personality. Computer Animation and Virtual Worlds, 17(3-4), 371-382 which has been published in final form at doi:10.1002/cav.1401

PrePrint: Computer Animation and Virtual Worlds (CAVW) Journal, 2006

Facial actions as visual cues for personality

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Abstract

What visual cues do human viewers use to assign personality characteristics to animated characters? While most facial animation systems associate facial actions to limited emotional states or speech content, the present paper explores the above question by relating the perception of personality to a wide variety of facial actions (e.g., head tilting/turning, and eyebrow raising) and emotional expressions (e.g., smiles and frowns). Animated characters exhibiting these actions and expressions were presented to human viewers in brief videos. Human viewers rated the personalities of these characters using a well-standardized adjective rating system borrowed from the psychological literature. These personality descriptors are organized in a multidimensional space that is based on the orthogonal dimensions of Desire for Affiliation and Displays of Social Dominance. The main result of the personality rating data was that human viewers associated individual facial actions and emotional expressions with specific personality characteristics very reliably. In particular, dynamic facial actions such as head tilting and gaze aversion tended to spread ratings along the Dominance dimension, whereas facial expressions of contempt and smiling tended to spread ratings along the Affiliation dimension. Furthermore, increasing the frequency and intensity of the head actions increased the perceived Social Dominance of the characters. We interpret these results as pointing to a reliable link between animated facial actions/expressions and the personality attributions they evoke in human viewers. The paper shows how these findings are used in our facial animation system to create perceptually valid personality profiles based on Dominance and Affiliation as two parameters that control the facial actions of autonomous animated characters.

Keywords: facial animation, social agent, personality, facial actions

Introduction

Facial actions such as head tilting, turning, and nodding, eyebrow raising, blinking, and expression of emotions, are fundamental to the believability of a social agent, and can have a major effect on the perception of personality by viewers. This effect has not been thoroughly investigated in

behavioral psychology. Consequently, a comprehensive personality model for animated characters that allows these facial actions to be linked to a personality profile has yet to be developed. In this paper, we present the results of our experiments on the effect of facial actions as visual cues in the perception of personality. We also propose an effective personality model with two orthogonal parameters, Affiliation and Dominance, which activates the facial actions randomly, periodically, or in response to speech energy or content, in order to animate believable autonomous social agents.

The subject of personality has been studied by many behavioral psychologists [1,2,3,4]. Although many models have been proposed and used successfully, the relation between dynamic facial actions and the perceived personality types has not been investigated thoroughly. Previous studies have mostly examined full-body gestures and static facial expressions [5,6,7,8,9,10,11]. This is in part due to the difficulty of preparing many video segments with live actors for a variety of facial actions and their combinations. On the other hand, the effect of personality on the individuality and believability of an agent has lead to considerable research aimed at modeling agent personality. Although successful in many aspects, this research has yet to overcome some weaknesses such as:

- Lack of a theoretical and experimental basis from behavioral psychology
- Impractical and vague personality parameters
- Dependence on speech content, limited emotions, or random models to activate facial actions, instead of general personality-dependent actions

In this paper, we present our findings on the perception of personality types based on observed facial actions, and also an agent personality model using the Wiggins' circumplex model [1] with two practical and easily understandable parameters, namely, Dominance and Affiliation. Our proposed model associates facial actions and their frequency and duration to these parameters in order to cause the perception of certain personality types in the viewers. The model is used in our facial animation system which itself has been used to perform the experiments. Our methodology consists of (1) listing the possible facial actions, (2) creating animated videos with individual facial actions as visual cues, (3) running the experiments and analyzing the perception of personality types and parameters, and (4) devising a "perceptually valid" model, i.e. one that associates personality parameters to proper visual cues that increase the likelihood of the intended personality perception in viewers. These visual cues can be activated regularly, randomly, or based on speech energy level. We demonstrate that:

1. The Wiggins' model [1] is an effective and thorough way to probe the perceived personality, and define the personality of a social agent.
2. Single dynamic visual cues are reliably interpreted as altering the personality of the agent along the dimensions of social affiliation and dominance.
3. Dynamic emotional expressions are reliably interpreted as altering the personality along the dimensions of dominance and even more strongly, affiliation.
4. These results provide a solid foundation for exploring the integration/combination of dynamic visual cues for the establishment of believable agents.

In the following section we briefly review the related work in the areas of personality modeling. The subsequent two sections will describe the proposed approach and related theoretical basis. Our experimentation method and results, and some concluding remarks are the subjects of the other sections.

Related work

Personality and perception

Behavioral psychologists have proposed many models for human personality. One of the most widely used is the Big Five or Five Factor model [2]. The Big Five model considers five major personality dimensions: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (OCEAN). Modeling personality as an N-dimensional space allows for navigating through the personality space by changing one parameter along each independent dimension. Although successful in many aspects, the five dimensions in the Big Five model are (1) inter-dependent and (2) hard to visualize. As such, the model is hard to use for animated characters needing user-friendly and controllable personality parameters. Wiggins et al. [1] proposed another personality model based on two dimensions: Affiliation and Dominance. They show that different personality types can be considered points around a circular structure formed in two-dimensional space (Figure 1). The smaller number of dimensions allows them to be controlled more effectively and independently. The Big Five dimensions have also been mapped into this space quite successfully [4].

The perception of personality type and traits based on observation has long been a subject of research in behavioral psychology [5,6,7,8]. Unfortunately, this research has not focused on facial actions, and has primarily considered the observation of full-body behaviors. Also, mainly due to logistical reasons, the observations have been mostly limited to photographs or few dynamic actions. As Borkenau et al. [6,7] have illustrated, viewers can achieve relatively stable perceptions using short videos. Videos of live actors with different and configurable actions, however, can be expensive and difficult.

Among facial actions, the universal facial expressions of emotions [12] are the only group whose effect on the perception of personality has been investigated. Knutson [8] reported on the effect of facial expression of emotions on interpersonal trait inference based on Wiggins' model. He concludes that viewers attribute high dominance and affiliation to individuals with happy expressions, high dominance and low affiliation to those with angry or disgusted expressions, and low dominance to those with fearful or sad expressions. Research by Marsh et al. [9], Adams and Kleck [10], and Montepare and Dobish [11] support these results in general, but show some variations. Borkenau and Liebler [6,7] have reported one of the few studies which explicitly associated body gestures and behaviors as visual cues to the perception of personality. They categorized the visual cues into the following groups:

- General impressions such as estimated age and attractiveness
- Audio cues such as softness and deepness of the voice and calmness of speech
- Static visible cues such as length of hair, dress, stature, and thickness of features
- Dynamic visible cues such as pace of movements and stiffness of walking

Believable social agents

In early 1990's, Joseph Bates pointed out the importance of cognitive and emotional modeling for agents to make them believable [13,14]. Reily and Bates discussed some of the issues with personality and emotion in interactive agents [15] and Loyall and Bates [16] illustrated a method for generating natural language for emotional agents.

Badler et al. [17,18] proposed one of the first personality models for agents to control behavior (in their case, locomotion) based on certain individual characteristics. The proposed architecture includes a physical movement layer, a state machine for behavioral control, and an agent layer that

configures the parameters of the state machine. The model is not linked to any theoretically sound personality model, and is a general architecture for configurable behavioral controllers. Other researchers have also proposed methods for modeling agent behaviors. Among them, Rousseau and Hayes-Roth [19] define behavior as a combination of personality, mood, and attitude. The idea of separating independent components of behavior can be very helpful in designing autonomous agents. Funge et al. [20], on the other hand, propose the idea of hierarchical modeling, which includes behavioral and cognitive modeling layers at the top.

Another approach in behavioral modeling for agents includes associating different facial actions with certain states and events. Cassell et al. [21] propose a method for automatically suggesting and generating facial expressions and some other gestures based on the contents of the speech. In a later work, Cassell et al. [22] propose a comprehensive toolkit with a dedicated language for generating movements based on speech, through certain configurable rules. King et al. [23], Smid et al. [24], and Busso et al. [25] provide more recent examples of the automatic generation of facial actions (primarily expressions) based on speech. The main weakness of all these works is that the facial actions are (1) usually limited to the expressions, and (2) speech, and not a personality model, is the base for facial actions. A system to suggest facial actions based on personality settings has not been fully investigated.

Associating facial actions with personality requires a reasonably adequate personality model for the agent, and a thorough study of the effect of facial actions on the perception of personality. The latter, as mentioned before, has not been done properly yet, but the former has been the subject of some recent works. Kshirsagar and Magnenat-Thalmann [26] propose a multi-layer personality model. It is, more precisely, a multi-layer behavioral model that includes layers of personality, mood, and emotions on top of each other. Every layer controls the one below it, and the facial actions and expressions are at the bottom. The model allows definition of parameters at each level to individualize the agent. At the personality level, it utilizes the Big Five model with five parameters. Following observations can be made regarding this system:

- The problems associated with using the Big Five mentioned earlier.
- Hierarchical dependence of personality and emotional states. As suggested by Rousseau and Hayes-Roth [19], they should be treated independently. Personality types should be able to affect all possible facial actions directly and independently of the mood, and mood should be set independently of personality type, although it should be possible to adjust the mood change mechanism through personality parameters (one of the strengths of the multi-layer model).
- The hierarchical structure makes it difficult or even impossible for personality parameters to control facial actions that are not part of the expression of emotions, since personality can only change the mood and emotional states.
- Unnecessary separation of moods and emotions. Although moods and emotions are not the same, they are closely related. A separate layer of moods (including only good, bad, and neutral) does not provide enough extra functionality.
- Dependence on speech content or a probabilistic belief network for activating facial actions, instead of associating facial actions directly to personality parameters. This is, again, due to lack of an existing study on these associations.

Models proposed by Egges et al. [27] and Pelachaud and Bilvi [28] follow similar ideas. The latter uses a two-dimensional model similar to Wiggins [1] for personality (called performatives) and also separates them from emotions as two independent components activating facial actions through a belief network. They use an XML-based language to describe the desired communicative functions and a look-up method to retrieve the associated facial actions for each function:

```
<affective type="satisfaction">
```

`I am sure we will arrive to an agreement.</affective>`

In this example *`affective(satisfaction) = {raised eyebrows, smile, head nod}.`* The mapping from high-level personality parameters to facial actions is un-clear and based on limited observation and arbitrary settings. But the facial actions are not limited to speech and, as illustrated, can be defined anywhere. On the other hand, they have to be set explicitly where desired, while the ideal situation is to define them as part of a personality to be activated autonomously.

Multi-space behavioral model

The behavior of a social agent is determined by a variety of factors. Some of these factors are character-dependent (such as personality and mood), and some may be independent of the character we have defined (for example scripted tasks, general rules of interaction and event handling). The authors have proposed [29] that an effective and comprehensive behavioral model can be structured with the following independent but interacting parameter spaces:

- *Geometry* is the basic space that includes visual (and audio) parameters such as physical points (pixel or vertex), facial features, and higher-level components such as facial regions, which can be moved and resized as a group.
- *Mood* is the encapsulation of all emotional states as a short-term characteristic of an agent. It includes all standard and user-defined emotions. These could be grouped into good, bad, and neutral moods [26], but it would not provide much practical value. As shown by Russell [30], moods (or emotions) form a two dimensional space that can be controlled by two orthogonal parameters, Arousal and Valence.
- *Personality* space holds the information about the long-term characteristics of an agent such as head movements and typical gestures. It may also include settings on the mood change mechanism. The Big Five model [2] and Wiggins' circumplex [1] are examples of parameterized personality models.
- *Knowledge* is an umbrella space that includes behavioral parameters, which can be applied equally to any agent. Examples are the script to follow (basic actions), rules of interaction, and event handling. In our proposed model, Knowledge acts as the entry point to control the agent and passes the commands to other parameter spaces.

Unlike some approaches reviewed in the previous sections, we do not organize these spaces as layers on top of each other. This allows them to directly interact with each other (for instance, personality can affect geometry without going through mood). Geometry can be 2D or 3D, and forms a hierarchical structure. Knowledge space (which could also be called Task or Script) is based on a specially designed language for scripting facial scenarios. Mood can be controlled by two parameters or by selecting any combination of standard or user-defined emotional states. Geometry, Mood, and Knowledge spaces are the subjects of other publications [29].

Personality parameters and visual cues

The primary objective of personality modeling is to make it possible for the agent to perform facial actions that cause the viewer to perceive certain personality types, as intended by the character designer. It is important to understand the difference between this practical approach regarding personality perception and the deeper theoretical questions concerning how personality types and parameters influence facial actions. The effect of personality on facial actions can be very complicated. The link between facial actions and the perception of personality in the viewer,

on the other hand, is more straightforward and practically useful for animators, and can be studied through direct experiments asking viewers how various actions are perceived, as reported in this paper.

To correctly model the effect of facial actions as visual cues on the perception of personality, the following questions need to be answered:

What are the facial personality types and parameters?

What are the facial actions that affect the perception of personality?

What is the association between visual cues and the perceived personality?

Based on existing findings in behavioral psychology, there is no evidence showing that general personality types and parameters cannot be applied directly to facial personality. Future research, which the authors intend to do, might result in such a conclusion and provide us with personality models specifically designed (or customized) for faces. For the time being, it is reasonable to assume that facial personality falls into the same models as general personality. In this regard, the Big Five and circumplex models seem to be the most attractive options, as described earlier. We choose the Wiggins' circumplex model for its simplicity and clarity of parameters.

The visual cues for personality (i.e. facial actions and states) can be grouped into two categories, static and dynamic, as shown in Table 1. Assuming that the animated characters are geometrically designed, some visual cues such as age, gender, and attractiveness (however we define it) can no longer be controlled, and we do not consider them here. On the other hand, although facial expressions are temporal actions and happen with certain timing (e.g. rise and fall), they can be perceived with one single snapshot. This allows us to consider them within the category of static visual cues. Their timing configuration and those of dynamic cues (how often they happen and how fast they are performed) need to be associated with the personality parameters. In the next section we will discuss our experimental results on how the visual cues and their timing can affect the perception of personality in the viewers.

We give each personality parameter three linguistic values: LOW, MEDIUM, and HIGH. After performing the experiments discussed in the next section, visual cues are associated with each one of these parameter values, to form sets like the following:

$C_{i,j} = \{c_{i,j,n}\}$: $c_{i,j,n}$ is the nth visual cue associated with the jth value of ith parameter.

Each visual cue is defined as an individual MPEG-4 FAP [31] or a combination of them. If p_i is the value of ith personality parameter set for the agent (i=0 or 1), $v_{i,j}$ (the strength of the jth linguistic values of that parameter) will be calculated using a fuzzy membership function. These strengths are used to activate the visual cues:

$a_{i,j,n} = v_{i,j} \times m_{i,j,n}$ where $a_{i,j,n}$ and $m_{i,j,n}$ are activation level of the visual cue (or the related FAP) and its maximum value, respectively.

The timing for activating visual cues can be random, periodic, or based on speech energy level. Speech content can also be used as suggested by other researchers [23,24,25]. Some measure of speech energy can be calculated by analyzing the speech signal. We define two strength thresholds of Impulse and Emphasis for this energy. Different visual cues can be associated with these thresholds. Once a threshold is reached, one of the associated cues that matches the agent personality is randomly selected and activated based on the value of $a_{i,j,n}$.

A typical personality profile includes items such as:

```
Dominance = 80              // High Dominance
Affiliation = -80           // Low Affiliation
Impulse = 15                // energy scale
Emphasis = 25               // energy scale
ImpulseCues = …             // list of cues here
EmphasisCues = …            // can use external files
```

Joy,10,10,10,10 // delay-rise-hold-fall times

Experiments and results

Method

Thirty-one undergraduate students (17 males and 14 females) from the University of British Columbia participated in the experiment for course credit. Participants were unaware of the purpose of the study, and randomly assigned to one of two separate groups of 15 and 16 individuals, each of which was exposed to a different set of stimuli (one for emotional expressions and one for other facial actions). This grouping was for convenience; we only had access to the human viewers for a one-hour period and so we had to divide the total set of stimuli between them. The stimuli were videos of animated characters speaking and either performing one type of facial actions based on the speech energy or expressing one emotion periodically. Facial actions and expressions used in our experiments are listed in Table 2. They form three groups in all, each with eight actions/expressions.

All stimuli were displayed on a computer monitor, and consisted of 3 sets of video clips (expressions, slow actions, and fast actions). Each set included 8 actions (or expressions) and 4 videos (2 genders, 2 races) for each action/expression. Video clips featured the computer-generated head of a single character who could be either male or female and either Caucasian or Asian (see Figure 2). During the clip, the character spoke from a script in which it seemed as if the participant were in the middle of ordering airline tickets, and the character was giving information about the flight and asking about the destination, flight times, etc. Each clip was approximately 21 seconds in length. Because the specific characters and audio script was randomly assigned to each of the actions/expressions, the results we obtained could be generalized across all variations in gender, race, and audio script.

A total of 32 personality-related adjectives were used during the experiment to permit viewers to indicate how the characters were perceived. The adjectives were drawn from eight groups, representing the eight primary sectors in the circumplex model of personality (see Figure 1). The four adjectives in each of these groups were those known to be more characteristic of the personality at that place in the personality space [1]. At the end of each clip, the eight adjectives (selected randomly, one from each of the eight groups) were presented sequentially, and the participant was required to indicate the extent to which they felt the adjective could be appropriately used to describe the character in the video. They indicated their response on a 7-point scale where 1 was “yes” and 7 was “no”.

Adjectives used in the experiments are (listed for groups in Figure 1):

1- Hi-Dom, Med-Aff: Dominant, Self-Assured, Assertive, Self-Confident
2- Hi-Dom, Lo-Aff: Sly, Crafty, Cunning, Tricky
3- Med-Dom, Lo-Aff: Hard-hearted, Unsympathetic, Warmthless, Cold-hearted
4- Lo-Dom, Lo-Aff: Introverted, Sociable, Not Social, Antisocial
5- Lo-Dom, Med-Aff: Not Aggressive, Shy, Timid, Not Authoritative
6- Lo-Dom, Hi-Aff: Not Cunning, Not Sly, Not Wily, Not crafty
7- Med-Dom, Hi-Aff: Gentle-hearted, Tender, Tender-hearted, Soft-hearted
8- Hig-Dom, Hi-Aff: Friendly, Extraverted, Cheerful, Outgoing

Each of the different animated characters (2 genders, 2 races) were randomly assigned to exhibit different facial actions/expressions, thereby ensuring that the effects of individual physiology and/or voice characteristics were not responsible for any of the results we obtained. It

should also be noted that we are sensitive to an important theoretical distinction between the transient emotional state of an individual and their enduring personality traits. Momentary expressions of joy and sadness are not necessarily the reflection of any particular enduring personality. However, when it comes to personality perception, this distinction is not as easy to make. Indeed, one of the major discoveries of the past decade is that personality perception is heavily biased toward the current emotional displays of an individual being viewed (i.e., the "correspondence bias" of Gilbert [32]). So the study of the relation between facial actions/expressions and the perceived personality can help design characters that "seem" to have certain personality types.

Results

In analyzing the data, we began by calculating the average rating for the eight groups of adjectives separately for each facial action/expression. This provided a mean rating for the eight positions on the affiliation-dominance circle for each movement (groups 1 to 8). Group 1 is at the top of the circle (i.e. high dominance and neutral affiliation). Numbering is counter-clockwise, so the bottom of the circle is group 5 with low dominance and neutral affiliation. We then applied the method outlined by Wiggins et al. [1] (also used by Knutson [8]) to determine the effects of pure dominance and affiliation, as stated in the following equations where Si is the score for group i:

Dominance = S1 – S5 + [0.707 x (S2 + S8 – S4 – S6)]

Affiliation = S7 – S3 + [0.707 x (S8 + S6 – S2 – S4)]

The resulting dominance and affiliation scores of all facial actions/expressions, averaged over their viewers, are shown in Figure 3 and Table 2. The results include mean and standard error of the Dominance and Affiliation scores calculated using the above equations. The mean values represent comparative relation of the facial action/expression to the Dominance and Affiliation parameters. The standard errors show the average variability in estimates of the mean derived from different viewers.

The experimental results shown in Figure 3 clearly show that facial actions and expressions are used as visual cues in the perception of personality. This is illustrated by the extent to which the various actions/expressions are distributed over the circumplex. Furthermore, the placement of these actions/expressions in the circumplex can be related reasonably well to the two-dimensional personality model (affiliation, dominance) and therefore used for creating personality profiles. Specifically, the results for facial expressions confirm the findings of Knutson [8] and others [9,10,11] to a reasonable extent, but show that emotional expressions mostly affect the perception of personality along the affiliation dimension, and have less of an effect on the perception of dominance. The specific findings for facial actions show that they also are related reasonably well to ratings of dominance, with head nodding and gaze aversion being reliably perceived as signalling low dominance and one eyebrow raising and head tilting being seen as communicating high dominance.

Discussion

We interpret these results as pointing to a reliable link between animated facial actions/expressions and the personality attributions they evoke in human viewers. This makes it especially important for future research to discover the most consistent visual cues for this assignment. The fact that the ratings of our human viewers of these animated characters also conformed to a well-established theory of personality attribution, originally developed to account for attributions made regarding human actors, suggests that this approach also has validity.

As a further indication of the validity of our approach, we note that the facial actions /expressions we have identified can be combined for even greater impact. This is demonstrated in the sample videos for Exhibitionist (high on both affiliation and dominance) and Shy (low on both dimensions). We have used two-brow raise, head tilt, head turn, and joy for Exhibitionist, and head nod, avert gaze, down-right head rest position, and contempt for Shy. Other combinations are easily possible to achieve other personality types.

Concluding remarks

We have studied the effect of facial actions on the perception of personality, and have investigated a perceptually valid personality model to be used for believable animated characters. We showed that facial actions and expressions could affect the perception of personality along the dimensions of affiliation and dominance. The experiments demonstrated the usability of Wiggins' model for probing the perception of personality types and defining them. Based on our experimental findings, we proposed a personality modeling approach that can be used to create social agents acting autonomously based on controllable personality types.

Future studies will need to confirm and explore in greater detail the individual and combined effects of facial actions on personality perception. Studies should also be conducted with larger experimental populations and on populations with interesting group differences (cultures, ages, immediate interests). Improving the visual realism of the head model may also increase the validity and reliability of the results. But as Borkenau, et al. [6] have noted, even "thin slices of behaviour" can act as strong visual cues for perception of personality. Our study shows that short dynamic facial actions, selected based on the actions of real people, even if performed with less-than-ideal realism in animated characters, can clearly affect the perception of personality.

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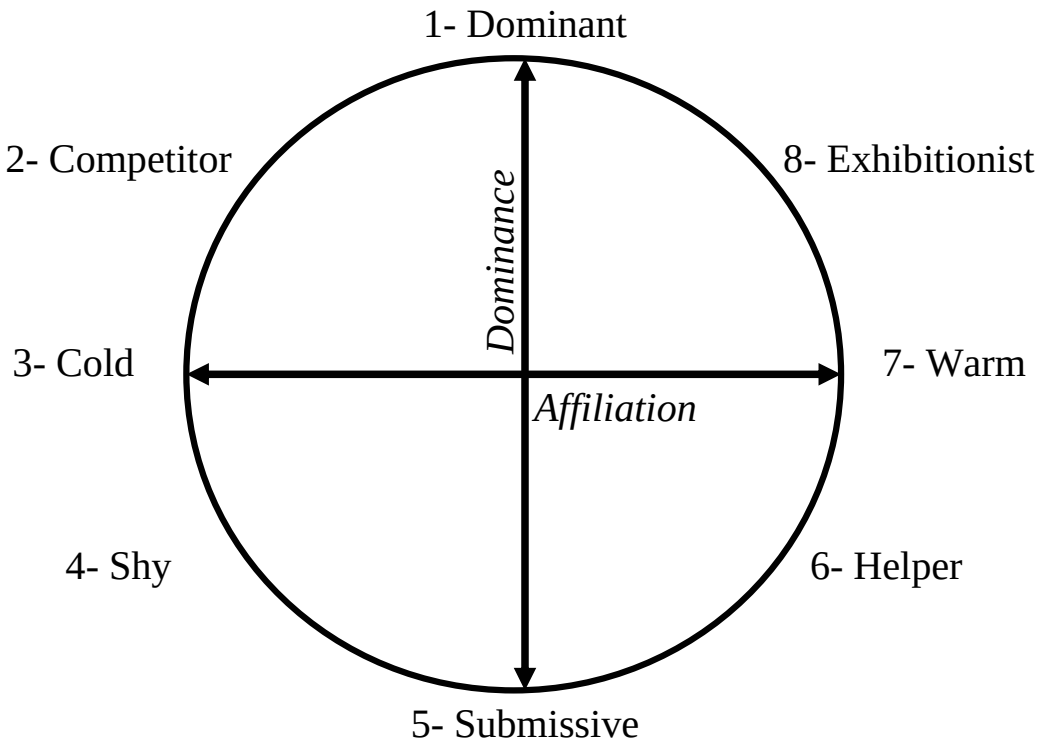
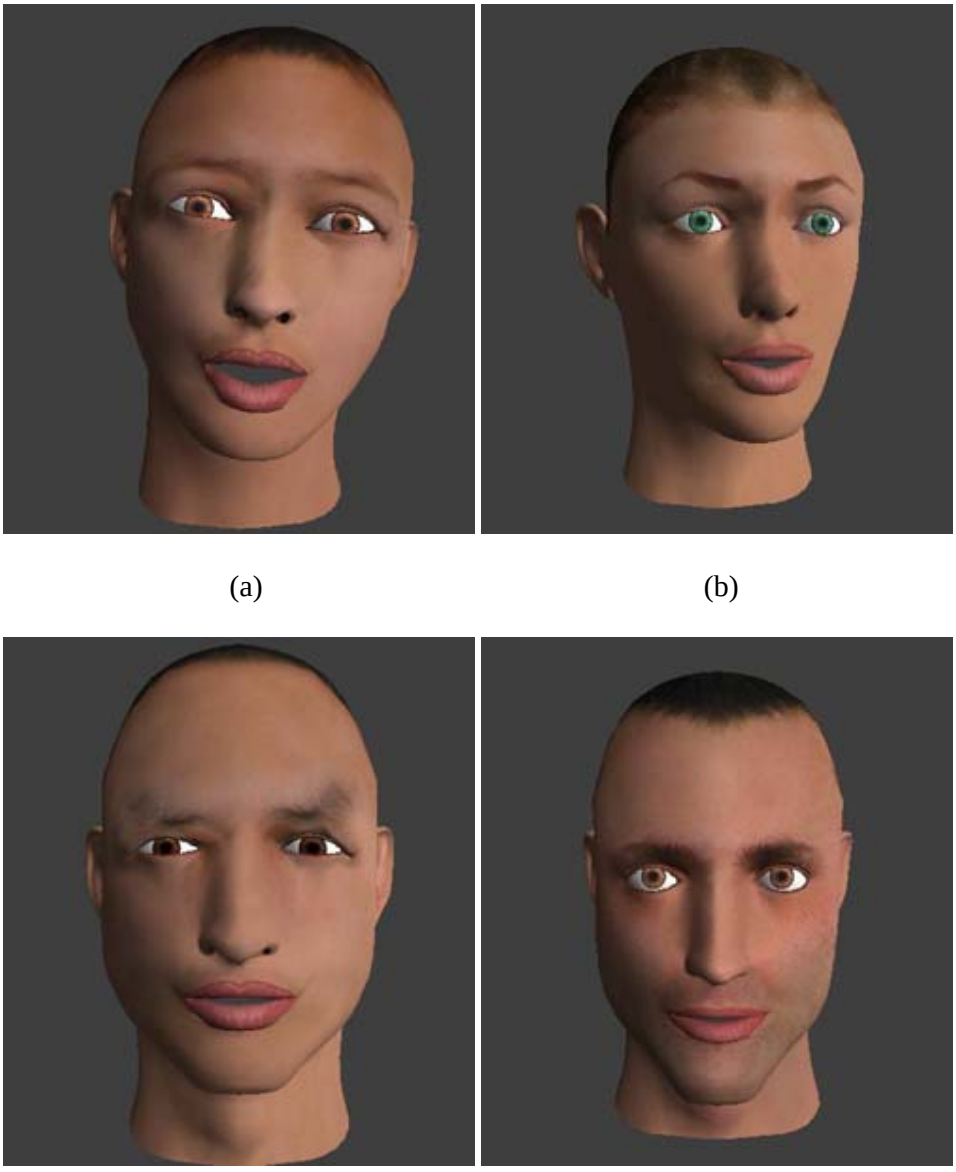


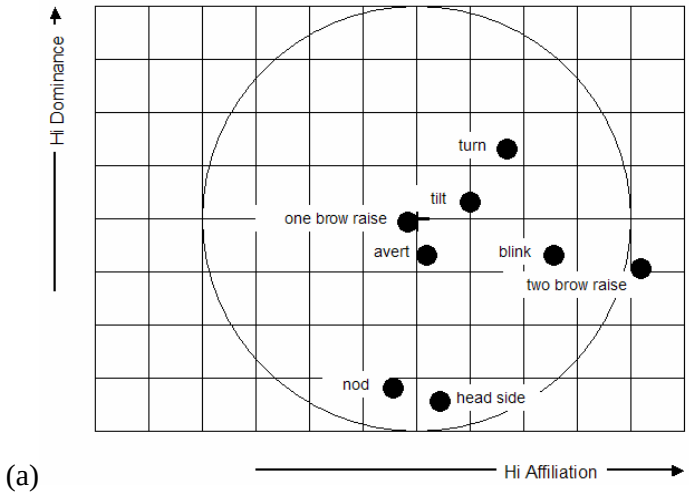
Figure 1: Wiggins Circumplex Model of Personality Types. The dimensions could be easily defined along Shy-Exhibitionist and Helper-Competitor. In that case they would correspond to Extroversion and Naivety. This shows how this model can cover others such as Big Five.



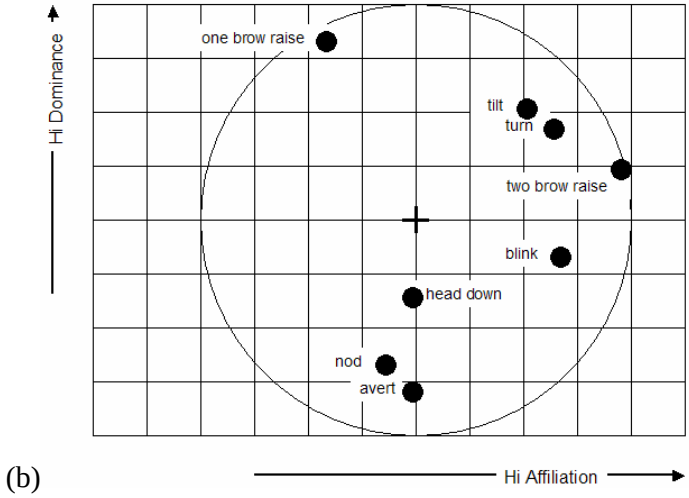
(a) (b)

(c) (d)

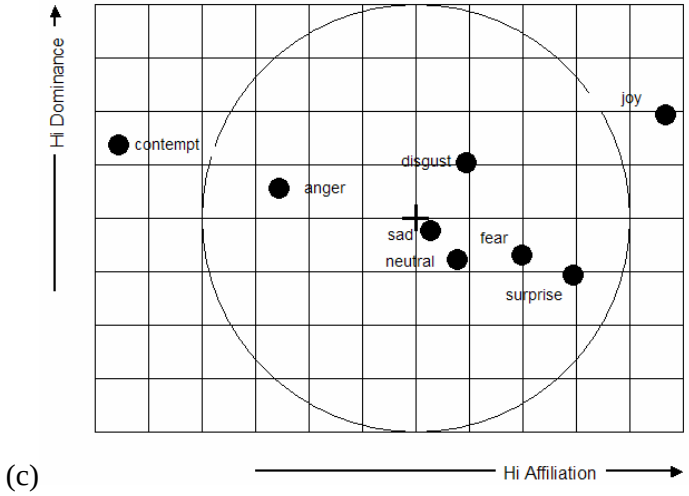
Figure 2: Illustrations of static frames from the movie sequences depicting in the experiments: (a) Head Tilt, (b) Head Turn, (c) One Eyebrow Raise, and (d) Head Nod.



(a)



(b)



(c)

Figure 3: Dominance-Affiliation Scores. (a) Slow and (b) Fast Actions, (c) Emotions

Table 1: Static and Dynamic Visual Cues for Personality

Static Visual Cues	**Dynamic Visual Cues**

• Standard Emotions
  o Joy
  o Sadness
  o Anger
  o Fear
  o Disgust
  o Surprise
  o Contempt
• Head rest position
• Speaking out of a corner of mouth
• Gaze (looking into camera)
• Gender
• Age
• General Appearance (round face, full lips, eye separation, nose shape, brow thickness, etc)
• Baby face vs. mature
• Other attraction-related features
	• 3D Head Movements
	  o Frequency
	  o Duration
	  o Direction (yaw, pitch, roll)
	• Nodding (especially in emphasis for speech)
	• Laughing
	• Raising eyebrows
	• Frowning
	  o Symmetric vs. one-sided
	  o Frequency
	  o Duration
	• Gaze shift
	• Blinking
	  o Frequency
	  o Duration
	• Frequency and duration of expressions listed in Static Visual Cue

Table 2: Dominance-Affiliation Scores for Emotions and Facial Actions. Facial actions are performed in slow and fast modes. Means represent scores averaged over their viewers. Standard errors represent the average variability in estimates of the mean from the viewers.

Facial Action	**Affiliation**		**Dominance**	
	Mean	*Standard Error*	*Mean*	*Standard Error*
Emotions				
Joy	4.7	1.1	2	0.75
Sad	0.2	1.14	-0.2	0.75
Anger	-2.6	0.94	0.6	0.96
Fear	2	1.29	-0.8	0.82
Disgust	0.9	1.44	1	0.76
Surprise	2.9	0.65	-1	0.77
Contempt	-5.7	0.84	1.4	0.54
Neutral	0.8	0.96	-0.8	0.88
Slow Actions				
Turn	1.7	0.71	1.2	0.67
Tilt	0.9	0.58	0.2	0.73
Nod	-0.5	0.69	-3.1	0.6
Blink	2.5	0.53	-0.7	0.7
Avert	0.1	0.82	-0.7	0.88
One Brow	-0.1	0.93	0	0.98
Two Brow	4.2	1.29	-0.9	0.84
Head Side	0.4	0.54	-3.4	0.69
Fast Actions				
Turn	2.5	0.53	1.7	0.6
Tilt	2.1	0.6	1.9	0.66
Nod	-0.6	0.61	-2.8	0.8
Blink	2.7	0.48	-0.8	0.7
Avert	-0.2	1.12	-2.9	0.82
One Brow	-1.6	0.83	3.3	0.9
Two Brow	3.8	0.78	0.9	0.53
Head Down	-0.1	1.23	-1.4	0.53