse participation. Completion of the face-to-face survey was anonymous. Similarly, participating organisations and companies were informed that participation was entirely voluntary and anonymous. The utility of the information gathered from participants strictly being for this PhD project was explained in the Consent Form. Information about the research project was full and open with no deception or misleading of participants. Ethical approval for the research to be conducted was granted by the ECU Human Research Ethics Committee prior to data collection (project number: 3717 PARKER).

There were no special ethical considerations arising from this research study. Consent forms and recruitment materials are included in the appendices.

Definition of Terms

Avatar.

An avatar in the English language refers to a computer-generated image that has human form and characteristics. This computer generated character or alter ego can take the form of a three dimensional model such as in computer games, a two dimensional image or picture, or one dimensional username as used in online forums and chat communities (Avatar, 2010; Avatar (Computing), 2010). The usage of the word came from the gaming and 3D chat communities on the internet. The avatar can be a realistic photo, a simple cartoon, or a bizarre fantasy figure. Video game avatars are another player's form which has become something abstract, e.g. the video game character.

For many people, the choice of method when posting a Tweet, a Facebook message, Google instant message, Hotmail instant message, or Instagram on the internet, is their avatar, either as an image or username that represents the person online within these social networks and forums. Some people do not use their real photos or names. People will use another person's name or graphic image, that is their avatar, to identify and interact online, send a message, or link with their online profile. Thus, the online avatar can be any fantasy character should be relevant for use in health and social advertising.

An example of an online avatar profile would read something like "My avatar is 32. Her name is Melissa, and she is a writer. She has been contemplating starting a blog for months now, but she doesn't know where to start. She's a good writer, but she could really use some help on how to structure and format a blog post – plus, she's not really sure what exactly she wants to write about most of the time. She is working part-time and earning her graduate degree online, so she's usually studying up on how she can start her blog on the weekends. Melissa lives with her boyfriend and they both want to travel more, hate their jobs, and don't make enough money."



A simple cartoon avatar from a personal online user.



Social marketing avatars representing various corporate organisations.



A fantasy graphic avatar from a popular WA Department of Health 2 fruit and 5 veg health promotion campaign.

The above shown graphics and written avatars are examples of other people's inspiring work, by both corporate and personal designers. These types of avatars can be found by viewing online blogs and the avatars which people or corporations choose to show as their icon, their graphic, or their profile.

Physiognomy: The “science” of reading faces.

Physiognomy is a theory which defines a way of describing the temperament, moral and other personality trait characteristics of human beings from an individual's facial features. In so far as photography and the arts are concerned, physiognomy is an

aesthetic theory defined by patterns of meanings associated to the general appearance of a portrait or caricature which shows qualities of mind or character by the study of facial configuration and expression. A portrait or caricature captures the individual's inner character or quality of character revealed outwardly. The argument is that physical appearance implies character. Physiognomy in this particular context emphasising the aesthetic visual perception is studied in well known universities by painters, artists, literary writers, psychologists, law and psychological profilers, moralists, anthropologists, and others with an interest in the study of human nature, emotional expressions and human facial characteristics (Physiognomy, 1999-2009, 2006, 2009a).

Physiognomy has persisted for thousands of years in many cultures and was mentioned by Aristotle and other medieval scholars. "Physiognomy" is derived from the Greek language whereby "Physis" meaning 'nature' and "Gnomon" meaning 'judge' or 'interpreter'. In the 1770s Swiss pastor Kaspar Lavater developed a treatise to explain the link between facial features and human character. Lavater stated that our facial bones are soft and malleable by the forces inside us, our strong passions therefore can move the soft facial bones into predictable patterns, and these outward facial features of predictable characteristics of passions, character, and behaviour, can be read by well studied people into these sciences. Lavater's books were popular as they offered 'scientific' reasons for characteristic patterns in every face, revealing each facial feature in detail including characteristics such as intelligence, stupidity, people to trust and those to discard as untrustworthy, and an ethnic commentary of facial features. A significant cultural figure during the Age of Sensibility, Lavater's theories fed a pervasive desire for the accessible understanding of a person's inherent nature.

Qualitative Research

This is any kind of research whereby the findings are not produced by statistical procedures or quantifiable methods. It provides insights into the problem or helps to develop ideas or hypotheses for potential quantitative research (Flick, 2009). In qualitative research data analysis begins as soon as it is collected, thus data analysis and collection proceed in a cyclical fashion, where preliminary analysis informs subsequent data collection (Gibbs & Flick, 2007). Problems with qualitative studies include being more time consuming, with masses of data to transcribe, it is more difficult to code data, it is not applicable to widely dispersed social settings, generally it is only a case study with limited applicability to other situations, it usually gives only nominal level data, is difficult to quantify, and it is difficult to control for researcher bias (Daymon & Holloway, 2002).

Quantitative Research

The findings are produced by statistical procedures or quantifiable methods whereby explicit conclusions can be drawn, usually from a large number of individuals. If we were to define quantitative research, we might say that it is any research that involves the manipulation of numbers to make claims, provide evidence, describe phenomena, determine relationships, or determine causation. In such research, it is the numbers of a phenomenon, an opinion, or the results of an experiment that provide evidence for a researcher to make claims. Quantitative research uses many methods to collect, interpret, and report what these numbers mean, but these methods are usually very systematic in order to maintain the consistency of these numbers across different contexts. For this reason, quantitative research is said to be generalizable, which means that its results can be applied to other contexts and situations through statistical or

mathematical modelling; in other words, this type of research can be used to make predictions about what was being studied, whether phenomena, opinions, or experiments. Another important concept to quantitative research is sampling. A sample of a population, if large enough, can make predictions about that population. A lot of quantitative research is also deductive, which is to say that it is usually testing a hypothesis that has already been established before the numbers have been collected. Numbers are important to determine when a hypothesis has been confirmed or not because they are precise measures. Because quantitative research has precise measures that are generalizable, two more terms are important to understand when doing quantitative research. The first is reliability. Reliability is demonstrated when a test or measure consistently reveals the same results. The second is validity. Validity means that the test or measure actually shows what it intended to show. With quantitative research, the first decision is in the design of the study, whether the research is descriptive or experimental in nature. Descriptive studies often do just that, describe a quantity of a phenomenon. Experimental study design looks to test whether changing some condition or aspect influences another condition or aspect. A third design is inferential statistical analysis. This design can use new or already published data to infer or predict a future effect or phenomenon. Inferential designs are also used to examine correlations and causation (Balnaves & Caputi, 2001).

Intervention efforts to change behaviours are communicative acts and such efforts require ritualistic processes of evaluation. In this study, this was achieved through the conduct of a formative evaluation utilising audience assessment and questionnaire pretesting.

Why is a Mixed Method Research Design Relevant?

A basic question faced by researchers in many fields is a justification of their choice of research instruments and methods. I have defined qualitative and quantitative research designs because I have made use of both in this study, therefore this study can be classified as mixed methods research. In 1957, Cronbach drew attention to the existence of two separate disciplines in research methodology. One was concerned with documenting averages while the other was interested in describing and interpreting individual differences. Nonetheless, research is a systematic investigation to find answers to a problem. There is a move towards qualitative and subjective approaches in modern times with a legacy of division between the scientific qualitative approach, and the naturalistic phenomenological approach (Everitt, 1975).

A mixed method design involves utilising more than one research method generating different types of data. A case study design was utilised for to generate qualitative data during interviews with health and advertising professionals. Previously published forced choice scales and open ended questionnaires were used to quantitatively assess the consumer and audience opinions. (Van Maanen, 1979; Wiseman & Koester, 1993).

Utilizing a mixed method study has helped me develop and enhance my research skills. I was forced to think ‘outside the box’ when it came to developing a theoretical framework. I wanted to avoid the danger of selecting a particular strategy which would not benefit future readers and stakeholders, and to avoid ‘importing theory’ during the write up in order to support my findings and conclusions. I was fortunate in that the Journal which accepted my publication from this study did not have leanings for a particular type of methodology. The methods and methodology were developed as an overall plan in the research proposal which included a section on how the research

objectives would be achieved. The philosophical and theoretical perspectives are discussed in Chapter Three.

Thesis Outline

The report for this study is organised into six chapters which are briefly explained below.

Chapter One deals with introductory matter. It presents a brief background to cement and clarify the questions that instigated the PhD study. This study adopted a humanistic approach to the research question. It begins with an initial focus on the starting point sourced from the academic literature, to identify important themes and ideas. I have decided to work on facial physiognomy because not many other researchers do. I was interested in a specific original topic and looked for a supervisor with the same research interests. This PhD thesis research is not a repeat of studies with the same research questions and the same conclusions. From what I have gathered as evidence from this study, there has been an increase in the belief in facial physiognomy compared with historical academic literature reports. As a serious PhD student I have chosen a difficult , subjective, and original subject to work on during the duration of my Phd course. The research idea is novel, set in the context of existing up-to-date research in the field, and competently executed.

Chapter Two deals with a review of the literature and is provides a detailed overview of published research findings, arguments, and conclusions relating to the study of facial physiognomy. Detailed descriptions of various research designs are given along with critiques of the literature. The chapter begins with an introduction to the development of facial recognition from both an artistic and experimental science perspective. Factors that determine the influence of facial physiognomic decisions were

investigated in depth. A compilation of international literature on facial physiognomy is presented, these range from interpretation of more and less trustworthiness, to more and less dominant characteristics, to the basic belief in the capacity of people to judge another persons character from their facial physiognomic features. The focus of this literature review was on experimental design rather than historical accounts of facial physiognomy (Fridlund, 2014; Hartley, 2005; Plamper & Lazier, 2012; Spencer, 1997). In order to further investigate the effect facial physiognomy Chapter Three presents the methodology in relation to the perspectives taken for both the qualitative parts of the study and the quantitative components. As Crotty (1998) suggests, there is a bewildering amount of terminology describing the theoretical perspectives and methodologies. Within this chapter I have taken a stance by opting for a mixed methods approach.

Chapter Four presents the research design utilised in this study. This chapter also presents the main framework for data collection through surveys and interviews and an introduction to the analysis of this data and methodology.

Chapter Five discusses a focus group process followed during the questionnaire development, the results for the pilot study, and subsequently the results for the two main studies. One of these main studies surveyed more than 500 university students while the other surveyed more than 500 fly in fly out (FIFO) workers. In this chapter the results of the data analysis are also presented for the qualitative component of the PhD study. The data were collected and processed in response to the research questions posed in chapter three.

Chapter Six presents the concluding comments, as well as suggestions for further research in the area of facial physiognomy and public health communication. In the conclusion, some recommendations for further research are made, two potential

limitations of the method are highlighted and some interesting results are discussed with reference to long-standing philosophical problems in different areas. This final chapter summarizes the main answers to the study questions and elaborates a set of options for future engagement with social and health advertising researchers, considering different graphic contexts. Appendices provide more detailed background material to allow other social researchers to replicate this study.

Chapter Two: Review of the Literature

Effective use of occupational health communication resources should maximise the value and effectiveness or impact of the message. Communication is at the heart of who we are as human beings. The importance of the workplace as a setting for public health messages, and health promotion, is increasingly being recognised by organisations (World Health Organisation, 2010), and is well established (World Health Organisation, 2009). Occupational injury prevention research evokes a multidisciplinary approach to stimulate social and political change not only to prevent disease, disability and death caused by the working environment, but also to tackle non-work-related health issues. For example, cigarette smoking, drug use, high blood pressure, seat belt use, HIV-AIDS, sunburn, and vaccination, to name a few non-work-related public health issues. Evaluation of communication interventions for the above issues cannot be easily conducted using randomised trial methodology. Different disciplines utilise alternative models and these models are discussed later in this review. Collaboration between health professionals in the design of workplace health promotion strategies is essential. The acceptance of work-related public health communication targeting workplaces for occupational health and safety by a target audience will in part depend on the credibility and/believability of the endorser used to deliver the message (Hovland, Kelley, & Janis, 1982).

In my study, the public health communication model is used to advance research into the development of educational and information materials that are used by multiple stakeholders, and to advance the occupational safety and workplace health promotion research. Health communication is seen to have relevance for virtually every aspect of

health and well-being, including disease prevention, health promotion and quality of life (Parrott, 2004).

Much theoretical and experimental research has been done in relation to facial physiognomy. Because this study involved the use of a graphic of computer-morphed human faces in the context of an electrical safety setting and an injury reporting setting, my literature review scrutinizes not only the development of creative art as a form of expression in children, but also, looks at pure research studies and experiments.

Logically, I have summarised the literature review using a historical sequence method starting with the work of Lowenfeld and Brittain (1987). Furthermore, issues associated with decision making and judgements of morphed human faces that involve facial recognition and cognition were reviewed. The role of the face is discussed in terms of the meanings associated with facial composition and expression of emotions. Following this, the structure of trustworthiness and dominance with respect to the mediating process in encoding and response to another's facial physiognomy are investigated. Finally, the interdisciplinary collaboration, models, and approaches representative of occupational safety and workplace health promotion disciplines to develop effective injury prevention materials are discussed, in relation to art.

Pre-schematic Art

The evolutionary development argument by which judgments are made of others can be exemplified by art. Juxtaposed with this argument is the debate that art is a result of socialisation from birth. In introducing these two theories about how we make decisions for ourselves, the human face is one of the primary indicators during development from early childhood through to adolescence. Lowenfeld and Brittain (1987) describe six developmental stages in artistic expression of the human face:

- The scribble stage – beginnings of self-expression (2-4 years of age)
- The pre-schematic stage – first representational attempts (4-7 years of age)
- The schematic stage – the achievement of a form concept (7-9 years of age)
- The gang stage – the dawning realism (9-12 years of age)
- The pseudo-naturalistic stage – the age of reasoning (12-14 years of age)
- Adolescent art – the period of decision (14-17 years of age)

According to Lowenfeld and Brittain (1987) scribbles are the first attempts at art by children and do not reflect any attempt to draw an object, but rather, represent the development of kinaesthetic ability to put pen to paper. During the pre-schematic stage of psychosocial development children first start to incorporate facial features into their drawings. This developmental stage occurs when the child is between four to seven years of age. The drawing of a face is one of the first features that symbolise this stage. Faces can be associated with many different representational things, e.g. the sun is drawn with a face, or flowers will have a face drawn into their composition. Typically, the face is circular with recognisable eyes, nose and mouth, and stick limbs. The next stage in psychosocial development is the schematic stage. Between the ages of seven to nine children's art develops perspective and comprehension of facial recognition and expressions. By age fourteen children have developed that ability to express the feelings and emotions of others into their artwork portrayed with facial expressions. Through artistic illustration, teenagers between fourteen to seventeen years of age develop the artistic ability to express cultural concepts, ideas, concerns, humour, and satire into portraits. Heredity and a rich stimulating environment are important to the development of an awareness of facial expression and the physiognomic detail of emotions in artistic illustrations (Lowenfeld & Brittain, 1987).

Facial Recognition

Recent studies in human development and facial recognition suggest that the perception of emotions and judgments about another person's facial physiognomy are a hard-wired evolutionary phenomenon. From an early age, a baby's eye gaze is more pronounced, and the baby is more socially engaged with adult-judged attractive faces than unattractive faces. This phenomenon suggests that babies are evolutionarily hard wired to approach and interact with people with attractive faces and less likely to show as much interest in people who display less attractive facial features. The theory is that the ability to differentiate facial recognition is a cognitive process that develops from a very early age. (Hoehl, Reid, Mooney, & Striano, 2008). It has been demonstrated that a baby's gaze is more pronounced when presented with images of adult-judged attractive faces (Ma, Xu, & Luo, 2016).

Role of the Face

The human face has a function in expression of emotions and non-verbal communication (Carroll & Russell, 1996; Highfield et al., 2009; Todorov et al., 2008). Despite research on the social and evolutionary perspectives of the human face, research on the role of the face shows that facial recognition is also a primary function of a person's identity, commonly referred to as biometrics. Well respected researchers have argued that the role of the face is to identify a person (Tolba, El-Baz, & El-Harby, 2005; Zhao, Chellappa, Phillips, & Rosenfeld, 2003).

Trustworthiness and Dominance

It has been suggested that a message recipients perceptions of the communicator, be they positive or negative, may affect audience judgments of the

endorser's trustworthiness and dominance (Highfield et al., 2009). A message may be rejected if the recipient is motivated to believe that the endorser lacks credibility (Hovland et al., 1982). As suggested earlier, there is evidence that people judge others on the basis of facial features and it has been posited that trait judgements may be due to an overgeneralisation of emotion hypothesis as suggested in previous studies (Todorov, 2008; Zebrowitz, 2003). Face preferences affect a diverse range of critical outcomes. For example, endorser trustworthiness customarily improves advertising effectiveness. That is, there is a reinforcing opinion change in the direction of the communication when a more trustworthy endorser is utilised. In advertising research, endorser trustworthiness ranks as the third most important issue in advertising effectiveness to create awareness, only out ranked by endorser expertise and negative information about the endorser, which may not be a good thing (Amos, Holmes, & Strutton, 2008). Likewise strong associations, for example, an endorser with a dominant personality, impacts on consumer's beliefs about the advertisement by strengthening the message (Batra & Homer, 2004). Principal components analysis of facial physiognomy has been utilised by Todorov & Engell (2008) and Todorov (2008) to map the characteristics of the human face onto a 2D space of specific psychological trait inferences, namely trustworthiness on the X axis and dominance on the Y axis (Todorov et al., 2008).

Functional magnetic resonance imaging (fMRI) studies also demonstrate that the amygdalae are active in the evaluation of human faces. As shown in Figure 5, MRI intensity colour plots indicate that faces that possess less trustworthiness characteristics are rated by subjects as expressing angry emotions, whereas faces possessing more trustworthiness are rated as expressing happy emotions (Todorov, 2008).

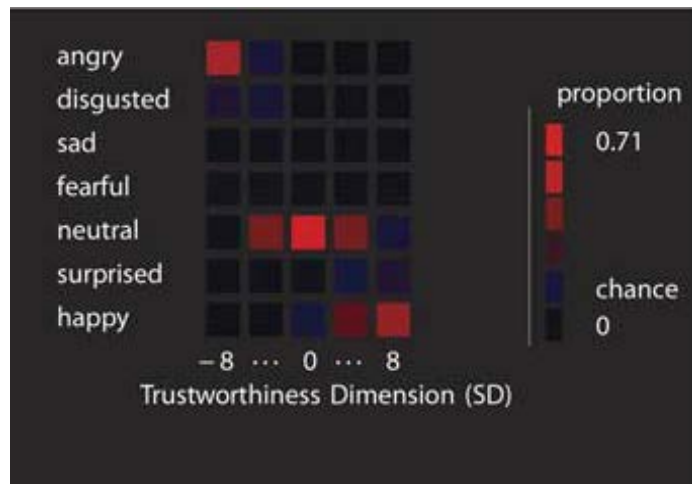


Figure 5. Intensity colour plots of emotion categorisation for faces by trustworthiness.
Source: Todorov (2008) p 214.

Attractive male faces are judged to be characteristically more dominant or mature looking than their more immature or ‘baby-faced’ counterparts (Keating, 1985). In my study, I explore attractiveness of male faces along the dominance / submissive scales. According to Todorov (2008) trustworthiness has a positive correlation with facial attractiveness, 0.57, and correlates negatively with aggressiveness, a characteristic of the dominance domain, -0.76, see Figure 6 and Figure 7. I have attempted to replicate these findings with my study.

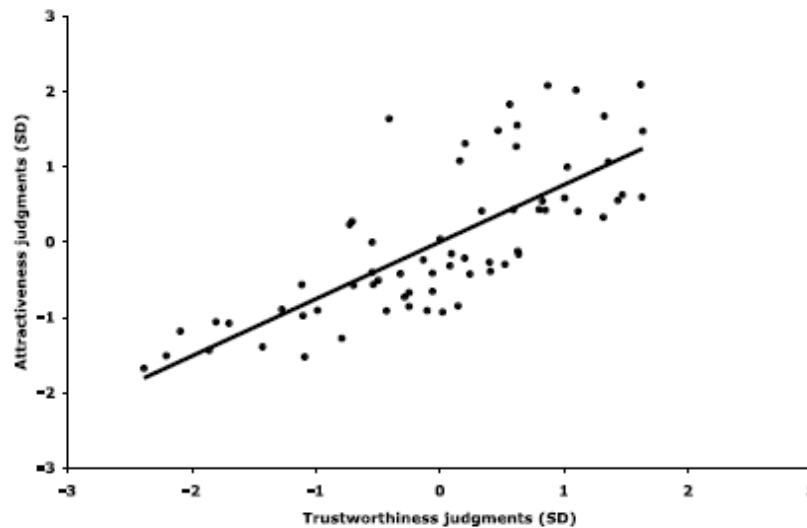


Figure 6 Decision judgements of attractiveness by trustworthiness. Source: Todorov (2008) p 211.

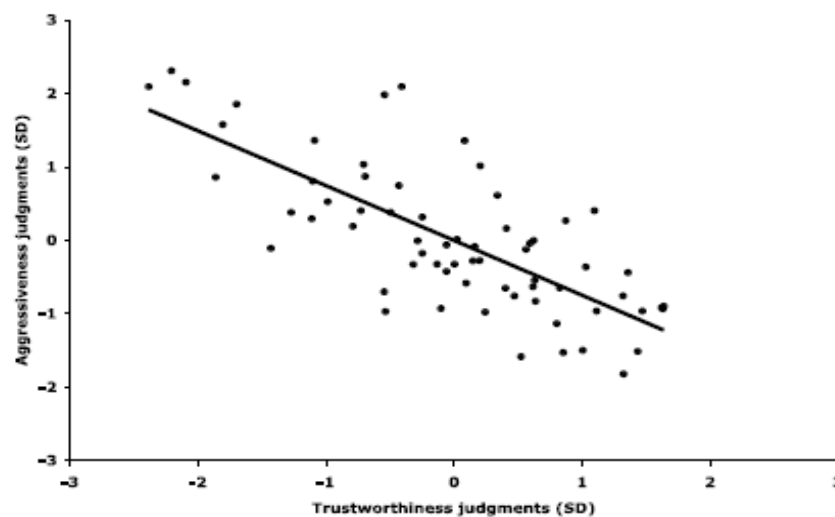


Figure 7. Decision judgements of aggressiveness by trustworthiness. Source: Todorov (2008) p 211.

The shortcomings of previous studies investigating the influence of physiognomy on trait judgments is that they lack context or are limited in situational context (Todorov et al., 2008; Vuilleumier & Sander, 2008). In my study, I have explored the public health communication contexts of electrical safety and reporting of accidents. The forced choice response methods, as opposed to open ended questions, of decision judgements of facial characteristics from previous studies have demonstrated

that people do make judgements of emotion categories and trait characteristics from the face when shown in pictures (Carroll & Russell, 1996; Russell, 1994). These studies suggest that there is no such thing as an impartial observer when considering the face of another.

Integrating Occupational Safety and Workplace Health Promotion

Injury prevention is one the many activities practiced by workplace health promotion professionals. Illustrations, including the use of endorsers, in health education materials have demonstrated to be useful in improving the humanness and readability of the message. Workplace health promotion programs can typically be evaluated by reporting the number of participants, monitoring of participants progress, and the inferred cost-benefit savings (Danna & Griffin, 1999; Engbers & Sattelmair, 2008; Goetzel & Ozminkowski, 2008).

There is no standard model to plan, implement and evaluation workplace health promotion. Projects use a variety of models, e.g. the PRECEDE/PROCEED model of health promotion, planning, and evaluation (Green & Kreuter, 1999), the Health Belief Model (Rosenstock, 1974), the Theory of Planned Behaviour (Ajzen, 2002), multilevel approach to community action (MATCH) (Simons-Morton, Greene, & Gottlieb, 1995), social marketing assessment response tool (SMART), Theory of Reasoned Action (Fishbein & Ajzen, 1975), Social Cognitive Theory (Bandura, 1986) etc. depending on the aims and objectives of the study. In Western Australia, more recently, and indeed internationally, the focus of health promotion campaigns, including the field of occupational safety, has been on the use of models which influence factors such as regulations, public policy, and legislation change, to impact on health behaviour and ultimately public health targets. An example of this model of health promotion would

be the introduction of the Tobacco Products Control Act 2006, Tobacco Products Control Regulations 2006, and establishment of the Western Australian Health Promotion Foundation known as Healthway (Cordova, 2000). A restructure of the Health Department of WA in 2006 saw the Health Promotion Services Branch replaced by the Tobacco Control Branch. As a result, workplaces in Western Australia have developed institutional or organisational no smoking policies or enforce non-smoking rules aimed at improving the health of the workforce.

A common environmental strategy used to communicate messages by both occupational safety and workplace health practitioners is the utilisation of signs or posters. Approximately 42% of Healthway projects include graphic artwork or a photograph and 63% of projects include role-modelling of healthy behaviour by an endorser (Holman, Donovan, Corti, & Jalleh, 1996). The Western Australian Health Promotion Strategic Framework 2007-2011 advocates two important health promotion approaches, risk reduction and prevention, to reduce the risk of injury (Department of Health, 2013). Comprehensively, the strategy includes policy and legislation, lifestyle and behavioural approaches that improve public health education and communication, and community empowerment. The Healthway Strategic Plan 2008-2011 and the Western Australian Health Promotion Strategic Framework 2012-2016 include injury prevention as a priority area with the focus on healthier and safer lifestyles and workplaces (WA Department of Health, 2017). These reports target workplaces as one of the settings for action with decreased injury, decreased severity or harm from injury, decreased risky behaviour, and an increased safety of environments, work processes, and products as outcome measures. The key target group for injury prevention is males aged between 25 and 44 years and along with education and awareness, occupational activities are highlighted as potential methods of prevention. Insufficient use of personal

protective equipment and tools, and insufficient safety precautions are some of the key risk factors contributing to injury in Western Australia (Government of Western Australia, 2007; Healthway, 2008). The integration of health promotion and occupational safety has been adopted as a control and preventive measure under the broader term occupational hygiene (Commonwealth of Australia, 2003).

In Australia, health promotion has been included as an element of occupational safety and health. Good health promotion programmes utilise public health communication theory and practice and strive to create messages that audiences will recognise and understand and that fit into the audiences' framework of actions concerning specific problems. Formative research of the literature prior to the development of a public health communication plan involves identifying the unique and practice contexts, while also balancing knowledge from many fields of professional practice.

Occupational safety personnel should be given training in health promotion to provide some of the foundation material from which to take advantage of best practice and develop their activities as an integrated part of occupational safety and health practices (Aw, Gardiner, & Harrington, 2008). Integrating and bridging occupational safety and health with health promotion and public health communication is one of the broader evolving systemic and organisational priorities for managing the impact of workplace injury on the public health system. Similar to the enforcement of smoking bans in workplaces, public policies for integrated workplace health promotion should include policy strategies for prevention (National Public Health Partnership, 2004).

Evidence-based Common Ground

Worksafe WA has identified electrical safety as one of seven priority areas, with electrical hazards existing in almost every workplace. It is estimated that there are over 2000 electrocutions each year in Australia (Harrison, Frommer, Ruck, & Blyth, 1989). The Department of Mines and Petroleum AXTAT (AXTAT stands for Accidents Database) and incident reports database now called the Safety Regulation System (SRS) has recorded 2289 electrical incidents (2 fatalities, 1879 injuries, and 408 with no injury over a one year period) in the Western Australian resources sector (Government of Western Australia, 2009). AXTAT and SRS are dynamic information systems developed in collaboration with industry that can provide key information about industry specific accident causation while, at the same time, identifying priority areas warranting industry's attention. The SRS database is free to sign in and can be accessed at <http://www.dmp.wa.gov.au/Safety-Regulation-System-SRS-1486.aspx>.

In Australia electricity is the most common cause of workplace fatalities leading to 10% of all workplace deaths (Harvey-Sutton, Driscoll, Frommer, & Harrison, 1992). In Western Australia approximately half of electrocutions resulting in injury occur in the workplace with approximately three fatal workplace electrocutions each year (Fatovich, 1992). From 1 June 2006 to 30 June 2016, 22 electrical fatalities occurred in Western Australia, and over the reporting period, 45 per cent of fatalities occurred in the workplace. There were 13,996 electric shocks reported since July 2006. The trend for electric shocks over the reporting period shows an increase (Department of Commerce, 2016). Fifty three percent of Western Australian resource sector workplace electrocutions involve working with live electricity (Kahler, 2007). Many of these incidents could have been avoided through the adoption and management of appropriate work practices, providing the worker with information, tools, work organisation and

procedures and work aids such as the lockout/tagout system (Government of Western Australia, 2006). Worksafe WA has recommended the utility of a lockout/tagout system in response to several electrical and non-electricity related injuries in the workplace where people have received serious injuries due to machinery and equipment being inadvertently started while workers have been performing maintenance or repairs. In Western Australia every 15 minutes a worker is injured, every 16 days a worker dies, and 22700 workers have time off work due to being injured in the workplace each year (Department of Mines Industry Regulation and Safety, 2018; Government of Western Australia, 2004). Table 1 shows the number of work related fatalities in Western Australia from 2000 to 2017.

Table 1.

Work-related fatalities in Western Australia 2000 to 2017. Source: Department of Mines, Industry Regulation and Safety 2018, p.6.

Year	Number of fatalities	Per Million Workers	Number of fatal events
2000–01	21	22.4	17
2001–02	18	18.6	18
2002–03	23	23.4	22
2003–04	20	20.6	19
2004–05	22	21.7	22
2005–06	12	11.3	12
2006–07	25	23	24
2007–08	27	24	24
2008–09	21	18	18
2009–10	9	7.7	9
2010–11	21	17.2	21
2011–12	17	13.5	16
2012–13	19	14.5	19
2013–14	16	12	16
2014–15	22	16	21
2015–16	22	16.3	19
2016–17	11	8.2	11
17yr Total	326		308

Data from 1988 to 2008 reflect that in Western Australia the mining resources sector accounted for 29 percent of work related fatalities, see Figure 8 (Government of Western Australia, 2008). The incident rate per million workers for electricity, gas, water and waste services was 112.6 for the period 2016-2017. Therefore, an electrical

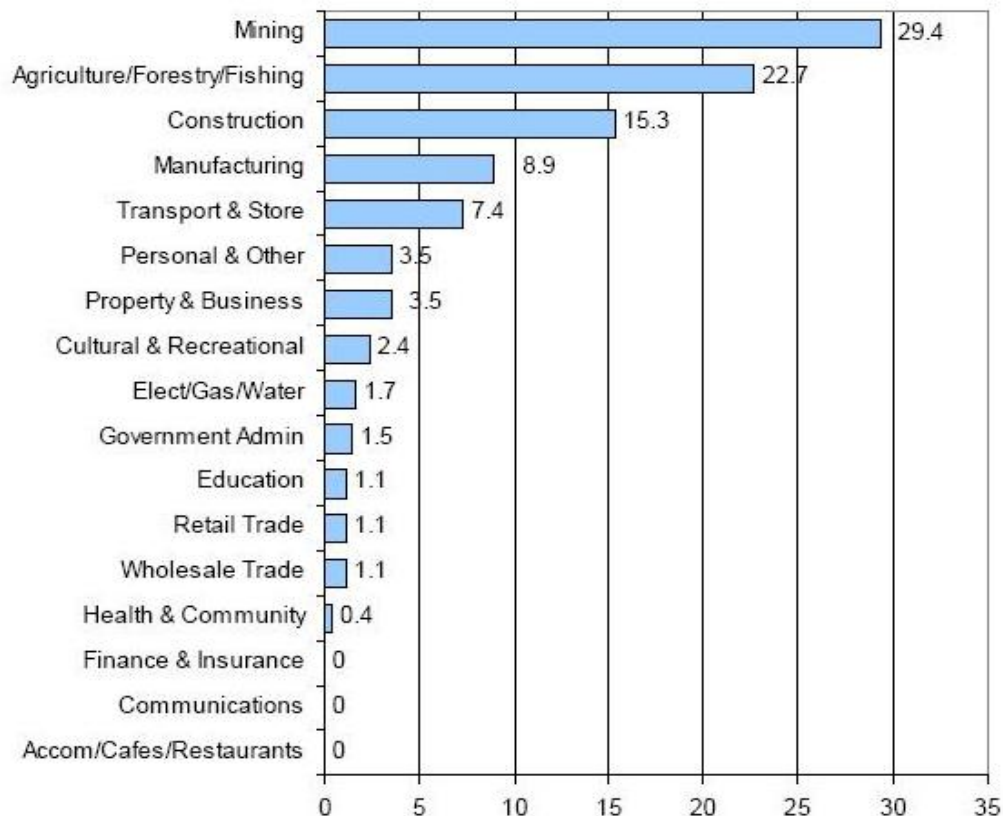


Figure 8. Work-related fatalities in WA 1988-89 to 2007-08 Percentage share of fatalities over all years by industry. Source: Government of Western Australia (2008) p 8.

safety survey with resource industry workers provides an ideal context to explore facial physiognomy. The top industry divisions for work-related fatalities during 2006 to 2017 were Agriculture (29 deaths), Metal Ore Mining (25 deaths), Construction Services (19 deaths), and Road Transport (18 deaths). During the 2016 – 2017 period the Construction industry had the largest proportion of fatalities, five deaths or 25 percent of total deaths. Looking at the 2006 to 2017 mining accounted for 14.3 percent of fatalities of all fatalities in Western Australia for the 11 year period, or 30

workers. See Figure 8, and for a comparison, Figure 9, showing there has been a change since starting this research study. Mining is now ranked third for fatalities.

These workplace injury statistics are well short of the national vision of ensuring Australian workplaces are free from death, injury and disease (Commonwealth of Australia, 2005; National Public Health Partnership, 2004). To achieve this target, one of nine priority areas for action in the National Occupational Health and Safety Strategy 2002-2012 is to increase occupational health and safety awareness.

“Raising community awareness and expectations is an important element in strengthening workplace commitment and motivation for higher standards of OHS performance. Such programs can assist in the community accepting that work-related injuries are preventable and not just ‘part of the job’. The messages of community awareness programs need to be targeted to specific audiences and provide for a response through structured follow-up activities, events and programs”, (p 12).

While this excerpt from the strategy document presents an outline for best practice and evidence-based research and practice and the role of occupational safety and health in public health, it is also important to recognise that the model is one of setting the benchmark too high creating tension between actions, practice, evidence, knowledge types, and values in the context on workplace settings. Building on the National Occupational Health and safety Strategy is the Australian Work Health and Safety Strategy 2012-2022. Within this document, three national targets are set to be achieved by 2022.

- A reduction in the number of worker fatalities due to injury of at least 20%.
- A reduction in the incidence rate of claims resulting in one or more weeks off work of at least 30%.

- A reduction in the incidence rate of claims for musculoskeletal disorders resulting in one or more weeks off work of at least 30%.

Public health communication is founded on the assumption that injury prevention reflects behavioural and environmental elements with an emphasis on strategic behaviour change and communication frameworks. Awareness alone is not sufficient. It is said that these priority actions and objectives will be achieved through the adoption of better designed public health communications and assuring adequate exposure to messages in the workplace, the result of evidence-based public health communication research and social and behavioural research (Commonwealth of Australia, 2005).

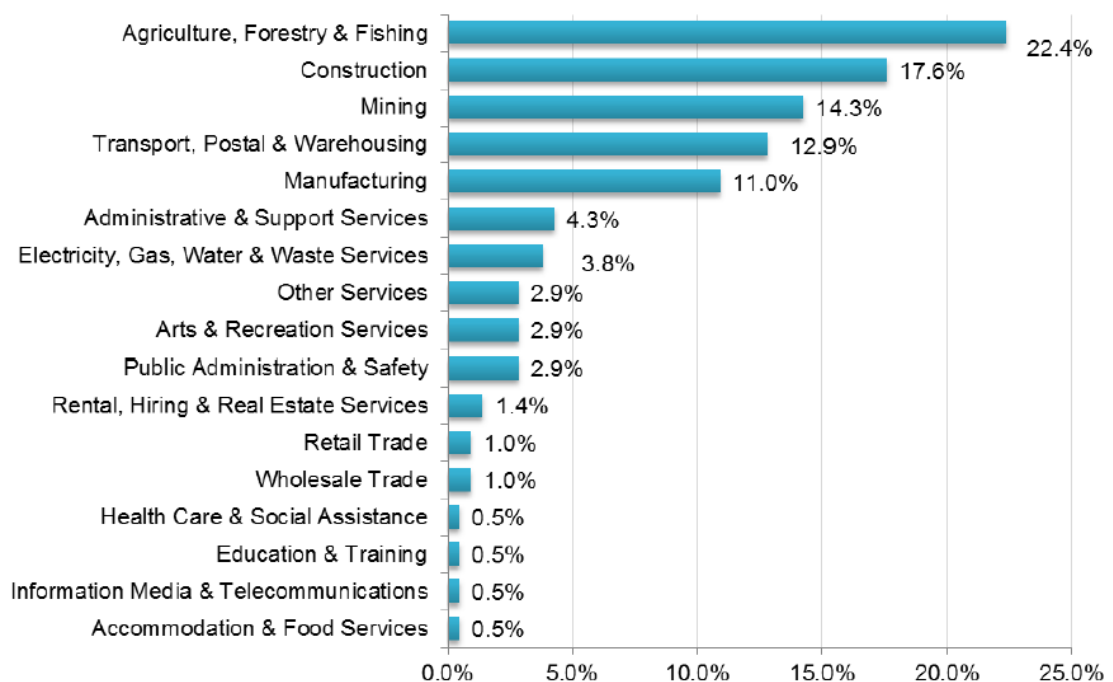


Figure 9. Proportion of work-related fatalities by industry 2006 to 2017. Source: Department of Mines, Industry Regulation and Safety 2018 p. 26

Electrical Safety

My initial proposal was to explore a public health communication using a male avatar as the experimental condition and lockout tagout as the context. Lockout/tagout

is a common process of isolating machinery in the resources sector to control hazardous energy sources when maintenance and servicing of machinery is being performed. Employees are required to attend a training session which involves the use of the lockout/tagout system as a part of their induction. “Employees taking part in this lockout/tagout procedure must be trained and retrained annually” (Hagan, Montgomery, & O'Reilly, 2001). Based on this information and with authority from Worksafe WA it was proposed to utilise the lockout/tagout system as the theme for a message that will give context to this study.

Unfortunately, the pre-test of the avatar conducted with five students for the lockout tagout questionnaire was not reported on favourably and it was decided to utilise a real advertisement. This is because the survey instrument was too long, and the students were unaware of the lockout/tagout system. After investigating a number of options, an advertisement for reporting workplace injury was selected. Worksafe WA have a website and toll-free phone number for reporting an injury but do not have any advertising for this resource. I chose a Canadian advertisement produced by Worksafe BC as this advertisement had a male endorser along with the details in the message.

Decision Judgements Under Uncertainty

It is known that people utilise both memory-based retrieval and message-based context information to assess the likelihood of an event, for example, when making an inference regarding another person's ability to cause harm based on facial cues and subsequent behavioural intentions such as approach or avoidance (Meyers-Levy & Tybout, 1997; Todorov, 2008). Risk assessments related to approach or avoidance are based on an availability heuristic or ease with which something can be retrieved from memory, and a representative heuristic, for example, the trait characterisation of a

another person from their facial characteristics (Tversky & Kahneman, 1974). According to Tversky and Kahneman (1974) “the confidence they have in their prediction depends primarily on the degree of representativeness (that is, on the quality of the match between the selected outcome and the input) with little or no regard for the factors that limit predictive accuracy” p. 104. From a practical standpoint, the use of an endorser in workplace health promotion and advertising not only involves decision judgements of trustworthiness and dominance as demonstrated by Todorov (2008), but also a self-risk assessment of memory-based and message-based factors, for example, past experience and knowledge of the context and the risk associated with the other person’s ability to cause harm or death and subsequent approach/avoidance intentions (Parker, 1999). This study explored the representative heuristic approach examining how a message audience collectively responds to the facial characteristics of a message endorser in a hypothetical advertisement for electrical safety, and how the results translate when compared between Todorov’s computer generated prototype of trustworthy/untrustworthy and dominant/submissive facial characteristics. This study will also elaborate on the understanding and theory of physiognomy during the creative stage of workplace health promotion message development by the message source with in-depth interviews collected from experts in the field.

Limitations

This study focused on manipulation or morphing of facial physiognomy as an independent variable. The focus for dependent variables were recall, agreement, likelihood to practice, and belief. The population sample for the questionnaire survey was limited in the number of people who consent to participate. All data was self-reported and thus the results may not be fully representative of the general population.

Chapter Three: Methodology

Statement of the challenge

The philosophical argument throughout my study is one of scientific realism. Reality can be studied at different levels, so forms of levelism have often been advocated in the past (Brown, 1916). Of course, the theory of ontological levels and the chain of being goes as far back as Plotin and forms the basis of at least one version of the ontological argument (Brown, 1916). Since then, levelism has enjoyed great popularity (Bandini & Vizzari, 2013). However, after decades of useful service, levelism seems to have come under increasing criticism, however, I believe that these reports have been greatly exaggerated and support levels of scientific realism.

Consider the following varieties of levelism currently available in the philosophical literature:

- epistemological, e.g., levels of observation or interpretation of a system (Marr, 1982);
- ontological, e.g., levels (or rather layers) of organization, complexity, or causal interaction etc. of a system (Craver, 2004);
- methodological, e.g., levels of interdependence or reducibility among theories about a system (Floridi, 2011); and
- an amalgamation of the above three, e.g., as in Oppenheim and Putnam (1958).

Indeed, philosophical realism aims at a discourse to make true statements about the subject matter, and in this study chose to apply scientific realism. The legitimacy of the philosophy of facial physiognomy chemistry is both an old and new problem. In my thesis, it is argued that there is no need for metaphysical or ontological underpinning to describe how the anatomy of a person's facial chemistry and the claim that it influences

trustworthiness and dominance reactions. The issue can be elucidated in terms of the philosophy of science, and the reader, accepting practical scientific realism.

But there is a paradox. On the one hand, sociologists have by and large kept their distance from these studies of ontological narrativity (MacIntyre, 1980; Ricoeur, 1979; Taylor, 1989). Yet on the other hand, sociology has shown an immense interest in theorizing about the very themes these new approaches to narrative are addressing--the study of meaning, social action, social agency, and most recently, collective identity. Indeed the last two decades have been notable for the number of heroic efforts by sociologists to recast' social analysis along the central axes of the interaction between agency and structure--that is, to develop a social theory that allows for human action which is nonetheless bounded and constrained by structural restraints (Coleman, 1990; White, 1992). In the context of post-positivist sociology, realism has emerged as a powerful and compelling epistemology for this thesis. In transferring this scientific realism into a philosophical study of natural science, realism splits into two parts. A strict highly naturalistic realism, and a reflexive or more mediated critical realism, both providing a better understanding of sociological theory and the construction of sociological explanations of the influence of facial physiognomy theory.

The validity of social evaluation of faces, i.e. facial physiognomy, as a symbolic language, allows people to understand other people according to universal social laws to prepare the person making the social judgement for appropriate action. From an epistemological point of view facial physiognomy and the perception of having an ability to infer trait characteristics from the face gives rise to a salient question: What is the source of the knowledge? The categorical rendering of truth fails because our epistemic life fails to capture the many subtleties of the truth or falsehood of these judgements. According to Alexander Todorov (2008) these social trait judgements

from faces are not necessarily accurate. From the constructionist approach, by contrast, the framework focuses on the message destination or message receiver of an arbitrary scheme which satisfies the human imagination and is largely fictional. Through a process of assimilation and accommodation, knowledge is internalised by the message destination and it might be asked at that point: What knowledge will the destination recall? Given that there are multiple scales for measuring both broad and targeted advertising audience opinions, and varied workplace contexts whereby advertising content is created; the application of advertising opinion surveys by message source experts, and the advantage of insider knowledge by the message source, renders the application of similar research methods unpredictable. Hence, it is proposed to conduct a mixed methods research study. A qualitative study of the message source, within the framework of the purpose and research questions of this study with the literature providing some guidance in the types of concepts utilised, and a quantitative survey study of the message destination or audience utilising established marketing scales, reactions to advertising stimuli scales and behaviour measures.

To examine the influences of facial physiognomy I have explored two philosophical questions; realism about the unit of science? and the contexts of the realism? I have achieved this by conceptual and empirical inquiry by way of a local case study, in addition a survey of over 1000 respondents comprising of approximately 500 students and 500 fly in fly out workers.

Qualitative and Quantitative Method

There is debate in the literature over the relative virtues of quantitative and qualitative methodology which has gained considerable impetus to my selecting a mixed method thesis study. The set of doctrines and practices of the two methodologies

varies somewhat from author to author or is defined with varying dimensions of distinction. There is substantial agreement about the fundamental contradictions between the two methods and their practical implications for the conduct of research. Distinctions between the two methodologies is deduced from a tendency for philosophical issues and technical issues to be looked upon simultaneously and occasionally to be perturbed and thrown into disorder. Philosophical issues for my study relate to asking for the answers of epistemology or the apt under-structure for the study of social interactions and its explanations for reactions to facial characteristics. By comparison, technical issues bespeak the consideration of the advantage or suitability of methods of research in affiliation to one another. The decision to use an epistemological base, leads to a selection for a methodical method on the line of reasoning of its greater correctness granted the preceding philosophical deliberations. The argument between choosing either a qualitative or quantitative study occasionally becomes confused, and this is particularly so when researchers have tried to demonstrate the similarities and differences between the two methodologies. A Google Scholar search of the internet revealed qualitative and quantitative comparisons on almost every research topic. In addressing this concern, I have contemplated the term methodology, whether described as quantitative or qualitative, as referring to an epistemological mixed method position. Mixed method qualitative research can fall into one of two camps. Firstly, it can be tied to a theoretical or epistemological method, or alternatively, it can be independent of theory or epistemology and framed as a realist or experiential position. The qualitative component of this study involved conducting a framework analysis (Krippendorff, 2004) of in-depth interviews with a sample of practitioners drawn from the advertising, marketing, model casting, health promotion, and occupational safety fields to add practical knowledge to the study. This research

study clearly falls into the second camp mentioned above. While some argue that qualitative research should fall into a particular school of thought, i.e. positivism, post-positivism, neopositivism, critical theory, humanism, imperialism, and so on, in general, this qualitative research utilised occupational and professional ideologies to communicate the research findings and practical knowledge (Davidson & McAllister, 2002; Denzin & Lincoln, 2000; Fossey, Harvey, McDernott, & Davidson, 2002). That is, health promotion in a public health context is recognised as a multidisciplinary profession which draws perspectives from many disciplines. As a result, there is a proliferation of conceptual and theoretical models from which the health or message promoter can choose. The theoretical freedom offered with this research, utilising framework analysis as a research tool is such that the results or practical knowledge are compatible across both health promotion and occupational safety paradigms in a broad public health framework. Communication and participation are inherently linked to public health and are as such health promoting in an occupational safety or workplace health promotion setting. For this research, data from in-depth interviews were collected. The interviews lasted for a period of approximately one hour each and explored the interviewee's practices and beliefs regarding endorser selection. It was proposed to utilise a semi-structured interview schedule as a guide although the interviews may vary somewhat. The interview schedule was pilot tested with an expert from an advertising agency during the development stage. While the focus of the interviews was on the influence of endorser facial characteristics, trustworthiness, and dominance, the outline was on the following points to replicate and extend previous research. The semi-structured questionnaire asked about reasons for utilising endorsers, how endorser selection decisions are made, and how endorser campaigns are executed

(Erdogan, Batra, & Tagg, 2001). To extend the research of Erdogan, Batra, and Tagg, the following themes were added to the questionnaire;

- Methodology of endorser/spokesperson selection;
- Characteristics looked for in a potential endorser/spokesperson;
- Perceptions of the socio-economic environment in understanding the utilisation of endorsers;
- Beliefs about the use of endorsers in workplace health promotional materials;
- Perceptions of successful workplace health promotions or advertisements that utilise an endorser/spokesperson and barriers to success;
- Perceived training needs to develop endorser selection skills.

Recruits were fully informed that these are the topics being investigated.

Individuals were initially contacted by telephone with a follow-up email to confirm details regarding where and when the interview was to take place. A sample size of 12 to 33 is considered to be sufficient for a framework analysis (Brunt & Courtney, 1999; Sherry, 1991). It was expected that most interviews would occur in the interviewee's workplace. Recruits were informed that their participation was both voluntary and confidential. Interviews were recorded with an audio-recorder and transcribed verbatim to perform a thematic analysis. A semi-structured questionnaire was pilot tested with a student from a marketing and advertising course who was asked to evaluate their understanding of the questionnaire and how they would improve the question design and sequencing.

A mixed method quantitative experimental study was utilised to augment the qualitative study and to gain an understanding of the influence of physiognomy on

workplace health interventions. That is, while the qualitative study collected data from the information source or message source, data was also collected from the receiver or message audience. The qualitative study provided data that served to triangulate the research with regard as to how and why message creators select an endorser for their promotions. This gave a fuller and richer understanding of the concepts and categories, and captured the meanings of quantitative relationships and when making sense of the outcomes from the message recipients data adding to the precision and inferential quality of the study.

The quantitative study explored the influence of the facial physiognomy variable on endorser and advertising effectiveness variable measures. The specific independent variable to be assessed was facial physiognomy. Five versions of facial physiognomy were assessed with semantic differential scales and specific open-ended questions in the pilot study and ten versions of facial physiognomy were assessed in the main studies along with three open ended questions. Participants were randomly assigned to five groups, a neutral face or control group, a more trustworthy face group, a less trustworthy face group, a more dominant face group, and a less dominant face group. A total of 19 questions were asked using a structured questionnaire, 71 semantic-differential scale items, 1 multiple choice, and 3 open ended. The construction and validation of these scales and questions are described under the heading group 2 & 3 in the methods and materials section of this thesis. Demographic questions such as age, gender, level of education, and occupation type are also included. The questionnaire was pilot tested with a group of 100 ECU students, 20 in each condition, during the development stage. Respondents were informed that they are evaluating a workplace health promotion advertisement so as not to bias the research questions.

Research Questions

A good research question is robust, and has a clearly identifiable theoretical construct, contributes to an understanding of the construct, and meets the criteria of transcendence of data.

After doing some preliminary research and brainstorming possible research questions I decided that this study would determine the following:

To what extent does facial evaluation influence the effectiveness of a hypothetical health promotional image in an occupational health and safety context? The question extends the work of Osterhoff and Toderov and relates to recommendations for further research.

Sub Questions

In narrowing the focus, in philosophy and related areas of science there are metaphysical and scientific questions about the nature of facial physiognomy. On the other hand, there are normative and epistemological questions about the nature of facial physiognomy. It is customary to distinguish between an obvious and compelling argument. I clarify the question further by considering the arguments with the following two sub-questions:

1. Do changes in the dominance and trustworthiness dimensions of facial physiognomy of a message presenter influence workers' perception of the validity of an occupational safety and workplace health advertisement?

2. Does facial physiognomy influence recall of information in the delivery of occupational safety and health messages among employees working in the resource sector in Western Australia?

Hypotheses

Most philosophers of science maintain Confirmationism's central tenet, namely, that scientific theories are probabilistically confirmed by experimental successes. Against this dominant (and old) conception of experimental science, Popper's well-known, anti-inductivistic Falsificationism ('Deductivism') has stood, virtually alone, since 1934 (Popper, 2002). Indeed, it is Popper who tells us that it was he who killed Logical Positivism. The received view of an advertisement hoc hypothesis is that it accounts for only the observations it was designed to account for, and so non-ad hocness is generally held to be necessary or important for an introduced hypothesis or modification to a theory. Familiar and firmer criteria for evaluating the hypotheses or modified theories so classified are characteristically available. These points are obscured largely because the received view fails to adequately separate psychology or sociology from methodology or to recognise ambiguities in the use of "ad hoc". A hypothesis can only be empirically tested and only after it has been advanced. My thesis is based upon deductive inferences to argue from the truth of the below listed singular statements or the falsity of those statements. The way in which I answer to these statements largely depends on my attitude to science. I would say that I am coming from a positivist position seeing empirical science as a system of statements which satisfy certain logical criteria such as meaningfulness and verifiability. This view of which methodology is an empirical science is in its turn a study of actual behaviours of

scientists, or of the actual procedure of science, may often be called a naturalistic methodology or an inductive theory of science.

Two simple methodological hypotheses are given to answer the previously mentioned sub-questions:

1. The dominance and trustworthiness dimensions of facial physiognomy of a message presenter influence workers' perceptions of the validity of an occupational safety and workplace health advertisement.
2. Facial physiognomy influences recall of information in the delivery of occupational safety and health messages among employees working in the resource sector in Western Australia.

Once these hypothesis statements have been tested they will add to the facial physiognomic literature and theory.

Study 1 Qualitative Methods and Materials

A sample of potential recruits was selected through Yellow Pages listings of advertising, marketing, and modelling/casting agencies in the Perth area as shown in Table 2. A full listing was obtained, and each agency was allocated a number for anonymity and to facilitate the selection of a purposive sample. Informants were screened and identified for inclusion criteria as being broadly knowledgeable or experienced regarding endorser selection and utilisation in print advertising or promotions. Some expected titles included Managers, CEOs, Account Directors, Creative Directors, Casting Directors, Planning Directors etc. Individuals were identified and associated with a random number for anonymity and contacted by

telephone. To increase representativeness a quasi-random sampling plan was implemented by associating agencies and individuals with random numbers, recruits were selected by using a random numbers table.

Comparison with the original Princeton study is shown in Appendix A. Semi-structured in-depth interviews were conducted utilising the draft interview schedule shown in Appendix E. Interviews were digitally recorded, transcribed, and imported into NVivo 10 for analysis. Respondents signed an Informed Consent Form as shown in Appendix F.

Study 2 & 3 Quantitative Methods and Materials

The questionnaires used for this part of the study are attached in Appendix B, Appendix C and Appendix D. As a measure of overall believability of the advert the advertising perceived believability scale was utilised (Beltramini, 1988). The advertising believability scale is a 10-item semantic differential scale with a Cronbach's alpha of .94. The mean and standard deviation were, 4.30 0.60, respectively, with a sample size of 727. The scale was developed via 584 student responses evaluating 3 adverts. Responses were recorded on a five-scale format however, for the purposes of the present study, responses were captured using a seven-point scale format. The items were: unbelievable – believable, untrustworthy – trustworthy, not convincing – convincing, not credible – credible, unreasonable – reasonable, dishonest – honest, questionable – unquestionable, inconclusive – conclusive, not authentic – authentic, and unlikely – likely (Bearden & Netemeyer, 1999).

Participants were asked to indicate their agreement with the message testimonial on a single item measure 1-7 scale, disagree – agree. Positively framed versus negatively framed advertisements have an effect-priming on decision judgements.

Positively framed advertisements are persuasively more effective and people are more agreeable in their attitude toward both the visual of the advert the written text than negatively framed material (Chang, 2005; Garg, 1996; Smith, 1996). In this study, attitude toward the advert was measured with a single item on a 1-7 scale, negative – positive (Yi, 1990).

The source-credibility scale (Ohanian, 1990) was utilised as a dependent measure regarding participants' opinions of the endorser. This measure is a 15-item scale incorporating three dimensions - expertise, trustworthiness, and attractiveness. Five items for each dimension are scored on a seven-point Likert scale. The items of this scale are: attractiveness: unattractive – attractive, not classy – classy, ugly – beautiful, plain – elegant, not sexy – sexy; trustworthiness: undependable – dependable, dishonest – honest, unreliable – reliable, insincere – sincere, untrustworthy – trustworthy; and expertise: not an expert – expert, inexperienced – experienced, unknowledgeable – knowledgeable, unqualified – qualified, unskilled – skilled. The scale was developed using exploratory factor analysis to derive each of the items. Confirmatory factor analysis was utilised with a further sample in order to validate the final items in each dimension. The three subscales have high construct validity: attractiveness .90, trustworthiness .89, and expertise .89.

To study the influence of endorser dominance the perceived dominance scale was utilised (Manusov, 2005). This measure is a 10-item scale scored on a seven-point semantic differential scale. Scale items are dominant – submissive, confident – unconfident, low status – high status, sluggish – energetic, hesitant – decisive, aggressive – meek, outgoing – withdrawn, silent – talkative, dynamic – passive, awkward – poised. Manusov (2005) reported an alpha of .66 to .92 for the scale.

An additional question was asked to assess respondents' belief of physiognomy - "is it possible, in your opinion, to know an individual's personality traits from looking at his or her face?" (Hassin & Trope, 2000). This measure was developed by Hassin and Trope as a measure of belief in physiognomy at a point in time. The author's used a four-point differential scale: possible to know all traits (13%), many traits (26%), a few traits (36%), and not possible to know any traits (25%). One quarter of respondents from this study indicated that they were non-believers in physiognomy (Hassin & Trope's results are shown in brackets).

Because of the cluttered media environment associated with print media an advertisement audience tends to tune out resulting in a negative effect on attention to and memory recall regarding the advertisement. Three open ended questions were included in this study. One question asked respondents to freely recall some of the visual domain. The other asked respondents to freely recall the textual or semantic domain. The responses from these three questions was quantified into a score from 0 – 5. Additionally, respondents rated how interesting they found the advertisement as a measure of attention. Research indicates that an increase of attention or interest correlates with increased free recall (Burke & Srull, 1988).

Demographic data was collected to describe the sample. The questionnaire captured Gender (male/female), Age (age at last birthday), Education (less than university degree/undergraduate degree/post-graduate degree), Occupation (self-reported).

Further Clarification

Replication of this study was achieved by performing the same methodology with a sample of university students compared with a sample of resource sector

workers. Several limitations of my results should be addressed; Darwin waited some twenty years to publish his discovery in the *Origin of Species*. One explanation is that he feared the backlash reaction to the materialist implications of linking humans with animals. In this thesis, I have argued that there is evidence that people do make judgements about the trustworthiness and dominance of other people. Like Darwin, the history of the suppression of scientific thought and the evolutionist argument is alive and well in theories of religion to name only one view. Here I challenge the view of the universality of physical laws to emphasise the most radical proponents of the influence of facial physiognomy and disagree with the spiritual propositions of religion belief. The non-belief of some humanists is in culpable. Darwin almost did not have the opportunity to voyage around the world because Captain Robert Fitzroy believed in physiognomy (Kutschera, 2018). He thought that a man with such a nose would ne be good company for the voyage. Darwin was acutely aware of the social consequences of equating humans with animals and thus shied from publicly revealing his views until the intellectual climate became more tolerant. If this representational definition prevails, then, scientists must continue to view the influence of facial physiognomy as the epistemological other and in symbolic contrast to a causal explanation. After all, if my research results are correct, then everything we know from making families, to coping with illness, to carrying out strikes and revolutions are at least in part a result of numerous cross-cutting influences of other people's faces and their story lines in which social actors locate themselves (Somers, 1992). The main emotional obstacles to accepting evolution are its apparent conflict with valued beliefs about God, souls, and morality. It is tempting in explaining the phenomena of the origins or persistence of religious belief as the evolution of cultural artefacts and behaviours. The results are

worth waiting for because they challenge the search for the truth conditions and knowledge claims about the influence of facial physiognomy.

Chapter Four: Research Design

This chapter presents a general typology of the research design featuring the utilisation of mixed methods. The emphasis is on the more complex theoretical framework, and adaptation of a rigorous research design. The typology includes varying degrees of the mono-method designs, that is, qualitative and quantitative, and features mixed method dimensions that have been used by other authors. Certain types of research problems call for specific approaches. As a doctoral student, I found that understanding the various types of research designs daunting. The issue that needed to be addressed is identifying factors that influence the outcome of facial physiognomic interactions. Figure 10 illustrates how this study utilised a mixed method quasi-experimental, between groups design. Qualitative data were collected from Group 1 (e.g. expert information or source participants, and themes categorised and analysed). Quantitative data were collected from Group 2 and Group 3 (e.g. message audience participants, and group means and standard deviations analysed by categories). Results were compared with respect to endorser trustworthiness and dominance characteristics and message believability. A research framework shown in Figure 10 depicts the message information source, e.g. Group 1 participants, the independent variable e.g. physiognomy, the message audience, e.g. Groups 2 and 3, and the dependent measures.

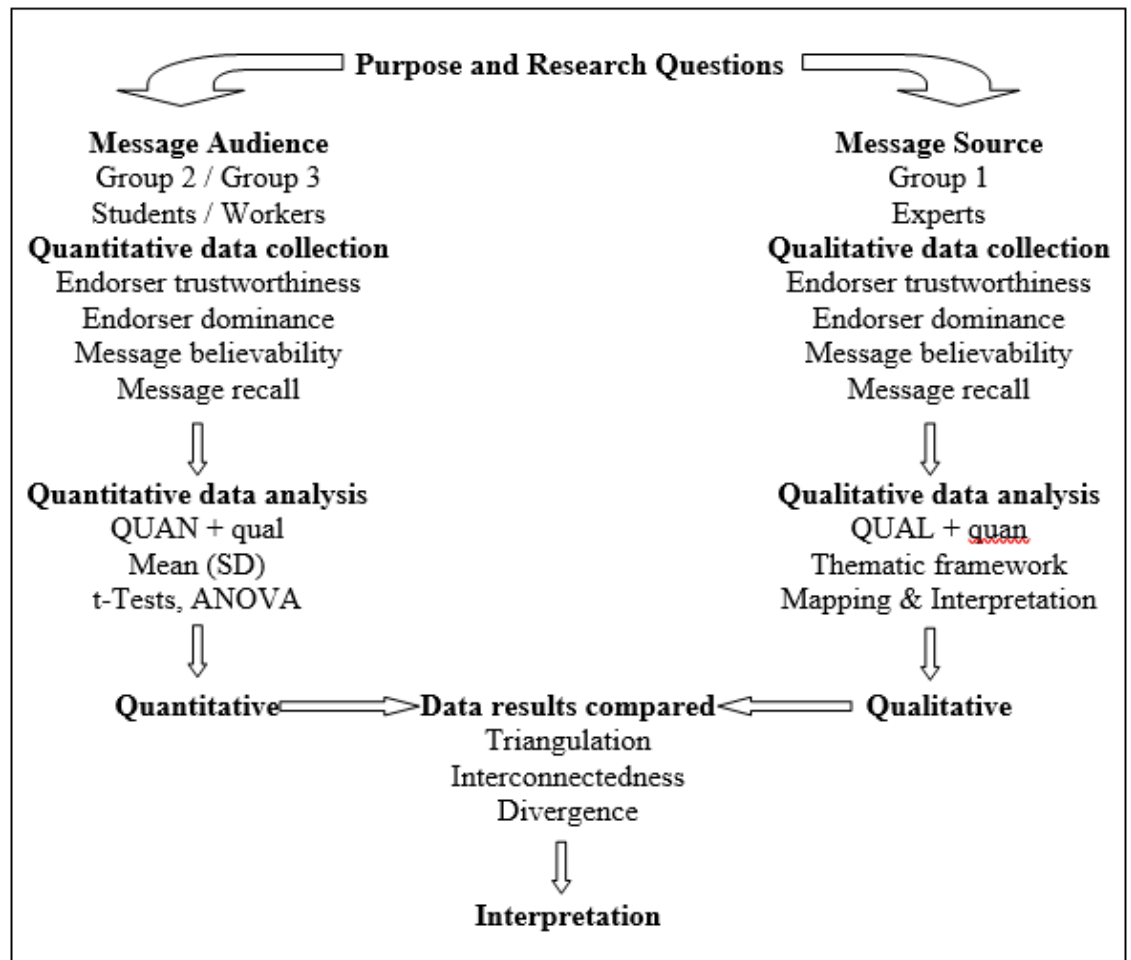


Figure 10. Graphic presentation of the research design.

For the quantitative portion of this study, the independent variable (facial physiognomy) was manipulated to present five versions of an endorser's face. A morphed neutral face was used as a control. The manipulated versions show faces morphed by less trustworthy, less dominant, more trustworthy, more dominant, neutral trustworthiness dimensions (See Figure 11). All other information presented to respondents was the same.

Independent variables (pilot study) – Facial physiognomy

1. Less Trustworthy face -3 Standard Deviations
2. Neutral Trustworthy face 0 Standard Deviations
3. More Trustworthy face +3 Standard Deviations
4. Less Dominant face -3 Standard Deviations
5. More Dominant face +3 Standard Deviations

Independent variables (main studies) – Facial physiognomy

6. Less Trustworthy face -8 Standard Deviations
7. Less Trustworthy face -4 Standard Deviations
8. Neutral face 0.0 Standard Deviations
9. More Trustworthy face +4 Standard Deviations
10. More Trustworthy face +8 Standard Deviations
11. Less Dominant face -8 Standard Deviations
12. Less Dominant face -4 Standard Deviations
13. Natural face – Standard Deviation not known
14. More Dominant face +4 Standard Deviations
15. More Dominant face +8 Standard Deviations

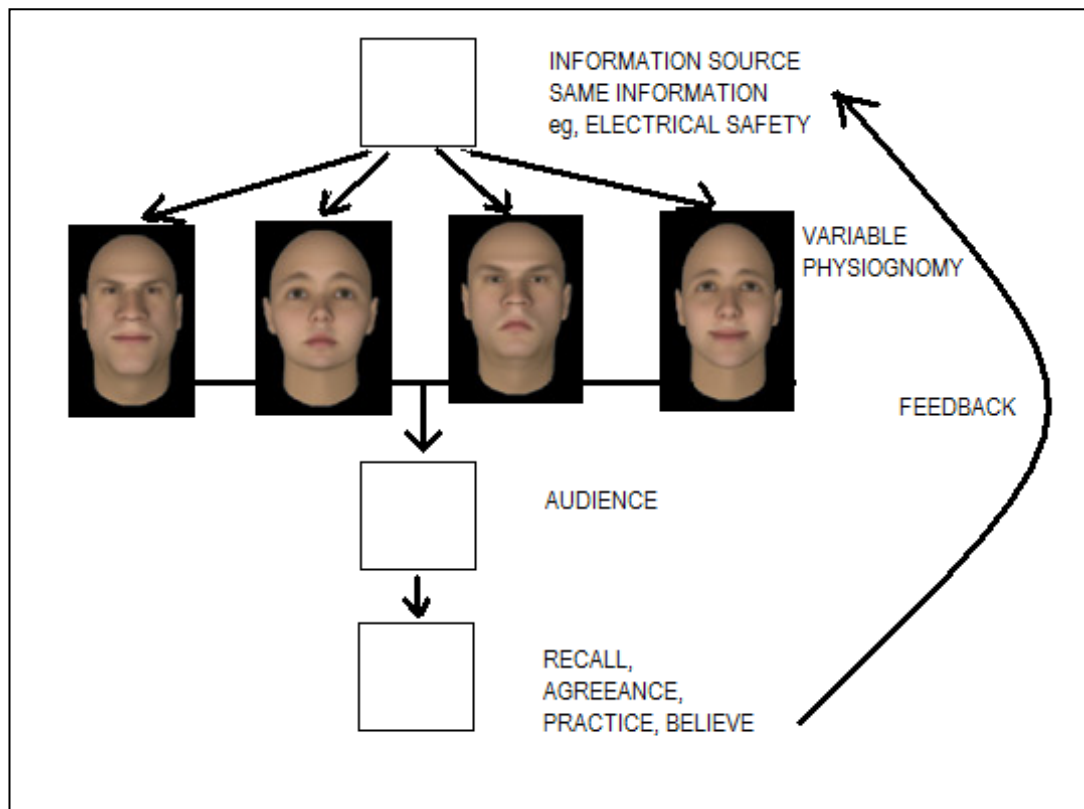


Figure 11. Research framework with physiognomy as an independent variable.

A total of 19 questions formed the dependent measures using a structured questionnaire, 71 semantic-differential scale items to assess attitude toward the advertisement, attitude toward the endorser, and behavioural intention, 1 multiple

choice to assess belief in physiognomy, and 3 open ended question to assess recall of information presented in the advertsment.

- Advert believability 10 items 1-5 scale
- Attitude toward the testimonial 4 items 1-7 scale
- Endorser credibility 5 items 1-7 scale
- Endorser trustworthiness 5 items 1-7 scale
- Endorser attractiveness 5 items 1-7 scale
- Endorser dominance 10 items 1-7 scale
- Belief in physiognomy 1 item 1 of 4 choices
- Recall of advert information/text dimension 1 item 1-5 points
- Recall of advert visual dimension 1 item 1-5 points
- Endorser approachability/avoidance 2 item 1-7 scale

Population and Sample

Three different groups were selected to participate in this study: Group 1 consisted of 100 psychology students, Group 2 consisted of 500 students, and Group 3 consisted of 500 fly-in/fly-out workers.

Group 4 consisted of a minimum of one recruit from either the government occupational safety sector, from the government health sector, from an advertising agency, from a modelling agency, or from a marketing company. The participant was interviewed in-depth to capture the essence of model or endorser selection methods in the current Western Australian culture, and views on occupational safety and workplace health promotion in Western Australia. Organisations that were contacted to participate include those listed in Table 2. This study was limited to a case study selected from a population of approximately 458 organisations and government agencies.

Table 2.

Potential participant companies sample composition

Business Type – Perth WA	Results
Advertising agencies	108
Casting Agencies & Consultants	12
Model Agencies	23
Marketing Services & Consultants	122
Occupational Health & Safety	160
Health Support Organisations	28
Government Agencies	5
Total	458

A sampling frame was identified aiming for one significant participant per organisation type as shown in Figure 12. As a starting point the number of permanent employees was determined, which was indicative of the size of the organisation. This indicator was useful for comparative purposes to distinguish between large and small organisations. Gender, age and years of experience in the industry were also included to measure the influences of these variables. Previous utilisation of endorsers was also included as an essential selection criterion when selecting the purposive sample.

Organisation Type	No. Of Employees	Respondent ID	Gender	Age	Position	Length of Experience	Endorser Selection
Type 1			M/F	years		years	Y/N
Type 2							
Type 3							
Type 4							
Type 5							
Type 6							
Type 7							

Figure 12. In-depth Interview Sampling Matrix for Data Collection of Facial Physiognomy and Endorser Selection Opinions.

Group 2 comprised of (n=500) undergraduate or postgraduate student volunteers recruited from Edith Cowan University. Students, from the fields of psychology, communication and arts, occupational safety, and health promotion, were approached during class contact time. Recruits were asked to participate in a small survey questionnaire to assess the reliability of an occupational safety and health advertising message. Data collected from this part of the study was anonymous and voluntary. Students were a suitable sample population in that they are gainfully occupied with their studies. Class contact time is deemed part of their usual occupation.

Group 3 consisted of (n=500) employees recruited from the resources sector in Western Australia. The workers were selected utilising a purposive sampling strategy. In partnership with a major rural airline company, the researcher was given access to the airline's terminal at Perth airport to conduct the research. Workers in the departure lounge were invited to participate in the research project by completing a short survey to assess the reliability of an occupational safety and health message. Data collected was anonymous and voluntary.

Instrument Development and Pilot Testing

Instruments were developed during 2009 as shown in Figure 13. The qualitative interview schedule containing semi-structured and open-ended questions was further developed during June/July of 2009. The interview participants (n=5) were interviewed for approximately one hour. Interviews were digitally voice recorded and transcribed. Interviewee's were asked to comment on the terminology used, the content and sequence of questions, and to make any suggestions to improve the instrument. Respondents were also asked to complete a short survey as part of the mixed-method

study. This survey looked at the reasons for utilising endorsers, how endorser selection decisions are made, and how endorser campaigns are executed.

Likewise, the quantitative survey questionnaire containing semantic differential rating scales, multiple choice and open-ended questions, and an advertisement addressing an electrical safety issue in an occupational safety context with visual facial characteristics of the endorser morphed by trustworthiness and dominance, was developed during the same time. Each survey questionnaire contained one of five manipulated facial physiognomic conditions. Participants were instructed to examine the advert containing the morphed visual stimuli and semantic information, then they were asked to rate the advertisement for believability, endorser credibility, and free recall of visual and semantic information contained in the advert. Behaviour intention and scales for manipulation analysis were also rated. Finally, respondents were asked to comment on the terminology used, the questionnaire layout and length, the content and sequence of questions, and further comments to improve the survey questionnaire.

A purposive convenience sample of experts (n=5) and students (n=50) from Edith Cowan University were recruited to pilot test the qualitative semi-structured interview questionnaire and the quantitative survey questionnaire respectively. Recruits were contacted during weeks 1 and 2 of semester 2, 2009.

Efforts were made to purposely select recruits with some knowledge or experience with endorser selection for pretesting the qualitative interview instrument. Interviewee's were given a copy of the signed Informed Consent form. Interviewee's were assigned a random number and no identifying information was stored with the interview records. Pretesting sample selection was purposeful with no limits on controlling conditions with the quantitative survey questionnaire. The pilot qualitative interviews were conducted during weeks 4 and 5 of semester and pre-analysed with

NVivo 10 software. The framework analysis (Krippendorff, 2004; Lacey & Luff, 2001; Pope, Ziebland, & Mays, 2000) was utilised to meet the a priori information needs and develop outcomes or recommendations. Through familiarisation, identification of a thematic framework, indexing, charting, and mapping and interpretation an exploration of the raw data showed possible associations and divergences.

Quantitative stimuli and survey instruments were pilot tested during weeks 5 and 6 of semester and pre-analysed utilising SPSS 24 software. Data were analysed to meet a priori information needs for this mixed-method study. Manipulation checks for internal and external validity were performed for the included scales and compared with published research. Means and Standard Deviations were analysed for the dependent measures.

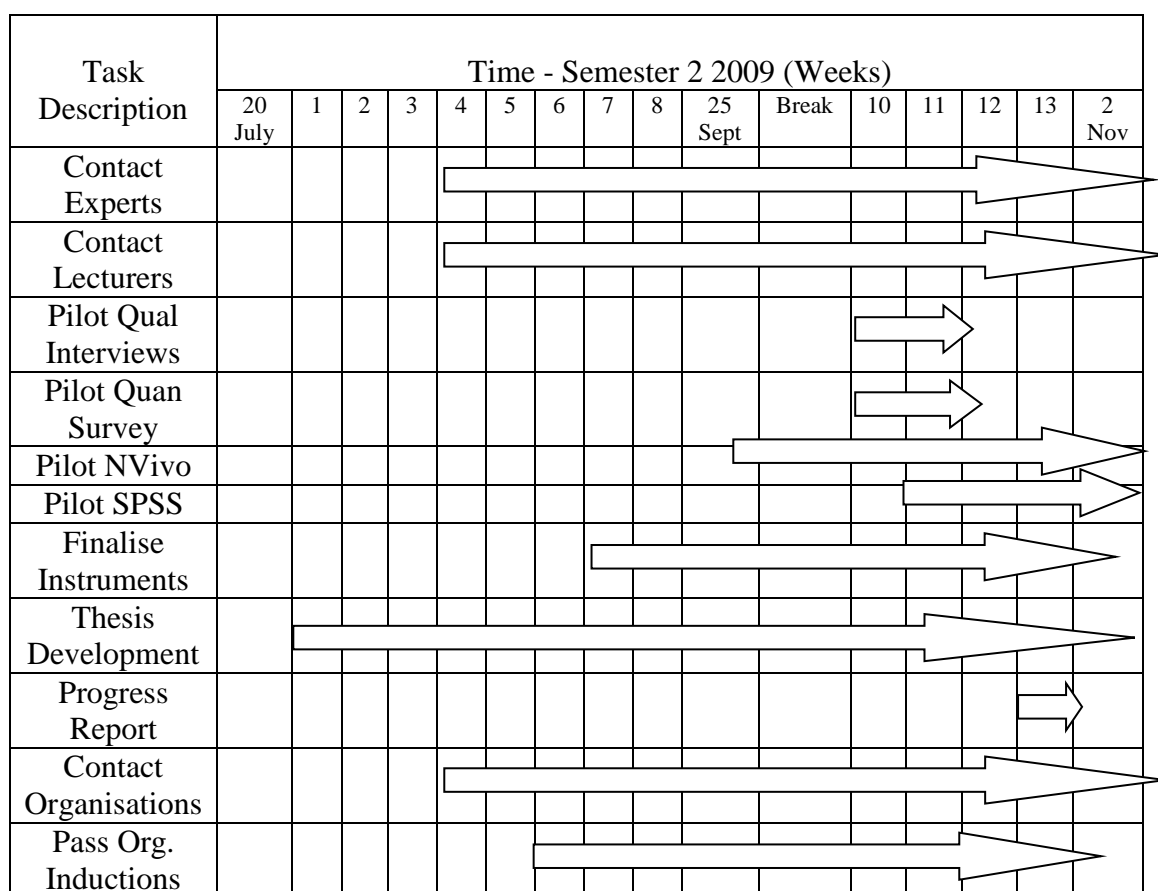


Figure 13. A Gantt chart for developing and pilot testing instruments for this study and preparation to visit a resource sector worksite.

Following pre-testing the final instruments were created and professionally printed ready for distribution and use with experimental groups during the first semester of 2010, as shown in Figure 14. Lecturers and organisations contacted initially during semester 2 2009 were contacted again and permission was obtained to conduct the research surveys.

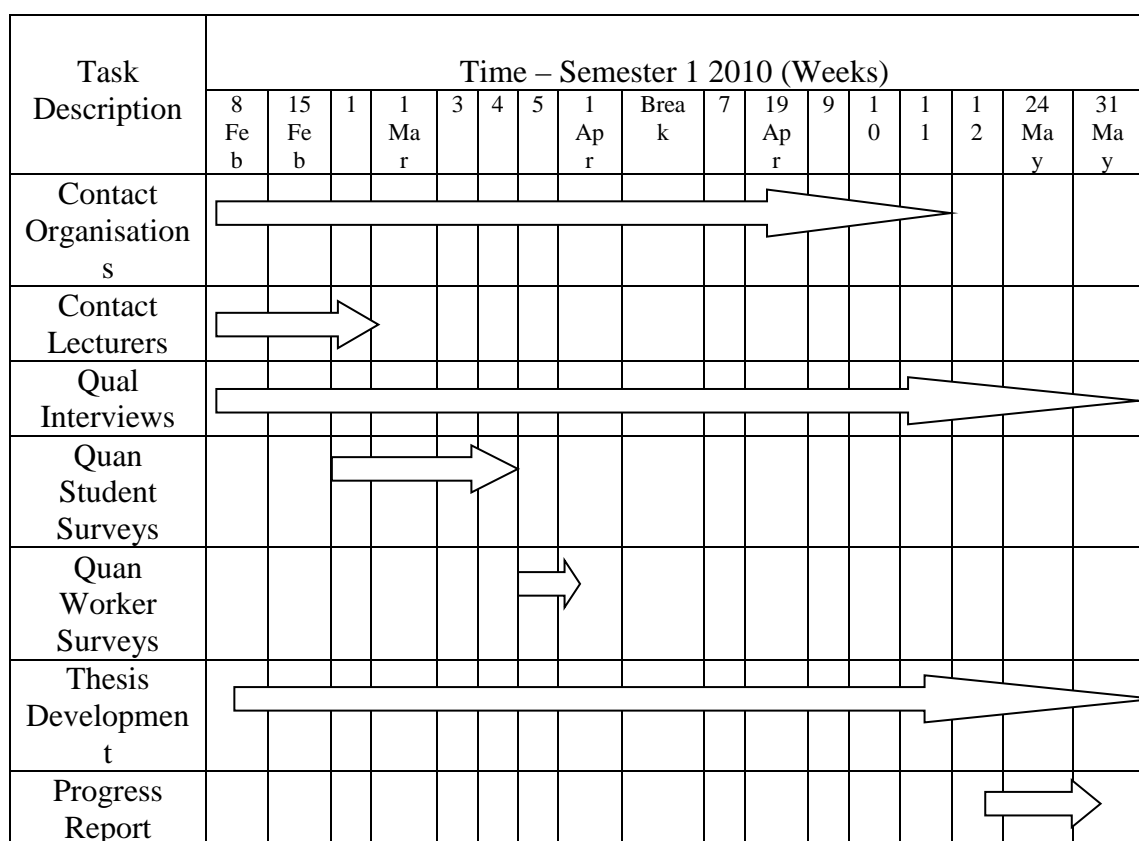


Figure 14. A Gantt chart for the research study's timeline for data collection periods.

Ethical Considerations

Ethics approval was obtained from the Edith Cowan University Human Research Ethics Committee prior to proceeding with the collection of any data. The application covered informed consent, no pressure on individuals to participate, respect for individual autonomy, avoiding causing harm, maintaining anonymity and

confidentiality, and taking care in research with vulnerable groups. Using the universities ethics support, guidance and reporting the research undertaken was of minimal risk. The research proposal was approved by the Human Research Ethics Committee guidelines without further modification being needed. No conditions of approval were placed on the research. Participants in the in-depth qualitative interviews were asked to voluntarily sign an informed consent form before the interviews. The interviews were digitally recorded and then transcribed later. The decision by the recruit to give voluntary informed consent was made after the recruit had received essential information about the study. Participants were given a copy of the consent form for their records. Only the investigator has had access to the digital recordings, transcriptions, and subsequent data. Completed interviews were anonymised and the names of participants were not reported in any of the research outputs. Participants were informed that they may withdraw from the study at any time. Recruits were also fully informed of the issues and themes being investigated.

Study groups 2 and 3 were recruited from Edith Cowan University and worksites in the resources sector in Western Australia. Recruits were over the age of 18 and their consent was inferred by their choice to complete the questionnaire. Participation was voluntary and participants were free to withdraw from the study at any time. No personal or identifying details were collected and the participants remained anonymous. Recruits were informed that the study was investigating the effectiveness of an advertisement concerning an occupational safety and health issue.

Chapter Five: Data Analysis

Questionnaire development

The proposed questionnaire shown in Appendix B was tested on five students from a Western Australian University. Feedback was that the students did not know about lock out tag out. Also, the questionnaire was too long, taking about 20 minutes to complete which would be a large ask for student class time. The questionnaire was revised as shown in Appendix C. This questionnaire was a lot shorter time wise and the face was the prominent component of the hypothetical advertisement.

Pilot Study

Introduction

This study was set up to replicate the Princeton study with the addition of an occupational health and safety context.

Method

This study was a paper and pencil questionnaire which was delivered during class contact time with 100 psychology undergraduates.

Materials

Five images of faces were obtained from Princeton University facial images. The faces were manipulated on dominance dataset, fi_000_dom1 and fi_000_dom6, and on trustworthiness dataset, fi_000tw0, fi_000_tw3 and fi_000_tw6 (Oosterhof & Todorov, 2008). These faces were selected to form the experimental condition for this pilot study. The faces were presented to participants with no modification to the facial features. A testimonial or semantic component concerning electrical safety was added to the images thereby adding an occupational safety and public health communication context to the images.

As a measure of overall validity of the hypothetical advertisement the advertising perceived believability scale was utilised (Beltramini, 1988). The advertising believability scale is a 10-item semantic differential scale with a Cronbach's alpha of .94. The mean and standard deviation were, 4.30, 0.60, respectively, with a sample size of 727. The scale was developed via 584 student responses evaluating 3 advertisements. Responses were recorded on a one to five-point scale format, however, for the purposes of the present study, responses were captured using a one to seven scale format. The item concepts were: unbelievable – believable, untrustworthy – trustworthy, not convincing – convincing, not credible – credible, unreasonable – reasonable, dishonest – honest, questionable – unquestionable, inconclusive – conclusive, not authentic – authentic, and unlikely – likely (Bearden & Netemeyer, 1999).

The attitude toward the testimonial scale (Feick & Higie, 1992) was selected to measure the validity of the semantic component of the hypothetical advertisement. The four component items of this scale explore the general effectiveness, persuasiveness, strength, and effectiveness of the advertisement to influence behaviour.

The source-credibility scale (Ohanian, 1990) was utilised as a dependent measure regarding participants' perception of the endorser. This measure is a 15-item scale incorporating three dimensions - expertise, trustworthiness, and attractiveness. Five items for each dimension are scored on a seven-point Likert scale. The items of this scale are: attractiveness: unattractive – attractive, not classy – classy, ugly – beautiful, plain – elegant, not sexy – sexy; trustworthiness: undependable – dependable, dishonest – honest, unreliable – reliable, insincere – sincere, untrustworthy – trustworthy; and expertise: not an expert – expert, inexperienced – experienced, unknowledgeable – knowledgeable, unqualified – qualified, unskilled – skilled. The

scale was developed using exploratory factor analysis to derive each of the items.

Confirmatory factor analysis was utilised with further samples in order to validate the final items in each dimension. The three subscales have high construct validity:

attractiveness .90, trustworthiness .89, and expertise .89.

To study the influence of endorser dominance the perceived dominance scale was utilised (Manusov, 2005). This measure is a 10-item scale scored on a seven-point semantic differential scale. Scale items are dominant – submissive, confident – unconfident, low status – high status, sluggish – energetic, hesitant – decisive, aggressive – meek, outgoing – withdrawn, silent – talkative, dynamic – passive, awkward – poised. Manusov (2005) reported an alpha of .66 to .92 for the scale.

The claim that facial physiognomy is linked to evolution, in that either a decision judgement that is made or an autonomic response is triggered to either approach or avoid another person, was explored. A semantic differential scale from 1 to 7 agree/disagree was constructed to match the other scales. Respondents were asked ‘in real life, the person in the advertisement is someone I am likely to approach/avoid’ (Todorov, 2008).

An additional question was asked to assess respondents’ belief of physiognomy - “is it possible, in your opinion, to know an individual’s personality traits from looking at his or her face?” (Hassin & Trope, 2000). This measure was developed by Hassin and Trope as a measure of belief in physiognomy at a point in time. The author’s used a four-point differential scale: possible to know all traits (13%), many traits (26%), a few traits (36%), and not possible to know any traits (25%). One quarter of respondents from this study indicated that they were non-believers in physiognomy (Hassin & Trope’s results are shown in brackets).

Three open ended questions were included in this pilot study. Firstly, free face description (Oosterhof & Todorov, 2008). Secondly, free recall of the visual domain aspects of the image (Burke & Srull, 1988). Thirdly, free recall the testimonial or semantic domain (Burke & Srull, 1988).

Subjects

One group of students studying social psychology at a university in Western Australia were used, 26 males and 72 females. The mean age of respondents was 25 years of age with a mean of 13 years of education. Eighty five percent indicated English as their first language. Social status for the sample ranged from 14 percent for upper middle class, 49 percent middle class, 6 percent lower middle class, 7 percent skilled working class, 5 percent working class, and 2 percent lower class.

Procedure

The structured survey questionnaire was administered during normal class contact time. All instructions were given in English both by the researcher and on the survey cover sheet. The survey questionnaires were handed out to participants randomly according to the questionnaire sequencing. Upon completion, the survey questionnaires were collected by the researcher and the students were debriefed. One hundred surveys were completed, 20 in each condition.

Results

Data analysis was performed using SPSS 24 and NVivo 10 software. Phase 1 survey questions consisting of semantic differential scales were analysed with SPSS 24

while the three open ended questions and demographics were analysed in NVivo 10.

Phase 2 interview questions were analysed with NVivo 10.

Results of Phase 1 of the Study: Quantitative Data Analysis

In this pilot study, some interesting profiles for each of the facial physiognomy groups were obtained Figure 15 shows a line graph of the means for the facial physiognomy groups. The less dominant ($M = 42.6$) and less trustworthy ($M = 42.3$) groups scored higher than the other groups, more dominant ($M = 39.3$), more trustworthy ($M = 38.9$), neutral trustworthy ($M = 39.5$).

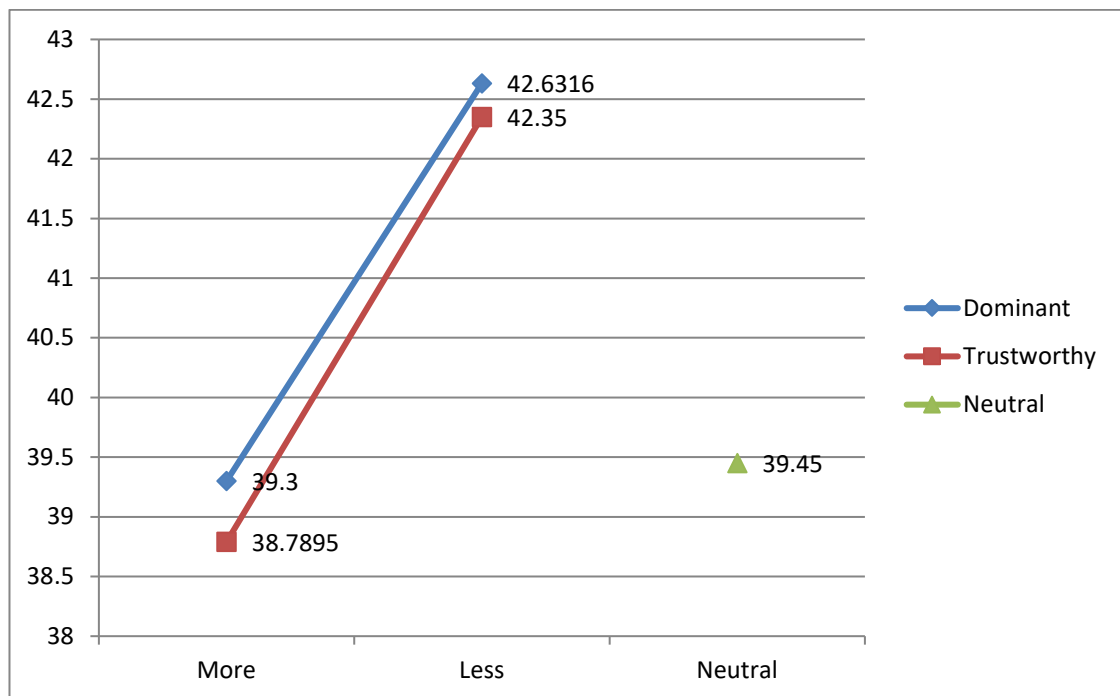


Figure 15. Graphical display of the mean differences between facial physiognomy groups and Advertisement Believability.

In Figure 16 the mean decision judgements for the advertisement believability scale concepts highlight some interesting differences between the facial physiognomy groups. Overall there was a swing to the right for likely, honest, reasonable, and believable. There was a swing to the left for not authentic, inconclusive, and questionable. For the remaining concepts, not credible/credible, not

convincing/convincing, untrustworthy/trustworthy, the means fell around the centre score.

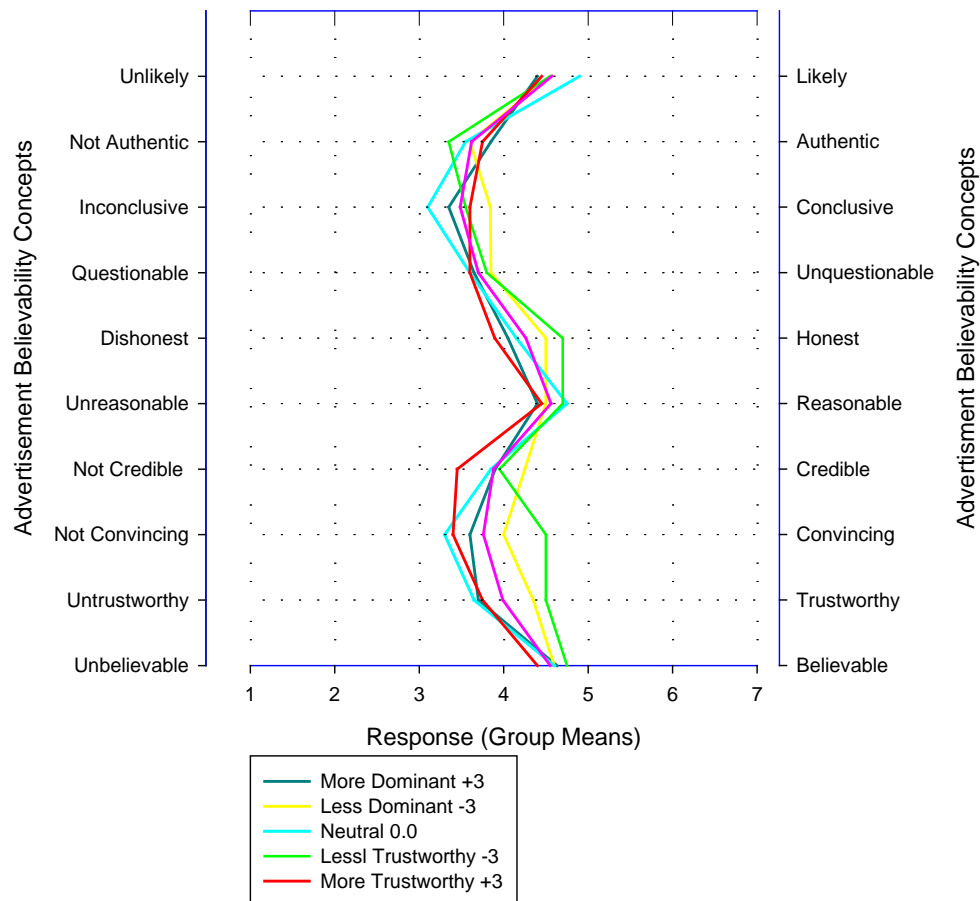


Figure 16. Mean concept profiles for the five facial physiognomy groups for the advertisement believability scale.

For advertisement believability, the partial plot shows a negative relationship to perceived dominance (see Figure 17). The plot in Figure 17 shows a positive relationship to the source-credibility subscale trustworthiness. No obvious outliers are shown on these partial plots. There is even spacing of the cluster of dots indicating homoscedasticity. The results of the pilot study therefore support the hypothesis that the dominance and trustworthiness dimensions of facial physiognomy of a message

presenter influences university students' perceptions of the validity of an occupational safety and workplace health advertisement.

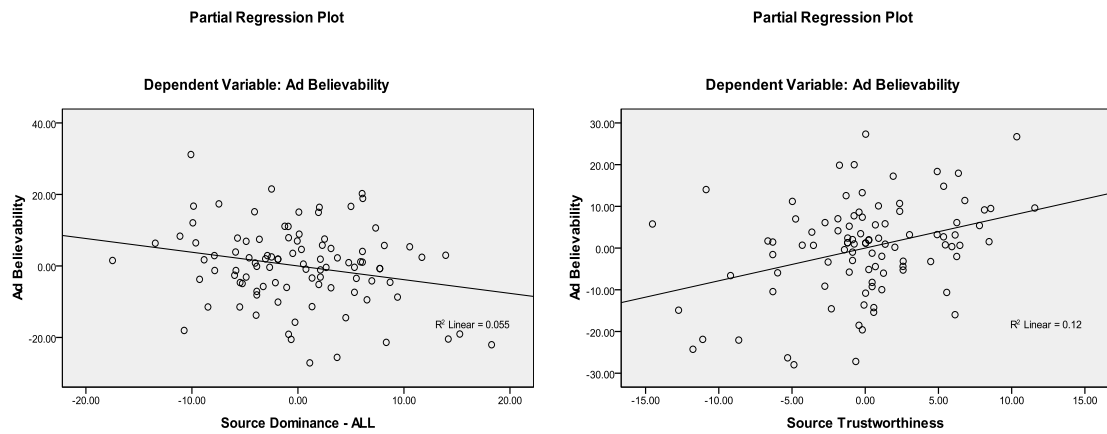


Figure 17. Partial plots showing the relationships for perceived dominance and trustworthiness to advertisement believability.

The overall Cronbach's Alpha was $\alpha = .884$ which is good compared with $\alpha = .94$ claimed by Beltramini, the scale developer (Beltramini, 1988). The corrected item-total correlations for the advertisement believability scale are all above .3 which is encouraging (see Table 3). Only one item would increase the Cronbach's Alpha if the item was deleted, the concept dishonest/honest. The increase is not dramatic so the item has been retained.

Table 3.

Item-total statistics for the advertisement believability scale.

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Un/Believable	35.9184	102.426	.661	.545	.866
Un/Trustworthy	36.5204	107.489	.588	.589	.872
Not/Convincing	36.7551	107.238	.569	.504	.873
Not/Credible	36.5714	105.423	.622	.468	.870
Un/Reasonable	35.9082	103.878	.771	.699	.860
Dis/Honest	36.2449	117.238	.311	.309	.890
Un/Questionable	36.8061	105.251	.601	.581	.871
In/Conclusive	37.0102	105.392	.576	.428	.873
Not/Authentic	36.8673	103.931	.680	.521	.865
Un/Likely	35.8980	101.495	.734	.654	.861

When an oblique rotation was conducted the pattern matrix shown in Table 4 identified two factors. Factor 1 seems to identify questionability while Factor 2 seems to represent trustworthiness.

Table 4.

Correlations between variables and factors following the rotation of the axis.

Rotated Component Matrix ^{a,b}		
	Component	
	1	2
Un/Questionable	.840	
Un/Reasonable	.825	
Un/Likely	.793	
Un/Believable	.767	
Not/Credible	.730	
Not/Authentic	.724	
Un/Trustworthy		.832
Dis/Honest		.744
Not/Convincing		.700
In/Conclusive	.416	.579

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser

Normalization.

a. Study Number = Pilot Study

b. Rotation converged in 3 iterations.

Figure 18 shows the means of the facial physiognomy groups for the attitude toward the testimonial scale. Comparison of these means Figure 15 shows that there is 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.

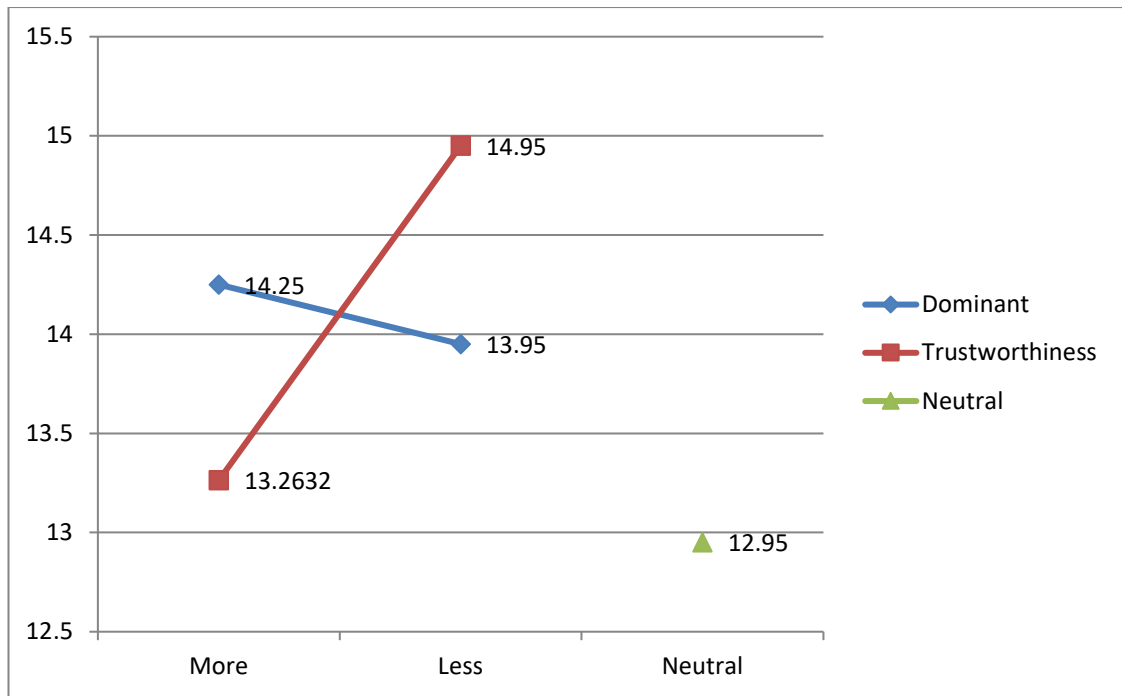


Figure 18. Graph showing the mean difference between facial physiognomy group and Attitude Toward the Testimonial.

The mean decision judgement profiles for the attitude toward the testimonial are shown in Figure 19. Overall the scores lean to the left for all profile concepts.

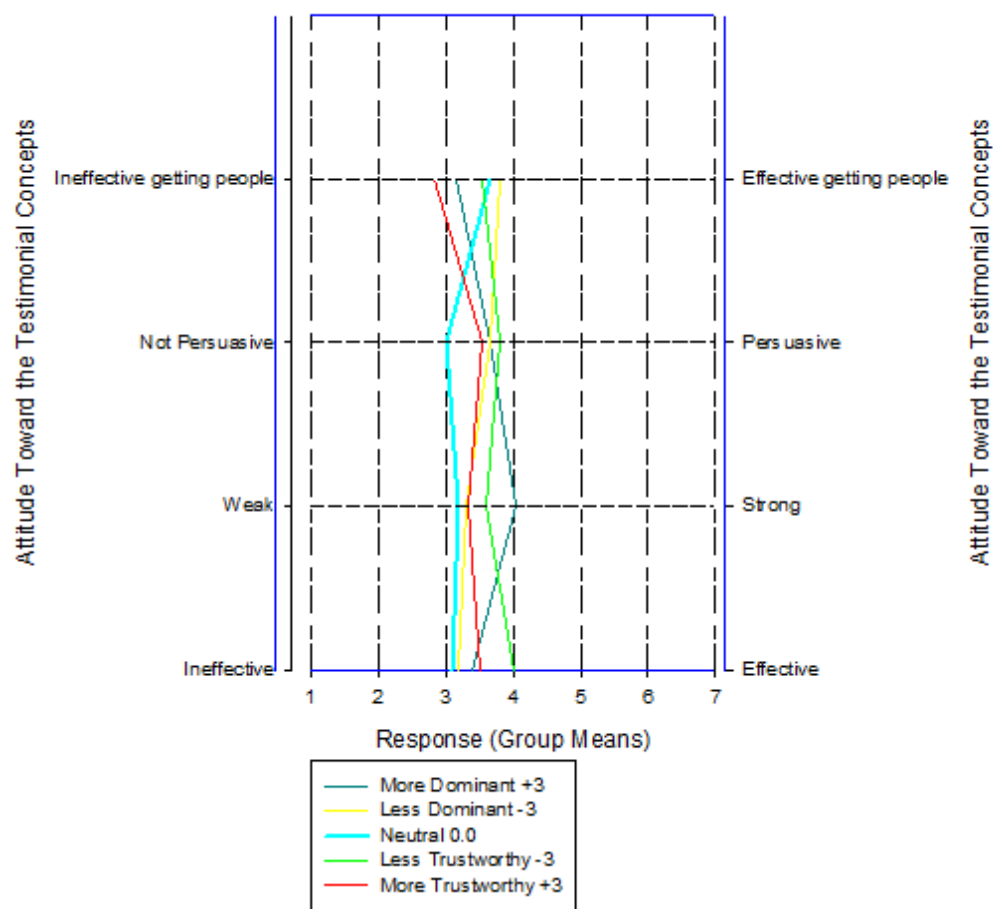


Figure 19. Mean concept profiles for the five facial physiognomy groups for attitude toward the testimonial.

For the attitude toward the testimonial the measure of scale reliability was Cronbach's Alpha $\alpha = .84$ which is a good value. As shown in Table 5 all the corrected item-total correlations are above .3 indicating that all items correlate well with the total score from the questionnaire. No item if deleted would increase the Cronbach's Alpha.

Table 5.

Item-total statistics for the attitude toward the testimonial scale.

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
In/Effective	10.4343	17.738	.700	.551	.783
Weak/Strong	10.3838	18.300	.673	.455	.795
Not/Persuasive	10.3535	16.374	.744	.592	.760
Getting People like me to be...	10.4646	17.251	.580	.345	.840

The source-credibility scale results have been split into four sections: the total source-credibility scores, and the three subscales, attractiveness, trustworthiness, and expertise, see Figure 20 . Overall, all the graphs show interaction between the dominant facial physiognomy groups and the trustworthiness facial physiognomy groups. The subscale of primary interest to the investigator was trustworthiness. This subscale shows that the more trustworthy group scored higher than the less trustworthy group. For the dominance groups, 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 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. The interesting thing to note is that the less trustworthy group scored higher than the more trustworthy group unlike for the other two subscales. 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 higher, $M = 54$, and less trustworthy group lower, $M = 53$.

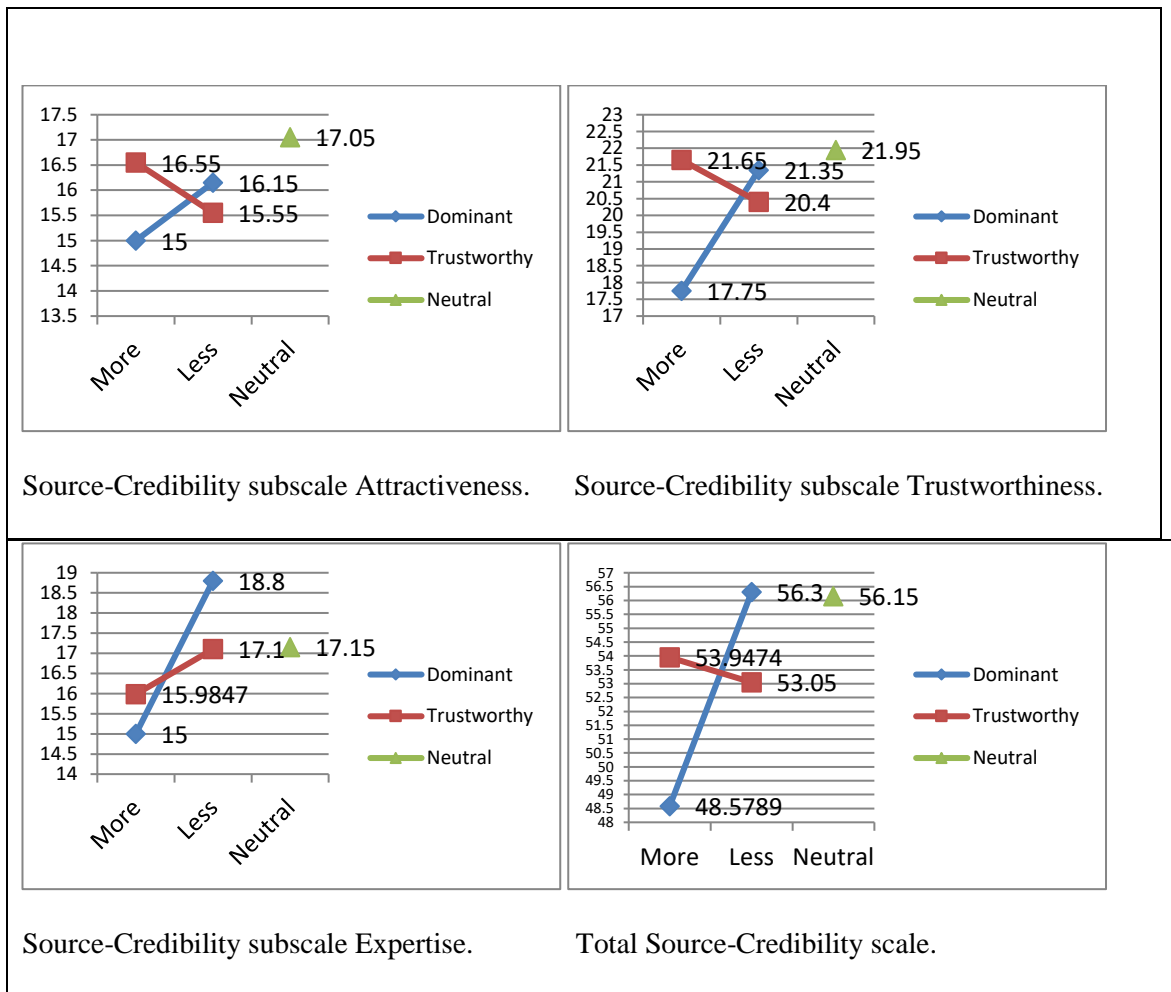


Figure 20. This graph shows four line graphs of the mean difference between facial physiognomy groups for Source-Credibility and the subscales Attractiveness, Trustworthiness, and Expertise.

In Figure 21, mean decision judgements 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 $\alpha = .89$ was computed for the source-credibility scale.

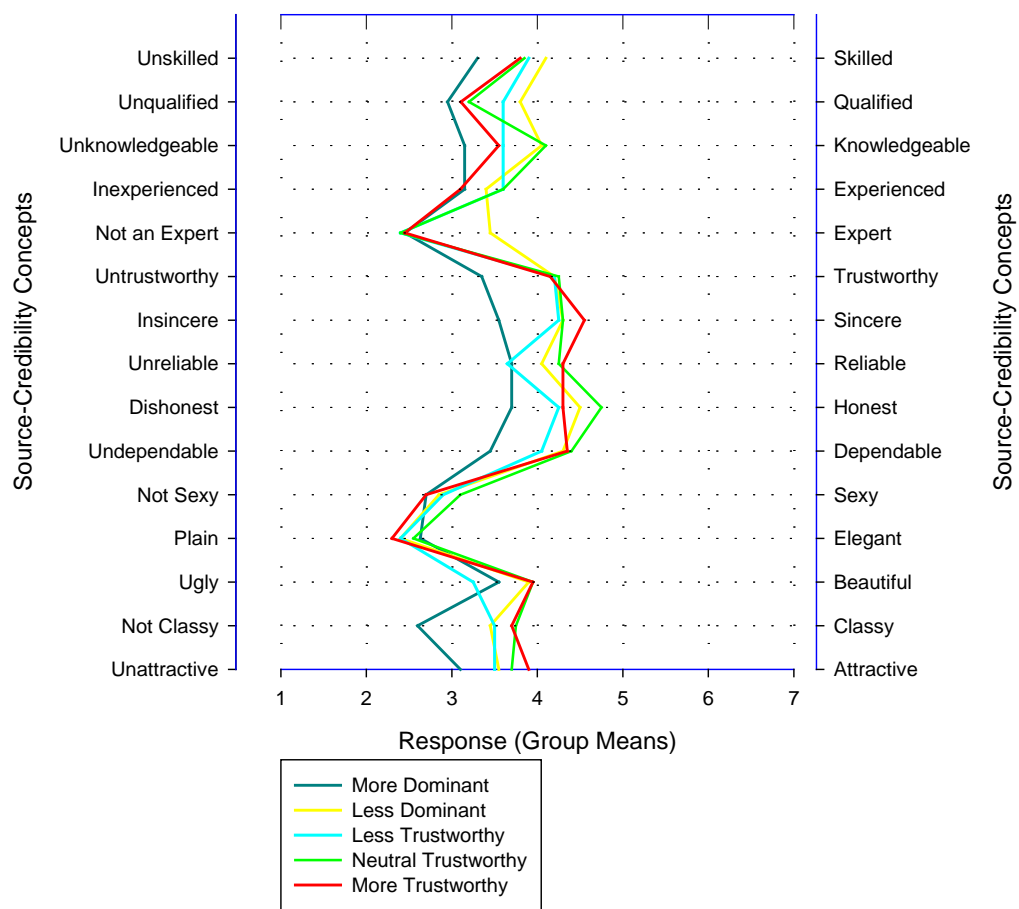


Figure 21. Mean concept profiles for the five facial physiognomy groups for source-credibility.

Deletion of any concepts would not increase reliability, as demonstrated in Table 6. The corrected item-total correlation column shows that all items are above .3 which is encouraging. This scale was retained as is by the investigator.

Table 6.

Item-total statistics for the source-credibility scale.

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Un/Attractive	50.0918	134.971	.596	.659	.880
Not/Classy	50.2245	139.001	.559	.499	.882
Beautiful/Ugly	49.8878	141.544	.512	.479	.884
Plain/Elegant	51.2041	145.009	.302	.425	.892
Not/Sexy	50.7857	139.015	.500	.490	.884
Un/Dependable	49.5204	136.438	.579	.516	.881
Dis/Honest	49.3469	133.920	.671	.670	.877
Un/Reliable	49.6531	133.940	.690	.685	.876
In/Sincere	49.4796	141.531	.425	.370	.887
Un/Trustworthy	49.6020	134.304	.695	.673	.876
Not an Expert	50.9898	135.845	.590	.536	.880
In/Experienced	50.2551	138.687	.465	.372	.886
Un/Knowledgeable	49.9490	135.822	.532	.549	.883
Un/Qualified	50.2959	135.509	.643	.605	.878
Un/Skilled	49.8571	136.412	.591	.557	.880

It is acknowledged that a sample size of 100 is small when performing factor analysis (Comrey & Lee, 1992) and that ideally there should be 10 times more participants than variables (Nunnally, 1978). 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 .8 which is regarded as good. All the communalities were above .5 ranging up to .7 which is also good suggesting that the sample is adequate to perform a factor analysis. The anti-image correlations ranged from .7 through to .9 which is also good. Bartlett's test of sphericity was highly significant ($p < .001$) therefore the factor analysis is deemed appropriate. The source-credibility scale was factor analysed using the method of principal components and the factors rotated with the varimax method. Three factors were extracted. The rotated factor matrix shown in Table 7 shows the first factor, trustworthiness. The second factor

shown is for attractiveness with one concept also loading on trustworthiness with the absolute values suppressed at .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 and the scale was utilised in its current form for the larger study.

Table 7.

Rotated factor loadings for the source-credibility scale with absolute values less than .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.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

The first factor accounted for 40.333% of the total variance explained compared to 12.926% for factor 2 and 8.594% for factor 3. After rotation, the percent of variance explained for factor 1 reduced to 23.993%, while for factor 2 it was increased to 19.081%, and factor 3 increased to 18.779%. These three factors accounted for an accumulative 61.853% of the variance explained.

To test the facial physiognomy of the more/less trustworthy and more/less dominant groups the perceived dominance scale was utilised (Manusov, 2005). Looking at the relationships between the means for the facial physiognomy groups it is shown in Figure 22 that 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 ($M = 34.3$). There was interaction between the groups and this was the expected pattern when juxtaposed with the source-credibility subscale for trustworthiness.

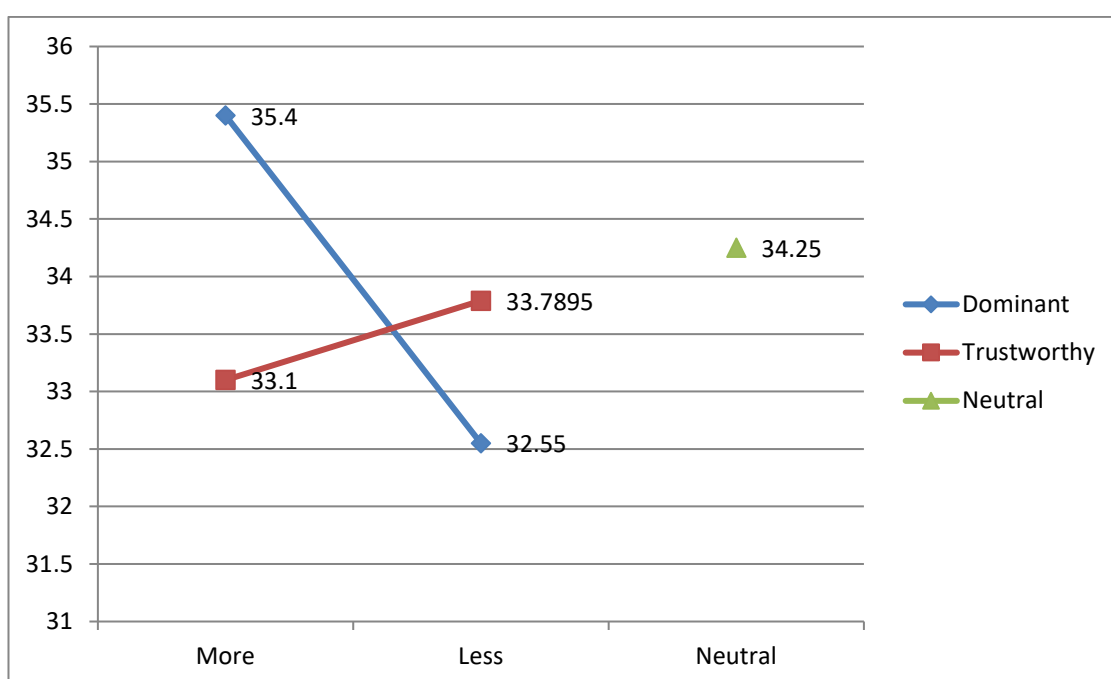


Figure 22. Graph showing the mean differences between facial physiognomy groups and Perceived Dominance.

The mean profiles for the perceived dominance scale concepts are shown in Figure 23. There is a wide variation around the scale middle for the physiognomy groups when asked to make a decision judgement between the awkward/poised, meek/aggressive, and submissive/dominant semantic differentials.

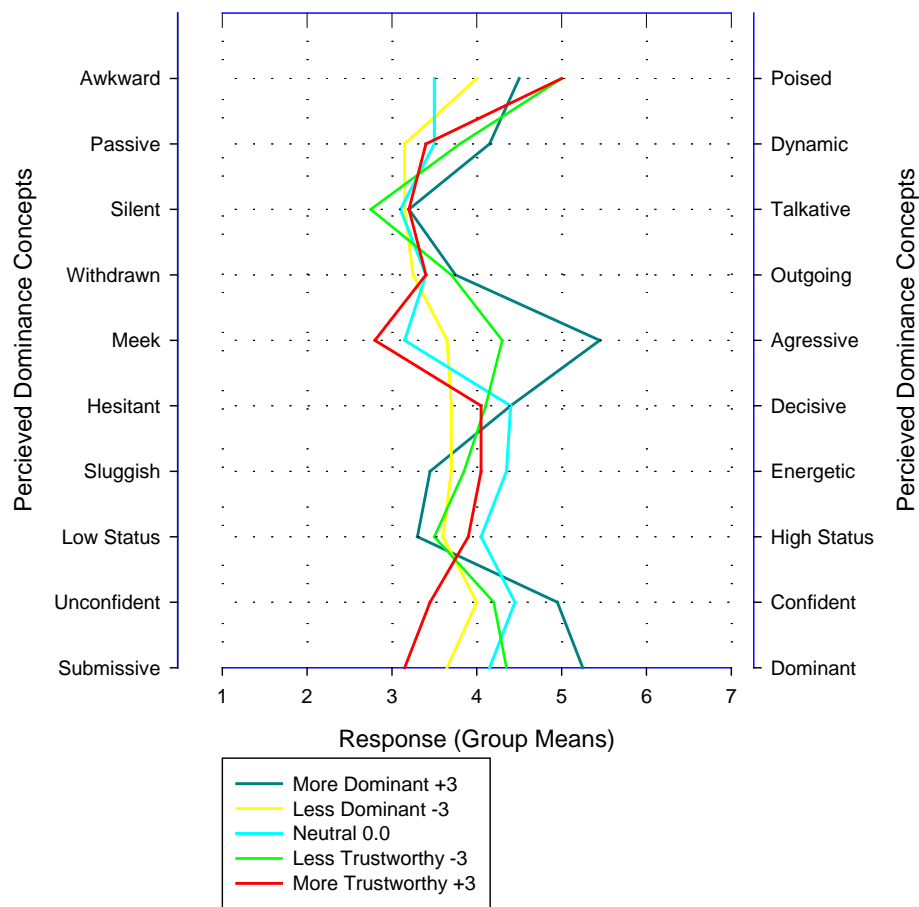


Figure 23. Mean concept profiles for the five facial physiognomy groups for perceived dominance.

Due to a printing error on the survey instrument some data were missing for the concept awkward/poised. This concept was removed from analysis of the dominance scale.

The factor analysis for the perceived dominance scale identified two dimensions as shown in Table 8, however, for this pilot study the scale has been used unidimensionally. The two factor dimensions accounted for 59.137 % of the total variance explained. The scale still attained a good reliability, a Cronbach's Alpha of $\alpha = .83$.

Table 8.

Rotated component matrix for the perceived dominance scale.

Rotated Component Matrix ^a		
	Component	
	1	2
Low/High status	.791	
Sluggish/Energetic	.757	
Silent/Talkative	.719	
Outgoing/Withdrawn	.687	
Dynamic/Passive	.579	.436
Dominant/Submissive		.841
Aggressive/Meek		.821
Un/Confident		.709
Hesitant/Decisive		.587

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

One perceived dominance scale concept loaded on both factors, dynamic/passive. The factor analysis 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 24 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. The notion that there is a function of evolution at play when people decide 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 & Toderov, 2009; Oosterhof & Todorov, 2008) is supported by the findings demonstrated in Figure 24. 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.

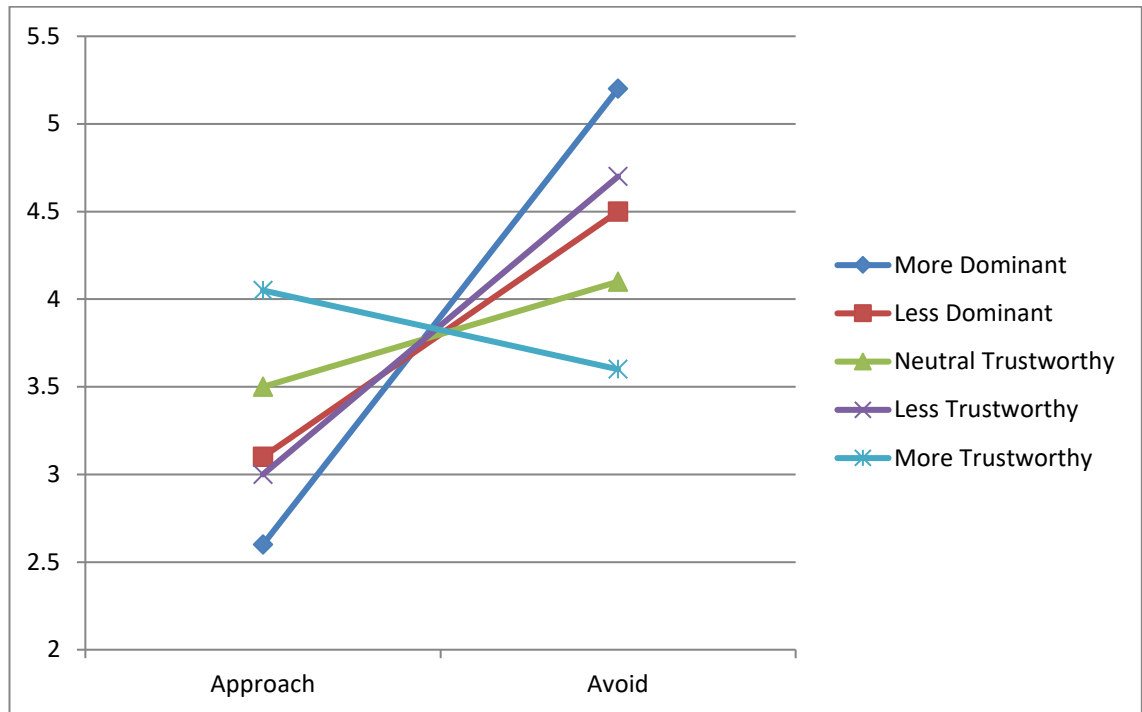


Figure 24. Graphical display of the differences between facial physiognomy group and likelihood to Approach/Avoidance in real life.

This pilot study addressed the issue of belief in physiognomy. As is shown in Figure 25 only 11 percent 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 traits, 17 % many traits, with one percent saying that it is possible to know all character traits.

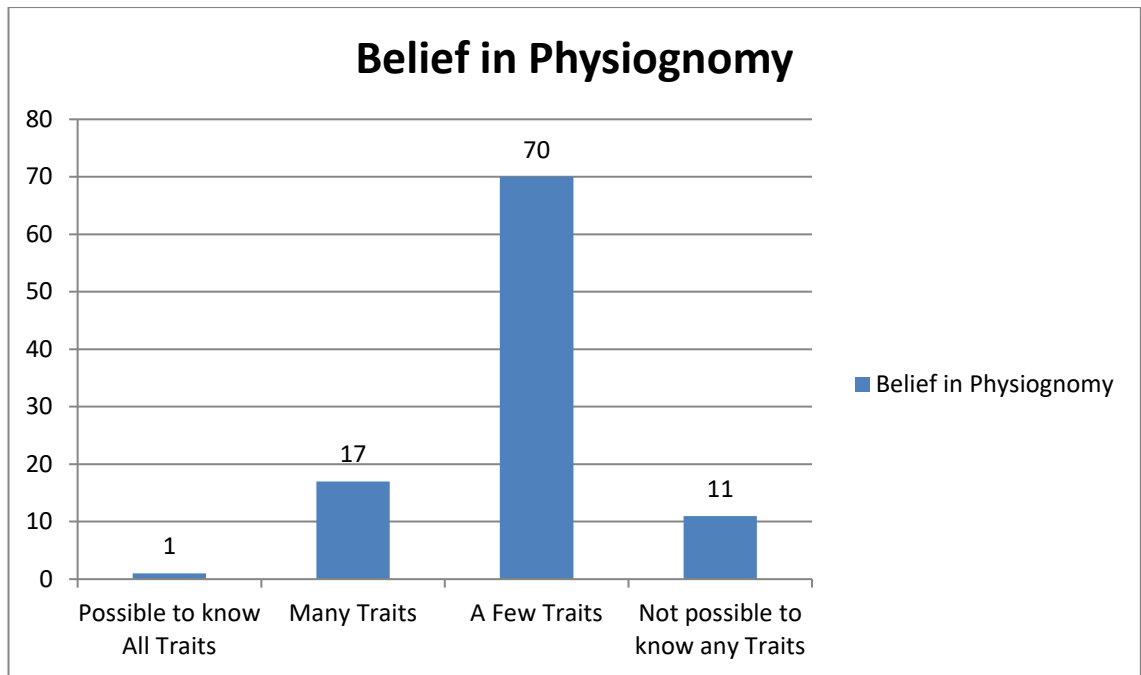


Figure 25. Bar chart of the frequency of belief in physiognomy for each of the four categories.

Results of Phase 2 of the Study: Qualitative Data Analysis

The terms free facial description, free image description, and free recall of the information supplied in the image have been utilised to form a qualitative component to this pilot study. Many lines of data were supplied by respondents which can be analysed based either entirely theoretically or on a methodology linked to an explicit model of facial physiognomy. The analysis tactic for this pilot study involved one of noting themes with a framework analysis approach (Krippendorff, 2004). After familiarisation and identification of a thematic framework, the data were coded, and thematic charts and case charts were constructed by the investigator so that the data could be easily interpreted and mapped across the whole dataset. The key dimensions drawn out for free recall of information presented in the testimonial are shown in Table 9. A selection of the responses corresponding with the research testimonial shows that overall for the neutral trustworthy group participants recalled more of these 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 occupational safety and health messages among university students in Western Australia.

As far as the free recall of information presented in the hypothetical advertisement was impacted by facial physiognomy, the pilot study findings also suggest that for the neutral trustworthy face there is a greater recall. Figure 26 demonstrates that the range of recalled categories was higher for the neutral trustworthiness faces. The testimonial contained four categories of information: the human body conducts electricity, electricity moves dangerously fast through water, the human body is 70 percent water, and be very careful around electricity. The trustworthy faces had a greater overall recall of information. Four categories of information were presented in the testimonial and as is shown in Figure 26 only the trustworthy faces recalled all four categories, one for the less trustworthy group, and two for the other trustworthy groups. The more dominant group mostly recalled two categories while the less dominant group mostly recalled only one category.

Table 9.

Recall of the categories for the research testimonial by facial physiognomy group.

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

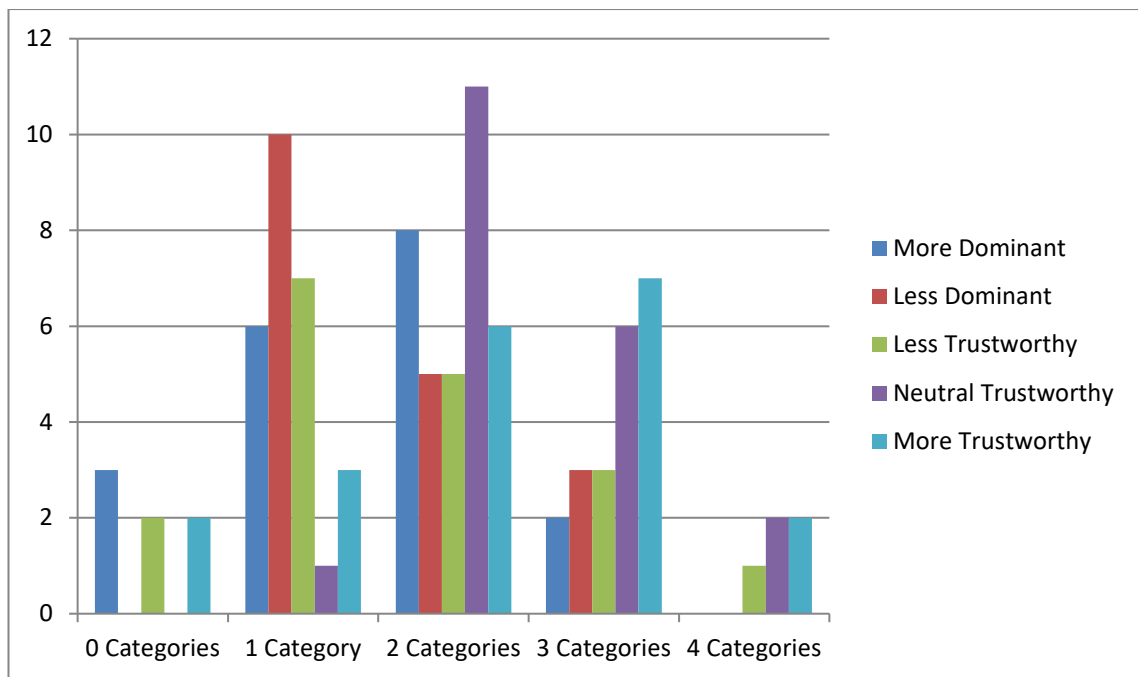


Figure 26. Response rates by number of recalled categories and facial physiognomy group.

Specifics of the free image description and conditions which the respondents considered important elements of the overall image elements that were mentioned included the black background, the cloud of writing (thought bubble coming from the man's head), the avatar description, avatar head looks like a light bulb hence relation to electricity, male gender, use of the testimonial to attract attention.

Like the free image description respondents were asked to freely describe the person in the advertisement. The summaries drawn from case analysis were coded for analysis. Table 10 shows the structure of the examples for the free face description and the text presents some excerpts from a case analysis for the facial physiognomy groups. All the experimental groups had a low response for the emotional category. For this category, the common theme was 'emotionless' connotations with one respondent stating that the more dominant face displayed anger and seriousness. Sixty-nine sources described the physical aspects of the faces, for example, bald, white, male, eye colour,

skin tone, mouth shape. For the behavioural category, 58 sources stated descriptions such as likely occupation (scientist, thug, criminal, policeman, bad boy, murderer, gangster, swimmer, bad actor), thinking about electrical safety, deep in thought, looking up, disconnected in thought, preoccupied, indifferent, pondering. Other free facial descriptions included animated human being, computer generated, air brushed, abstract picture showing the danger of electricity, wonder why he is bald – choice or cancer, the person is not real.

Table 10.

Factors drawn out from the free face description by physiognomy group matrix.

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

Discussion and Conclusion

The data generated by participants in this pilot 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 judgements based on another's facial physiognomy, including facial images displayed in a public health communication context. In this study, interesting profiles were obtained for each of the scale item concepts between each facial physiognomy grouping. The results of the quantitative component of the survey analysis raise an interesting question. 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 judgements are made based on another person's facial physiognomy. Furthermore, there is an atypical innate and perhaps evolved 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 possibility that is possible to know some aspects of another person's character from their facial physiognomy (Parker, Oosthuizen, & Costello, 2015).

One question that arose from the results of the factor analysis of source-credibility scale relationships is that perhaps a larger scale study would better demonstrate the three factors. The scales utilised in this pilot study were developed from a logical basis and have been established through peer reviewed literature (Beltramini, 1988; Ohanian, 1990). A larger scale study is warranted and the results shown here encourage utilising a larger sample of university students and a sample from the working population since the public health topic is relevant to both groups. The utility of both larger samples would allow for a stronger basis for formulating hypotheses regarding the differences between facial physiognomy groups and the influence of trustworthy and dominant physiognomic facial characteristics on public health communications.

The use of a mixed method design hypothetical questionnaire in this pilot study has proved to be encouraging and for the study of the influence of facial physiognomy on public health communications. A few minor changes to the questionnaire are recommended before further study with a larger sample. These changes relate to the choice categories for racial background, education, and social status. The remainder of the questionnaire is of a convenient length and it appears to be able to capture the dimensions related to facial trustworthiness, facial dominance, and validity of a public health communication or public health advertisement.

The argument laid out in this pilot study supports the literature review and the major finding was that, without exception, people do make decision judgements in the

short term about dominance, trustworthiness, approach or avoidance behaviour, and that recall of information differs based on facial characteristics when presented with an avatar of a human face in a hypothetical public health advertisement (Oosterhof & Toderov, 2009).

Conclusion

The question that arose from the pilot study was whether a similar result would be obtained using a real public health advertisement with a real face. In the following study, a real face was morphed to characterise more/less dominant and more/less trustworthy facial features as the use of a real face provided a more valid assessment.

Study One (students)

Introduction

One of the first issues encountered during the data collection phase of this study was gaining access to a sample of resource sector workers, and a sample of media professionals. The difficulty is that most organisations either declined participation or simply did not respond to invitations to participate. To overcome this, the survey was initially administered to students. Fortunately, resource workers were sourced at a Perth airport terminal when a regional airline servicing the mining sector agreed to grant access to checked in passengers, these data are presented in the next chapter. The data gathered from students are presented here and has been compared with published results from the literature as well as that obtained from resource sector workers.

Method

Students were recruited for the study by contacting their lecturers and where permission from the lecturer was granted, administration of the survey was conducted during normal class contact time. To make up the numbers some students were recruited as they entered or left the library or the computer laboratory at the Joondalup campus of the university. Students were advised that the survey was anonymous, and that participation was voluntary. Most students approached completed the survey with few refusals.

The survey questionnaire was handed out randomly based on the experimental conditions. These consisted of; dominant faces, +8, +4, -4, and -8 deviations from a neutral (0.0) face, and trustworthy faces +8, +4, -4, and -8 deviations. The control conditions being a neutral face (0.0 deviations) and the natural face thus there were a total of ten experimental conditions.

As in the pilot study, the survey questions consisted of the advertising believability scale, advertisement persuasiveness scale, source credibility scale, perceived dominance scale, approach-avoidance scales, belief in physiognomy, three open ended questions, and demographics.

Results

Analysis consisted of firstly exploring the concepts for each scale by graphing the means for each facial physiognomy group. Partial plots were explored graphically by looking at the regression correlations. A Cronbach's alpha was computed and compared with the original and published results assessing the reliability for each of the scales. Kaiser-Meyer-Olkin and Bartlett's tests were run prior to a factor analysis using the principle components method with oblique rotation. This set of analysis finalised exploration of the scales' reliability and validity. For the results, facial physiognomy group means, and standard deviations were firstly analysed. This was followed by a 1 x 5 ANOVA which was preceded by Levene's test for homogeneity of variances. Finally, to examine the difference between facial physiognomy groups post hoc Tukey's HSD tests were performed. These analyses were performed for both the dominant and the trustworthy component of the experiment.

Belief in physiognomy as shown on Figure 27 was compared with published results. Source credibility (the source trustworthiness sub scale), and the perceived dominance scale was also assessed. These two scales were used to determine if more trustworthy looking faces scored higher on the trustworthiness sub-scale compared with less trustworthy looking faces, and whether more dominant faces scored higher on the perceived dominance scale compared with more submissive looking faces. The advertising believability scale and the advertising persuasiveness scales were also

explored, and finally the likelihood of avoidance and likelihood to approach the person in the advert for each of the facial physiognomy groups was determined.

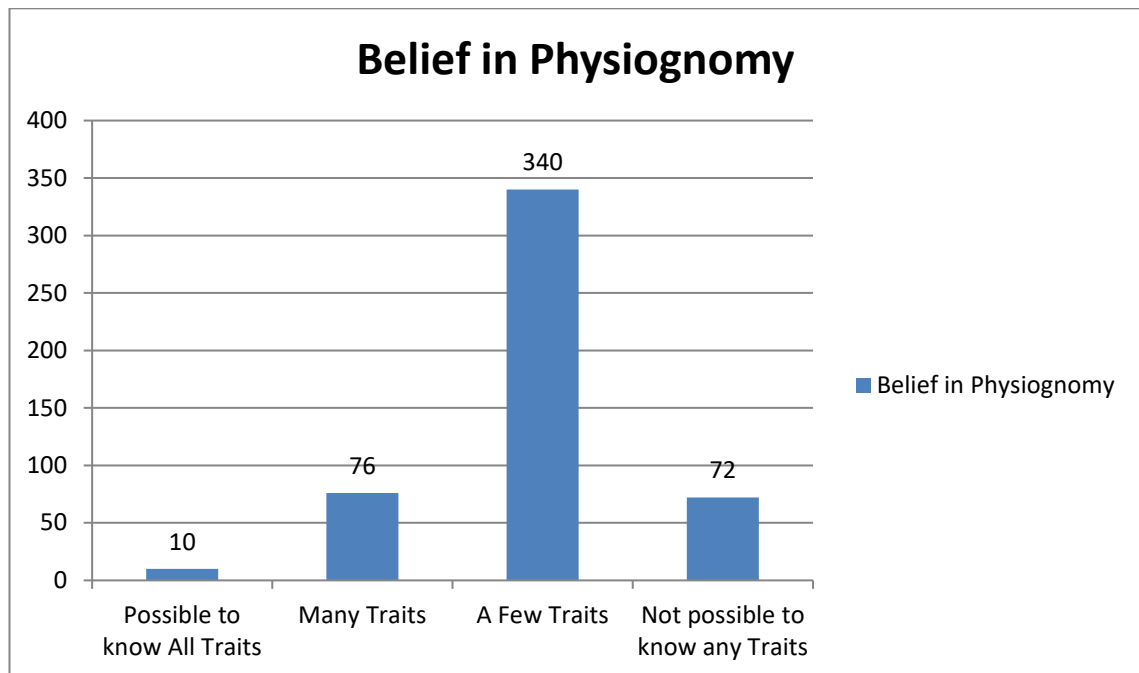


Figure 27. Belief in physiognomy.

Belief in Physiognomy

Most (68.27%) of respondents indicated that they believed it possible to know a few traits about the person in the advertisement from the models' facial features. Some individuals (15.2%) believed it was possible to know many traits, while 2.01% believed it possible to know all traits, and 4.64% believed it was not possible to know any traits. The plot of belief in physiognomy shows the number of responses for each condition.

The belief in physiognomy results shown in Table 11 compares the results from this study of a sample of university students with those from the pilot study previously reported in this thesis and the results of a representative sample of 535 Israelis as published by Hassin and Trope (2000). As is shown in Table 11 there were far fewer respondents who thought it not possible to know any traits compared with Hassin and Trope's sample. There is a substantial increase, almost a double fold increase, for 'possible to know a few traits' for both the pilot study and this study compared with

Hassin and Trope's study. Very few of our respondents in both the pilot study and this study thought it possible to know all traits compared with Hassin and Trope's study.

Table 11.

Belief in physiognomy comparison between Hassin & Trope (2000) (535 Israelis), our pilot study (99 psychology students), and this study (498 university students).

	Possible to know all traits	Possible to know many traits	Possible to know a few traits	Not possible to know any traits
Hassin&Trope	13.0%	26.0%	36.0%	25.0%
Pilot study	1.0%	17.2%	70.7%	11.1%
This study	2.0%	15.3%	68.3%	14.5%

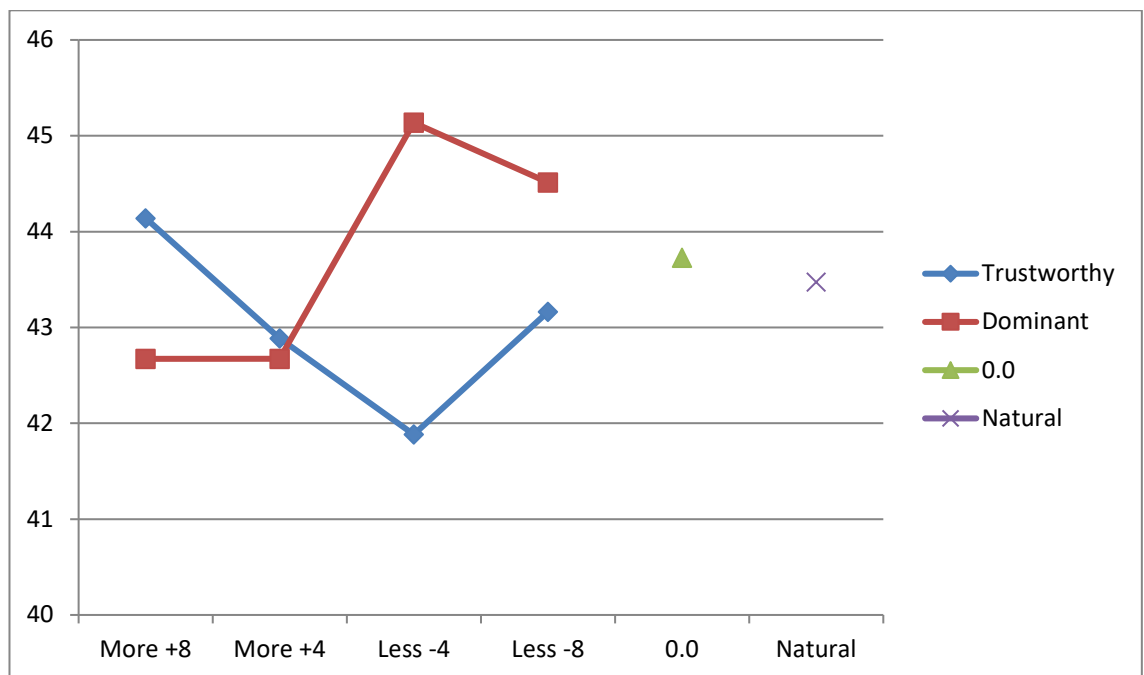


Figure 28. Mean groups responses of students for advertisement believability.

Ad Believability

Plots of means for the advertisement believability scale in Figure 29 show that for the trustworthy component more trustworthy faces were associated with greater advertisement believability. For the dominance component less dominant faces were

associated with greater advertisement believability. The neutral component and natural component were situated in the middle of the range. This data supports the assumption that more trustworthy and less dominant faces are more likely to be believed in advertising media. There was a close to significant difference between the less trustworthy (-4) and less dominant (-4) components with the significance level set at .10, $t = -1.789$, $df = 89$, $\alpha = .077$.

Plots of the advertisement believability concepts show agreement between the trustworthy and dominant components.

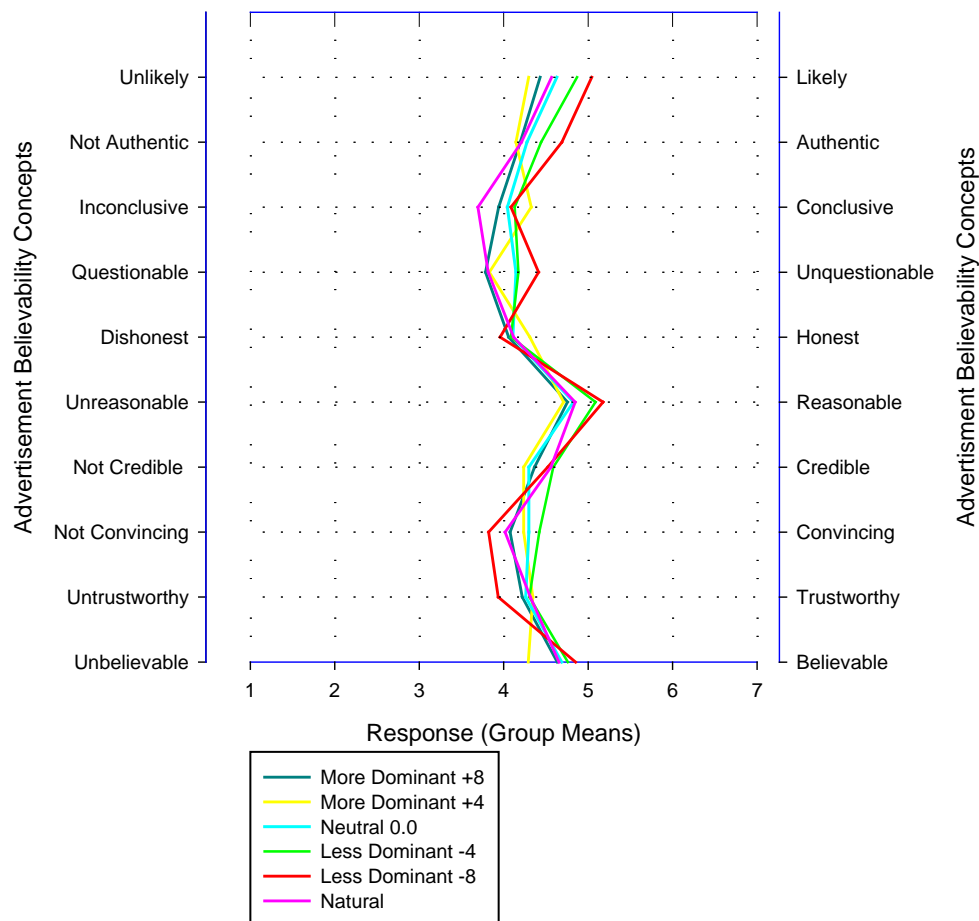


Figure 29a. Dominance groups.

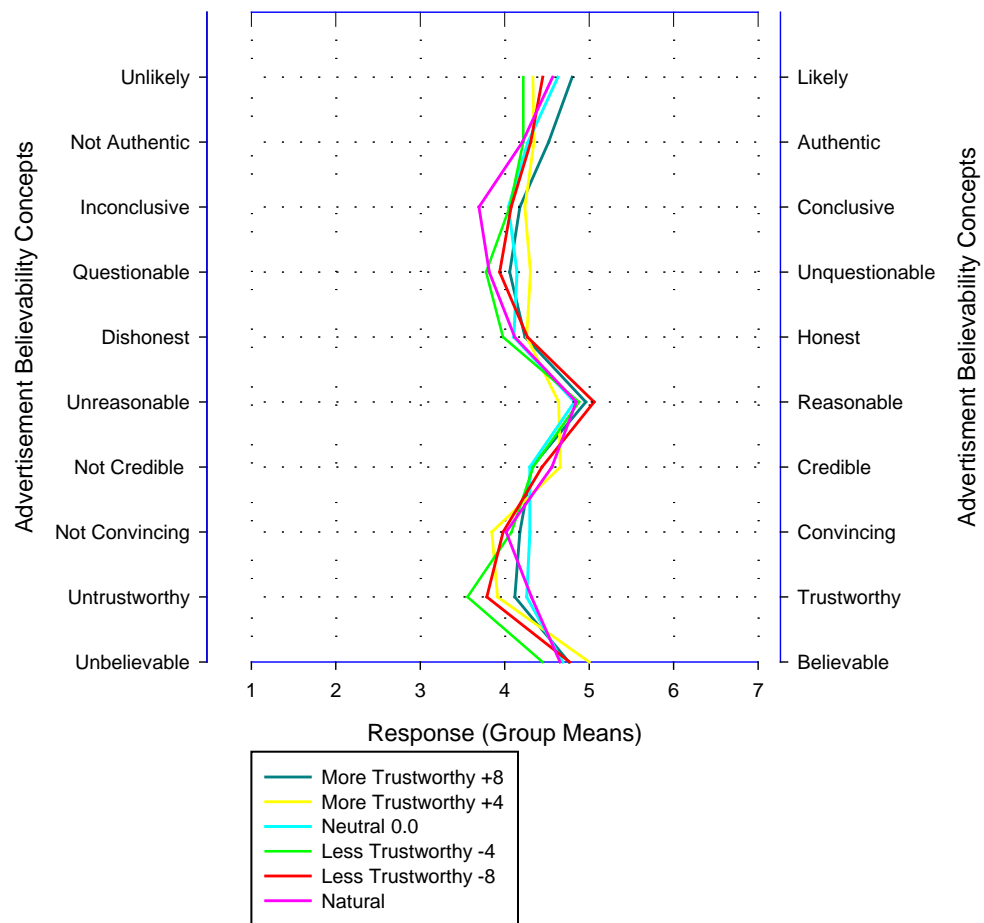


Figure 29b Trustworthiness groups.

Figure 29. Plot of advertisement believability concepts.

For these data, the KMO statistic was .841 which falls into the range of being strongly significant and suggests confidence in the decision that factor analysis is appropriate for these data. Bartlett's test of the null hypothesis for the original correlation matrix, the R-matrix, is highly significant, $p < .001$, suggesting there are some relationships between the variables and therefore factor analysis is appropriate. Factor extraction of the linear components within the advertisement believability dataset before rotation identified two factors. The first factor explains 37.907% of the total variance. The remaining factor accounted for considerably less of the total variance, 15.651%.

Table 12 shows the rotated component matrix. There are six variables loaded highly onto the first factor and this factor could be labelled advertisement credibility. The variables which load highly on factor two all seem to relate to different aspects of advertisement trustworthiness, therefore, could be labelled advertisement trustworthiness. These data support the result from the pilot study. The reliability of the advertisement believability scale was Cronbach's alpha .809, which indicates a reliable scale.

Table 12.

Correlations between variables and factors following the rotation of the axis.

Rotated Component Matrix^{a,b}		
	Component	
	1	2
Not/Credible	.762	
Un/Likely	.736	
Un/Reasonable	.732	
Not/Authentic	.719	
Un/Believable	.701	
Un/Questionable	.634	
Un/Trustworthy		.804
Not/Convincing		.791
Dis/Honest		.655
In/Conclusive		.575

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser

Normalization.

a. Study Number = Students

b. Rotation converged in 3 iterations.

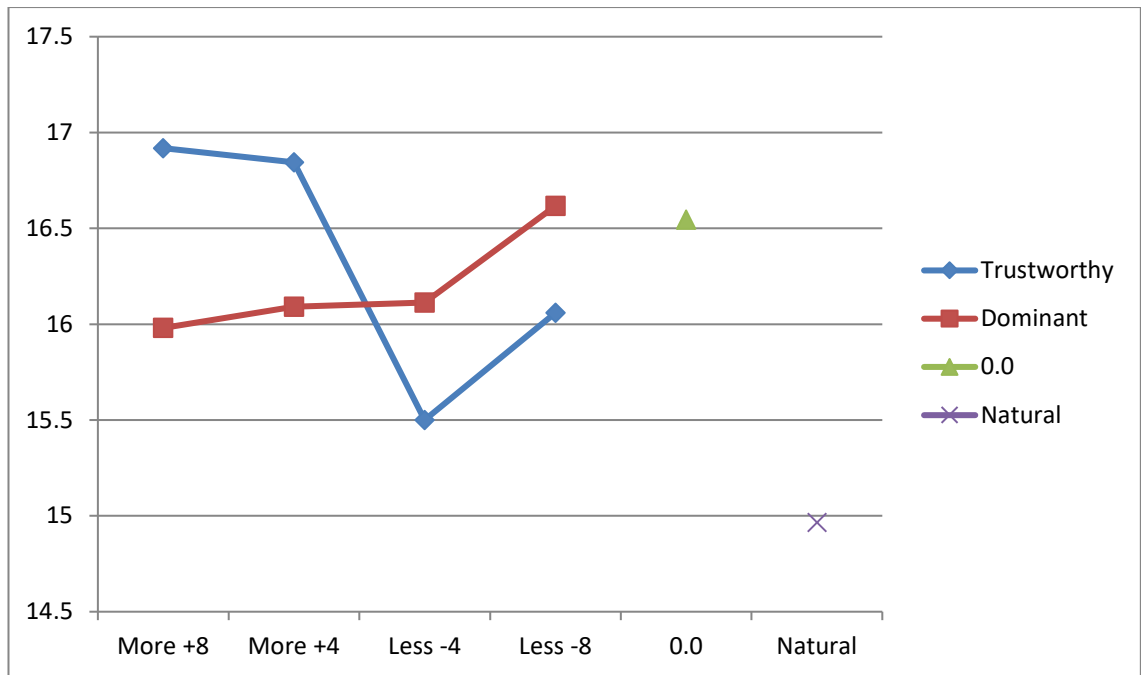


Figure 30. Students mean advertisement persuasiveness scores for the independent variable groups.

Advertisement Persuasiveness

Plots for the advertisement persuasiveness scale, as demonstrated in Figure 30, show that the more trustworthy faces component are associated with greater persuasiveness. For the dominant component less dominant faces are associated with greater advertisement persuasiveness. The neutral component was in the middle of the range while the natural component was associated with the lower end of advertisement persuasiveness. These data give evidence to support the assumption that more trustworthy and less dominant faces are more persuasive in advertising.

Figure 31 shows the plot for attitude toward the testimonial and there are no significant differences between facial physiognomic groups.

Source Credibility

Overall the plots for source attractiveness shown in Figure 32 show that the dominant face component was more attractive than the trustworthy face component. The

natural component was in the upper range of the scale while the neutral component was in the middle range. These data suggest that a more dominant face is associated with greater source attractiveness.

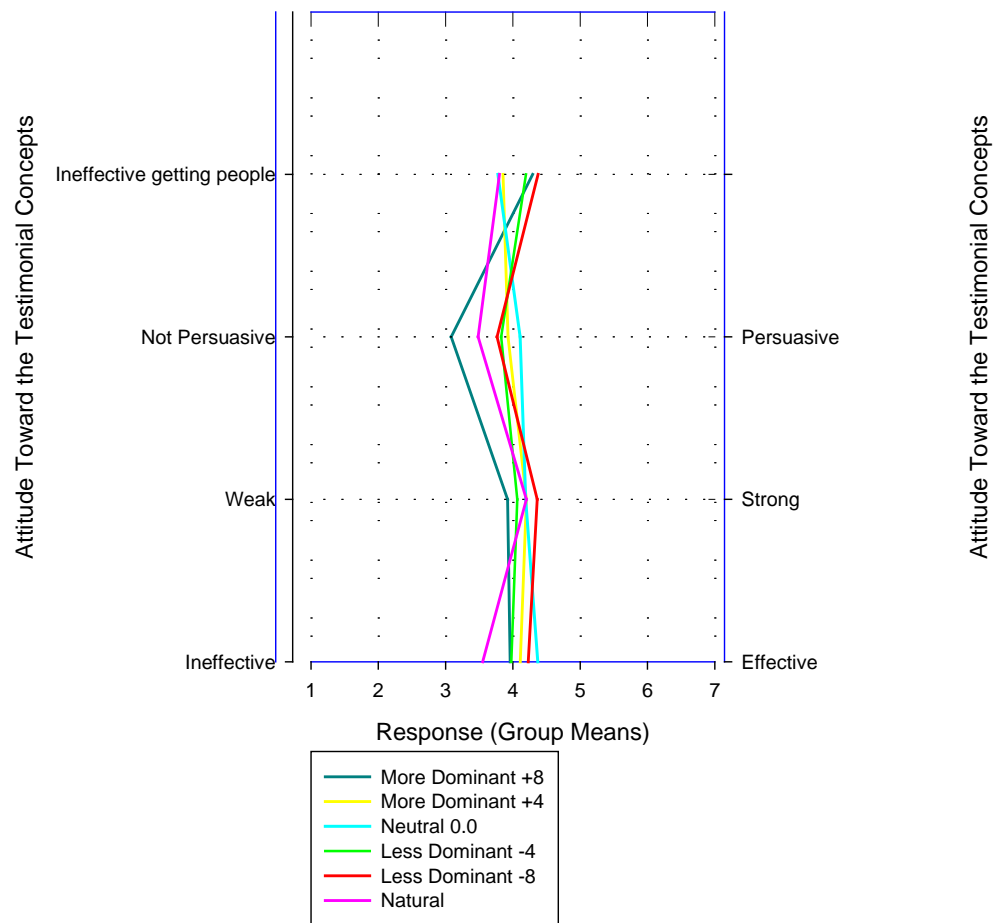


Figure 31a Dominant groups

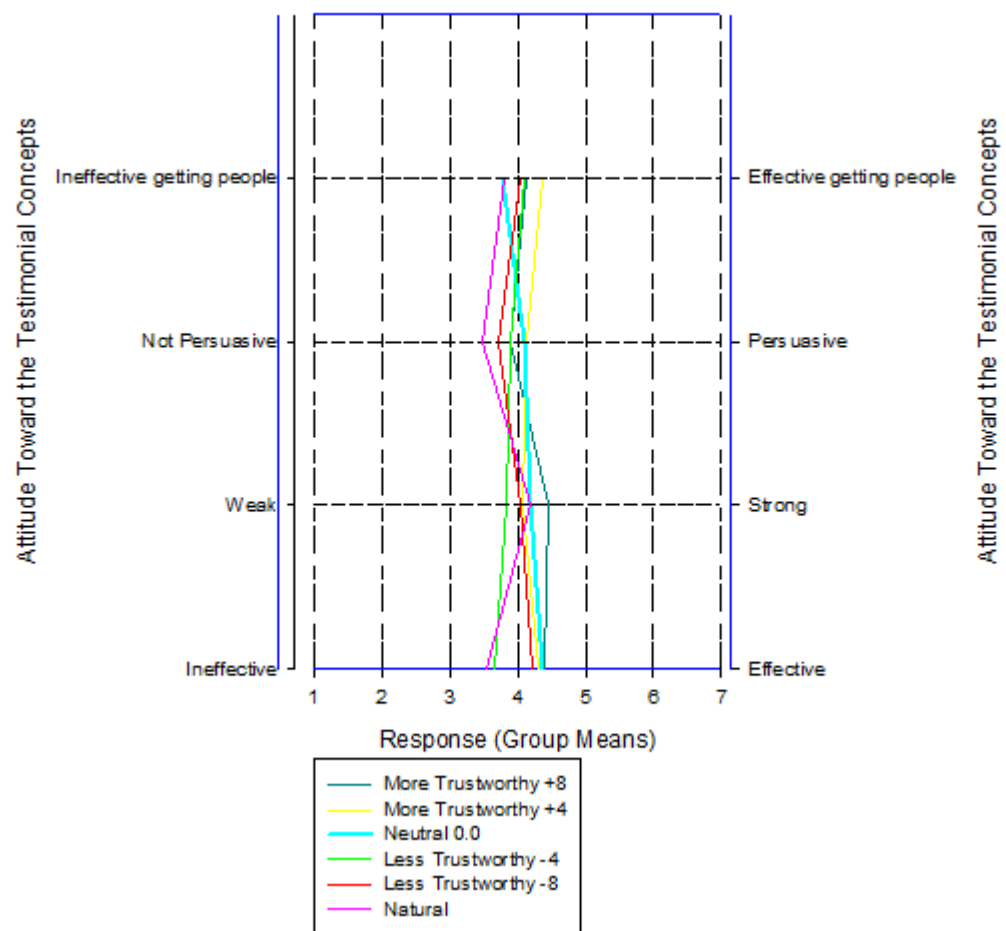


Figure 31b. Trustworthiness groups.

Figure 31. Mean concept profiles for the five facial physiognomy groups for attitude toward the testimonial - Students

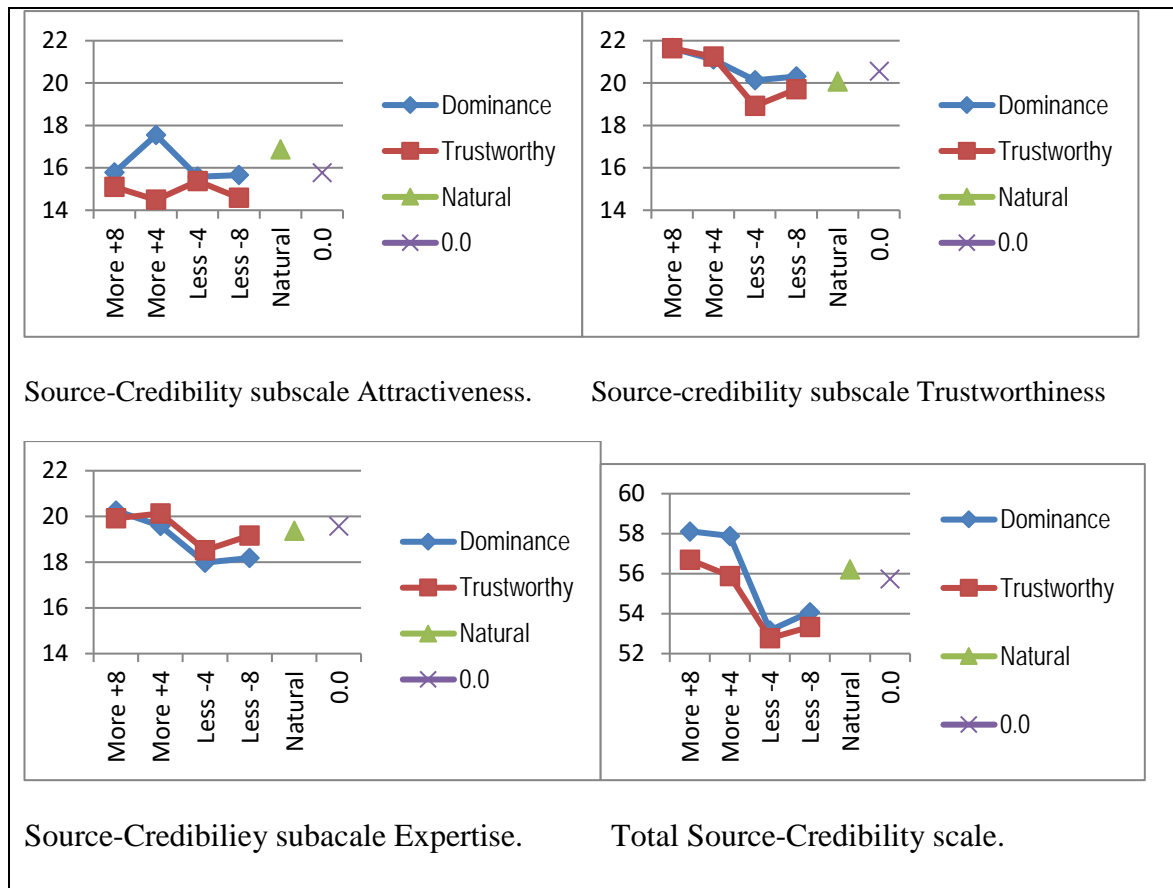


Figure 32. Students' mean trustworthiness subscales from the Source Credibility scale.

Source Trustworthiness

The plot of source trustworthiness in Figure 32 shows that the trustworthy component has a stronger effect with the more trustworthy component having a greater score than the less trustworthy component. This effect is the same for the dominant component but with a smaller effect. The neutral and natural components are in the middle range. These data suggest that more trustworthy and more dominant faces are likely to be associated with greater source trustworthiness than less trustworthy and less dominant faces.

Source Expertise

The plot for source expertise shows that the trustworthy component has a greater effect than the dominant component. For both the dominant and trustworthy component, more dominant and more trustworthy had a greater score on the scale than less

dominant and less trustworthy components. The neutral and natural components were in the upper middle range. Like the source trustworthiness outcome, more trustworthy and more dominant looking faces were associated with greater source expertise when compared with less trustworthy and less dominant faces.

Source Credibility

The plot for overall source credibility, the total of attractiveness, trustworthiness, and credibility, shows that the dominant component had a greater effect than the trustworthy component. See Figure 33a and 33b, more dominant and more trustworthy components had a greater score than less dominant and less trustworthy components. The neutral and natural components scored in the middle range. These data give support to the assumption that more trustworthy and more dominant faces are associated with

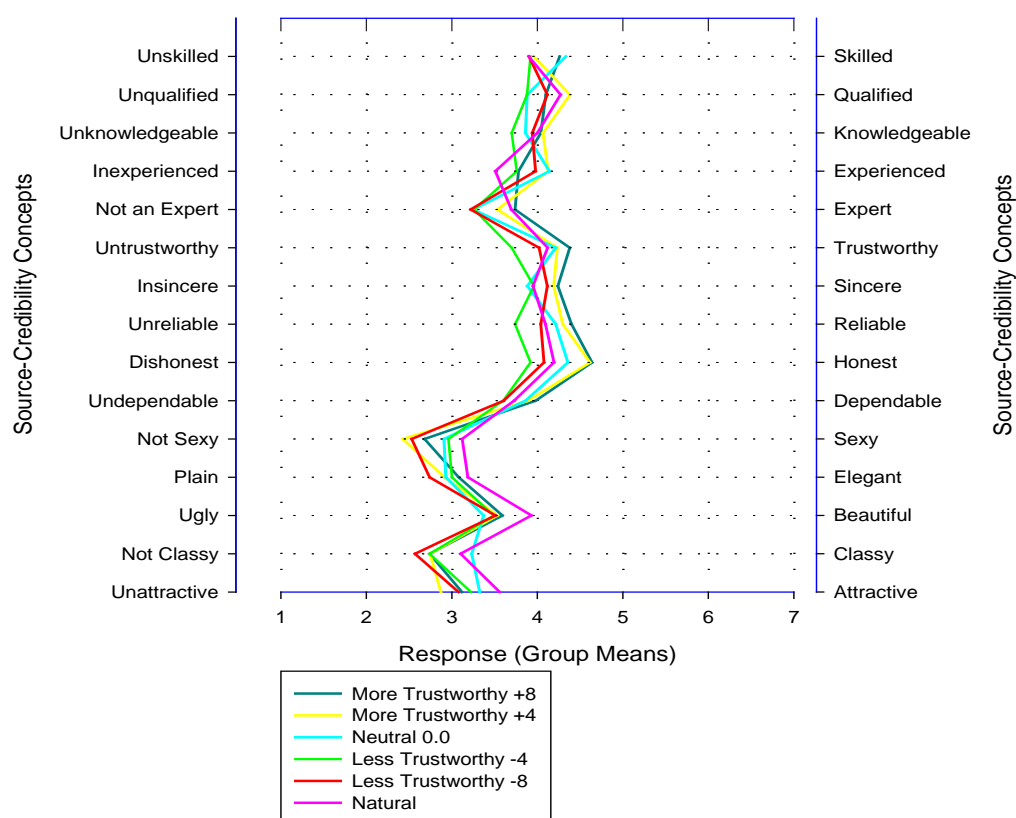


Figure 33a. Trustworthiness group

greater source credibility when compared with less trustworthy and less dominant faces in advertising.

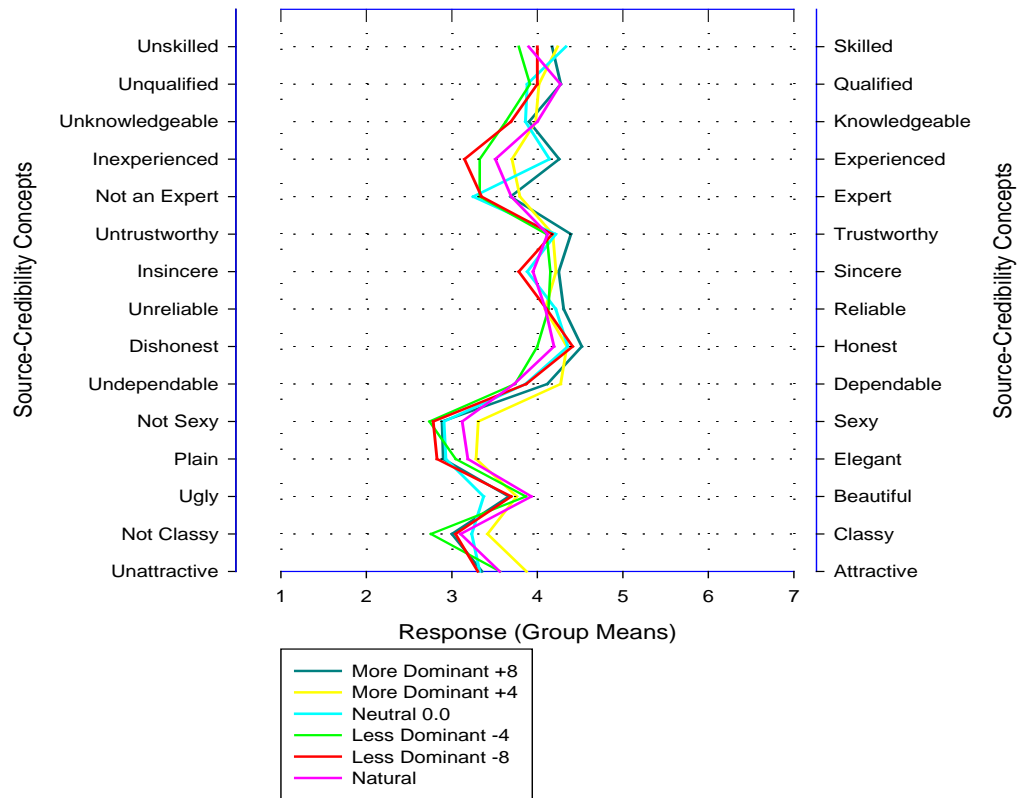


Figure 33b. Dominant groups.

Figure 33. Mean concept profiles for the five facial physiognomy groups for source-credibility.

Perceived Dominance

The plot for perceived dominance shows that the dominant component had a greater effect. More dominant components scored higher on the scale than less dominant components. There was a slight effect for the trustworthy component with less trustworthy components scoring slightly higher than the more trustworthy components. The neutral component scored in the lower range while the natural component scored in the upper range. These data suggest that the dominance scale is in-fact measuring facial dominance.

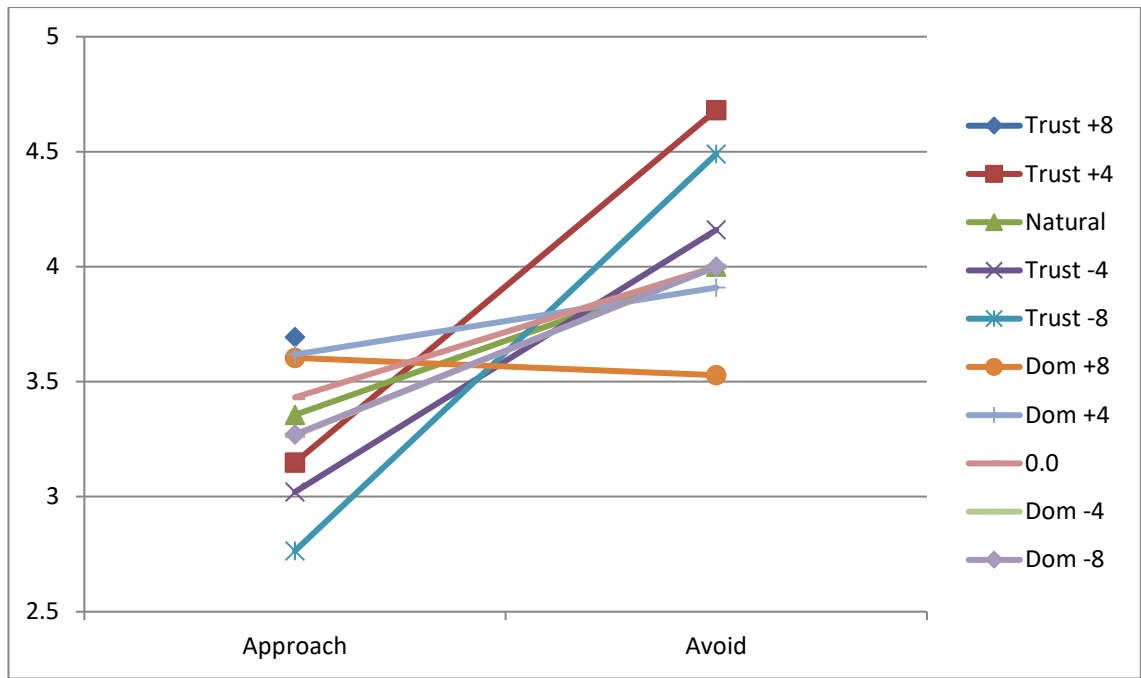


Figure 34. Graphical display of the differences between facial physiognomy group and likelihood to Approach/Avoidance in real life.

Approach/Avoidance

The plot for approach/avoidance behaviour shown in Figure 34 and Figure 35 shows that for the trustworthy component the more trustworthy (+8) condition was most approachable and least avoided. Meanwhile for the trustworthy component the less trustworthy condition (-8) was the least likely to be approached and second most likely to be avoided. This suggests that there are subtle cues to approach – avoidance motivation for the trustworthy component. For the dominance component, the more dominant condition (+8) was more likely to be approached than avoided, while the less dominant condition (-8) was more likely to be avoided than approached. This shows there is subtle interaction between the trustworthy and dominance conditions.

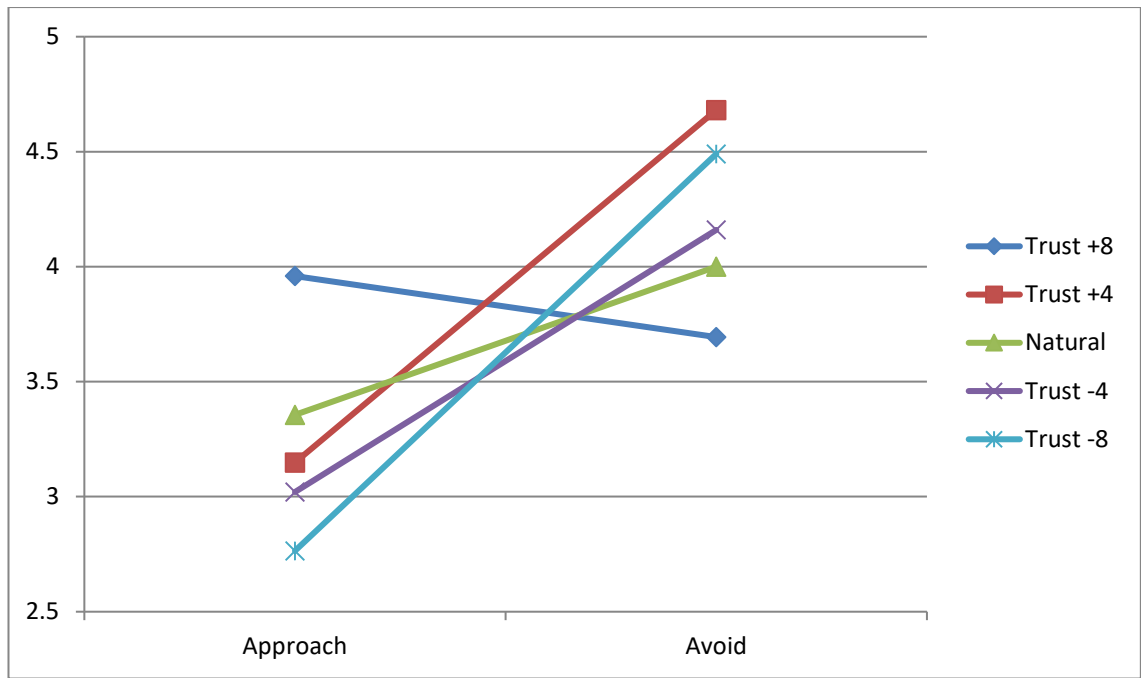


Figure 35a. Trustworthiness groups.

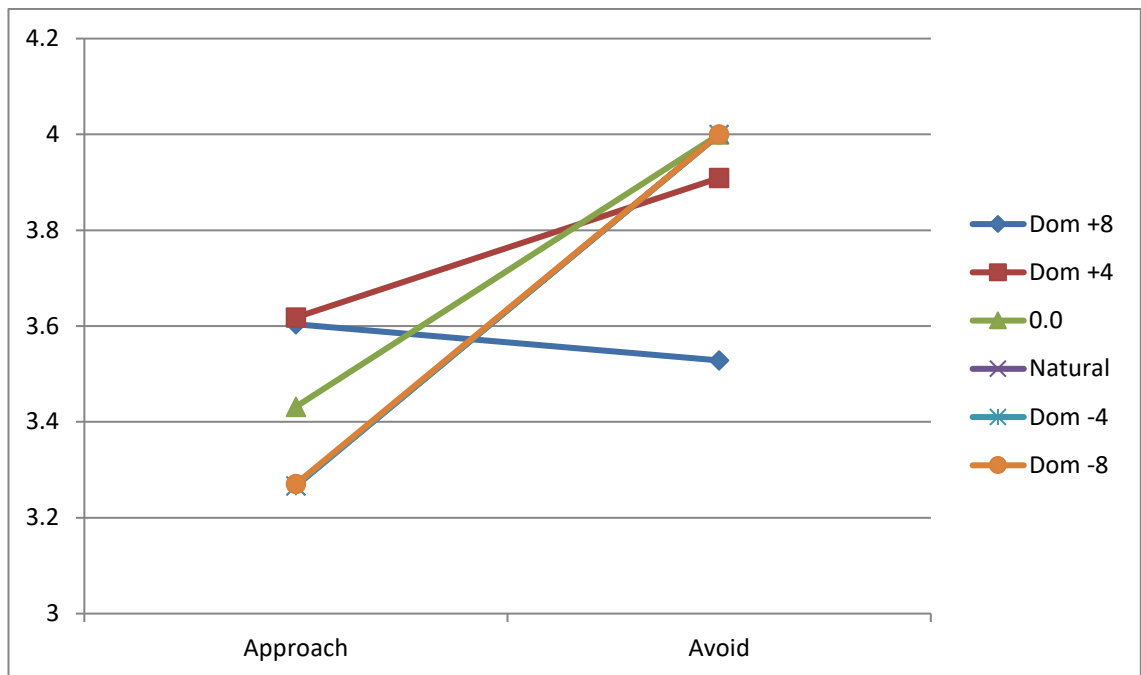


Figure 35b. Dominance groups.

Figure 35. Graphical display of the differences between facial physiognomy group and likelihood to Approach/Avoidance in real life.

Perceived Dominance

The plot for perceived dominance shows that the dominant component had a greater effect. More dominant components scored higher on the scale than less dominant components. There was a slight effect for the trustworthy component with less trustworthy components scoring slightly higher than the more trustworthy components. The neutral component scored in the lower range while the natural component scored in the upper range. These data suggest that the dominance scale is in-fact measuring facial dominance.

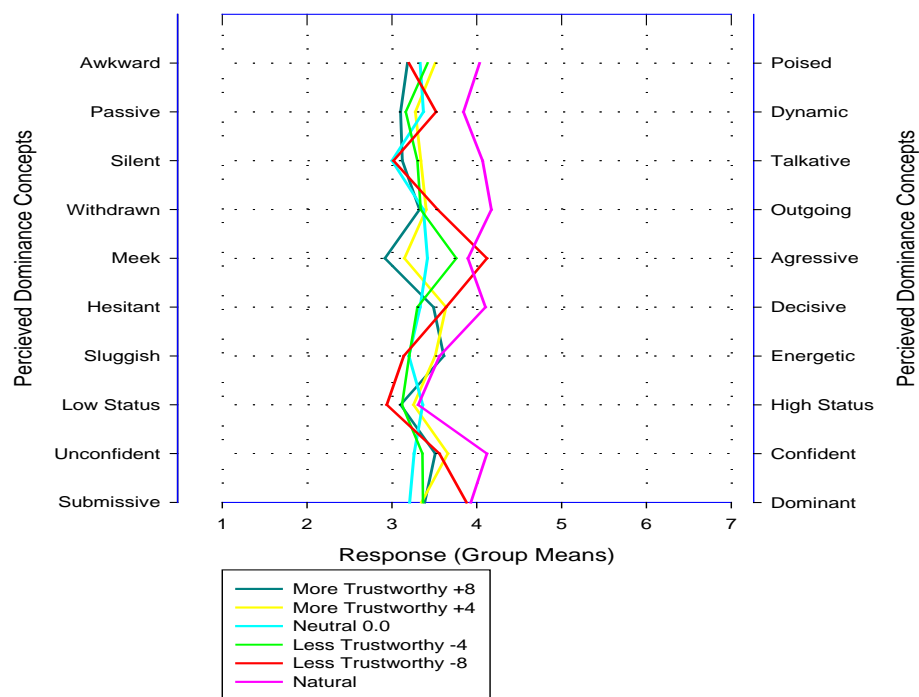


Figure 36a. Trustworthiness groups.

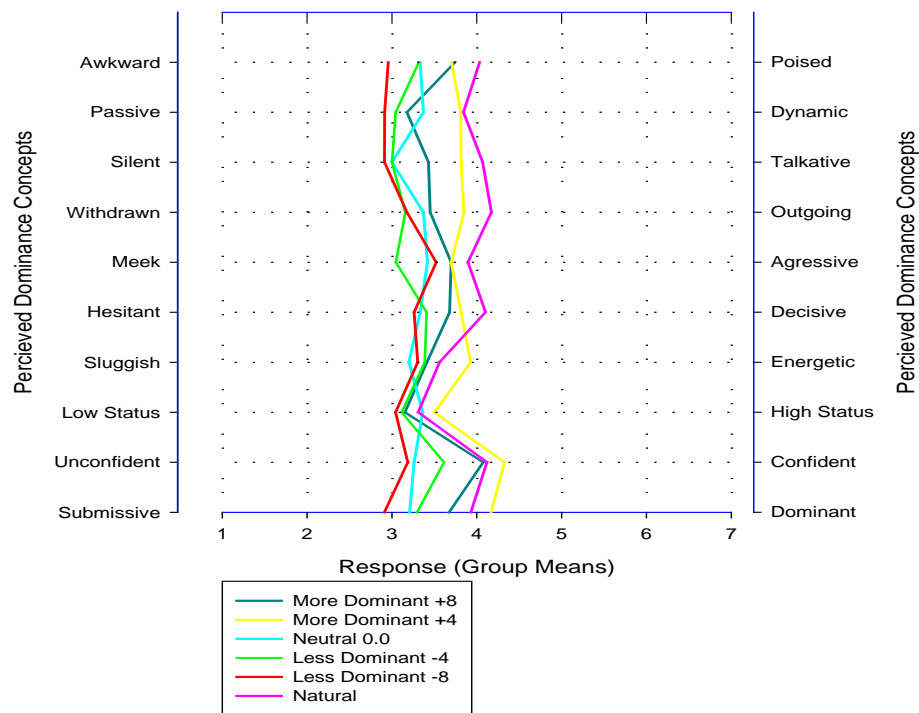


Figure 36b. Dominance groups.

Figure 36. Mean concept profiles for the five facial physiognomy groups for perceived dominance.

Discussion and Conclusion

The purpose of the student study was to investigate the effect of ten variants of facial physiognomy on advertisement believability, their attitude toward the advertisement testimonial itself, and recall of information from the advertisement.

The findings of the student study indicate that the more trustworthy and less dominant variants of facial physiognomy in the advertisement had a greater influence in advertisement believability, although this difference was not significant for the dominant component ($t = -1.378$, $df = 94$, $sig = .172$). The difference for the trustworthy component was not significant either ($t = 1.416$, $df = 95$, $sig = .160$). Consistent with previous research more dominant faces were perceived as more dominant and less dominant faces perceived as less dominant.

Study Two (resource sector workers)

Introduction

According to the facial physiognomy hypothesis, there should be a difference in advertisement believability, advertisement persuasiveness, source trustworthiness, and perceived dominance impressions, judgements, and decisions upon manipulation of the facial image. This study examined facial physiognomic information on the interpretation of the character traits and dependent variables by resource sector workers.

Method

This stage of the research project depended on obtaining data from resource sector workers. In order to understand the process in public health believability and to obtain power for statistical testing a minimum of 500 workers was needed. A purposive sampling strategy was employed. Numerous unsuccessful attempts were made to enlist workers from a variety of resource sector employers and to conduct surveys “on-site”. Subsequently Perth airport terminal operators were approached and permission was granted to interview passengers in the departure lounge leaving for their fly-in fly-out scheduled work rosters. A total of 518 resource sector workers were surveyed at the airport.

Data collection took place over a four-day period from 27 July 2010 through to 30 July 2010. Participants were approached after they had booked in at the airport terminal front desk, while seated waiting for their flight to be called for boarding. All participants were given the same introductory information. The majority of persons approached agreed to participate in the research study saying they had nothing else to do while waiting for their flight. On average, each survey took about 5 minutes to

complete. Surveys were then checked for completeness and collated for subsequent data entry into SPSS version 24 for analysis.

The experimental design was a five (+8, +4, 0.0, -4, and -8) by one between subjects with 0.0 neutral facial physiognomy being the control. Each survey presented to participants had the same occupational health and safety message with an image of a male manipulated by trustworthiness and dominance facial physiognomy. Participants were told they would be taking part in an evaluation of the advertisement and were instructed to rate the target on several personality tests.

The surveys were randomly assigned to 1 of 10 groups. Firstly, the image was unedited, i.e. the image was from the original poster with a male model. Secondly, there was an edited image of neutral facial physiognomy, image 0.0 of a male. Thirdly, there were four edited images for dominance at +8, +4, -4 and -8 deviations of males. Lastly, there were four edited images for trustworthiness at +8, +4, -4 and -8 deviations of males. Thus, there were a total of 10 conditions for this part of the research. This allowed for extension of the pilot study which only explored 5 conditions of male faces, neutral (0.0), and +3 and -3 deviations for both dominance and trustworthiness. The random assignment process involved sequencing the surveys with each of the 10 surveys obtaining one of the research study conditions.

Following transcription of the survey data into SPSS 24 the data were analysed. Initially, means were explored for advertisement believability, advertisement believability concepts, advertisement persuasiveness, and advertisement persuasiveness concepts. Means were explored separately for the dominance and trustworthiness groupings. A factor analysis was then performed using SPSS 24 to ensure that the items in the advertisement believability, advertisement persuasiveness, source credibility, and perceived dominance scales did in fact measure the scale concepts.

Results

The sample of resource sector workers had a mean age of 37 years. Their average education was 12.7 years. Three hundred and ninety-one (79.3%) were male and 102 (20.7%) female. English was the first language for most participants (91.1%) with 81.3% identifying themselves as white/Caucasian, 41.1% as middle class, 25.6% as skilled working class, 19.9% working class, 7.4% upper middle class, 4.2% lower middle class, and 1.7% under class.

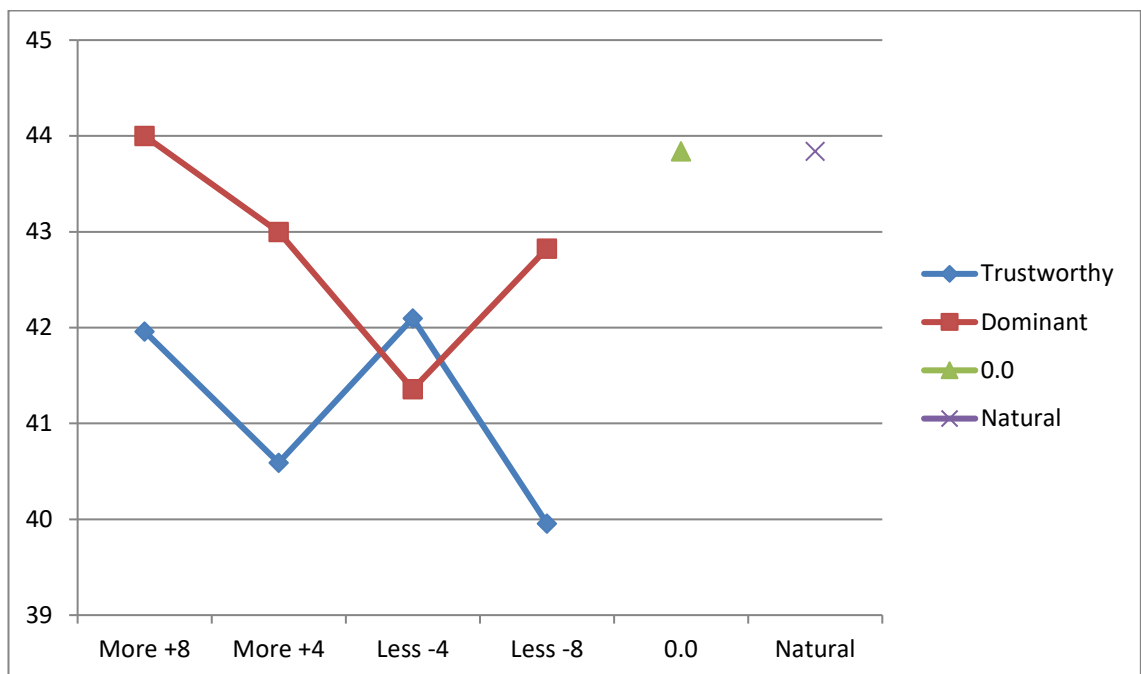


Figure 37. Mean responses of resource sector workers for advertisement believability.

Ad Believability

Figure 37 shows that the more dominant +8, natural and neutral conditions scored higher on the advertisement believability scales. There is interaction between the less dominant and less trustworthy conditions. There was interaction between the less dominant -4 and the less trustworthy -4 conditions. These data suggest that more dominant faces are associated with greater advertisement believability.

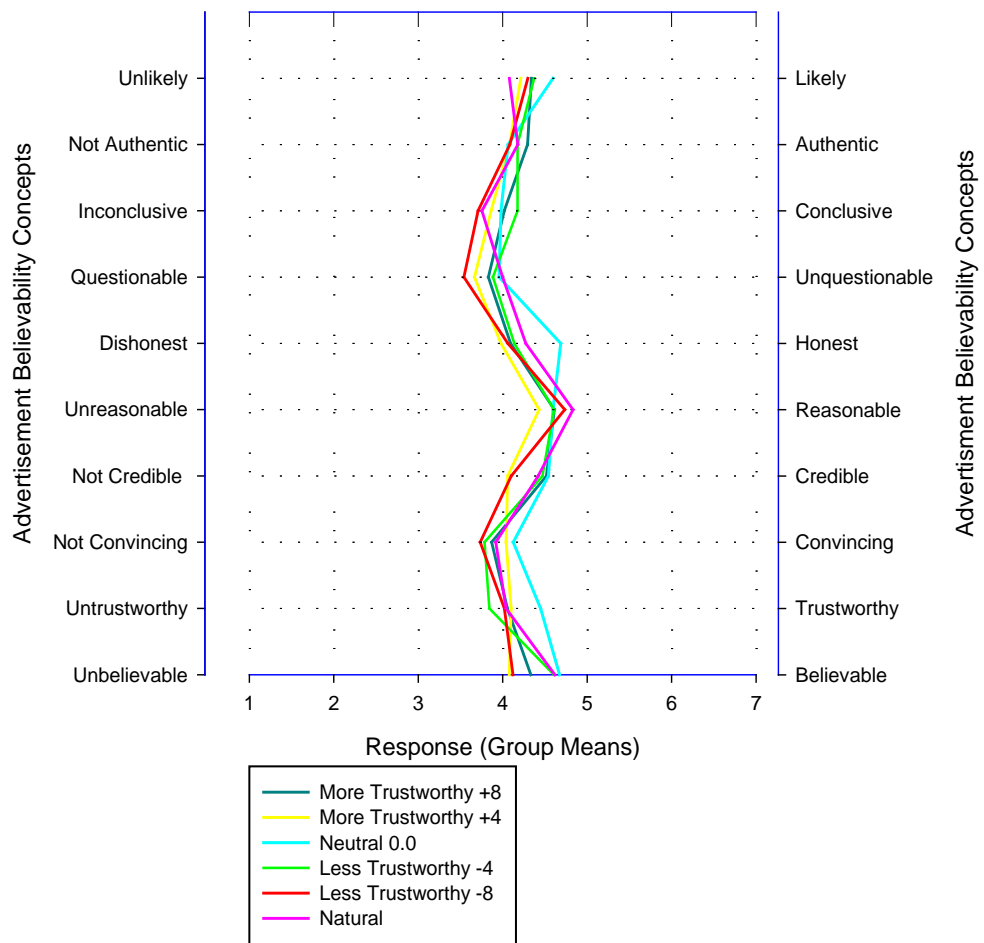


Figure 38. Mean responses of resource sector workers who received the trustworthy component for the advertisement believability scale concepts.

Ad Believability – Trustworthiness Facial Physiognomy

Data shown in Figure 38 indicates that the facial physiognomy groups followed a similar high agreement pattern except for the questionable/unquestionable and the honest/dishonest concepts, which shows a subtle variation for the neutral and less trustworthy (-8) facial physiognomy groups. The concepts lean toward the right for likely, authentic, honest, reasonable, credible, and believable concepts. Only one concept, questionable, leans toward the left. The remaining concepts are mid-range.

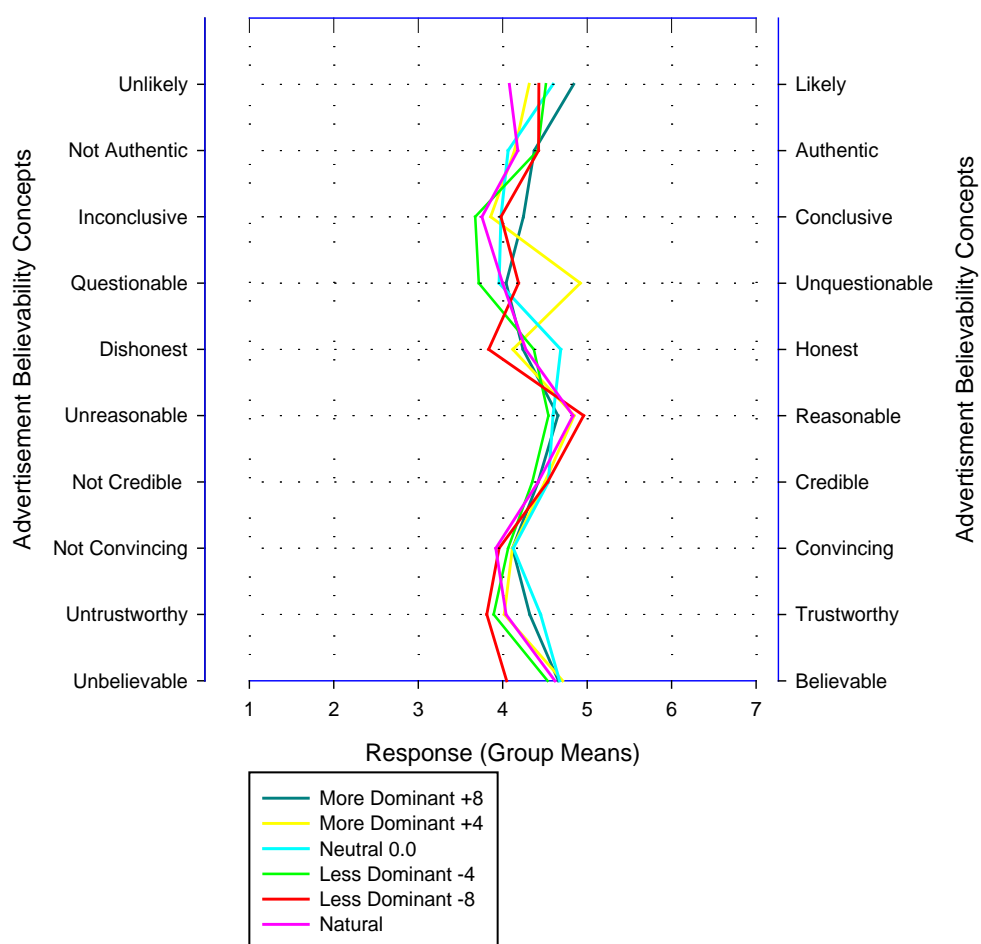


Figure 39. Mean responses of resource sector workers who received the dominance component for the advertisement believability scale concepts.

Ad Believability – Dominant Facial Physiognomy

Figure 39 shows that that the five dominant physiognomy groups differentiated somewhat for the adjective ‘ad believability’. There is high agreement on the concepts ‘convincing’ and ‘credible’. There is somewhat less agreement for the concepts ‘questionable’ and ‘honest’. The different, but somewhat similar concepts are ‘not convincing’ and ‘convincing’. The neutral and more dominant conditions being more trustworthy and more believably than the less dominant conditions. The chart shows that the concepts lean toward the right for likely, authentic, reasonable, credible, and believable. The remaining concepts are mid-range with no concepts leaning toward the left.

The factor analysis using principle components and oblique rotation indicated that the scale items loaded onto two factors. Factors one and two accounted for 60.75% of the total variance explained. The KMO statistic was .842 which provides significant evidence that the factor analysis is appropriate for these data. Bartlett's measure of sphericity is highly significant, $p < .001$, and therefore factor analysis is appropriate. As shown in Table 13 the same two factors seem to emerge as for the pilot study. Factor 1 seems to be related to credibility while factor 2 represents trustworthiness. The first factor accounted for 39.93% of the total variance and the second factor 20.828%. The reliability co-efficient was .820 which shows that the scale is reliable. No items if deleted would increase the Cronbach's alpha.

Table 13.

Correlations between variables and factors following the rotation of the axis.

Rotated Component Matrix^{a,b}		
	Component	
	1	2
Not/Credible	.831	
Un/Likely	.808	
Not/Authentic	.806	
Un/Reasonable	.784	
Un/Believable	.756	
Un/Questionable	.670	
Not/Convincing		.818
Un/Trustworthy		.809
Dis/Honest		.757
In/Conclusive		.643

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Study Number = Workers

b. Rotation converged in 3 iterations.

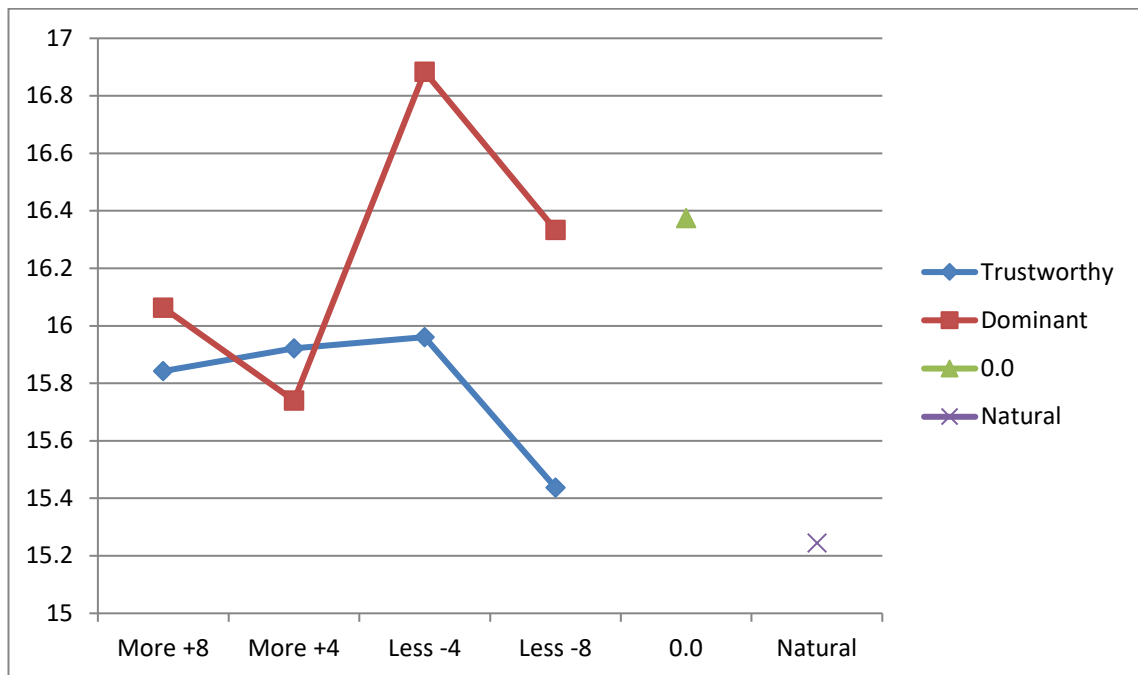


Figure 40. Advertisement Persuasiveness mean ratings from survey participants – resource sector workers.

Advertisement Persuasiveness

The plots for advertisement persuasiveness in Figure 40 show that more trustworthy and less dominant faces had a greater persuasive influence. The neutral component was in the middle of the range and the less trustworthy and natural component was least persuasive. The neutral component had more effectiveness than the trustworthy component while the more trustworthy and less dominant components were considered to be stronger compared with the less trustworthy and more dominant components.

Examining the profiles of trustworthiness and dominance (Figure 41 and Figure 42), it is apparent that there is a more negative rating for “ineffective / effective at getting people like me to” and not persuasive / persuasive concepts for the trustworthy component. For the dominance component this slightly negative rating is only seen with the not persuasive / persuasive construct.

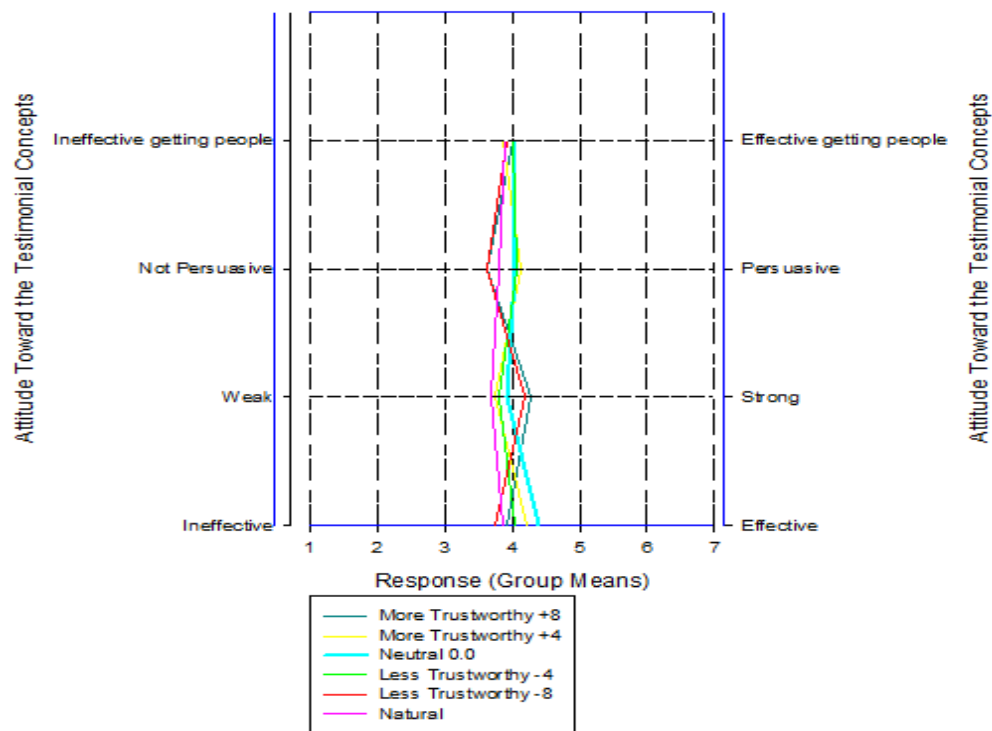


Figure 41. Resource sector workers trustworthiness profile image.

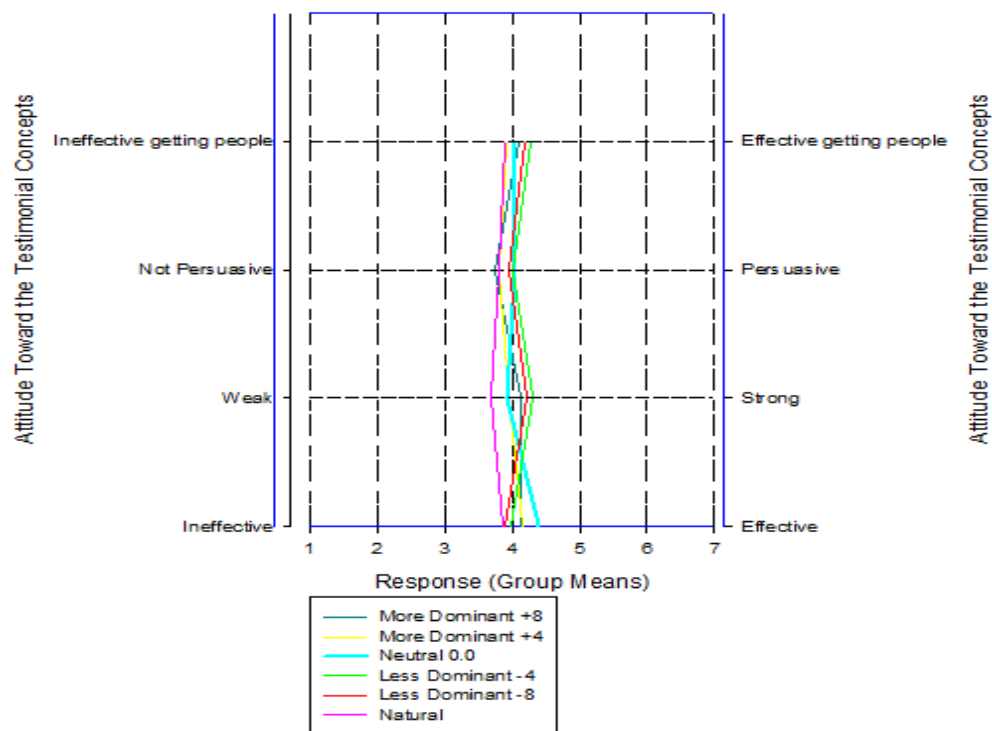


Figure 42. Resource sector workers dominance profile image.

A factor analysis of the scale identified 2 factors which accounted for 53.49% of the explained variance for factor 1 and 26.12% for factor 2. The determinant of the correlation matrix is .368 which is greater than .001 therefore multicollinearity is not a problem for these data. The KMO statistic is .612 which is above the recommended minimum of .5 by Kaiser (1974). For these data Bartlett's test is highly significant ($p < .001$), therefore factor analysis is appropriate. Table 14 shows the two factors and the correlations between the questionnaire items and factors. This information has been utilised as a guide to make the following decisions. Factor 1 might be labelled emotional responses while factor 2 might be labelled behavioural responses. A check of the reliability of the questionnaire scale returned a Cronbach's alpha of .708 which is a value that would not be increased by deleting any of the questionnaire items.

Table 14.

Correlations between variables and factors following the rotation of the axis.

Rotated Component Matrix ^{a,b}		
	Component	
	1	2
Not/Persuasive	.898	
In/Effective	.879	
Getting People like me to be...		.872
Weak/Strong		.862

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Study Number = Workers

b. Rotation converged in 3 iterations.

For the trustworthiness component, the overall effect of facial physiognomy on advertisement persuasiveness was not significant, $F = 1.262$, $df = 4$, $.\alpha = .286$. Levene's statistic was not significant indicating that the variances are not significantly different.

The t -statistic derived from the contrast tests was not significant. Tukey's HSD post hoc tests were not significant.

One-way ANOVA Analysis of the dominance component elicited there was no significant overall effect of facial physiognomy on advertisement persuasiveness, $F = .420$, $df = 4$, $\alpha = .794$. Levene's statistic was not significant and the t -statistic from the contrast tests was not significant. Tukey's HSD post hoc tests were not significant.

Source Credibility

Figure 43 shows the source attractiveness for each of the facial physiognomy groups. The dominant groups were considered to be more attractive than the trustworthy groups by this sample of resource sector workers. The more trustworthy groups were more attractive than the less trustworthy groups. The neutral and natural components were mid-range.

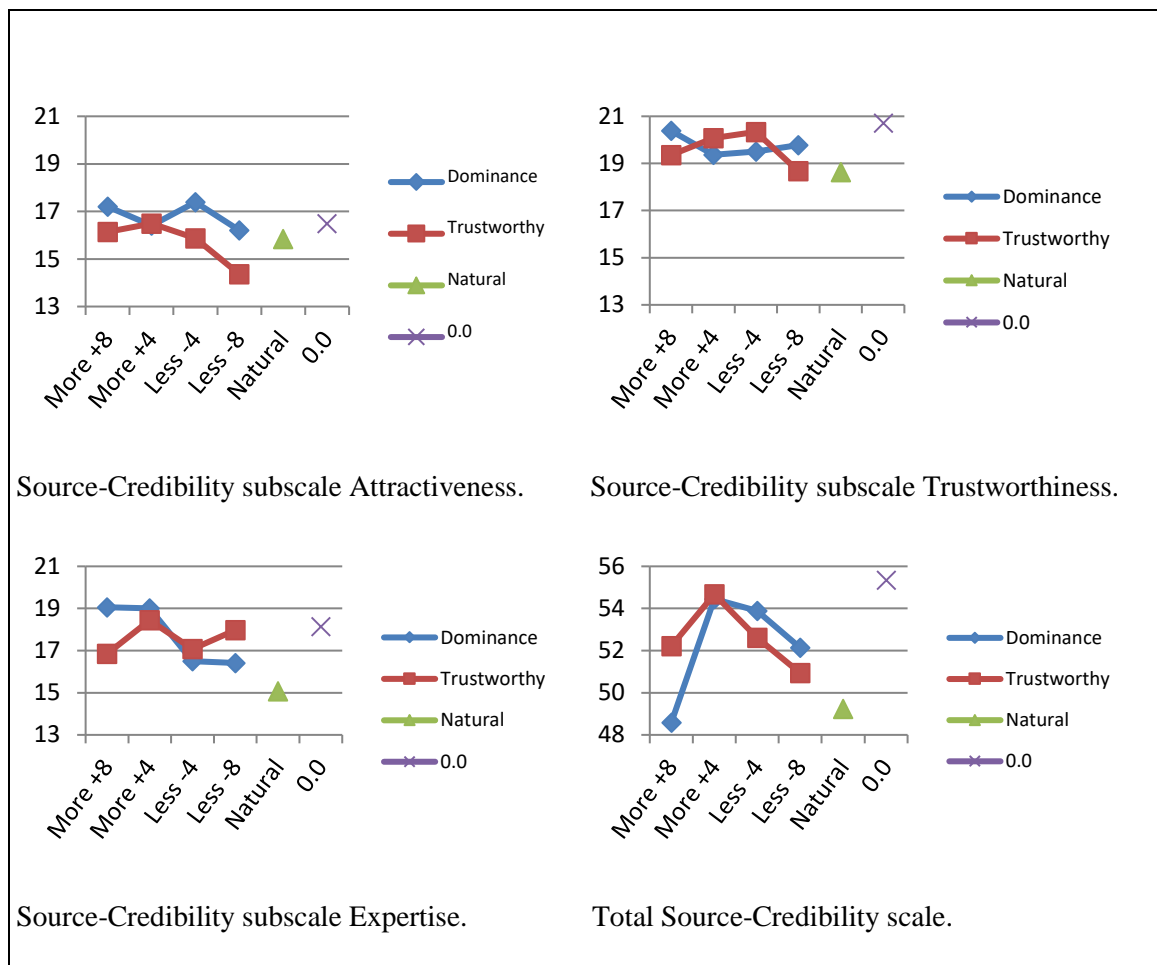


Figure 43. Source Credibility and sub-scale mean ratings from survey participants – resource sector workers.

Source Trustworthiness

The plot for source trustworthiness shows that the extreme trustworthy component (+8 and -8) were less trustworthy than the extreme dominant components. The subtler trustworthy components (+4 and -4) were more trustworthy than the dominant counterparts. The neutral component was the most trustworthy and the natural component the least trustworthy.

Source Dominance

The plot for source expertise shows that the more dominant components were considered to be more expert than the less dominant components. The trustworthy and neutral components were midrange compared with the dominant component. The natural component was the least expert.

Source Credibility

The plot for source-credibility shows that for the more and less extreme components (+8 and -8) source credibility is lower than compared with the subtler groups (+4 and -4). The neutral component had the greatest source-credibility and the natural component the second least.

The profile of the source-credibility scale concepts, Figure 44 and Figure 45, shows that the trustworthy sub-scale was midrange while the expertise and attractiveness sub-scales leaned to the left components. The more dominant components were considered to be more expert than the less dominant components. This trend is not evident for the trustworthy component; however, there is a trend for the more trustworthy components to lean to the right of the profile for the trustworthy sub-scale compared with the less trustworthy components. On both source-credibility scale profiles there is greater variability for the source-expertise sub-scale than for the attractiveness and trustworthiness sub-scales.

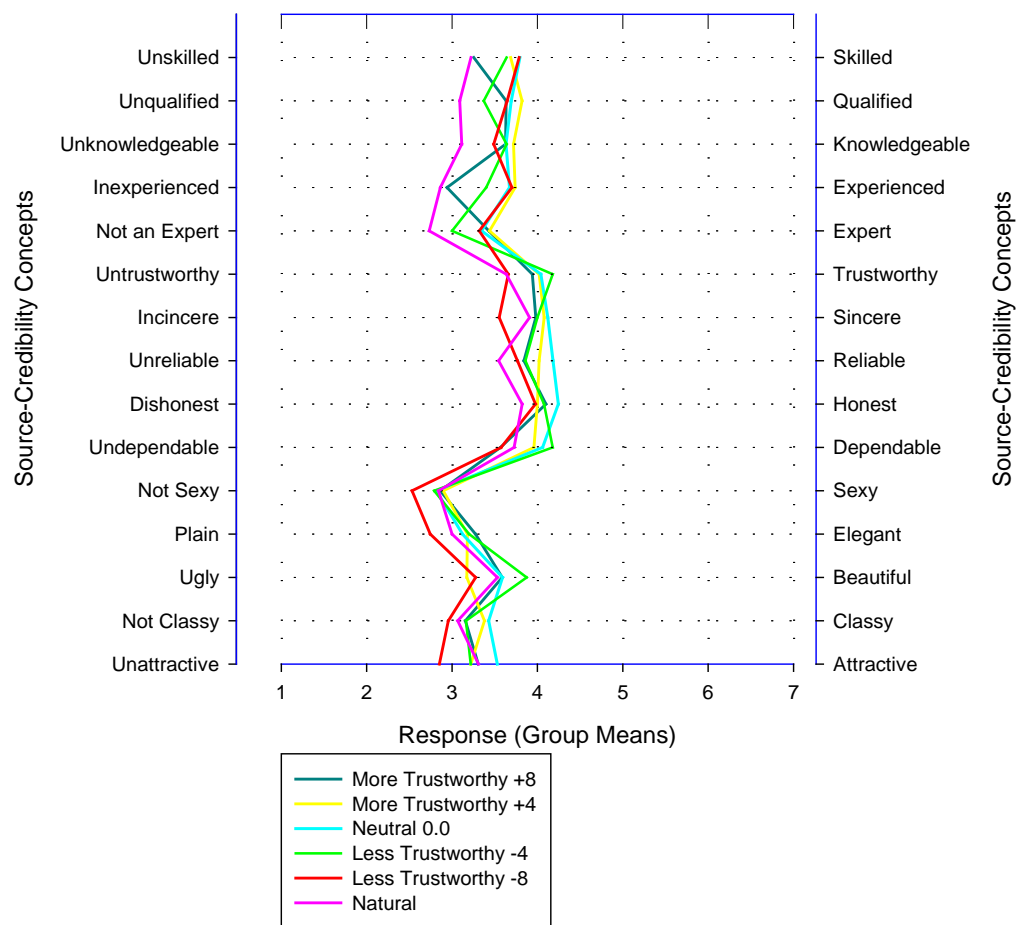


Figure 44. Mean profiles of resource sector workers for source credibility concepts. Group Trustworthiness.

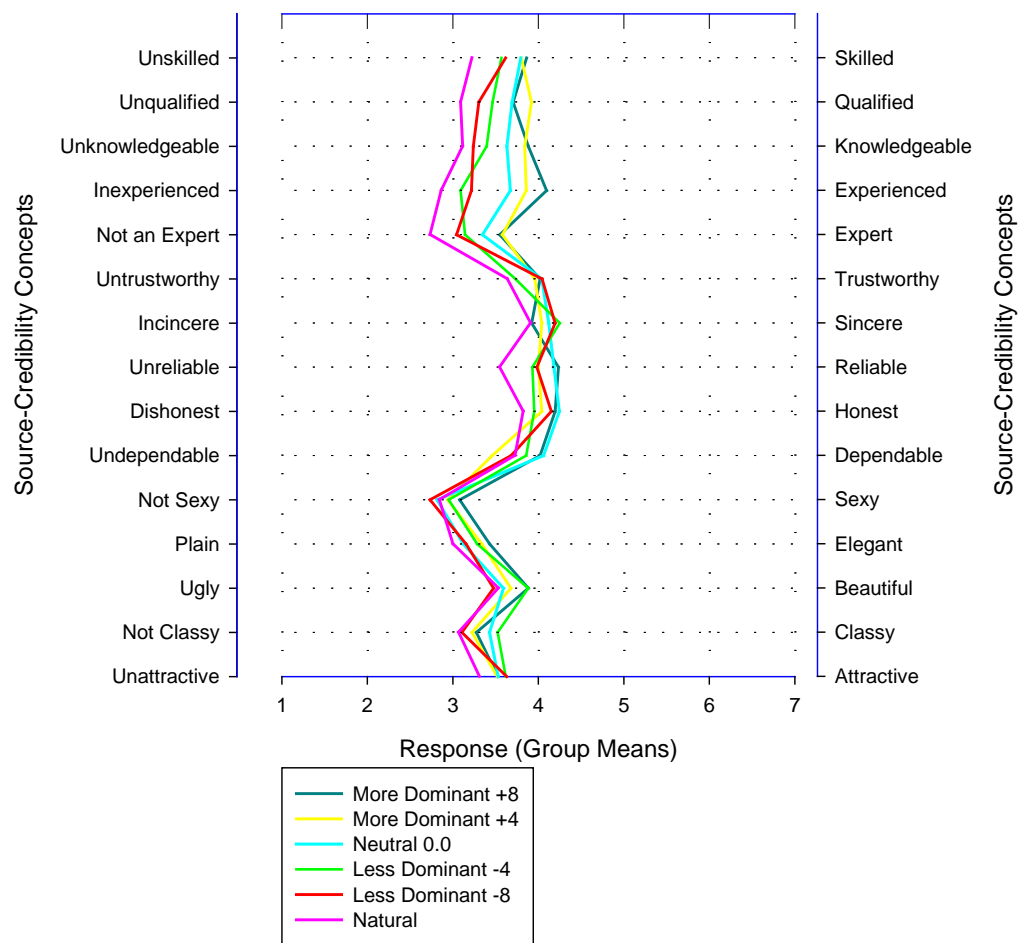


Figure 45. Mean profiles of resource sector workers for dominant groups. Concepts of source credibility.

A principal components analysis was conducted on the 15 items with orthogonal varimax rotation. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, $KMO = .868$, which is robust according to Kaiser (1974). Bartlett's test of sphericity $\chi^2(105) = 3225.638$, $p < .001$, indicated that correlations between items were sufficiently large for principal components analysis. An initial analysis was run for the individual sub-scales. Factor analysis of the source-attractiveness sub-scale indicated one factor which accounted for 53.39% of the variance explained. Likewise, the source-trustworthiness sub-scale indicated one factor with 59.34% of the variance explained by this factor. For the source-expertise sub-scale only one factor was identified which

accounted for 61.625% of the variance explained. However, factor analysis of the source-credibility scale indicated four factors. These four factors, shown in Table 15, accounted for 67.62% of the variance explained after rotation. The scree plot was rather ambiguous and showed inflections that would justify retaining all four factors for the final analysis. The items that cluster on the same factors suggest factor 1 represents source trustworthiness, factor 2 source attractiveness, factor 3 source expertise and factor 4 a combination of source attractiveness and source trustworthiness.

Table 15.

Correlations between variables and factors following the rotation of the axis.

Rotated Component Matrix^{a,b}				
	Component			
	1	2	3	4
Dis/Honest	.844			
Un/Trustworthy	.802			
Un/Reliable	.797			
Not/Sexy		.819		
Plain/Elegant		.784		
Un/Attractive		.737		
Not/Classy		.686		
Un/Skilled			.730	
In/Experienced			.727	
Un/Qualified	.462		.707	
Un/Knowledgeable	.429		.704	
Not an/Expert	.421		.610	
In/Sincere				.705
Beautiful/Ugly				.666
Un/Dependable				.659

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Study Number = Workers

b. Rotation converged in 6 iterations.

The source-credibility scale had a high reliability, Cronbach's $\alpha = .874$. Only one item if deleted would increase the reliability statistic, ugly/beautiful, which would

then produce a Cronbach's $\alpha = .878$. This item was not deleted from the analysis as .8 indicates good reliability.

Perceived Dominance

For the dominant component there was no significant effect of source-credibility, $F(4, 227), = 1.120, p = .348$. While the source attractiveness and source trustworthiness were not significant for the dominant component, there was a significant effect for source expertise, $F(4, 233), = 2.932, p = .022$. The trustworthy component showed no significant effect for source credibility, $F(4, 235), = 1.180, p = .320$. The subscales for the trustworthiness component, source attractiveness, source trustworthiness and source expertise, showed no significant effects. The source of the difference for the dominant component was between the more dominant +8 and less dominant -8 variables indicating that the more dominant source is considered to be more expert than the less dominant source.

The plot of perceived dominance, Figure 46 shows that the more dominant components scored higher on the scale than the less dominant components. The trustworthy components scored much lower as did the neutral and natural components.

Like the student study component of this research, the plot for perceived dominance in Figure 46 shows that the more dominant faces scored higher on the scale than did the less dominant faces. The trustworthy component scored less than the dominant component except for less, -8, conditions when the reverse was the case. The natural condition scored lowest and the neutral component scored midway between the upper and lower scores of the trustworthy and dominant -8 conditions.

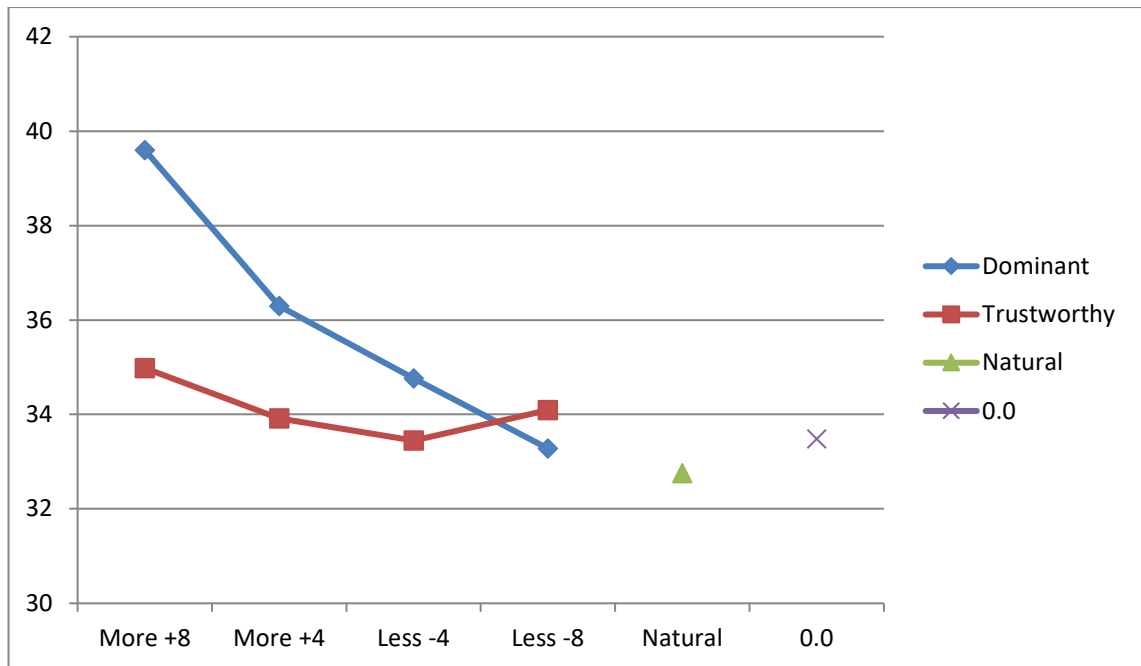


Figure 46. Plot of resource sector workers mean scores for perceived dominance.

The plot of the concept profiles for the perceived dominance scale, Figure 47 and Figure 48, shows that for the dominant components the more dominant groups leaned to the right sided concepts while the less dominant groups leaned to the left sided concepts. The less trustworthy components were considered to be more aggressive in the perceived dominance profile while the more trustworthy components were considered to be meeker rather than aggressive. Overall both components leaned toward the left of midway of the scales between numbers three and four.

Reliability analysis of the perceived dominance scale produced a Cronbach's Alpha of .869 which is considered a good value indicating good reliability. No items if deleted would produce a greater reliability alpha.

A principal components analysis was conducted on the ten items with orthogonal rotation. The Kaiser-Meyer-Olkin measure verified the sampling adequacy

for the analysis, KMO = .874, according to Kaiser (1974). The sample size is adequate for factor analysis. All KMO values for individual items were > .880 which is well above the anticipated .5. Bartlett's test of sphericity $\chi^2 (45) = 1948.524, p < .001$, indicated that correlations between items were sufficiently large for principal components analysis. Two factors were extracted and in combination explained 61.25% of the variance. Factor 1 accounted for 46.42% of the variance while Factor 2 accounted for 14.83%. Table 16 shows the factor loadings after rotation. The items that cluster on the same components suggest that component 1 represents persuasiveness while component 2 represents control.

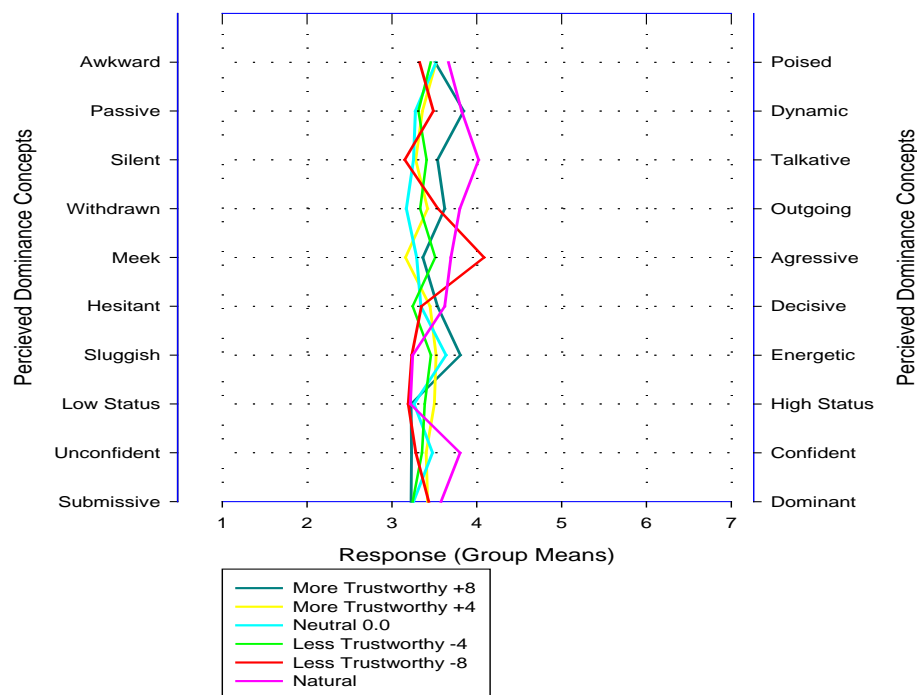


Figure 47. Mean profiles of resource sector workers for perceived dominance - Trustworthy component.

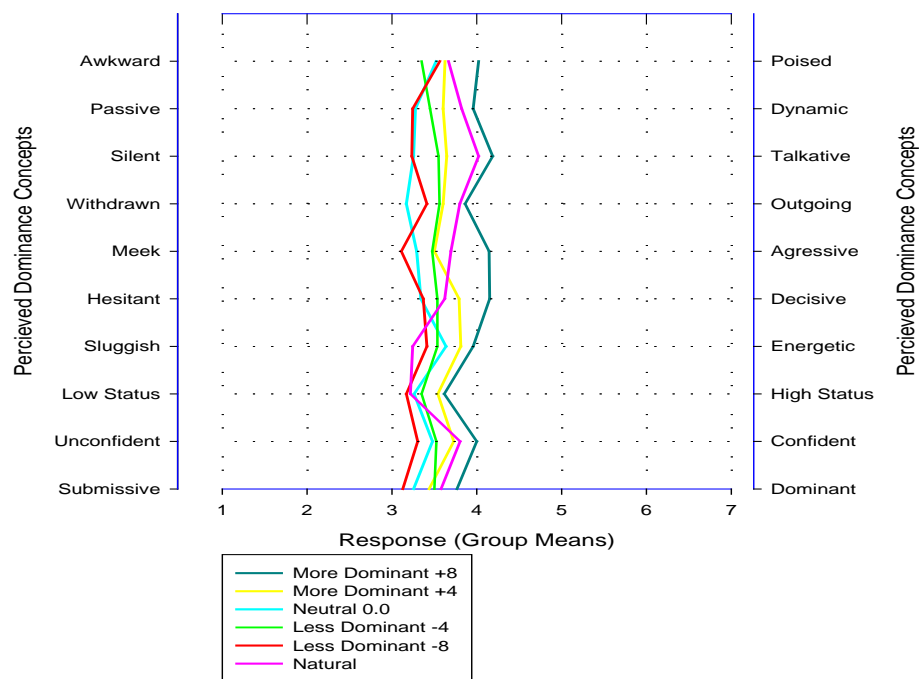


Figure 48. Mean profiles of resource sector workers for perceived dominance - Dominant component.

Table 16.

Correlations between variables and factors following the rotation of the axis.

Rotated Component Matrix ^{a,b}		
	Component	
	1	2
Sluggish/Energetic	.860	
Hesitant/Decisive	.782	
Low/High status	.760	
Awkward/Poised	.744	
Silent/Talkative	.520	
Aggressive/Meek		.825
Dynamic/Passive		.747
Dominant/Submissive		.705
Outgoing/Withdrawn		.704
Un/Confident	.443	.650

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser

Normalization.

a. Study Number = Workers

b. Rotation converged in 3 iterations.

Approach/Avoidance

The plot for approach/avoidance behaviour shown in Figure 49 and Figure 50 shows that for the trustworthy component the more trustworthy (-8) condition was most avoided and least approachable. Meanwhile for the trustworthy component the more trustworthy condition (+4) was the less likely to be approached and second most likely to be avoided. This suggests that there are subtle cues to approach – avoidance motivation for the trustworthy component. For the dominance component, the more dominant condition (+8) was more likely to be approached than avoided, while the less dominant condition (-8) was more likely to be approached than avoided. This shows there is subtle interaction between the trustworthy and dominance conditions.

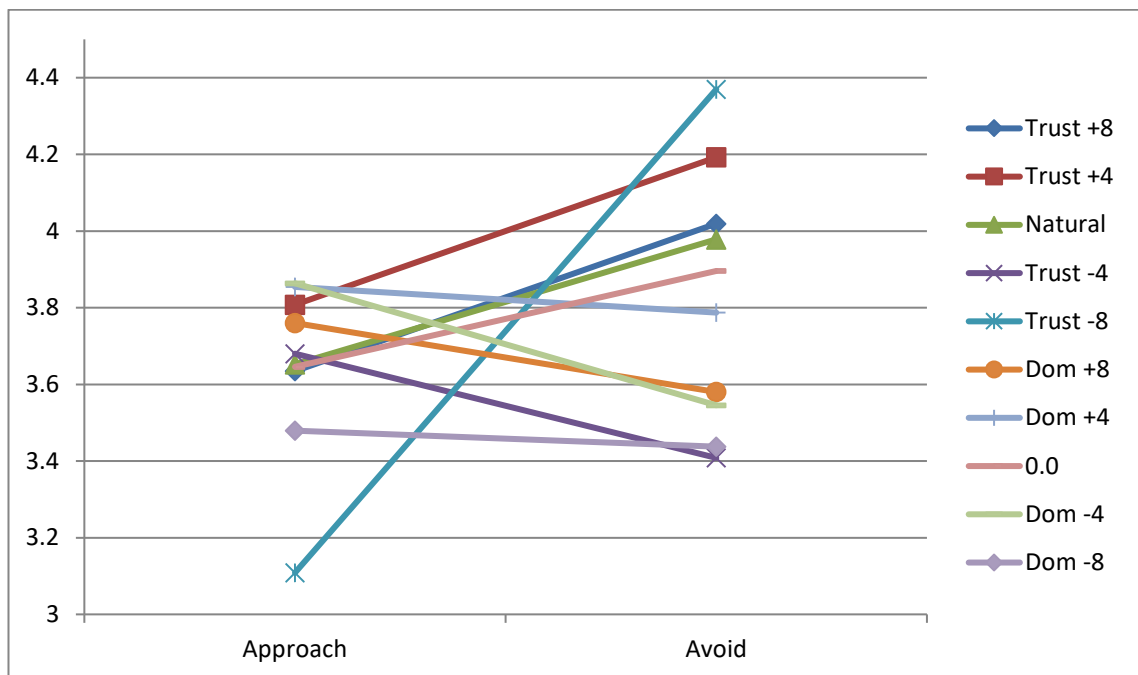


Figure 49. Graphical display of the differences between facial physiognomy group and likelihood to Approach/Avoidance in real life.

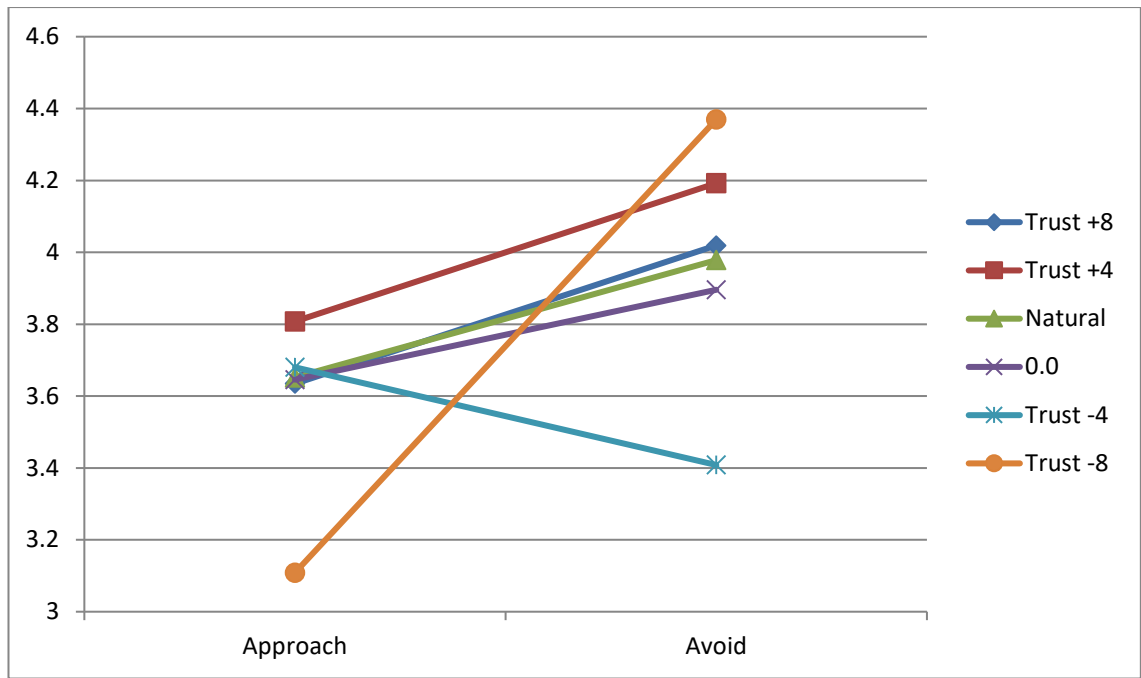


Figure 50a. Trustworthiness groups

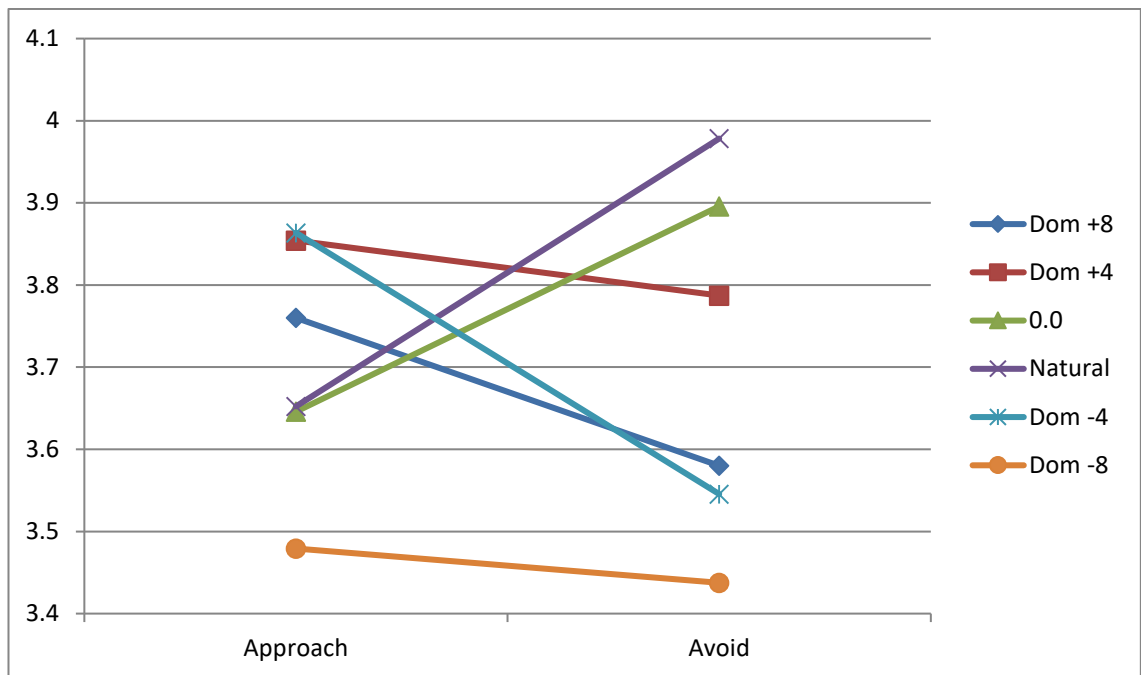


Figure 50b. Dominance groups.

Figure 50. Graphical display of the differences between facial physiognomy group and likelihood to Approach/Avoidance in real life.

The plots of likelihood of approach and avoidance behaviour, Figure 51, shows that there is a much larger gap between the approach/avoidance for less dominant (-8)

and less trustworthy (-8) components than for the other components. For both the dominant component (-8) and trustworthy component (-8) resource sector worker indicated that they were more likely to avoid the person shown in the advertisement and less likely to approach the person. The trustworthy (-4) and dominant (-4) were more approachable than likeliness to be avoided. The neutral component was more likely to be avoided. For the more trustworthy and more dominant components, the dominant component was more likely to be approached, while for the trustworthy component, it was the opposite, more likely to be avoided.

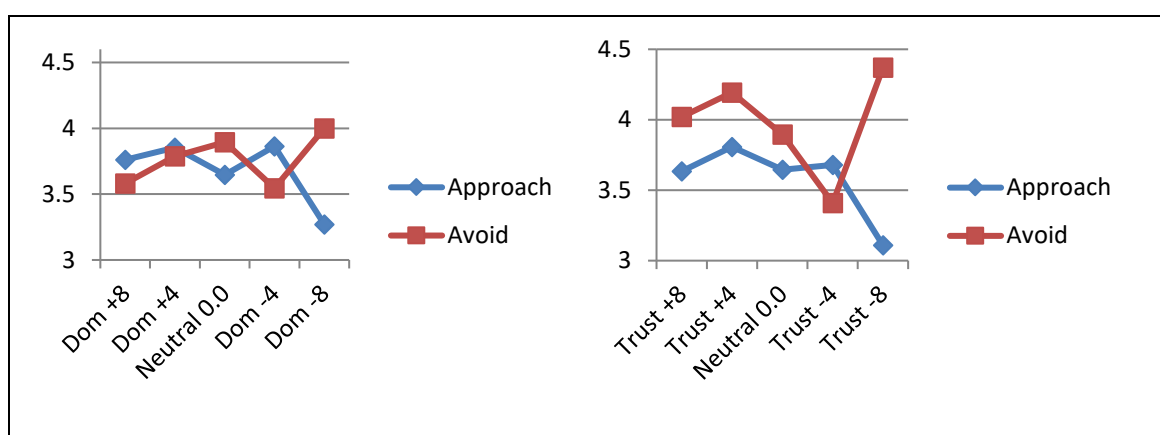


Figure 51. Resource sector workers likeliness of approach or avoidance by each of the facial physiognomy conditions.

Belief in Physiognomy

Figure 52 shows that 113 participants or 23.7% of those who answered the question on belief in physiognomy think that knowing a person's true personality traits from his or her facial physiognomy is impossible. 2.7% thought that it is possible to know all an individual's personality traits from his or her facial physiognomy, 10.7% thought it was possible to know many traits, and 62.9% thought that it is possible to know a few traits. There were 477 valid samples and 41 with missing values.

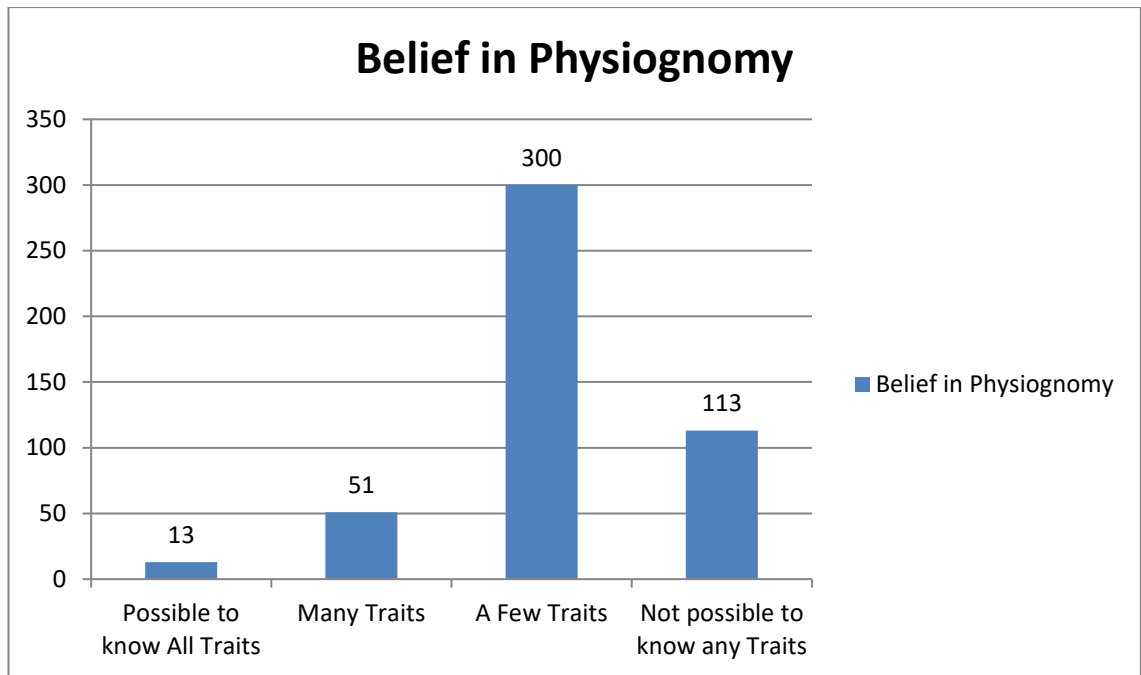


Figure 52. Resource sector worker's response to belief in physiognomy.

Conclusion

The purpose of the resource sector workers study was to investigate the effect of ten variants of facial physiognomy on advertisement believability, their attitude toward the advertisement testimonial itself, and recall of information from the advertisement.

The findings of the resource sector workers study indicate that the less trustworthy and the natural variants of facial physiognomy in the advertisement had a greater influence in approach/avoidance.

Study Three (experts)

Introduction

This part of the study investigated the culture and practice of endorser selection. The original intention was to undertake in-depth interviews with experts in order to glean an understanding of their organisational, political and policy perspectives, and at the same time capture the categories or concepts of interest that are thought to play a role in advertising validity and recall, for example, ascertaining their notion of endorser trustworthiness and dominance.

Most organisations contacted said they were too busy to participate and most of the rest were non-responders. I only managed to obtain one interview with the director of an advertising company which had been awarded the advertising contract for the WA Health Department. With this unforeseen event, I have had to improvise this part of my study. I completed a case study analysis of the interview and combined this with analysis of the concepts discovered in the readings.

Thereafter, an open-ended question was used to elicit narrative responses. Qualitative data was analysed with the aid of NVivo 10 software. Themes were extracted to explore an interpretation of subjective meaning and practical significance, a description of the social and cultural context, and consideration as to the laypersons knowledge regarding endorser physiognomy. Data were examined by the researcher and results reported to the interviewee to confirm meaning, and this was compared with accounts given in the literature. Assumptions about the thematic approach were framed in a realist or experiential method independent of theoretical or epistemological approaches. Through a structural realist or experiential approach, the method of a thematic analysis allows for theoretical freedom and is a flexible research tool that

provides a detailed account of the data to answer the research questions from the perspective of the message source.

The first stage in the analysis was to focus on identifying concepts in terms of their meanings of facial physiognomy, e.g. anything physiognomic attended to by the interviewee, and creating free nodes. The second stage of the analysis was to focus on the structural aspects, e.g. the combination of facial features upon which the interviewee focused and discerned upon in relation to endorser selection, and the how they distinguish one face from another as being trustworthy, dominant, and influential in the recall of messages presented in a public health advertisement targeting workers in the workplace on the issue of electrical injury prevention. Some possible themes identified from the literature which may arise as primary concepts or free nodes of enquiry are listed below:

- Standing out
- Shorthand
- Cost of acquiring the endorser
- Endorser trustworthiness
- Believability
- Dominance
- Campaign budget
- Likelihood of acquiring the endorser
- Endorser controversy risk
- Endorser values define and refresh the image
- Endorser adds new dimensions to the image
- Credibility
- Prior endorsements
- Physical attractiveness
- Equity membership status
- Aspiration
- PR coverage
- Desperate for ideas so utilise endorser
- Endorser profession
- Convincing clients
- Endorser likeability
- Endorser-target audience match

- Endorser-product match
- Overall image of the endorser
(Erdogan & Baker, 1999; Erdogan et al., 2001; Oosterhof & Todorov, 2008; Todorov et al., 2008).

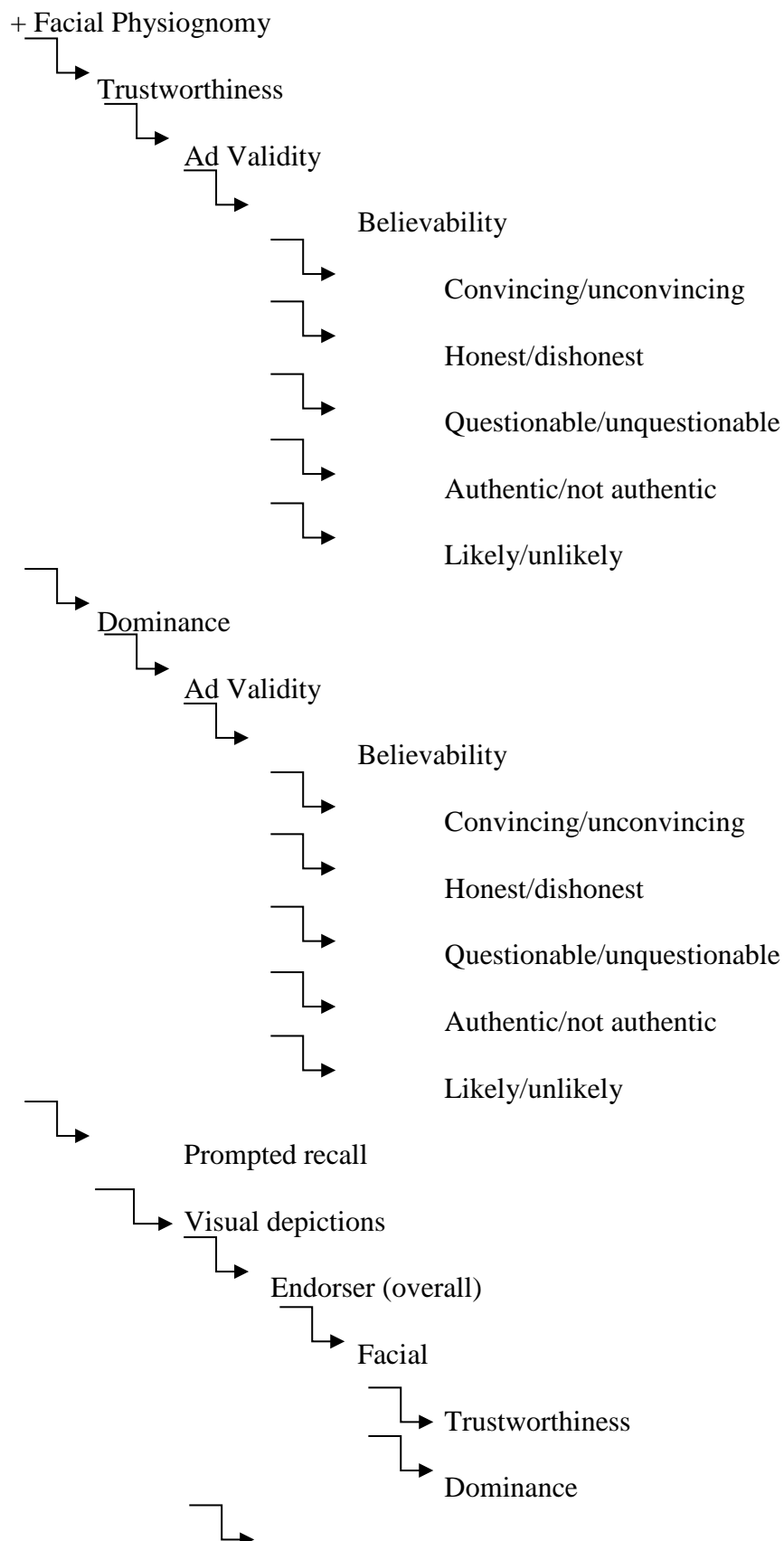
Other potential sources of qualitative data could include written company procedures regarding endorser selection. Images from past advertising campaigns that have utilised endorsers that are mentioned in the interviews could also be included along with any notes and development details if the agency consents to the utilisation of these materials. All the above listed concepts could be utilised as free nodes in NVivo 10, then transformed into tree nodes. Connections between the concepts would be shown in relationship nodes, for example, where it is explicitly or implicitly stated in the interview transcript that there is a connection or relationship between the various concepts. For instance, consider the following text passage:

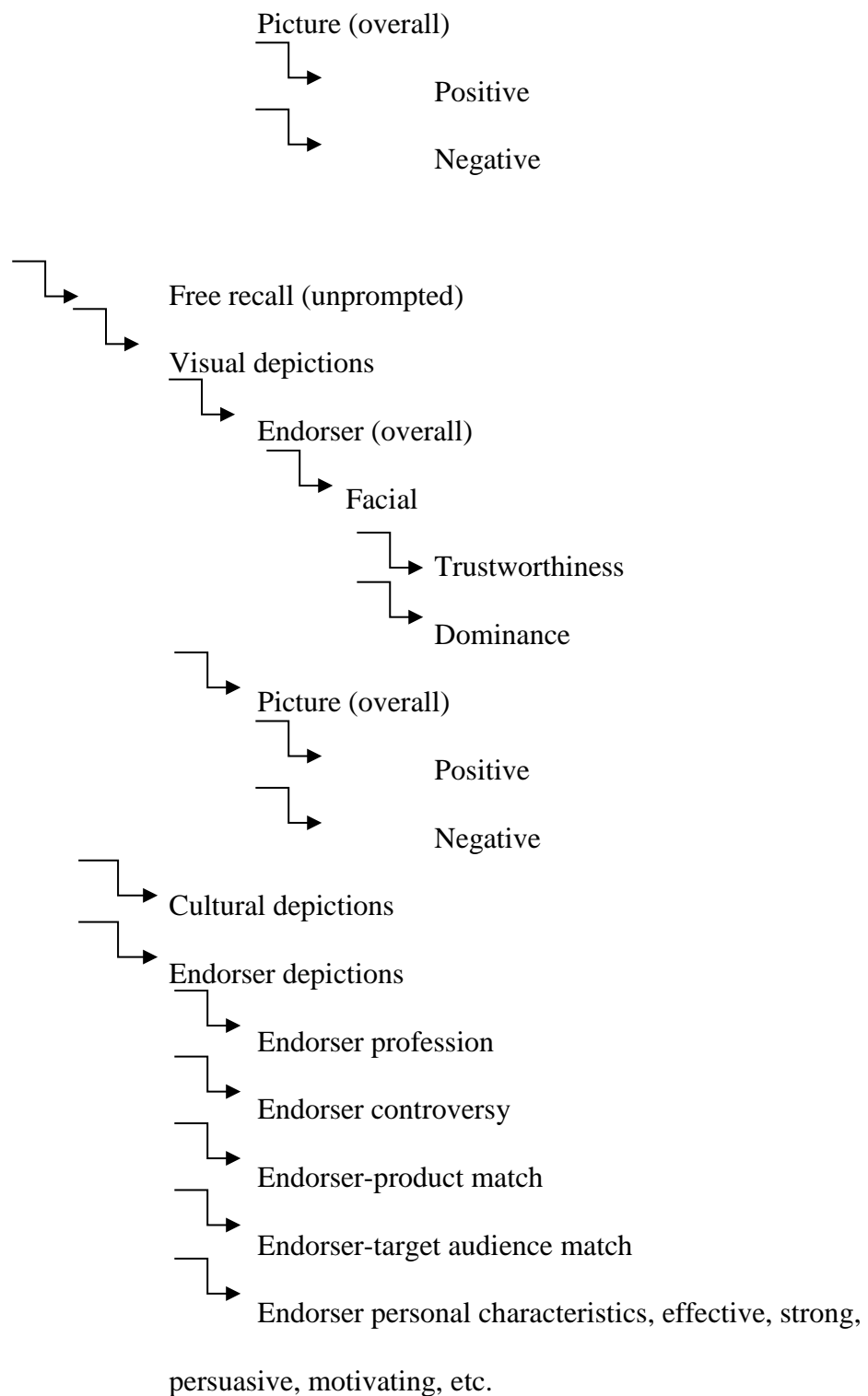
“...the Hula-Hoops and Harry Enfield relationship generated phenomenal recall and awareness figures as well as increased sales” Erdogan & Baker (1999).

Here there is an implied relationship between Hula-Hoops and Harry Enfield. Further, it is implied that this relationship generated or influenced advertisement recall and awareness along with increased sales. There are five concepts implied in this relationship and can be represented by the following scheme: Hula-Hoops ↔ Harry Enfield → Recall and Awareness and ↑ Sales.

As shown above the choice of operational concepts were not limited during analysis, although the primary, secondary, and tertiary concepts or tree nodes/child nodes for describing the how trustworthiness and dominance dimensions of facial

physiognomy influence of worker's perceptions of advert validity and recall could be organised as follows;





While the above concepts or categories are hypothetically constructed from the literature the coding choices and conceptual shifts were driven by the in-depth interview transcript. It is expected that between concepts would be generated by the expert in the

field for describing the endorser facial characteristics, trustworthiness and dominance in a decision-making context, and its influence on print advertising validity and recall by students and workers. The concept analysis looking at whether these concepts appear in the transcript as well as the interrelationships between the concepts was sufficient to describe and make possible some generalisations and shared meaning comparisons, differing types of knowledge, and individual nuances. In this study, the above-mentioned concepts were used during the interview because they were thought to play a role in endorser credibility and perceived believability of print advertising.

Data was interpreted and not just paraphrased to make an organised and convincing story to answer the research questions. Illustrative extracts were inserted into the results discussion.

Data Analysis

The analysis of interview data collected from the advertising and social marketing professional were collected to look at;

- Methodology of endorser/spokesperson selection;
- Characteristics looked for in a potential endorser/spokesperson;
- Perceptions of the socio-economic environment in understanding the utilisation of endorsers;
- Beliefs about the use of endorsers in workplace health promotional materials;
- Perceptions of successful workplace health promotions or advertisements that utilise an endorser/spokesperson and barriers to success;
- Perceived training needs to develop endorser selection skills.

Somewhat differently, this part of the study investigated the opinions of experts working in the marketing and advertising disciplines to obtain the perspectives of creative professionals involved in the production side of public health communications.

This would highlight the participants' stories and real-life knowledge in relation to endorser selection. The investigator believes that a good story is the best way to interpret and convey this expert practitioner's knowledge.

Selection of an endorser "depends on a number of different people" and the context for the advertisement or message as can be established by reading the following transcript.

I'm not always the selector; it depends on a number of different people. Usually, we would ... I mean, I guess there is a process that you go through to decide whether in fact if you need a presenter or model or an actor depending on the outcome but if you do we would generally speak to a casting agent. It depends like if you just talk about a presenter to start with. Choosing a presenter is a different approach creatively than choosing a model or a. actor, so a presenter or spokesperson come from a different point of view. If it's a creative idea that's about having someone as an endorser to talk about a product then that means that you must find a presenter that can convince the audience so they have either got to be of like age, or they have got to be respected or admired or whatever. The same spokesperson must be an authority in their field so you would decide that as almost part of the creative process. In other situations when you have come up with a creative idea and you want to feature someone in the work who is a presenter or spokesperson then that's a model or actor and then that goes through a process of casting where we would traditionally choose someone. Traditionally we would hit the casting agent they would provide us with a whole lot of potential people to fit within a brief and our producer our creative team will narrow that down. We might then narrow that down to 3 or 4 people if we feel that they're appropriate. With actors, they would go through a casting session where they would practice what they are saying and on screen and the director of the television commercial or the work would choose which ones that seem to deliver it from a quality of acting point of view as well as credibility. Models it's a little bit different. They're not necessarily cast in the same way so really the process varies quite differently depending on what your using the person for.

I think it's always a combination. So, relevance is important. They've always got to be credible and they have always got to be believable but believable in the delivery so the only example I can give you is the 2 & 5 campaign which is the vegie characters we base the vegie character around for want of a better description a potential endorser, and one of those was Rolf Harris. When we were choosing who to base our character on we did a lot of research and we talked with the audience about who they liked would find liked. So, likeability is very important, who they find believable, who they find credible. So, there was some people in our group said that they liked a lot, they didn't paint a nutrition message coming from someone like that would be believable Again it depends on their reality is no strict formula because it depends on what your topic is so if you are talking about nutrition for Australians then you need someone that's got high credibility, believability, and trustworthiness. Where, if you're talking about some other humorous take say for a fast food retailer, then it's about likeability and their popularity. So there is no real fixed formula.

There is no again for they work that we do we work for brand like red rooster and work for the government and there are serious messages and messages targeting youth, messages targeting old people, so with each different territory is a completely different approach like we would never, like so, it really is more about in the context of the message and the relevance of that message that it plays a role. I'm not usually the person that chooses, it's usually the producer so I usually that their point but for me it's always the connection relevance to the brand, if you are doing soft toys for kids they would need to be friendly and soft and in that sense trustworthy, but if it was a serious medical product then they would need to be credible and authoritative. I think credibility is for different areas.

Facial characteristics, don't know, can't answer that question

Basic principles, again, relevance to the audience we are talking to. It's no good getting a rock musician to endorse a bank. Firstly, it's relevance to the category, and then, their reputation. I could say you look at various people that endorse something and facial expression, and sorts of things are secondary to the character that they are. Like, for example, Rolf Harris has glasses, beard, looks like a grand dad, people in that space of time take on that service. But there is a history with Rolf Harris, so when you see him you connect with those different things. you would rarely not get an endorser that is not known by the community. They have always got to be connected to the message that you are selling. You have got to have relevance, so relevance is the first thing, then track record.

There is I think the financial sector in the broader sense, superannuation, banks tend to use endorsers/spokespeople much more. Obviously, models can be from a very broad fashion category, it's so varied, and the financial sector is most known for using credible endorsers.

Our methodology is pre-testing. So, if we have chosen we would usually develop territories build around people and we would test it with the audience first. So, we never just come up with an idea and blast it out there. We do a lot of research. So, we would develop draft concepts around particular people, whether its concepts using models that are important to the idea. A technique around the endorser approach or spokesperson approach we share that with a group of people that are representative of the audience we are targeting and have feedback of which one they responded to. That is usually a two-hour session. Focus groups that sort of thing.

I could not tell you what sort of skills or training is needed for endorser selection. I would say the people who spend more time in that territory. PR companies. Public relation companies. So, endorsement tends to come more from the PR strategy. For example, having a public face, so, there a bunch of PR companies around that do different things, but I think they would be the best people equipped for that sort of thing. Because it's not something that leaves the process, it comes as a result. You don't decide up front that you are going to have a model or spokesperson. You decide through the process. When we select them, there are criteria that our producers and creative people work to and it is sort of done to in writing because it is not a process per say.

Conclusion

The case study design involved here is one of intensive exploration of a single person. The purpose of the investigation was to provide empirical evidence for a theoretical model or facial physiognomy use in endorser selection. The subject self-selected was a director of a Western Australian advertising company. The participant completed the face-to-face questionnaire. The transcript provides indications of the direction of strength of many individuals being involved in the model of endorser/spokesperson selection as well as the use of other public relations organisations and modelling agencies is the selection of endorsers/spokespersons.

The study has been conducted in the area of interest and the small effect size would essentially label the study a pilot study. Considering that the organisation interviewed was awarded the WA Health Departments advertising contract I would consider the effect size to be more than small and that the size was sufficiently large to have theoretical value.

Reliability and Validity

Quantitative Analysis

A data set was created to test the null hypothesis that there is no significant difference between groups or group interactions. The significance level was set at .05 to increase statistical power. Data were collected using semantic-differential scales. A *t*-test for independent samples and F distribution between the five physiognomy groups by perceived believability was run and reported in tables and graphs with a discussion and interpretation of the results. Group means, and standard deviations were discussed to answer the two research questions. Graphs were utilised to

illustrate any differences between the two groups for advertisement believability, and advertisement recall.

With a 5x1 layout, effect size set at 0.25 increments, alpha at 0.05, the power estimate is 0.952 with a sample size N=25 and 0.888 for a sample size N=20 as shown in Table 17 and Table 18. That is, the five independent variables by advert believability score. A 5x1 between groups ANOVA was performed. This type of design was analysed for advertisement validity or believability. In addition, a 5x1 ANOVA was performed for unprompted visual recall, and unprompted textual recall of information from the hypothetical advertisement. Significant differences were reported.

It is possible to extend this research further by utilising the five physiognomy conditions, the three main measures, trustworthiness, dominance, and believability (high, medium, low), and scores for two open ended unprompted recall questions (high, low), one measuring the semantic or text domain of the advertisement, and the other looking at the visual domain. This gave a 5 x 3 x 2 multi-factorial design and has provided some interesting results (i.e. main effects and more specific interactions). For example, if belief is high then it would be expected that unprompted recall would be high for the visual domain? If belief is high and recall is low, then did physiognomy influence recall of the visual domain? This could also be true of the text domain. As shown in Table 17 and Table 18, a sample size for this type of design is 400 respondents. In addition, it is possible to perform a thematic analysis with results from the two-unprompted recall open-ended questions by quantification of the results.

F tests – ANOVA: Fixed effects, special, main effects and interactions		
Analysis:	A priori: Compute required sample size	
Input:	Effect size f	= 0.25
	α err prob	= 0.05
	Power (1- β err prob)	= 0.95
	Numerator df	= 10
	Number of groups	= 5
Output:	Noncentrality parameter λ	= 25.000000
	Critical F	= 1.854692
	Denominator df	= 395
	Total sample size	= 400
	Actual power	= 0.950419

Table 17.

Power analysis for a one-way ANOVA design.

Power Analysis for ANOVA Designs

The power parameters you specified were:

a = '5' (levels of factor for power)

b = '1' (levels of factor(s) crossed with A)

delta = '0.25 0.5 0.75 1.0 1.25' (effect size(s))

alpha = '0.05' (significance level)

Power analysis for ANOVA designs

5x 1 layout Ha: T1=GM-Delta/2, T2=T3=...=T(k-1)=GM,
Tk=GM+Delta/2 tested at Alpha= 0.050

DELTA (in units of sigma=Std. Dev.)

N	0.250	0.500	0.750	1.000	1.250

2	0.051	0.055	0.063	0.074	0.089
3	0.053	0.062	0.079	0.104	0.139
4	0.054	0.069	0.095	0.136	0.194
5	0.056	0.076	0.113	0.171	0.252
6	0.057	0.083	0.131	0.207	0.312
7	0.059	0.090	0.150	0.244	0.372
8	0.061	0.098	0.169	0.282	0.431
9	0.062	0.105	0.189	0.320	0.488
10	0.064	0.113	0.209	0.358	0.542
12	0.067	0.129	0.251	0.434	0.641
14	0.071	0.146	0.294	0.506	0.724
16	0.074	0.163	0.337	0.573	0.792
18	0.078	0.180	0.380	0.635	0.846
20	0.081	0.198	0.422	0.691	0.888
25	0.090	0.244	0.523	0.803	0.952
30	0.099	0.291	0.614	0.879	0.981
35	0.109	0.339	0.694	0.929	0.992
40	0.119	0.387	0.761	0.959	0.997
50	0.139	0.479	0.860	0.987	0.999

The sample size values given are those for each of the 5 levels of the factor called 'Factor A'.

Results were analysed with SPSS version 24 and, subject to non-violation of assumptions, tested for the equality of variances between each of the treatment conditions.

Both stability and equivalence of the questionnaire were analysed with a between groups ANOVA. The Spearman correlation procedure was used to measure homogeneity.

A factor analysis was utilised for assessment of the multidimensional structure of the scales and results reported appropriately in table format. Cronbach's alpha was reported and compared with the results originally reported by the scale developers.

Communicating Research Findings

The results of this study were presented through an appropriate refereed journal and accepted and published. They were also presented at an appropriate conference.

Chapter Six: Conclusion

Introduction

When meeting a new person, we are impressed by their facial features and based on these first impressions we draw inferences about the character of the new person. When combined with past experience, body language, and the spoken word, the face functions as one source of character inference information to understand what the new person is feeling, what they are saying, and what they are thinking. There is strong support and census that there is a universality of facial emotion recognition as far as one's ability to identify and interpret facial expressions and make judgements about the other new person's character based on their facial features.

This thesis has presented a brief review and study of facial physiognomy in a public health context. The incorporation of facial physiognomy research in public health communications allows the professional practitioner to consider outcomes beyond outcomes based on behavioural observations, to pre-intervention issues related to message design. How fundamental or redundant were the dyads? To what extent is existing language adequate in analysing and expressing human characteristics? My investigations of these questions did produce different and disparate implications, along with many insightful discoveries. Personality characteristics and making judgements about another person's character traits based on facial physiognomic humour could serve as a survival instinct where, on occasion, we are expected to exaggerate the importance of the expected acts of the person we are judging.

Four studies were proposed and completed to examine the viability of the Source Credibility Scale and Perceived Dominance Scale which were utilised to measure individual ability to interpret character based on facial features. Another

interesting result from this research project is that preliminary evidence suggests there are individual differences in the belief that one can judge another's character from their facial features.

I was taught a lesson while exploring this study. Given the choice of dyadic pairs of choices people will make a choice about another person based on the other person's physiognomic characteristics. My original reason for choosing the scales utilised was to explore the human experience of judging another's character for a bit of psychological enlightenment and human wisdom. The results awakened my mind as to how prevalent the belief in facial physiognomy and judging another person's character through physical properties is, yet, there is little research to explain or demonstrate this phenomenon. The role of chance was certainly evident in Study 1 which clearly demonstrates that respondents were more likely to approach a more trustworthy looking avatar and less likely to approach a more dominant avatar. . The methodology sought to explain this phenomenon is Darwin's evolutionary theory. Only 11 percent of respondents indicated that they did not believe it was possible to know any character traits from looking at another person's face. This is a comparable result and a new facial physiognomic characterisation insight compared with the results of previous findings asking the same question.

Key Findings

There are various indications which suggest that this study has contributed to the health and facial physiognomic literature. The acceptance of the study 1 paper by a reputable refereed journal is significant. The methodology utilised to explain how the phenomenon of facial physiognomy influences health advertising outcomes was solid as was how the research was carried out and organised such that the results are productive demonstrating an understanding of the phenomenon and research design changes from

the start to finish. This is demonstrated with changes in the graphic material utilised for the pilot study (study 1) and the graphic material utilised for studies 2 and 3. Hindsight was extracted from an analysis of historical papers as advisory and a summary of these previous studies was provided in the literature review.

Critical Reflections

Some broad principles and concepts can be garnered from the four studies presented in this thesis. Although facial physiognomy is ordinarily meant to work with high-level conscious concepts and fundamental dimensions as demonstrated with the scales in this study, which when used in a systematic and directed way, produced interesting results, it can also be shown with low-level unconscious concepts. There are many more thousands of human character trait dyad combinations available which if studied closer over a period of time could reveal a wholly unexpected result and prove meaningful. In this study, I wished to learn whether the limited and historically tested character traits from the scales and subsets selected would be sufficient to describe human nature. And more specifically, I wanted to see if the selected character logical dyads would continue to be useful and meaningful. The scientist in me might be drawn into this subset of dyads used in this study, but in might be mindful to find some reservations about human nature and the way State and Commonwealth, through regulation, is producing intrinsic normalities of external facial phenomenology rather than the intersubjective dynamics of natural selection and human relationships. These equal opportunity and occupational health and safety regulations do not represent any individual's theories, preferences, or prejudices; hence, they are a thrilling initial interest. I can nonetheless scan the scales utilised and predict by a second method of study, such as including knowledge of and belief in equal opportunity and occupational health and safety regulation, employing the same form of multidimensional scaling the

breadth of interest in human facial physiognomy might result in a different explanatory feature and outcome.

The scales utilised in this study are interesting in part simply because they have been generated through scientific exploration thus they are guaranteed to be robust and comparable.

Directions for Future Research

One of the main themes demonstrated through this research is the fact that facial physiognomy has remained as a visual method of reading a person's character over time since as early as 500 before Christ. The roll of message recipients in health advertising demonstrates both a public and private discourse and distinction between facial identity and reading a person's character. The importance of this sense of forming a person's character based on their facial physiognomic properties and the history of facial physiognomy demonstrates the need to uncover the affective elements for health advertising. The obsession with measurement and the desire to measure facial physiognomic likeliness comes to the front when looking at the work of Duchenne's mechanisms of human facial expressions and Darwin's inception of evolutionary theory. The outstanding question for further research is the role of repetition in creating character likeliness in health advertising and determining if this correlate with the idea of goodness of fit rather than true character interpretation from viewing a health advertisement? The importance of character classification and context is evident when comparing Study 1 and Studies 2 and 3 images and the results extracted from this study. There is a need to further explore facial physiognomic beliefs with scientific approaches to character formation and to distinguish differences between historical scientific enquiry and understanding of facial physiognomy in current day popular culture. Replication of this research study would prove to be beneficial to the scientific

community and academic community with an interest in facial physiognomy. Such future research projects could be conducted in different countries or cultures demonstrating differences and similarities in the belief and persuasiveness of facial physiognomy in public health advertising and promotions.

Summary and Conclusion

I am going to conclude with my opinions. After all partaking in a PhD is all about forming one's own opinion and expressing such opinions through an original piece of research. This study began with a question about facial physiognomy which was unanswered in the research literature. From this modern day question, I have referred to Darwin's assertions, evolutionary ideas, social movements, and writings which are still popular in America, Canada and Australia. The term Social Darwinism is still popular among evolutionary social movements when comparing the expressions of humans and animals as a consequence of evolutionary heredity, the understanding that human character could be biologically inherited. Darwinism has become a social movement covering an enormous range of evolutionary ideas symbolised in science rather than religion. The work of Lavater admitted that the human face profile didn't show much but rather it had the advantage of being a theory with work in progress. Indeed, when it comes to the relationship between human physiognomy projecting evidence of inner character and when it comes to reading a person's character, not only is the face important but another methodology is hands being read as in palmistry. Indeed, there is evidence of the power of the hand when in human physiognomic history when considering Auguste Rodin's 'the hand of god' which portrays two struggling figures, Adam and Eve, of which 'the hand of the devil' forms a companion piece. This sculptural artwork demonstrates that historically there has always been the tendency for both positive and negative physiognomic human qualities.

What has been demonstrated by this research is that, over time, humans have inherited an unconscious mixed with conscious embodiment in the form of positive and negative characteristics which are expressed by facial physiognomic traits. What I have learnt from my participation in the study is that human evolution has emerged from a physical existence where human physical traits predominate the development of more complex human relationships. In conclusion, humans are capable of forming hundreds of character traits of others that can be expressed both positively and negatively. These opinions are based on facial physiognomic expressions and are vital to expression and overriding action when it comes to taking a conscious and quick inventory of the personal values and beliefs of others.

This thesis might be considered as an OHS audit of OHS advertising and promotion effectiveness. After all the current OSH legislation requires employers to show a duty of care to their employees. Such duty of care would no doubt encompass OSH promotion in the workplace.

In this study I have demonstrated that people do make character judgements of others based on the other's facial physiognomy, and more so in the present day than compared with historical studies. What is strikingly evident is that the larger proportion of the advertisement or promotion that is devoted to another person's face there is a greater likelihood that the recipient of the message will accept or reject the advertised message. This is evident in study 1 whereby there is a clear differentiation between the message recipient being likely to approach or avoid the person (or avatar) in the advertisement.

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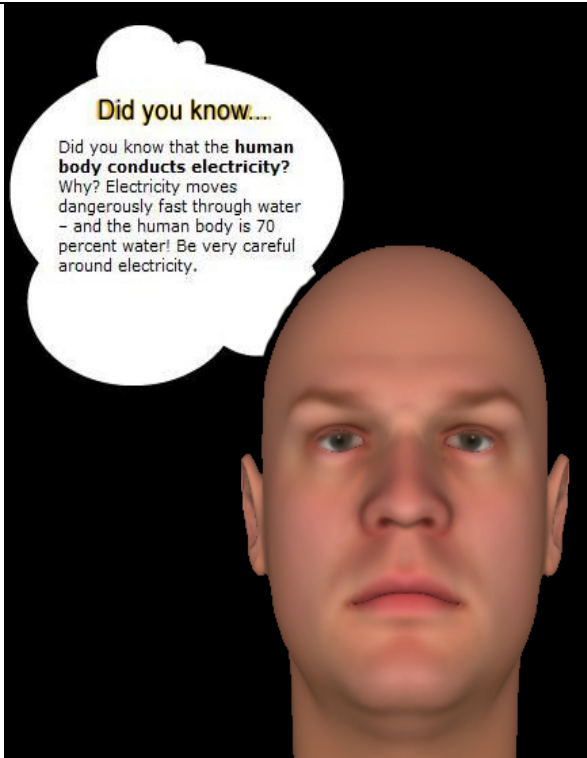
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Appendices

Appendix A. Evolving pilot project compared with the original Princeton study.

Original Princeton University Study	This Edith Cowan University Pilot Study
Avatar Face	Avatar Face
No Context	Context (home and workplace electrical safety)
Pure Research	Applied Research (hypothetical advertisement)
Dependent Variables: Free face description Trustworthiness rating scale Dominance rating scale Threat rating scale Approach/avoidance behaviour Valence/attractiveness rating scale Power/strength rating scale Emotional attributions rating scales Anger Disgust Sad Fearful Neutral Surprised Happy	Dependent Variables: Free face description Advertisement believability scale Attitude toward the testimonial scale Free image description Source-Credibility scale (attractiveness, trustworthiness, and expertise subscales) Perceived dominance scale Free testimonial recall Knowledge Awareness Likely to approach scale Likely to avoid scale Belief in physiognomy rating scale
Functional magnetic resonance imaging	
Data driven facial feature modelling	Data driven questionnaire development
	
Computer generated face only (no context)	Computer generated face and thought bubble (electrical safety context)

Appendix B. Questionnaire used in the focus group.

Permission to use photo obtained 11 May 2009: Curtis curtis@roughneckcity.com

Image morphed using Facegen software (Singular-Inversions, 2004) and Photoshop Elements software (Adobe, 2007).

Morphed face extracted from Princeton University, Social Cognition and Social Neuroscience's database (Oosterhof & Todorov, 2008).

1. Free recall of advert visual dimension (Burke & Srull, 1988)
2. Free recall of advert information/text dimension (Burke & Srull, 1988)
3. Free face description (Oosterhof & Todorov, 2008)
4. Advert attention-interest scale (Chang, 2005)
5. Advert believability scale (Beltramini, 1988)
6. Advert frame-attitude scale (Yi, 1990)
7. Advert agreement scale (Chang, 2005)
8. Attitude toward the testimonial scale (Feick & Higie, 1992)
9. Advert realism scale (Feick & Higie, 1992)
10. Source credibility scale (Ohanian, 1990)
11. Source attention-likability scale (Whittler & DiMeo, 1991)
12. Source baby/mature faced scale (Highfield et al., 2009)
13. Source feminine/masculine faced scale (Highfield et al., 2009)
14. Source dominance scale (Manusov, 2005)
15. Source six basic emotions scale (Oosterhof & Todorov, 2008)
16. Behavioural Intention – Theory of Planned Behaviour (Fishbein & Ajzen, 1975)
17. Source approach/avoidance scale (Oosterhof & Todorov, 2008)
18. Belief in physiognomy (Hassin & Trope, 2000)
19. Demographics – Age, Race, Language, Gender, Education, Occupation, Social Class.



Why is there a LOCKOUT/TAGOUT program?

1. To establish a safe and positive means of shutting down machinery, equipment and systems.
2. To prohibit unauthorized personnel from starting machinery or equipment while it is being serviced.
3. To provide a secondary control system (tagout) when it is impossible to lockout the machinery.
4. To establish responsibility for implementing and controlling lockout/tagout procedures.
5. To ensure that only approved locks, standardized tags and fastening devices will be utilized.

The following WorkSafe (www.worksafe.wa.gov.au) publications contain relevant information on
 Lockout and Tagout: Code of practice on the safe guarding of machinery and plant;
 Guidance note: Isolation of plant; Publication: Machinery and equipment safety - an introduction

You are invited to participate in a research study.
 The study procedure will require you to examine the advertisement,
 and make some ratings about it.

DIRECTIONS: Just look the advertisement over to get a sense of its style and appearance. After that turn the page and make your ratings on the next pages.

Read each of the questions very carefully and provide for each question **one answer** that best represents yourself or your opinion. There are no “right” or “wrong” answers.

Be as honest as you can and try to answer all the questions.

If you are unsure about an answer, please give your best guess

Without looking at the advert list some important aspects of the image or graphic shown in the advertisement.

- a)
- b)
- c)
- d)
- e)

Without looking at the advert list some important reasons why there is a lock out/tag out program.

- a)
 - b)
 - c)
 - d)
 - e)
-

Write down everything that comes to mind about the *person* in the advert;

.....
.....
.....
.....
.....
.....
.....



Compared to most ads you are familiar with, how interesting would you consider this advertisement to be?

Uninteresting 1 2 3 4 5 6 7 Interesting

Please circle the number between the two phrases or words that best represents how you generally feel about the *advertisement message*.

Unbelievable	1	2	3	4	5	6	7	Reliable
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Not convincing	1	2	3	4	5	6	7	Convincing
Not credible	1	2	3	4	5	6	7	Credible
Unreasonable	1	2	3	4	5	6	7	Reasonable
Dishonest	1	2	3	4	5	6	7	Honest
Questionable	1	2	3	4	5	6	7	Unquestionable
Inconclusive	1	2	3	4	5	6	7	Conclusive
Not authentic	1	2	3	4	5	6	7	Authentic
Unlikely	1	2	3	4	5	6	7	Likely
Negative	1	2	3	4	5	6	7	Positive
I Disagree	1	2	3	4	5	6	7	I Agree
Ineffective	1	2	3	4	5	6	7	Effective
Weak	1	2	3	4	5	6	7	Strong
Not Persuasive	1	2	3	4	5	6	7	Persuasive
Ineffective for getting people like me to seek further information on lockout and tagging	1	2	3	4	5	6	7	Effective for getting people like me to seek further information on lockout and tagging

It is hard to imagine being in the situation described in the advertisement?

Disagree 1 2 3 4 5 6 7 Agree

The scenario is realistic?

Disagree	1	2	3	4	5	6	7	Agree
-----------------	---	---	---	---	---	---	---	--------------

Something like this situation will probably happen to me?

Disagree	1	2	3	4	5	6	7	Agree
-----------------	---	---	---	---	---	---	---	--------------

Thinking about the *person* shown in that advertisement, please circle the number between the two words or phrases that best represents how you feel about the *person* in the advertisement. Work quickly indicating your first response.

Unattractive	1	2	3	4	5	6	7	Attractive
Not classy	1	2	3	4	5	6	7	Classy
Ugly	1	2	3	4	5	6	7	Beautiful
Plain	1	2	3	4	5	6	7	Elegant
Not sexy	1	2	3	4	5	6	7	Sexy
Undependable	1	2	3	4	5	6	7	Dependable
Dishonest	1	2	3	4	5	6	7	Honest
Unreliable	1	2	3	4	5	6	7	Reliable
Insincere	1	2	3	4	5	6	7	Sincere
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Not an expert	1	2	3	4	5	6	7	Expert
Inexperienced	1	2	3	4	5	6	7	Experienced
Unknowledgeable	1	2	3	4	5	6	7	Knowledgeable
Unqualified	1	2	3	4	5	6	7	Qualified
Unskilled	1	2	3	4	5	6	7	Skilled
Cold	1	2	3	4	5	6	7	Warm
Unlikable	1	2	3	4	5	6	7	Likable
Unfriendly	1	2	3	4	5	6	7	Friendly
Uninteresting	1	2	3	4	5	6	7	Interesting
Baby faced	1	2	3	4	5	6	7	Mature Faced
Feminine	1	2	3	4	5	6	7	Masculine

Please circle the number between the two words or phrases that best represents how you feel about the *person* in the advertisement. Work quickly indicating your first response.

Dominant	1	2	3	4	5	6	7	Submissive
Confident	1	2	3	4	5	6	7	Unconfident
Low status	1	2	3	4	5	6	7	High status
Sluggish	1	2	3	4	5	6	7	Energetic
Hesitant	1	2	3	4	5	6	7	Decisive
Aggressive	1	2	3	4	5	6	7	Meek
Outgoing	1	2	3	4	5	6	7	Withdrawn
Silent	1	2	3	4	5	6	7	Talkative
Dynamic	1	2	3	4	5	6	7	Passive
Awkward	1	2	3	4	5	6	7	Poised

How *angry* is the *person* in the advertisement?

Not at all angry 1 2 3 4 5 6 7 Very angry

How *disgusted* is the *person* in the advertisement?

Not at all disgusted 1 2 3 4 5 6 7 Very disgusted

How *sad* is the *person* in the advertisement?

Not at all sad 1 2 3 4 5 6 7 Very sad

How *happy* is the *person* in the advertisement?

Not at all happy 1 2 3 4 5 6 7 Very happy

How *surprised* is the *person* in the advertisement?

Not at all surprised 1 2 3 4 5 6 7 Very surprised

How *afraid* is the *person* in the advertisement?

Not at all afraid 1 2 3 4 5 6 7 Very afraid

For me, obtaining further information on the general duty of care and lockout and tagging system would be?

Pointless	1	2	3	4	5	6	7	Worthwhile
Unimportant	1	2	3	4	5	6	7	Important
Boring	1	2	3	4	5	6	7	Stimulating
Not enjoyable	1	2	3	4	5	6	7	Enjoyable
Not beneficial	1	2	3	4	5	6	7	Beneficial
Uninteresting	1	2	3	4	5	6	7	Interesting

Most people who are important to me would agree that I should obtain further information on the general duty of care and lockout and tagging.

Disagree 1 2 3 4 5 6 7 **Agree**

How easy or difficult would it be for you to obtain further information on the general duty of care and lockout and tagging?

Difficult 1 2 3 4 5 6 7 **Easy**

I am confident that I would be able to obtain further information on the general duty of care and lockout and tagging.

Disagree 1 2 3 4 5 6 7 **Agree**

If I wanted to, I could easily obtain further information on the general duty of care and lockout and tagging.

Disagree 1 2 3 4 5 6 7 **Agree**

I expect to obtain further information about the general duty of care and lockout and tagging system.

Disagree 1 2 3 4 5 6 7 **Agree**

I want to obtain further information about the general duty of care and lockout and tagging system.

Disagree 1 2 3 4 5 6 7 **Agree**

I intend to obtain further information about the general duty of care and lockout and tagging system.

Disagree 1 2 3 4 5 6 7 **Agree**

The person in the advertisement is somebody who I would approach.

Disagree 1 2 3 4 5 6 7 **Agree**

The person in the advertisement is somebody who I would avoid.

Disagree 1 2 3 4 5 6 7 **Agree**

Is it possible, in your opinion, to know an individual's personality traits from looking at his or her face?

Possible to know all traits	Many traits	A few traits	Not possible to know any traits
-----------------------------	-------------	--------------	---------------------------------

In what year were you born?

What is your ethnic or racial background?

Is English **your first language**/mother tongue? ☐ Yes ☐ No

If 'No' which language do you normally speak?

Which is your gender: ☐ Male ☐ Female

What is your highest year of education completed:

Please circle a number and word or phrase.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 or more

---Primary School--- ---High School--- ---Technical / College / University---

Undergraduate / Postgraduate

What is your primary occupation? If a student what is your major?

Would you say you are; Please tick the appropriate box

- | | |
|---|--|
| <input type="checkbox"/> Upper middle class | <input type="checkbox"/> Skilled working class |
| <input type="checkbox"/> Middle class | <input type="checkbox"/> Working class |
| <input type="checkbox"/> Lower middle class | <input type="checkbox"/> Under class |

Thank you.

Your time and contribution to this research activity are sincerely appreciated.

Appendix C Questionnaire used in study 1 (pilot study).

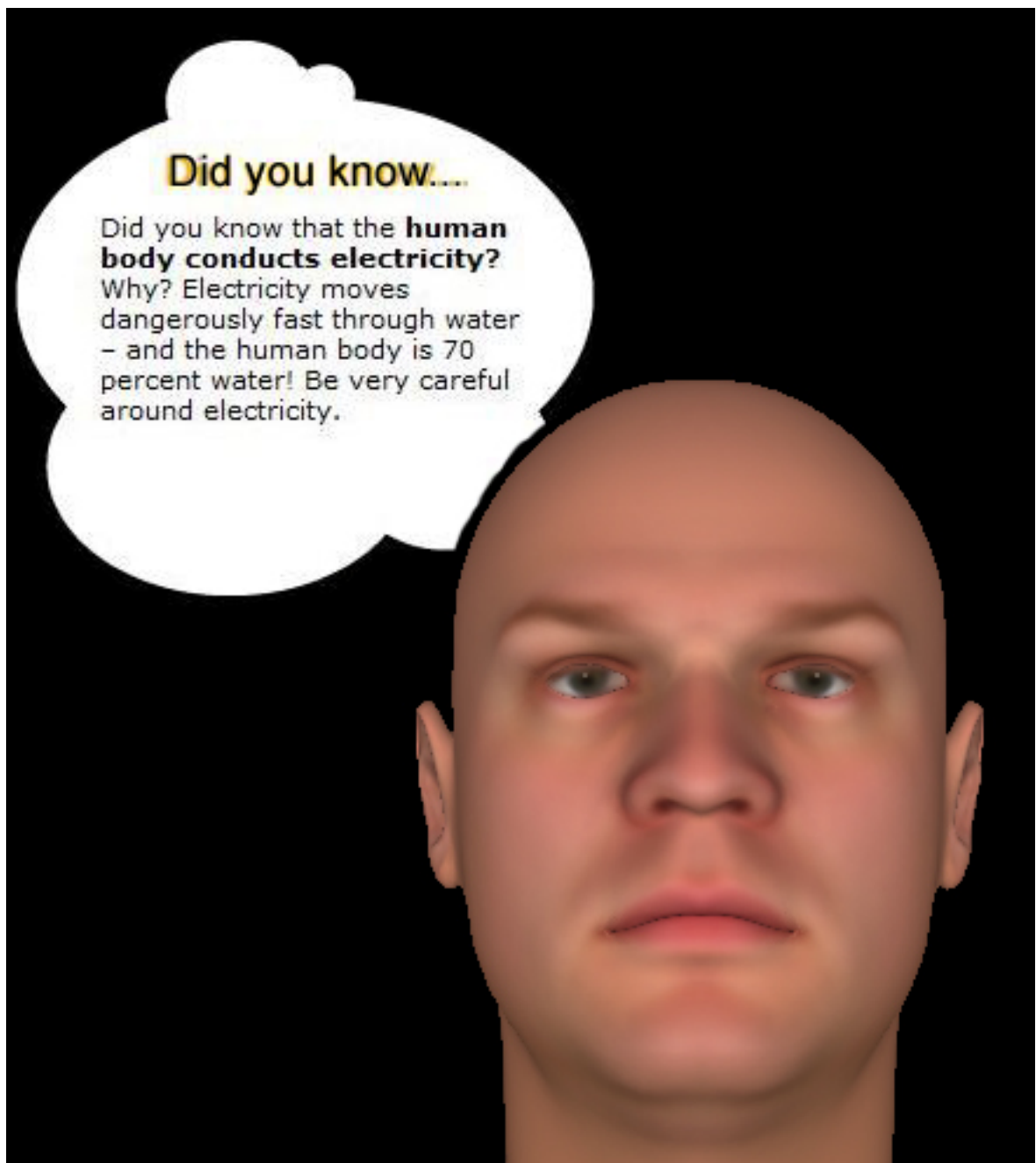
You are invited to participate in a research study.

The study procedure will require you to examine the advertisement and make some ratings about it.

DIRECTIONS: Just look the advertisement over to get a sense of its style and appearance. After that turn the page and make your ratings on the next pages.

Read each of the questions very carefully and provide for each question **one answer** that best represents yourself or your opinion.

There are no “right” or “wrong” answers.



1. Write down everything that comes to mind about the *person* in the advert;

2. Please circle the number between the two phrases or words that best represents how you generally feel about the *advertisement message*.

Unbelievable	1	2	3	4	5	6	7	Believable
Trustworthy	1	2	3	4	5	6	7	Untrustworthy
Convincing	1	2	3	4	5	6	7	Not Convincing
Not credible	1	2	3	4	5	6	7	Credible
Unreasonable	1	2	3	4	5	6	7	Reasonable
Honest	1	2	3	4	5	6	7	Dishonest
Questionable	1	2	3	4	5	6	7	Unquestionable
Conclusive	1	2	3	4	5	6	7	Inconclusive
Not authentic	1	2	3	4	5	6	7	Authentic
Unlikely	1	2	3	4	5	6	7	Likely
Effective	1	2	3	4	5	6	7	Ineffective
Weak	1	2	3	4	5	6	7	Strong
Persuasive	1	2	3	4	5	6	7	Not Persuasive
Ineffective for getting people like me to be careful around electricity	1	2	3	4	5	6	7	Effective for getting people like me to be careful around electricity

3. Without looking at the advert list some important aspects of the image or graphic shown in the advertisement.

4. Thinking about the *person* shown in that advertisement, please circle the number between the two words or phrases that best represents how you feel about the *person* in the advertisement. Work quickly indicating your first response.

Unattractive	1	2	3	4	5	6	7	Attractive
Not classy	1	2	3	4	5	6	7	Classy
Beautiful	1	2	3	4	5	6	7	Ugly
Plain	1	2	3	4	5	6	7	Elegant
Not sexy	1	2	3	4	5	6	7	Sexy
Dependable	1	2	3	4	5	6	7	Undependable
Dishonest	1	2	3	4	5	6	7	Honest
Unreliable	1	2	3	4	5	6	7	Reliable
Sincere	1	2	3	4	5	6	7	Insincere
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Not an expert	1	2	3	4	5	6	7	Expert
Experienced	1	2	3	4	5	6	7	Inexperienced
Unknowledgeable	1	2	3	4	5	6	7	Knowledgeable
Unqualified	1	2	3	4	5	6	7	Qualified
Skilled	1	2	3	4	5	6	7	Unskilled

5. Please circle the number between the two words or phrases that best represents how you feel about the *person* in the advertisement. Work quickly indicating your first response.

Dominant	1	2	3	4	5	6	7	Submissive
Confident	1	2	3	4	5	6	7	Unconfident
Low status	1	2	3	4	5	6	7	High status
Sluggish	1	2	3	4	5	6	7	Energetic
Hesitant	1	2	3	4	5	6	7	Decisive
Aggressive	1	2	3	4	5	6	7	Meek
Outgoing	1	2	3	4	5	6	7	Withdrawn
Silent	1	2	3	4	5	6	7	Talkative
Dynamic	1	2	3	4	5	6	7	Passive

6. Without looking at the advert list some important facts presented in the message.

- 7a. The person in the advertisement is somebody who I would be likely to approach.

- 7b. Disagree 1 2 3 4 5 6 7 Agree The person in the advertisement is somebody who I would be likely to avoid.

Agree 1 2 3 4 5 6 7 Disagree

8. Is it possible, in your opinion, to know an individual's personality or character traits from looking at his or her face? Please circle one phrase.

Possible to
know all traits

Many traits

A few traits

Not possible to
know any traits

In what year were you born?

What is your ethnic or racial background?

Is English **your first language**/mother tongue? ☐ Yes ☐ No

If 'No' which language do you normally speak?

Which is your gender: ☐ Male ☐ Female

What is your highest year of education completed:

Please circle one number and one word or phrase.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 or more

---Primary School--- ---High School--- ---Technical / College / University---

Undergraduate / Postgraduate

What is your primary occupation? If a student what is your major?

Would you say you are; Please tick the appropriate box

- | | |
|---|--|
| <input type="checkbox"/> Upper middle class | <input type="checkbox"/> Skilled working class |
| <input type="checkbox"/> Middle class | <input type="checkbox"/> Working class |
| <input type="checkbox"/> Lower middle class | <input type="checkbox"/> Under class |

Thank you.

Your time and contribution to this research activity are sincerely appreciated.

Appendix D Questionnaire used in study 2 and study 3.

You are invited to participate in a research study.

The study procedure will require you to examine the advertisement and make some ratings about it.

DIRECTIONS: Just look the advertisement over to get a sense of its style and appearance. After that turn the page and make your ratings on the next pages.

Read each of the questions very carefully and provide for each question **one answer** that best represents yourself or your opinion.

There are no “right” or “wrong” answers.

It's now faster and easier to report an injury

Teleclaim 1•888•WORKERS

(1 888 967-5377) Mon to Fri 8 am to 4 pm

If you are a Telus Mobility, Rogers, or Bell Mobility customer, dial #5377 on your cellphone



If you missed work as a result of an injury, remember to:

- 1** Report your workplace injury to your employer
- 2** Seek first aid or medical attention if necessary
- 3** Report your injury to WorkSafeBC by calling Teleclaim, Mon - Fri, 8:00 am - 4:00 pm
- 4** Keep your employer and WorkSafeBC informed of your progress
- 5** Return to work safely

Call us — we're here to help

WORK SAFE BC

WORKING TO MAKE A DIFFERENCE



Write down everything that comes to mind about the *person* in the advert;

Please circle the number between the two phrases or words that best represents how you generally feel about the *advertisement message*.

Unbelievable	1	2	3	4	5	6	7	Believable
Trustworthy	1	2	3	4	5	6	7	Untrustworthy
Convincing	1	2	3	4	5	6	7	Not Convincing
Not credible	1	2	3	4	5	6	7	Credible
Unreasonable	1	2	3	4	5	6	7	Reasonable
Honest	1	2	3	4	5	6	7	Dishonest
Questionable	1	2	3	4	5	6	7	Unquestionable
Conclusive	1	2	3	4	5	6	7	Inconclusive
Not authentic	1	2	3	4	5	6	7	Authentic
Unlikely	1	2	3	4	5	6	7	Likely
Effective	1	2	3	4	5	6	7	Ineffective
Weak	1	2	3	4	5	6	7	Strong
Persuasive	1	2	3	4	5	6	7	Not Persuasive
Ineffective for	1	2	3	4	5	6	7	Effective for
getting people like								getting people like
me to report an								me to report an
injury								injury

Without looking at the advert, list some important aspects of the image or graphic shown in the advertisement.

Thinking about the *person* shown in that advertisement, please circle the number between the two words or phrases that best represents how you feel about the *person* in the advertisement. Work quickly indicating your first response.

Unattractive	1	2	3	4	5	6	7	Attractive
Not classy	1	2	3	4	5	6	7	Classy
Beautiful	1	2	3	4	5	6	7	Ugly
Plain	1	2	3	4	5	6	7	Elegant
Not sexy	1	2	3	4	5	6	7	Sexy
Dependable	1	2	3	4	5	6	7	Undependable
Dishonest	1	2	3	4	5	6	7	Honest
Unreliable	1	2	3	4	5	6	7	Reliable
Sincere	1	2	3	4	5	6	7	Insincere
Untrustworthy	1	2	3	4	5	6	7	Trustworthy
Not an expert	1	2	3	4	5	6	7	Expert
Experienced	1	2	3	4	5	6	7	Inexperienced
Unknowledgeable	1	2	3	4	5	6	7	Knowledgeable
Unqualified	1	2	3	4	5	6	7	Qualified
Skilled	1	2	3	4	5	6	7	Unskilled

Without looking at the advert list some important facts presented in the message.

Please circle the number between the two words or phrases that best represents how you feel about the *person* in the advertisement. Work quickly indicating your first response.

Dominant	1	2	3	4	5	6	7	Submissive
Confident	1	2	3	4	5	6	7	Unconfident
Low status	1	2	3	4	5	6	7	High status
Sluggish	1	2	3	4	5	6	7	Energetic
Hesitant	1	2	3	4	5	6	7	Decisive
Aggressive	1	2	3	4	5	6	7	Meek
Outgoing	1	2	3	4	5	6	7	Withdrawn
Silent	1	2	3	4	5	6	7	Talkative
Dynamic	1	2	3	4	5	6	7	Passive
Awkward	1	2	3	4	5	6	7	Poised

The person in the advertisement is somebody who I would be likely to approach.

Disagree 1 2 3 4 5 6 7 **Agree**

The person in the advertisement is somebody who I would be likely to avoid.

Agree 1 2 3 4 5 6 7 **Disagree**

Is it possible, in your opinion, to know an individual's personality or character traits from looking at his or her face? *Choose one*

- ☐ Possible to know all traits
 ☐ Many traits
 ☐ A few traits
 ☐ Not possible to know any traits
-

In what year were you born?

What is your ethnic or racial background? Please tick the appropriate box *Choose one*

- ☐ Aboriginal
- ☐ African
- ☐ African American
- ☐ Asian
- ☐ Black / International
- ☐ East Indian
- ☐ Hispanic
- ☐ Indian
- ☐ Latino
- ☐ Maori / Islander
- ☐ Mediterranean
- ☐ Middle Eastern
- ☐ Mixed Race
- ☐ White / Caucasian

Is English **your first language**/mother tongue? ☐ Yes ☐ No
If 'No' which language do you normally speak?

Which is your gender? *Choose one* ☐ Male ☐ Female

What is your highest year of education completed? *Choose one:*

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 or more

Please circle a number and word or phrase for highest level of education completed.

---Primary School--- ---High School--- ---Technical / College / University---
Undergraduate / Postgraduate

What is your primary occupation? If a student what is your major?

Would you say you are; **Please tick the appropriate box** *Choose one*

- ☐ Upper middle class
- ☐ Middle class
- ☐ Lower middle class
- ☐ Skilled working class
- ☐ Working class
- ☐ Under class

Thank you.

Your time and contribution to this research activity are sincerely appreciated.

Appendix E. Interview schedule and survey questions for study 4.

We are interested in learning more about how and why electrical injury prevention and workplace health promotions work. In particular we are investigating the influence of facial characteristics of endorsers, models, actors, spokespersons on public health communication and advertising effectiveness. Thank you for taking the time to participate in the interview so we can better target public health communications and workplace health promotions and occupational safety services to meet current needs. This interview will take approximately 30 minutes to complete followed by a self completion questionnaire which will take approximately 15 minutes to complete.

1. What process do you use in the selection of a presenter, model, actor, spokesperson or endorser for your promotional and advertising materials?

2. What endorser characteristics do you look for? For example, endorser believability, trustworthiness, dominance, credibility.

3. What facial characteristics do you look for? For example, endorser facial attractiveness, facial maturity, masculinity, trustworthiness, dominance etc.

4. What can you tell about an endorser, actor, model, spokesperson from their facial characteristics?

5. Do any of the above mentioned facial characteristics influence advertisement recall or validity? How would you measure public health communication validity?

6. What are the basic principles that should be followed when selecting an endorser?

7. What are main enterprise sectors and in the current socio-economic environment that use models, endorsers, or presenters to convey their message? Has this changed?

8. How would you measure effectiveness of a commissioned advertisement endorser, model, actor, spokesperson, that is, what measures would you use to evaluate success and barriers to success?

9. What skills and training are needed for professionals involved in endorser selection decision making and utilisation?

10. Do you have a written procedure for endorser, model, actor or spokesperson selection?

The final report for this project will be widely disseminated. What information and format would be most useful to you?

Thank you. Your time and contribution to this research activity are sincerely appreciated.

Appendix F. Consent Form – In-Depth Interviews (study 4)

INJURY PREVENTION PROJECT CONSENT FORM AND INFORMATION FOR PARTICIPANTS

My Doctor of Philosophy in Public Health research project involves an integration of occupational safety and health promotion looking at the effects of a workplace health promotion in the context of a workplace community. In accordance with the National Injury Prevention and Safety Promotion Plan 2004-2014, my Doctor of Philosophy in Public Health research project involves Government, Private Sector and Workplace communities to find out more about the selection of promotional materials and how these can aid with the prevention of injuries by achieving a positive workplace safety culture and creating a safe workplace environment.

This project is looking at the type promotional material used by Health Professionals to inform and educate the workforce about the causes of injury and safe work practices in some workplace communities in Western Australian resource sectors. To do this we are looking at some injury prevention strategies in detail to find out what the main approaches are to selection of promotional material relative to the medium or media, and what might be done to help develop better promotions to stop workplace injury from happening.

You are invited to take part in this project by answering a few questions about your approach to occupational safety and workplace health promotion and the potential features and benefits of your approach. This involves an in-depth interview and completing a short questionnaire asking what you perceive to be the main issues and components of an effective workplace injury prevention strategy with an emphasis on the characteristics of the message endorser. If you agree, everything you say will be confidential and the records of these interviews will be kept private. Your name and that of your workplace will not appear on any reports. You may withdraw from this study at any time.

CONSENT FORM

I, (name)..... agree to take part in this Injury Prevention Project by answering some questions about my approach to occupational safety and workplace health promotion, my approach to content and form of creative media, and my perspective to the utility of a spokesperson/endorser to convey illustrative emotion. I agree that my interview question records can be utilised by the investigator only for the purposes of this injury prevention event. I understand that I can withdraw from this study at any time and that all records of these interview questions will be kept confidential.

Signature.....Date.....

Witness.....Date.....

WITHDRAWAL OF CONSENT

I (name).....withdraw my consent to take part in this study.

Signature.....Date.....

Witness.....Date.....