

The Human Face:

Each human face is unique and overlays an equally unique skeletal structure. (Lucas & Henneberg, 2015). The human face is enormously biologically and socio-culturally important, with the ability to send innumerable messages about transient and tangential events, such as a fleeting feeling or emotion. It's agility can convey the moment-to-moment fluctuations of a conversation or show more enduring moods and stable personality traits. Furthermore, the face can express interest or disinterest, acknowledgment and attention, in addition to suggesting biological and social information, including but not limited to; age, sex, gender, cultural belongings, health and ethnicity (Wilkinson, 2004). The face is important because it is how we recognise and identify people with whom we know, and, more generally, how we recognise and understand humanity (Bindemann et al., 2007; Bruce and Young, 1986). It is the locus of corporeal embodiment and experience, and due to this is unsurprising that the face is "typically the first part of the body we notice and the only part we address" (Wilkinson, 2004:5).

When there are non-viable or no associated identifying factors accompanying unidentified human remains, a forensic facial depiction can provide the authorities with investigative leads, usually through recognition from members of the public. Once a possible identity is suggested, it can be confirmed through various legally accepted methods, such as DNA or dental analyses. As such facial depictions have become pivotal in many forensic investigations.



Figure 1 – Famous face (Angelina Jolie) finished 3D asset in greyscale ready for use in experiments.

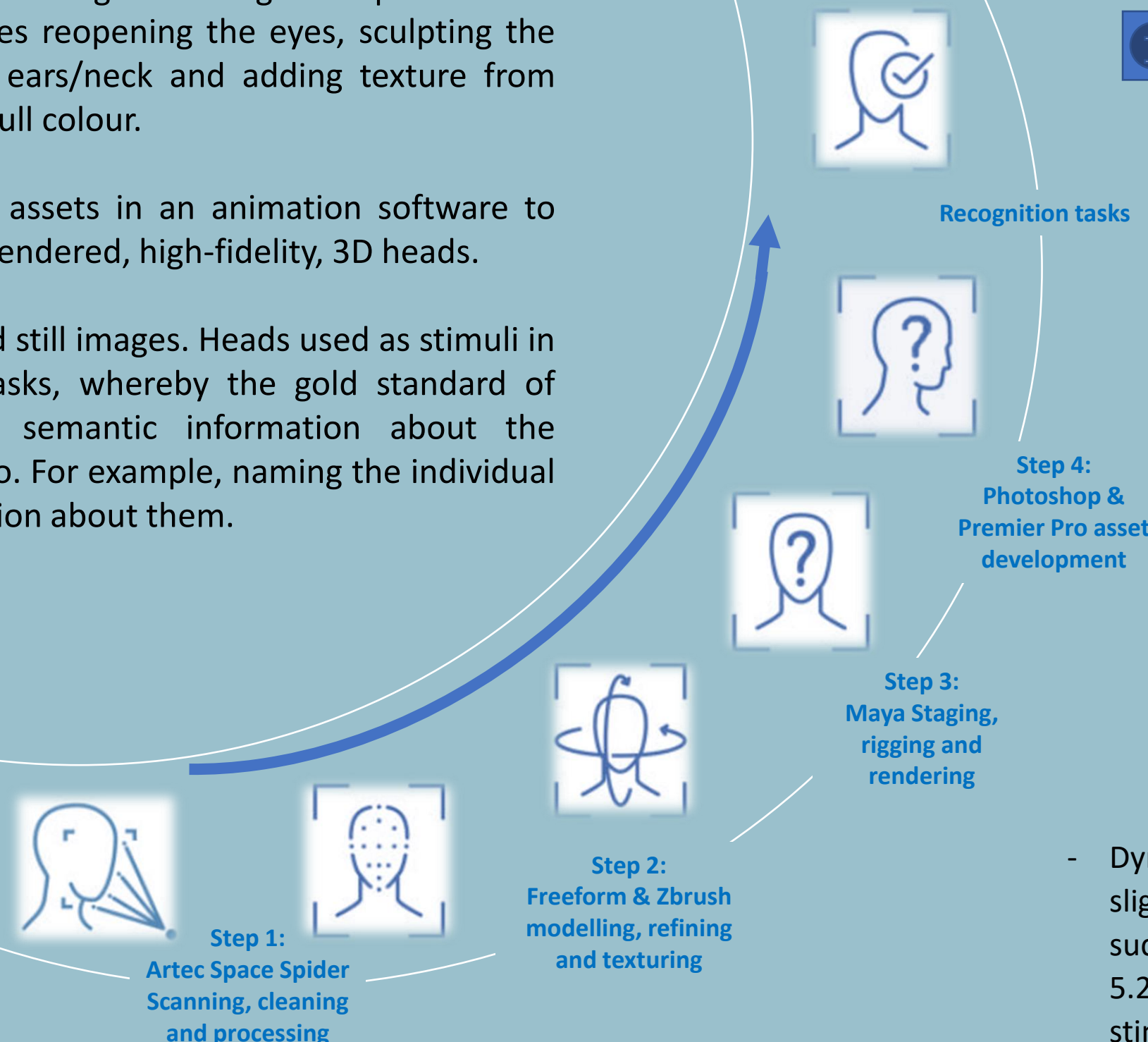
Stimuli Creation:

Step 1: 3D scanning a real face or a plaster cast of a famous face. Both famous faces and personally familiar faces are used within this research.

Step 2: Refinement of the digitised face. This is a much lengthier process while working on a digitised plaster cast famous face as this includes reopening the eyes, sculpting the rest of the head, adding ears/neck and adding texture from reference photographs in full colour.

Step 3: Staging the head assets in an animation software to transform them into fully rendered, high-fidelity, 3D heads.

Step 4: Developing gifs and still images. Heads used as stimuli in a series of recognition tasks, whereby the gold standard of recognition is retrieving semantic information about the identity the face belongs to. For example, naming the individual or recalling other information about them.



- What is a Forensic Facial Depiction?**
An approximation of what an individual might have looked like in life from analysing their skull.
- What Is Face Morphology?**
The shape of the head/face and the features within the face. Forensic artists are very good at estimating face morphology.
- What Is Facial Texture?**
Information on the face surface that is not related to morphology.
- What Are Some Examples of Facial Texture?**
Wrinkles, freckles, moles, blemishes, scars, lip striations (lines), head hair, facial hair, eyebrows, eyelashes, etc...

Initial Results

- Statistical analysis is currently ongoing but initial results for Phase One Experiment is as follows:
- Dynamic presentation of faces is slightly better for correct with a successful naming rate of 50%, which is 5.2% more than the statically displayed stimuli. The ground familiarity rate of correct naming is 80%.
 - Dynamic presentation of faces also had a small effect on increasing naming attempts at 10% , which is 0.8% more than statically displayed stimuli. The ground familiarity of mistaken naming is 3.1%, which is reflective of the use of a 'true-image'. Static presentation of faces are more likely to prompt no naming attempt. At 12.5% more than Dynamic presentation.
 - Overall familiarity of dynamically and statically presented faces 61.4% versus 57.2% respectively.
 - Thematically, participants found having the side profiles useful (more data analysis need to quantify this).

What Can Affect Facial Texture?
BMI, sun exposure, lifestyle, body modifications, etc...
While we can estimate age and 'health' from the skeleton we cannot estimate how we texturally respond to the about factors.

- Why is display important?**
- The way we cognitively process faces is different for familiar and unfamiliar faces (Bruce & Young, 1986).
 - Variant features ought to be excluded, such as hairstyle.
 - Having variant views gives more depth information and maximises opportunity to recognise as well as relies on shape rather than texture (silhouette).

What is the purpose of this research?
To find the most affective way to texture and display facial depictions to the public in order to maximise potential recognition.



SCAN ME

References & Additional Information

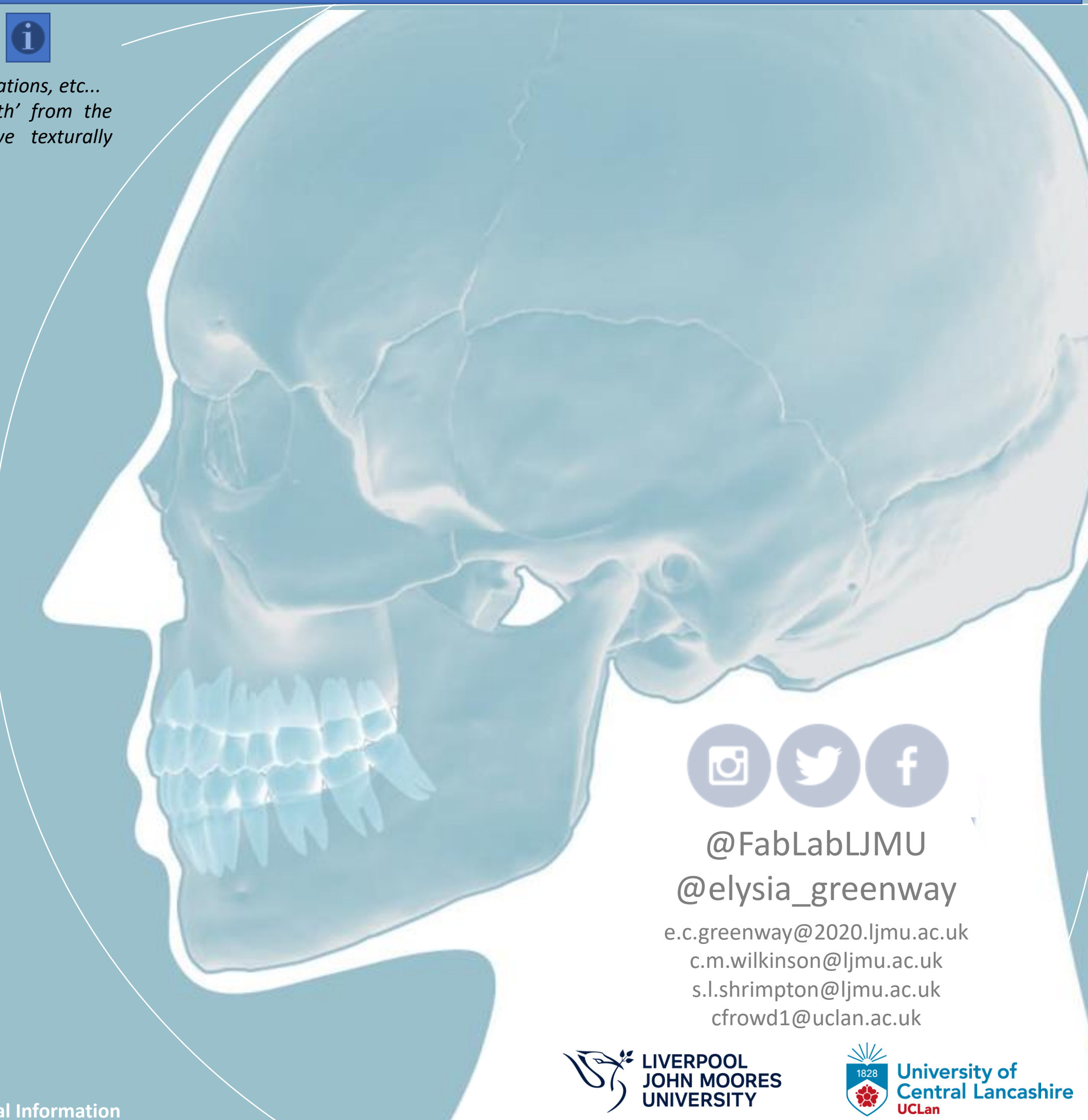
Experiment Phases:

Experiments surrounding display and texture are broken down into experimental phases and will inform the specifics or conditions and testing of the next phase. The initial proposed phases is as such:

Phase One - Establishing experiment and piloting of methodology. Famous faces stimuli, within-participant design, static vs dynamic presentation. Additionally a Famous Face stimuli rating study. Experiment finished with data being currently analysed.

Phase Two – Personally familiar stimuli presented frontal view only (as is currently standard display) vs an additional vantage point of ¾ or profile.

Phase Three - Dynamically presenting the stimuli with various amounts and/or types of texture added to the face until recognition is achieved.



@FabLabLJMU
@elysia_greenway
e.c.greenway@2020.ljmu.ac.uk
c.m.wilkinson@ljmu.ac.uk
s.l.shrimpton@ljmu.ac.uk
cfrowd1@uclan.ac.uk

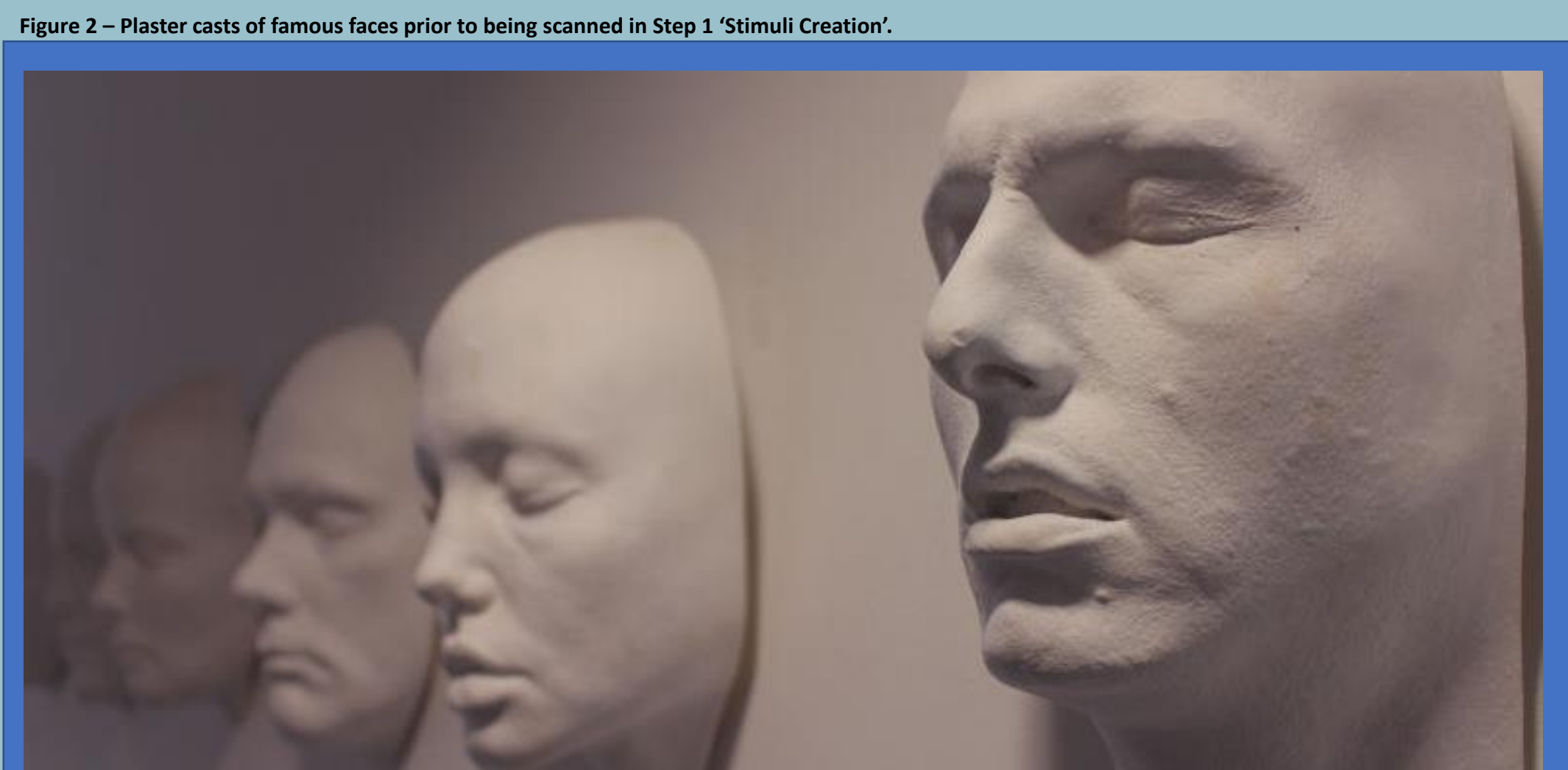


Figure 2 – Plaster casts of famous faces prior to being scanned in Step 1 'Stimuli Creation'.