



Interpersonal Perception and Android Design

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Abstract

The paper reports findings from a study of interpersonal perception and discusses implications for the design of people-oriented androids. The study investigates the relationship between perceptual performance and subjectively experienced levels of empathy, intimacy, and felicity in an interpersonal perception task. Correlation analyses revealed no relationship between objective performance and subjective experience. However, internal correlations indicate empathy and intimacy are linked and distinct from felicity. Analysis of gender effects of actors and observers indicate gender distributed roles. Design specifications for androids capable of interpersonal relationships are considered. A discussion of the phenomenology of empathic and moral androids of the future is offered.

Introduction

Androids of the future will have to live well and be efficient at designated tasks. Some of these tasks it may be assumed will require forming relationships with humans. People form relationships for many and varied purposes: collaborative relationships to cooperate towards a common goal, intimate relationships for pleasure and propagation, alliances and friendships for support in general and specific pursuits. Sometimes people come together for no other reason than they enjoy each other's companionship (Clark & Mills, 2004).

Sophisticated androids then will have to be capable of good relationships with people. However, how to have good relationships, and indeed how to live well, are difficult and perennial questions even confined within the human realm. Android science may be able to offer a fresh dimension with which to consider these questions. The study of relationships has begun to uncover some of the features of good interpersonal relationships, for example, escalation versus de-escalation conflict sequences in long-term relationships; empathic accuracy in close relationships; intimacy and self-disclosures in interpersonal exchanges; and commitment and relationship maintenance mechanisms (see Reis and Rusbult, 2004). These offer insights for the design of people-oriented androids, while considering human issues within an android framework may supply rigour and rationalisation of human relationship processes.

The present paper describes results of a psychological experiment to explore the role of empathy and intimacy in interpersonal perception. Interpersonal perception is a *competency* that can be measured by an objective standard or metric. Current research on emotional intelligence is beginning to address a suitable metric to assess the ability to

experience 'correct' emotions and to direct these and the emotions of others towards desired outcomes (Davies, Stankov, & Roberts, 1998). However, interpersonal perception is an *experience* as well as a competency. This paper explores the relationship between the experience and the competency of human interpersonal perception.

People must perceive each other accurately to achieve social purposes, for example, they must read emotions from facial expressions. They must interact physically and verbally and coordinate their actions by monitoring each other's emotions and intentions. Communication is a joint enterprise requiring interactants not only to encode and decode information but to be able to sense and experience collective purpose. Thus interpersonal perception, unlike object perception, is relational. The joint purpose of a greeting, seduction, or negotiation, is co-experienced – each perceives the other's perspective as well as his own. The so-called intersubjective nature of human communication has been characterised extensively, especially between infants and caregivers (e.g. Braten, 1998).

Intersubjective experiences arise between people. They are not properties of the individuals, but of their relationship. The present study focuses on the experiences of empathy, intimacy, and felicity in relation to interpersonal perceptual accuracy. These are explored by means of a classic deception detection test accompanied by items assessing levels of affect experienced towards the actors judged. The relation between experience and perceptual performance is an under-researched area. This paper presents an exploratory study. The principal question addressed is: Does empathy help or hinder interpersonal accuracy? Or are these processes independent. Common experience informs us that emotions sometimes blind us (e.g. "love is blind"), but sometimes may give us insights (e.g. "gut instincts"). An empirical effect in either direction, or indeed no effect, is of interest, since the relationship between experience and performance cannot be deduced *a priori*.

The implications for future androids, which may be required to form interpersonal relations with people or with each other, are considered. A discussion of the requirements of the empathic android and the moral android of the future is offered.

Method

Deception detection accuracy and self-report measures of empathy, intimacy and felicity were recorded in response to 30 second film clips of 12 actors presenting true or fake autobiographical speeches.

Subjects

The 134 participants (70 female, 64 male) recruited for the study were students and friends of students from the University of Edinburgh, UK.

Video Clips

Two video reels were constructed each consisting of twelve short (< 30 seconds) film clips of 12 actors. The actors were 6 male and 6 female students of the University of Edinburgh filmed in head and shoulders shots against a neutral background. Video reel A depicted 6 actors presenting true autobiographical speeches interspersed with 6 actors presenting fake autobiographical speeches. Video reel B depicted the same 12 actors presenting speeches in the reverse truth-condition: true autobiographies if in reel A they were fake, and fake autobiographies if they were true.

The actors' speeches followed the same format: actors identified themselves, described their present situation, family background, personal history, and their hopes for the future. The speeches were prepared on paper beforehand, by the actor if the recording condition was true, or they were allocated a fictional script if the condition was false. To reduce artificiality of turns of phrase, actors could rephrase parts of their fictional speeches.

The clips were recorded in a recording studio using a Panasonic AJ-D400E DVC Pro Camera. The footage was edited using a Panasonic AJ-D250 VCR and S-VHS edit suite and transferred on to VHS tapes. The tapes were played back on standard video players and TV monitors. An Apple Macintosh Creative Studio Computer running Graphic Converter v.4.2 was used to capture frames from the clips. The still images were printed out in greyscale and presented four per page of A4 of the response sheet.

Procedure

Participants indicated their judgments on a response sheet that had two parts: Part A contained instructions; requested the participant's gender; and presented a column of numbers 1 to 12 adjacent a column of T's and another of F's.

The written instructions to Part A were read aloud: Participants were instructed that in Part A of the experiment they would be shown short film of clips of male and female actors making a speech about themselves. They were to decide at the end of each clip whether the speech was genuine or fake and to indicate their decision by circling on the response sheet either T for 'true' or F for 'false'. At the end of the film participants were instructed to turn to Part B of the response sheet. Part B presented four questions with instructions to read each carefully before proceeding:

- Do you hope this person succeeds?*
- Would you let this person comfort you if you were upset?*
- Do you think you know what this person feels?*
- Would you go to this person if they were crying?*

The next four pages presented 12 still images one of each actor (taken from the clips) accompanied by the 4 questions

abbreviated underneath each still image. Participants indicated their impressions of the actors by circling the appropriate response 'yes' or 'no' to these items.

Analysis

To assess relationships between perceptual performance on the test and levels of self-reported interpersonal experience, Pearson correlations were calculated between accuracy, bias, and responses for the four interpersonal experience markers. Accuracy was scored as the number of actor clips judged correctly (true or false) out of the total of 12; bias is the number of true responses given overall (truth-bias); each of the four experience markers were scored as 1 for a 'yes' and 0 for a 'no' response. To assess gender effects on perceptual performance and interpersonal experience two-factor ANOVAs (actor gender x observer gender) were computed on the measures of accuracy and experience.

Results

Table 1. Correlation coefficients showing relationships between perceptual accuracy, perceptual bias, and the four empathy markers: succeed, comfort, feel, cry (see text for details). Significance levels are denoted as * $p < 0.05$ and ** $p < 0.01$.

	bias	succeed	comfort	feel	cry
accuracy	-0.086	-0.228**	-0.064	-0.032	-0.009
bias		-0.018	0.251**	-0.032	0.158
succeed			0.086	0.079	0.273
comfort				0.339**	0.486**
feel					0.275**

The first correlations of interest are those between performance (including both accuracy and bias), and the different measures of interpersonal experience. These correlations are shown in the first row of Table 1. First, perceptual accuracy is not correlated with perceptual bias. Thus more trusting observers, those who tended to give true instead of false judgments (a truth-bias) were no more, or less, accurate at deception detection than less trusting or skeptical observers. Perceptual accuracy is negatively correlated with hope for others' success. Thus higher levels of well-wishing are associated with lower interpersonal accuracy. Perhaps unexpectedly a truth-bias does not mediate this effect, as the bias/succeed correlation is not significant. Thus hope for others' success is not a halo-effect of trustiness (or vice versa) but diminishes accuracy through a different, as yet unidentified, mechanism. The remaining coefficients in the first row indicate that perceptual accuracy is not related to any of the other markers of interpersonal experience.

Perceptual bias is significantly correlated with the ‘*accept comfort*’ measure thus higher trust is associated with greater willingness to accept comfort from others when in distress. Perceptual bias was not correlated with any of the other interpersonal experiences.

The remaining three rows show the internal correlations between the four reported experiences. Willingness to accept comfort is significantly correlated with willingness to give comfort. Both these measures are also correlated with empathy (‘*know feelings*’). Thus higher levels of empathy are associated with a greater willingness to give and to accept comfort during distress of self or other. Finally, ‘*hope to succeed*’ was not correlated with any of the other experiences; indicating that well-wishing may be a different kind of interpersonal experience compared to intimacy and empathy.

Gender effects

To assess the effects of gender on accuracy and experience, a two-factor ANOVA (observer gender x actor gender) was computed separately for perceptual accuracy, perceptual bias, and the four measures of interpersonal experience. Table 2 shows the calculated gender effects for actors and observers and their interactions.

Table 2. F-values for main effects and interaction effects of actor and observer gender on perceptual performance and interpersonal experience. Significance levels are denoted as * $p < 0.05$ and ** $p < 0.01$.

Attribute	Observer	Actor	Observer x Actor
Detection accuracy	0.097	2.319	0.285
Perceptual bias	1.150	3.868	3.458
Hope to succeed	0.509	2.798	2.504
Accept comfort	4.315*	56.71**	12.05**
Know feelings	0.912	5.837*	3.986*
Give comfort	0.064	103.2**	11.70**

There were no significant gender effects on detection accuracy. Male and female observers showed no differences in their ability to detect deception; male and female targets showed no differences in detectability; and there were no actor/observer gender interactions. Analysis of perceptual bias revealed a main effect that approached significance: the truth-bias was greater for the male actors suggesting they appeared more trustworthy than the female actors. The

interaction effect also approached significance indicating a tendency for female observers to trust the male actors more, while male observers perceived no difference in trustworthiness between the sexes.

There were no main effects or interaction effects of gender on ‘*hope to succeed*’. Male and female participants in the study did not differ in the degree to which they hoped for others’ success. Male versus female targets also did not differ in the degree to which this experience was expressed towards them.

There are significant main effects of actor gender, observer gender, and the interaction for ‘*accepting comfort*’. Female participants were more likely overall to accept comfort compared with male participants. Both sexes were more likely to accept comfort from the female actors than from the male actors. The actor/observer interaction is underpinned by a simple effect: men were significantly less likely to accept comfort from the male actors.

The significant main effect of actor gender on ‘*knowing feelings*’ indicates that female actors in the study appeared more emotionally transparent than the male actors. The significant actor/observer interaction is due largely to the female participants who found the male actors comparatively opaque and the female actors comparatively transparent. Male participants indicated no difference of emotional readability between the sexes of the actors.

The largest effects arise from the effect of actor gender with regard to ‘*giving comfort*’. Male and female participants did not differ overall on the degree to which they would give comfort to someone who is crying. However, they were significantly more likely to give comfort to a woman who is crying than to a man who is crying. Further, the actor/observer interaction is significant: Male participants indicated they were less likely to go to the male actors and more likely to go to the female actors, compared with female participants who showed a similar female bias, but to a lesser degree.

Discussion

Studies of affect and social cognition have suggested that change of affect may function as a social gauge that detects risks to interpersonal relations. In particular the sociometer has been proposed as a gauge of relational devaluation that functions by producing negative affect, namely, diminished self-esteem when relationship devaluation is detected (Leary & Downs, 1995). Recent studies of emotional intelligence and of affect and cognition (feeling and thinking) are beginning to address the functional significance of

human feelings in tasks of everyday living (see Forgas, 2001). These studies indicate that the human body (as well as the human brain) plays a more significant role than previously thought in social and ordinary cognition (e.g. Damasio, 1994). Research indicates that androids of the future are likely to require something resembling a body with human capacities and human frailties if they are to inhabit the human social world successfully. These include the capacity to express emotions through having a face; experience empathy through the capacity for fellow feeling; experience intimacy through contact and disclosure, and to know when these are permissible with respect to culture and personal boundaries.

The present study explored relationships between perceptual performance and subjective experience in a task involving interpersonal perception. Experiences of intimacy, empathy, and felicity towards others are common interpersonal responses both in established relationships and first encounters. Such positive experiences promote social activity such as affiliation and exchange by enhancing social bonds (Clark and Mills, 2004). We may assume that artificial mechanisms of the future designed to substitute human social activities must be capable of relational experiences. This would include the capacity to experience emotions on behalf of the other—the basis of pro-social and moral motivations. These develop in humans from the primitive responses of infants, for example, reactive crying, concern and helping, self-conscious displays, social referencing, and sibling relationships (Thompson, 1998). Even such basic competencies as these, if displayed by androids will help to suggest a pro-social motivation—to belong to a community, to care for its members, and to be able to suffer as we do and require our support.

Perceiving persons differs from perceiving objects by the stark contrast that persons, unlike objects, are not always what they appear. The distinction between appearance and reality is a dilemma of the social world that is not, as a rule, a concern in the objective world. It arises from the inclination for humans to self-monitor their impressions on others, and from instincts to self-enhance and belong (see Fiske, 2004). Humans deceive each other readily and manage impressions of themselves as a daily affair whether motivated by self-interest or kindness towards others (DePaulo & Kashy, 1998). The perception of persons therefore must operate in a special mode compared with the perception of objects (see Ramey, *Android Science* 2005). In perceiving a person, as well as discern sensory properties, we must decipher the veracity of

our impressions. For this we rely on feelings and subjective impressions (DePaulo et al. 2003). Sophisticated androids participating in human society must therefore be capable of deception and its detection. Design specifications include specific competencies of the face, trunk, and limbs, for example, gaze behaviour, speech register, posture control, limb movements, and a visuo-emotional system able to decipher the significance of these. A greater challenge is to equip androids to discern generic impressions of authentic versus inauthentic behaviour. People rely on impressions of pleasantness, forthcomingness, compellingness, tenseness, and naturalness, rather than specific cues, when deciphering veracity naturally (DePaulo et al. 2003). A grasp of the distinction between authentic and inauthentic experience presupposes a '*subject of a life*', who is aware of choices, and the freedoms and constraints imposed on these by social life.

A principal finding of the present study is that perceptual accuracy is not reliably associated with levels of empathy and intimacy. The finding that a truth-bias is associated with levels of comfort giving is expected: trusting people are more willing to give comfort to others in distress. There is evidence that trusting people also make better social decisions even after their trust has been betrayed (Yamagishi et al. 1999). Correlations indicate that the intimate propensities to give comfort and to receive comfort are related. Further, both these are related to the experience of empathy. To accommodate these the design of android bodies should reflect the symmetry of giving and accepting comfort and its connection with experienced empathy. Giving and receiving comfort are complementary responses at a primitive level. Young infants cannot distinguish their own distress from the distress of others, and reactive crying is believed to be a primitive empathic response (Thompson, 1998). Mirror neurones in humans and primates provide a neural bridge between actions of the self and actions of others and have been proposed as a substrate for empathy (Gallese, 2003). The mirror system may provide design specifications for social androids which require a social instinct and a capacity for fellow feeling.

How do the findings on gender inform android design considerations? There were no sex differences in perceptual performance. Thus deciphering veracity and detecting deception is a sexless activity. Notable gender effects were obtained for experiences of empathy and intimacy. Women appear to be the gatekeepers of intimacy: they are more likely to be

given comfort and to have their comforting behaviours accepted by men and women. Men particularly resist accepting comfort from other men and are more likely to give comfort to a woman than to another man. If androids are to substitute the intimacy function of humans it is likely that something equivalent to gender role differentiation will be required. Feminine or maternal design specifications are implied. The intimate android must be perceived as an emotional safe house and potential attachment figure. Studies of intimacy and disclosure in long-term couples reveal wives to be more emotionally expressive overall than husbands. During conflict sequences they express more negative affect (anger, contempt, sadness), and more positive affect continuance, compared with husbands. Husbands express more defensive and deescalation affect sequences (Carstensen et al. 2004). Studies of proto-conversation between mothers and infants indicate that attachment security is contingent on mothers' empathic responsiveness. Responsive mothers show positive affect continuance, positive affect escalation, positive startup, and negative affect deescalation. Infants of depressed mothers who do not show these tend to be anxious, insecure, and show weaker immune systems (see Braten, 1998).

Empathic Androids

Empathic androids will require something resembling a human body and a human face, in whose gaze we experience validation, and in whose touch we feel a sense of belonging. This however will not be achieved by the aggregation of evermore realistic behaviours and appearances (see Vinayagamorthy, Steed, Slater, Android Science 2005). Such displays create in the limit only a perfect simulation. However lifelike in appearance, such beings will be no substitute for living contact. The 'uncanny valley' effect—the strangeness experienced towards robots that have subtle defects in their human-like appearance (see Ishiguro, Android Science 2005), suggests a primitive distrust (or disgust) for fake persons. Such persons threaten our wellbeing, and we may have specific alarm responses for their detection. The mere possession of a human-like body, even one that can blush with 'embarrassment', avert gaze with 'sympathy', or show a 'conscience' to act fairly, is inauthentic if these do not issue from something that is a being *'for-itself'*. A being-for-itself exists for its own reasons and purposes. It is likely only such a being is capable of intelligating the reasons and purposes of others. Lindblom and Ziemke (Android Science, 2005) posit embodied *development*, rather than embodiment *per*

se, as the precursor of intentional agency. In particular, self-locomotion and mimesis allow the neonate to discover others' perspectives and intentions. Emotional sentiment towards super-toys (see Taggart, Turkle, Kidd, Android Science, 2005) is anthropomorphic projection, distinct from true relational experience. In relationship two beings regard each other as capable of disclosing a new world through each other's perspective (Ramey, Android Science 2005). Only the 'subject of a life' is capable of contributing in this way.

Finally, on the possibility of moral androids a paradox has been identified: Would the creation of a moral being be an immoral act? (see Calverley, Android Science 2005). Would such a creation demean us as human beings? The argument reminds me of the android character Rachael from *Bladerunner* created with memories of a life she never lived. Her anguish is she is not the subject of her life. It raises the question: Is the android's anguish real if her life is not? Phenomenology, however, raises the counter question: What makes our reminiscences real? Current research on eye-witness testimony corroborates a constructivist view of memory. Memory is an ongoing construction, a narrative told in the present, whose criterion of veracity is often merely that of best explanation. The phenomenological givens of lived experience are the present, 'just past', and protension (striving towards). Rachael's experience by this assessment is no less real than ordinary experience. I suggest protension is the key to this moral dilemma. Protension is the being-becoming, transcending itself, intending towards the not-yet. Thus "I am not existence but possible existence. I do not have myself, but come to myself" (Jaspers, 1967). A protending being is an authentic being. A being continually negating itself as 'just past' lives in the here and now. Going beyond the self is what makes interpersonal relationship possible. Transformational motivation identified in human relationship research is the process by which the partner sets aside self-interest for the interest of the relationship. Humans distinguish themselves by their ability to transcend self and self-interest. Sartre's enigmatic being "which is not what it is, and is what it is not" implies being free is a process without end. The android of the future that transcends itself in this way has kicked away the ladder of determinacy. As such it would qualify as a moral being.

Conclusion

Human relationships provide social bonds which allow people to achieve together what they cannot apart. Relationships transcend their parts. It has been said that in relationship one plus one equals three. The maintenance of close relationships requires not only individual competencies, but also interpersonal experiences. These ensure pro-relationship motivations such as self-sacrifice and forgiveness. These imply design issues for social androids who may substitute human roles in societies of the future. A body that intimates and empathises is most likely a body that desires and needs other bodies, whose experience is not entirely bounded by its own body image, but is capable of transcending itself, as in genuine co-experience and collective consciousness.

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