humaine

D3e

Proposal for exemplars and

work towards them: Theory

Workpackage 3 Deliverable

ist
information
society
technologies

Date: 30th November 2005

IST project contract no.	507422
Project title	**HUMAINE** **Human-Machine Interaction Network on Emotions**
Contractual date of delivery	*November 30, 2005*
Actual date of delivery	*November 30, 2005*
Deliverable number	D3e
Deliverable title	Proposal for exemplars and work towards them: Theory
Type	Report
Number of pages	49
WP contributing to the deliverable	WP 3, WP 1, WP 4, WP 5, WP 6
Task leader	WP Leader: Prof. Klaus Scherer (UNIGE)
Author(s)	*Prof. Klaus Scherer, Etienne Roesch, Dr. Tanja Bänziger, Dr. David Sander, Prof. Roddy Cowie, Dr. Brian Parkinson, Dr. Peter Goldie, Dr. Sabine Doring, Prof. Aaron Ben-Ze'ev, Dr. Marc Schröder*
EC Project Officer	Philippe Gelin

Address of lead author: **Prof. Klaus R. Scherer, Etienne Roesch**
(Please address correspondence to Etienne.Roesch@pse.unige.ch)

Geneva Emotion Research Group
Psychology Department
Université de Genève
40 Boulevard du Pont d'Arve
1205 Genève
Switzerland

Table of Contents

1   The place of this report within HUMAINE

The HUMAINE Technical Annex identifies a common pattern that is followed by most of the project's workpackages

> The measure of success will be the ability to generate a piece of work in each of the areas which exemplifies how a key problem in the area can be solved in a principled way; and which also demonstrates how work focused on that area can integrate with work focused on the other areas. We call these pieces of work *exemplars*. The exact form of an exemplar is not prespecified: it may be a working system, but it might also be a well-developed design, or a representational system, or a method for user-centred design. (p 4)

> To that end, each thematic group will work out a proposal for common action, embodied in one or more exemplars to be built during the second half of the funding period (p.16)

> The process will begin with production by each thematic group of a review of key concepts achievements and problems in its thematic area; and drawn from the review, an assessment of the key development goals in the area. This review and assessment will be circulated to the whole network for discussion and comment, aimed both at building understanding of basic issues across areas, and at identifying the choices of goal that would be most likely let the different groups achieve complementary developments. That consultation phase will provide the basis for deliverables in month 11, which describe in some detail a few alternatives that might realistically be chosen as exemplars in each area, and their linkages to issues in other thematic areas. A decision and planning period will follow, involving consultation within and between thematic areas, leading to presentations at the second plenary conference, which will describe a single exemplar that has been chosen for development in each area, and the way work on the exemplar will be divided across institutions. The remainder of the project will be absorbed in developing the chosen exemplar. (p. 21)

The consultation phase has now ended. Near-final plans were presented to the whole network at the Plenary in May 2005, and adjustments have been made accordingly.

This deliverable reports the plans that have now been set out for the remaining 25 months of the project. They are necessarily provisional, because they will be subject to two reviews (in 2006 and 2007) before they are completed.

Work has begun on several aspects of the planned program. It is also reported.

Ethical issues affect the whole of HUMAINE, but rather than repeating essentially similar points in multiple deliverables, they will be handled coherently in a single document, D0o (Science and Society).

The following persons have contributed to the work reported in the deliverable:

Prof. Klaus Scherer, Etienne Roesch, Dr. Tanja Bänziger, Dr. David Sander, Prof. Roddy Cowie, Dr. Brian Parkinson, Dr. Peter Goldie, Dr. Sabine Doring, Prof. Aaron Ben Ze'ev, and Dr. Marc Schröder.

The institutions that have contributed are: UNIGE, QUB, UOXF, KCL, HU, DFKI

2 Brief overview of WP 3 and the exemplar proposal

2.1 The field covered by Workpackage 3

As already mentioned in the Technical Annex (Section 6.2), and in more depth in the review and assessment documents for the workpackage, WP3 "Theories and Models of Emotion" is concerned about the theoretical knowledge on emotions. It has a dual role within HUMAINE:

1. *Exploring emotions*; being highly cross-disciplinary (e.g., Psychology, Cognitive Neuroscience, Ethology, Philosophy, Computer Science), WP3 aims at defining and studying emotions using available expertises. In this framework, disciplines will constrain one another, and this recurrent feedback will provide new ways of addressing emotions.

2. *Feeding the network*; WP3 is considered as a content-oriented package, in that its general mission is to support other workpackages by providing the engineer-oriented community with comments, critics and synthesis of the work already available in the Humanities.

2.2 The research objectives

The output of WP3 "Theories and Models of Emotions" will take several forms, as agreed in the TA (pp 55-56, and Section 6.2 of the TA for additional details).

Joint research activities will produce research publications that will be both available on the HUMAINE portal, and via normal research dissemination procedures (online databases) for a wider audience. This work will comprise a review of the relevant literature on the topic (along with numerous pointers to relevant literature), as well as new insights depicting the state of the art in research activities for the topic.

A major objective of WP3 consists in the clarification of fundamental conceptual issues to guide the activities of the network. Thus, beyond the dissemination of new research results, WP3 will use the portal as an insider tool to feed the community with material constructed on the basis of the numerous interactions that WP3 is having with the rest of the network. The output that will be given to the community will then take various forms, open debates on the portal, downloadable documents, pointers to literature, mechanisms to ensure the dissemination of relevant material, just to name a few.

Finally, being a content-oriented workpackage, WP3 has a major role of consulting for the rest of the community. So far, apart from organizing dedicated events (i.e., the 1st HUMAINE workshop "Theories and Models of Emotion", held in Geneva in June 2004, and the Autumn Academy in Affective Sciences, held in Geneva October 2005), WP3 has endorsed this role by taking part in all the activities that have been organized in the network (i.e., workshops, summer schools, phone conferences, or debates), as well as by answering to acute demands from individuals.

2.2.1 Main elements of the exemplar

The main goal of WP3 is to feed the network with theoretical material and bring new perspectives to the output produced by other workpackages. In order to achieve this goal, we proposed the following subgoals:

1. Gather the needs, and identify specific demands from the network. We therefore identified several aspects that need to be pursued: conceptual clarifications, theoretical clarifications, theoretical consulting on specific points of applied research.

2. Organize relevant material in such a way as to be understandable by everyone. We aim at using the various expertise available in the network to make sure that the material that is being produced will be suitable for the targeted audience.

3. Disseminate this material using the means that have been established at the beginning of the funding period (i.e., the portal, the workshops, exemplars).

2.2.2 How the subtasks link to each other

The TA defines the scope of HUMAINE as follows:

> "HUMAINE aims to lay the foundations for European development of systems that can register, model and/or influence human emotional and emotion-related states and processes – 'emotion-oriented systems'. Such systems may be central to future interfaces, but their conceptual underpinnings are not sufficiently advanced to be sure of their real potential or the best way to develop them." (TA, page 1)

In this context, the aim of WP 3 is to develop connections between the research community focused on theoretical explanations of the Psychology of emotion with the research community concerned with emotion-oriented systems. The first quarter of the funding period allowed us to spot out several aspects that need to be worked through in order to bridge these gaps (see the Proceedings of the 1st HUMAINE workshop, held in Geneva, May 2004). Not surprisingly, the areas that have been spotted out concerns terminological and theoretical issues, along with specific issues about the implication of emotions in the expressive behaviours.

As explained later in this document, and in greater details in other deliverables, three different working groups (WGs) have thus been created to tackle each of these topics. Working groups are led by key figures in those areas, and mechanisms have been created to ensure the cohesion of the material that is being spread out in the network. In addition to the fact that often individuals participate in more that one working group, the output of each working group is used by other working groups. For instance, the taxonomies that are agreed upon in the working group responsible for terminological issues is used and exploited in the working group that is concerned with the expressive part of emotional interactions.

2.2.3 How the subtasks link to other aspects of HUMAINE

The output created by WP 3 is directly mapped onto the needs for theoretical clarifications expressed by the network. Therefore, the material produced by WP 3, and then disseminated to the network, is continuously adapted to fit into the network.

3 The planned program of research

The structure of WP3 has been described thoroughly elsewhere (TA, D3d for details). The following section will use that structure to explain the main goals that we are trying to achieve, how we organized to do so, as well as the means that we plan to use, and the major milestones that we planned.

WP3 is divided into three working groups (WG). Each of these tackles a specific problematic that has been agreed upon within the network, following out first interactions. In order to divide the working force into coherent working groups, we focused on both matches, and mismatches, between theoretical foundations and practical necessities, including the pointing out of topics for which no satisfactory theoretical support, if at all, could be identified (see D3d for additional information). Each WG is led by an individual, who is responsible for the internal and external coherence of the output produced (i.e., internal management of the work, and coherence of the work within the workpackage as a whole), and is further divided into subgroups.

- **WG1 "Conceptual and terminological clarifications"** (led by Dr. David Sander) is grounded on the fact that HUMAINE is, by essence, multi-disciplinary and multi-cultural. It quickly appeared to all of us that we needed consensual agreements about the phenomenon that we study, or apply, and so far no satisfactory framework managed to encompass the needs of the network. Therefore, the main goal of WG1 is to build such a framework on the basis of the contemporary theories and the perspectives that are used both in theoretical researches, and applied methodologies.

- **WG2 "Emotion models and computational modelling"** (led by Prof. Klaus Scherer, Etienne Roesch) is derived from the fact that the study of emotion is largely dependent on the level of representation of the phenomenon that is being used. The main goal of WG2 is to provide the community with formal descriptions of the mechanisms involved in the emotional processing. It gathers the different points of view taken from nowadays theorists, including Psychology, Cognitive Neuroscience, Philosophy, Ethology, and Computer Science, and aims at creating a fruitful dialog with engineer-oriented groups regarding issues encountered during the implementation process of the theories.

- **WG3 "Communication skills"** (led by Dr. Tanja Bänziger) focuses on the assessment of labelling schemes, and the comparison between human and automatic recognition of emotion. The aim of this working group is to address a set of theoretical concerns that are traditionally faced by groups interested in either side of emotional communication (i.e., encoding, or decoding).

As discussed in other sections of this document, the output produced by each WG will take several forms. Great use will be made of the portal to disseminate working documents, drafts, and final versions of the material produced. Some of it will be published in scientific journals, and therefore will be accessible to a broader audience using traditional dissemination procedures (e.g., online databases, international conferences).

3.1 WG1 "Conceptual and terminological clarifications" (led by Dr. David Sander)

3.1.1 WG1.1 "Elaboration of operational definitions" (led by Dr. David Sander)

WG1.1 aims at defining various emotion-related categories and concepts that are commonly manipulated in the scope of the network (i.e., affects, emotions, attitudes, moods, affective personality, and affective stances), and will provide recommendations as to the specific attention to be given to each class within the network and the most appropriate contexts to study the forms of affective phenomena that are most relevant to HUMAINE's concerns.

The subject matter of WG1.1 is controversial, and its procedure reflects that. The main parties to the project have engaged in discussion at both HUMAINE plenaries and at several workshops. In the process they have developed their views, clarified differences between them, and presented them both in internal documents and in published material. The outcome of the process will not necessarily be agreement, but it will allow accessible statements of the alternatives most relevant to the computational community.

The output produced by WG1.1 will take the form of documents that will be made available on the portal. Some of these documents are already published in international outlets (Doring, 2005, see also 2003; Ben-Ze'ev & Revhon 2005; Cowie et al., 2005; Cowie, 2005), or being published (Doring, under preparation; Cowie, under preparation) .So far, WG1.1 has listed the key concepts, and the key terminologies, that require clarifications. Several documents are being finalized, and future developments include reviewing procedures, with the help of the whole network.

a) **Participants**

Individual	Affiliation	Commitment
David Sander	**UNIGE**	+++
Brian Parkinson	UOXF	+++
Roddy Cowie	QUB	+++
Etienne Roesch	UNIGE	++
Klaus Scherer	UNIGE	++
Susanne Kaiser	UNIGE	++
Tanja Bänziger	UNIGE	++
Didier Grandjean	UNIGE	++
Sabine Döring	KCL	++
Peter Goldie	KCL	++
Aaron Ben-Ze'ev	HU	++
Ruhama Goussinsky	HU	++
Shlomo Hareli	HU	++
Shay Tzafrir	HU	++
Marc Schröder	DFKI	++
Stephan Rank	ÖFAI	++

b) Main steps planned

"Emotional life: Terminological and conceptual clarifications"	Carried out by	Start / end dates
Complete first draft to philosophers in HUMAINE	QUB, KCL, HU	07/2006
Revised draft from UNIGE-GERG and others	QUB, UNIGE, ÖFAI	10/2006
Second revision available on portal, with cautionary comments if necessary	QUB	02/2007

"Philosophical point of views about emotion"	Carried out by	Start / end dates
Selection and gathering of relevant texts	KCL, UNIGE	07/2006
Publishing on the portal for open discussion	KCL, UNIGE, QUB	10/2006
Revision and publishing	KCL	02/2007

3.1.2 WG1.2 "Evaluation of the actuarial occurrence of affective phenomena (led by Prof. Roddy Cowie)

WG1.2 aims at quantifying what constitute the landscape of emotional reactions in everyday life. So far, this WG identified the methodologies that are well suited for such enterprise (see next section), and some preliminary results have been produced. Therefore, efforts will be invested into full implementation of the ongoing studies.

a) Participants

Individual	Affiliation	Commitment
Roddy Cowie	**QUB**	+++
Aaron Ben-Ze'ev	HU	++
Brigitte Krenn	ÖFAI	++
Anton Batliner	FAU	++
Laurence Devillers	LIMSI	++

b) Main steps planned

Subtasks	Carried out by	Start / end dates
Finalized design of the study	QUB	07/2006
Pilot study	QUB	12/2006
Study rationales, hypothesis, and results, available on the portal for comments	QUB	02/2007
Full study begins	QUB	10/2007

3.1.3 WG1.3 "Assessing the semantic space of affect labels across languages (led by Etienne Roesch)

WG1.3 aims at linking the operational definitions for different kinds of affective phenomena, agreed upon by the HUMAINE partners, with lay concepts and verbal labels for different affects, to allow ready transfer in both directions and determine areas of overlap and differences. Future work will involve the whole HUMAINE network in a cross-cultural study that will allow us to compare the semantic profiles of commonly used emotional terms across languages.

a) Participants

Individual	Affiliation	Commitment
Etienne Roesch	**UNIGE**	+++
Klaus Scherer	UNIGE	+++
David Sander	UNIGE	++
Tanja Bänziger	UNIGE	++
Kostas Karpouzis	ICCS	++
Brigitte Krenn	ÖFAI	++
Laurence Devillers	LIMSI	++
Elisabeth André	UA	++

b) Main steps planned

Subtask	Carried out by	Start / end dates
Completion of the piloting of the questionnaire	UNIGE	03/2006
Generalization of the questionnaire; translation into HUMAINE languages, by HUMAINE partners	UNIGE, QUB, INESC_ID/IST, LIMSI, UTWENTE, DFKI, FAU, DIST, ÖFAI, FER, KTH, ICCS, HU/TAU	
Web interface development and testing	UNIGE, DFKI	
Publication of the questionnaire on the portal	UNIGE, DFKI	
Data collection and analysis	UNIGE	
Publishing of the results	UNIGE	09/2006

3.2 WG2 "Emotion models and computational modelling" (led by Prof. Klaus Scherer, Etienne Roesch)

WG2 aims at bridging the gaps between theoretical approaches and applied approaches. Efforts are invested in fruitful dialogs between the many disciplines that are represented in the network. The first year of the funding period allowed us to identify several points that would need to be clarified. Each of these is being addressed separately in different documents that are being, and will be, circulated in the network.

In addition to acute theoretical clarifications, we will attempt to describe in a theory-free manner the different mechanisms involved in the emotional processing (see D3d for further description). Similarly, we will establish a mapping between levels of analysis as offered by different theories and models of emotion. Answering the question "what model for what purpose?", the deliverable will take the form of a short document available on the HUMAINE portal.

a) Participants

Individual	Affiliation	Commitment
Etienne Roesch	**UNIGE**	+++
Klaus Scherer	**UNIGE**	+++
Paolo Petta	ÖFAI	+++
Stephan Rank	ÖFAI	+++
Kostas Karpouzis	ICCS	+++
Lola Cañamero	UH	+++
René te Boekhorst	UH	+++
John Taylor	KCL	+++
Roddy Cowie	QUB	++
Fiorella de Rosis	BARI	++
Tanja Bänziger	UNIGE	++
Didier Grandjean	UNIGE	++
David Sander	UNIGE	++
Aaron Ben-Ze'ev	HU	++
João Dias	IST-INESC	++
Guilherme Raimundo	IST-INESC	++
Ana Paiva	IST-INESC	++
Catherine Pelachaud	Paris8	++
Jean-Claude Martin	LIMSI	++
Stacy Marsella	USC	++
Jonathan Gratch	USC	++

b) Main steps planned

Several documents will be posted on the portal for comments throughout the remaining of the funding period.

3.3 WG3 "Communication skills: labelling, annotating, recognizing emotional expressions" (led by Dr. Tanja Bänziger)

At the onset of the project, this work area has been split into two directions. Details of the planned activities in both directions (WG3.1 and WG3.2) have been provided in deliverable D3d. The many interactions within this working group has led to the refocusing of some of it, and the creation of a third working group (WG3.3) "Differences in emotion-sensitivity, individual and situational", led by Dr. Brian Parkinson. The two former directions are introduced in the following paragraphs, whilst the latter is briefly described. Links and integration of the planned activities with emergent activities of the research network are outlined.

3.3.1 WG3.1 "Labelling schemes for audio-video data" (led by Dr. Tanja Bänziger)

Work in the first direction (WG3.1) is centred on the issue of labelling (or annotating) emotional content in audio-video material. The focus is set principally on labelling (or annotating) emotions in recordings involving specific contexts with little (or no) experimental control (e.g. television interviews, talk-show settings). Within HUMAINE, a common labelling scheme is needed to allow sharing and comparison of annotated audio-video data. But there is a trade-off between this need and specific needs connected to specific data sets (or specific research questions). In consultation with the research groups involved in the network, we will propose a core set of categories (or dimensions) that should be used under any circumstances (i.e. for all data sets), as well as various, potentially usable/useful, additional categories (or dimensions), which could be used for specific data set (and specific research questions). The categories/dimensions will be defined with respect to available psychological models of emotions and should allow the description of the emotional states that are relevant to the research groups involved in the network (i.e. not only "basic emotions").

In spring 2005, members of the network constituted an "emotional representation language" group. The development of "labelling schemes" is one of several subtasks for this working group. Its further foci include developing XML tools for labelling/annotation of emotional behaviours/expressions and using "representation languages" (emotion terms, categories or dimensions) for the generation of emotional behaviours/expressions (e.g. in ECAs).

Consequently, the role of WG3.1 has been redefined. To prevent emergence of redundant activities, the activities of WG3.1 will be integrated in the activities of the "emotional representation language" group. The participation of WG3.1 to this group with larger focus will remain restricted to theoretical propositions on labelling schemes based on psychological models. Obviously, members of the "emotional representation language" group who were not involved in WG3.1 now might also contribute to the task initially set for WG3.1. Below, the list of HUMAINE members who originally committed participation to WG3.1 is represented. Members of the "emotional representation language" group are listed next to this group.

The "emotional representation language" group has initiated a collection of "emotion descriptions" available on HUMAINE's webportal (http://emotion-research.net/restricted/ wp6/emolang/descr/). This list will be extended to include further theoretical propositions and will be used as the basis for the formulation of several propositions regarding labelling schemes to be used for the annotation of different types of audio-visual recordings.

a) Participants

This task is conceived as an ongoing collaboration between members of WP3, WP5 and WP6

ORIGINAL COMMITMENT TO WG3.1			MEMBERS OF EMOTIONAL REPRESENTATION LANGUAGE GROUP	
Individual	Affiliation	Commitment	Individual	Affiliation
T. Bänziger	*UNIGE*	+++	**H. Pirker**	**OFAI**
S. Kaiser	UNIGE	+++	**B. Krenn**	**OFAI**
L. Devillers	*LIMSI*	+++	P. Petta	OFAI
E. Douglas-Cowie	QUB	+++	S. Rank	OFAI
K. Scherer	UNIGE	+++	M. Schroeder	DFKI
C. Cox	QUB	++	C. Pelachaud	PARIS 8
I. Sneddon	QUB	++	C. Peters	PARIS 8
J.-C. Martin	*LIMSI*	++	F. Burkhardt	t-systems
A. Batliner	*FAU*	++	R. Cowie	QUB
K. Karpouzis	ICCS	++		
			In this group and also in WG3.1	
			T. Bänziger	*UNIGE*
			L. Devillers	*LIMSI*
			J.-C. Martin	*LIMSI*
			A. Batliner	*FAU*

b) Main steps planned

The scope of WG3.1 has been redefined. In priority, its activities will be integrated with the activities of the "emotional representation language" group. In this context, plans for empirical work on labelling schemes have been suspended in favour of theoretical input on emotional descriptors. Upcoming steps will partly depend on the evolution of the activities in the "emotional representation language" group. We will help gathering and structure available propositions for "descriptors" that can be used to describe emotional expressions in a variety of settings.

3.3.2 WG3.2 "Assess and compare human/automatic recognition" (led by Dr. Tanja Bänziger)

Work in the second direction (WG3.2) is directed towards the comparison between human recognition of emotions (sensitivity to nonverbal expressions of emotion) and automatic recognition of emotion. A set of theoretical issues related to the decoding/recognition of emotional expressions will be addressed. Important aspects for the assessment of the performance of human decoders and/or automatic recognition systems will be identified and principles regarding those aspects will be formulated. The principal outcome (exemplar) of WG3.2 will take the form of a document outlining the major issues that have to be considered when assessing the performance of a human decoder or an automatic recognition system.

A potential for linking these theoretical considerations with empirical work has arisen in the context of a working group created around the issue of improving automatic recognition of emotions. This working group – CEICES (Combining Efforts for Improving automatic Classification of Emotional user States – under the direction of A. Batliner) – has defined its task as follows:

"The classification performance of emotional user states found in realistic, spontaneous speech is not very high, compared to the performance reported for acted speech in the literature. This might be partly due to the difficulty of providing reliable annotations, partly due to suboptimal features vectors used for classification, and partly simply to the difficulty of the task. CEICES aims at improving this state of affairs by combining the competence found at different sites that deal with this topic."

The focus of WG3.2 remains in the assessment of procedures/methods used to study recognition. Its contribution to CEICES will take the form of alternative approaches to annotated (label) the realistic expressions to be recognized by the automatic classifier(s).

a) Participants

CEICES is an initiative mostly contributing to WP4 (and includes also collaborations outside of HUMAINE)

ORIGINAL COMMITMENT TO WG3.2			MEMBERS OF CEICES	
Individual	Affiliation	Commitment	Individual	Affiliation
T. Bänziger	**UNIGE**	+++	***A. Batliner***	***FAU***
K. Scherer	UNIGE	+++	S. Steidl	FAU
K. Karpouzis	ICCS	++	L. Kessous	TAU
			N. Amir	TAU
In WG3.2 and also in CEICES			R. Gretter	ITC-IRST
A. Batliner	*FAU*	+++	D. Seppi	ITC-IRST
L. Devillers	*LIMSI*	++	*L. Devillers*	*LIMSI*
J.-C. Martin	*LIMSI*	++	R. Cowie	QUB
			B. Schuller	TUM
			T. Mueller	TUM
			K. Laskowski	CMU
			J.-C. Martin	*LIMSI*

b) Main steps planned

CEICES is using a common data bank of vocal expressions to test and compare feature extraction and automatic classification performed in different research groups. WG3.2 will contribute to this endeavour by providing alternative human classifications and/or ratings of part of the material used.

Subtask	Carried out by	Expected completion
Selection of the recordings to be rated	UNIGE	03/2006
Definition of rating scheme (dimensional and categorical ratings)	UNIGE	03/2006
Rating studies (with naïve listeners)	UNIGE	06/2006
Report on results of the rating studies	UNIGE	09/2006
Relating automatic classification(s) to human judgements	UNIGE/FAU	?

3.3.3 WG3.3. "Differences in emotion-sensitivity, individual and situational" (led by Dr. Brian Parkinson)

This new working group will take over the strong emphasis on individual variation (individual differences or "skills" in emotion recognition) that was described at length in the previous deliverable (D3d). With the full implementation of the two studies described above (WG3.1, and WG3.2), it appeared necessary to the members of the WG that a subgroup should be created in order to fulfill the interests and commitments that were expressed at the beginning of the project.

This evolution in the structure of WG3 was necessary for two reasons. First, the individual differences in emotion sensitivity are of major concerns for most of the HUMAINE network (HCI and ECA designers), and it would have been a great loss not to pursue in that direction, or to fail providing it with adequate organizational support. Second, and most importantly, some of the funding that has been granted to HUMAINE partners was devoted to this topic, including Ph.D. projects (QUB, UOXF) or ongoing studies, already presented in various HUMAINE workshops (HU).

This working group will be led by Dr. Brian Parkinson (UOXF), whose expertise in the field is internationally recognized. To date, Dr. Parkinson has been assessing the effects of video-conferencing on affect communication (Parkinson, 2004, 2005). He is interested in whether nonverbal feedback from another person modulates emotion presentations in an identical way when people interact via computer compared to face-to-face (Parkinson, & Lea, in press; Kramer, & Parkinson, 2005: see also Ben Ze'ev, 2005)

a) Participants

Individual	Affiliation	Commitment
Brian Parkinson	**UOXF**	+++
Claudia Marinetti	UOXF	+++
Tanja Bänziger	UNIGE	++
Etienne Roesch	UNIGE	++
Klaus Scherer	UNIGE	++
Roddy Cowie	QUB	++
Margaret McRorie	QUB	++
Edelle McMahon	QUB	++
Aaron Ben-Ze'ev	HU	++

b) Main steps planned

No proper schedule has been drawn yet. However, being mapped onto the work of academic Ph.D. students, different milestones will be established and entertained throughout the funding period. The work will, of course, be disseminated in the network.

3.4 Steps to ensure co-ordination

Individual leaders have been selected to ensure co-ordination, both within WP 3 and within HUMAINE. Leaders are responsible for the dissemination of the output provided by the working groups, and for the adjustments that would be required along the advancement of the project. So far, two mechanisms have been used. First, WP 3 organized major events for the network, the 1st HUMAINE workshop and the Autumn Academy in Affective Sciences, both held in Geneva. These events allowed the working groups to keep track of the needs of the network. Second, we will make extensive use of the portal to ensure the dissemination of the output produced and to gather comments about it. This mechanism has proven to be very reliable, and allowed the creation of a community-based work in progress.

3.5 Steps to ensure dissemination

As mentioned several times in this document, WP 3 will use the portal to reach individuals within the network. The portal is also well-known outside the network and we therefore hope to reach a broader audience.

Furthermore, some of the work that is being produced by WP 3 will be published in international journals, and will therefore be accessible by others using traditional dissemination mechanisms (e.g., online databases, conferences).

Finally, WP 3 maintains strong ties with international research entities (see Section 5 of this document), and some of the work that is being produced within WP 3 will also be peer reviewed by other research groups that are not part of HUMAINE but whose expertise are internationally recognized.

4   Research achievements to date

As described in previous documents, in details, WP3 "Theories and Models of Emotions" is grounded on a number of different disciplines, ranging from Psychology, and Cognitive Neuroscience, to Ethology, and Computer Sciences.

By originating fruitful dialogs between such different disciplines, WP3 aims at producing the material that is required to bridge the gaps between theory-oriented and engineering-oriented approaches.

4.1   Achievement 1: overview of the emotional life, taxonomy and actuarial assessment (WG1)

WG1.1 and WG1.2 aim at defining emotion-related categories, affect, emotion, attitudes, moods, affective personality, and affective stances, in order to provide a basis for recommendations as to the specific attention to be given to each class within the network, and the most appropriate contexts to study the forms of affective phenomena that are most relevant to HUMAINE's concerns.

In an effort to link theory and empirical research, an attempt is being made to clarify and organize the various states, processes, and behaviour patterns that people express when referring to their "emotional life". In an "Affective Computing" context, as defined by Picard (1995), it is clear that some sort of taxonomy is to be defined if one ever wants to create machines that understand, manipulate, or express emotion-laden output. The aim of this work is to define the constituents of representational systems that have traditionally been used to frame theoretical models. We will bring support to this overview of the literature by empirically testing some of the proposed taxonomies.

As noted in section 3.2.1, there has been sustained and lively debate in this area, through HUMAINE meetings and position papers, both circulated internally and published. Following on from those exchanges, a comprehensive review is being written, and more elaborated versions will be circulated within the network, as also described in section 3.1.1. of this document.

The review focuses on the concept of "emotional life", which encompasses the sum total of phenomena (i.e., states, processes, behaviour patterns, etc) whose presence would justify saying that a person is not totally unemotional. The scope of what the concept of emotional life really considers is fairly easy to test by measuring the amount of time where people somehow remain in an unemotional state. Graph 1 below shows pilot data produced by rating raw recordings from a TV project, 'Castway', which filmed people continuously for a year in a challenging environment. The material used in the experiment consisted of 9 tapes lasting about 30 minutes each, which were chosen by a member of the Castaway production team to convey the range of material that the year's filming provided. That is by no means a strictly representative sample of life (emotional and otherwise), but it seems to be less radically biased than any other large scale primary source that is available to study in that way. As such, the onus is on people who seriously dispute estimates based on it to identify better primary sources.

In each tape, a rater made continuous judgments about the emotional state of a person who was identified as the target of the rating. The rating system used three categories: unemotional; showing emotion in a strong sense; and elements of emotion, but not emotion in a strong sense. Fuller definitions of the categories are given with other definitions at the end of this section. Output indicated how close to a neighbouring category the rating was at any time, and that information was used to subdivide each of the main categories into two. The histograms show the proportion of time when the rating fell into in each subcategory. The top panel shows data for the whole set of recordings (about 4.5 hours). The lower histograms show the extremes of the sample – the left hand panel refers to the tape where the target was on the whole most emotional, and the right hand panel to the tape where the target was least emotional.
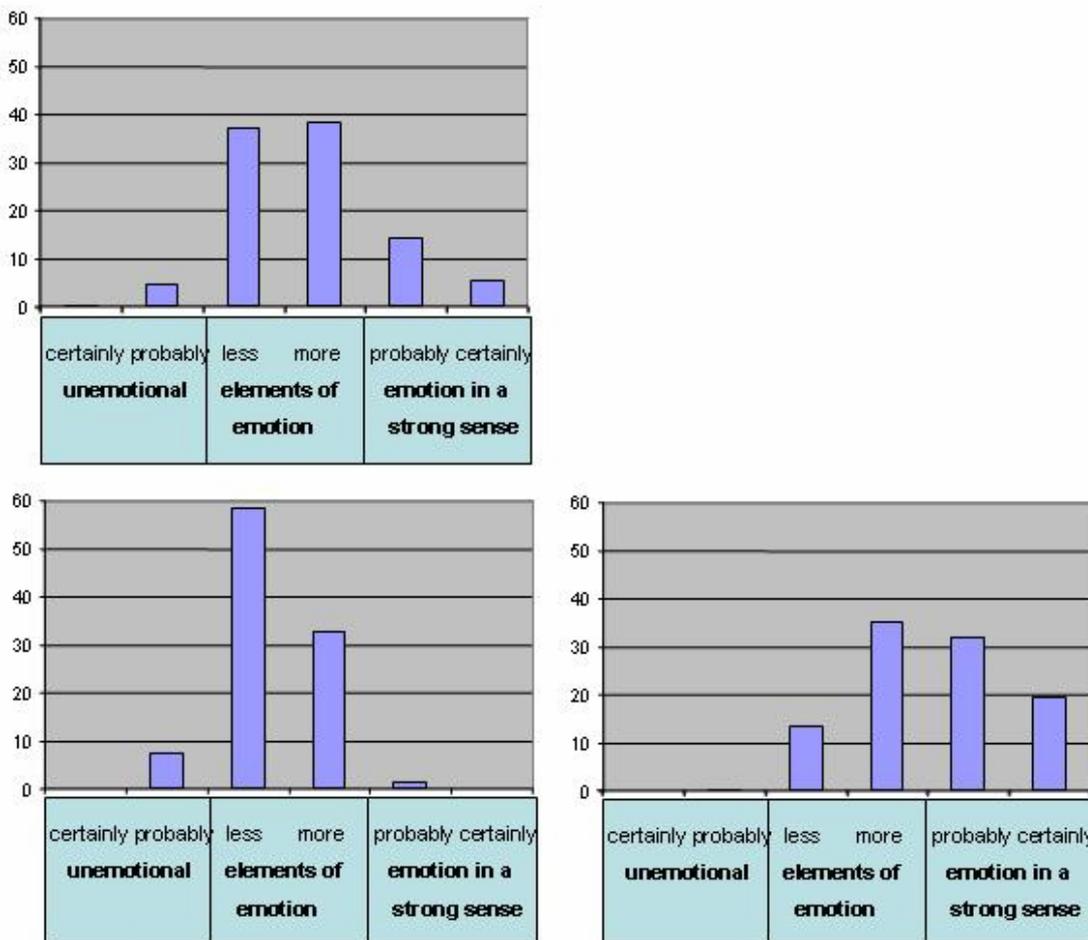
Graph 1: the proportion of time spent by a person recorded on video during the 'Castaway' TV project in each of three major categories – unemotional; emotion in a strong sense; and elements of emotion, but not emotion in a strong sense.

Clear, outright unemotionality was strikingly rare, accounting for less than 8% of the time even in the least emotional tape; and the subcategory containing completely unequivocal

instances was vanishingly rare. These findings strongly support the intuition that emotion of some sort is a pervasive feature of life. It is quite likely that there are many kinds of situation where people would be genuinely unemotional for a higher proportion of the time than these recordings showed, but exact figures are not important. The question that matters is whether something that people intuitively regard as a kind of emotionality is the norm rather than the exception, and the data strongly suggest that it is.

4.1.1 Participants

Individual	Affiliation	Commitment
David Sander	**UNIGE**	+++
Roddy Cowie	**QUB**	+++
Etienne Roesch	UNIGE	++
Klaus Scherer	UNIGE	++
Tanja Bänziger	UNIGE	++
Peter Goldie	KCL	++
Sabine Doring	KCL	++
Brian Parkinson	UOXF	++
Aarton Ben-Ze'ev	HU	++

4.1.2 Other output (demonstrations, resources, etc)

The output of this work mainly consists of working documents that are being circulated within the network (Cowie, in prep; Doring, in prep). Other documents, building on the feedback that provided the many interactions organized in the working group, have already been published in international journals (Cowie, 2005; Cowie, Douglas-Cowie, Cox, 2005; Doring, 2003, 2005).

4.1.3 Follow-up in progress

It seems clear from the data, that some sort of structure seems to bound emotional life. Various types of formal structures have been proposed, and people seem to navigate freely among different types of structures, varying in complexity, at the same time.

It is an important matter for applications like emotion-oriented computing to know how much of human life in general, and communication in particular, is likely to involve emotion in some sense. There is a real difference between setting out to let machines cope with occasional, exceptional events in human life, and setting out to address something that is inherent in most dealings with humans. The data clearly suggest that emotion in a broad sense is inherent the great majority of dealings with humans.

Therefore, further developments of this research are two-fold. First, it will include a comprehensive overview of the concept of emotional life, on the basis of previous work describing psychological categories. Second, it will include a fruitful dialog between the members of the network to ensure that the theoretical content that is being described is

coherent with the other theoretical approaches that are developed in the network, on one hand, and is suitable for direct applications by engineering-oriented groups, on the other hand.

This work will require feedback from the whole network, and will build upon the work of both WG1.1 defining terminological issues, and WG1.2 quantifying actuarial expressions of emotional life.

4.2 Achievement 2: The "Grid Study" (WG1.3)

The aim of this study is to assess cross-cultural differences in the semantic profiles that are implicitly attributed by people when they use emotional terms. The rationale for this is that emotional terms often are used in different contexts. Being so, the intrinsic meaning of an emotional term varies on the basis of who uses it, when one uses it, or where. Building upon the work of contemporary emotion researchers (Scherer,1988 ; Frijda, 1995), we constructed a questionnaire on the basis of a set of dimensions that are believed to describe the antecedents to the genesis of emotional experiences, and its consequences on the components of emotions (the appraisal component, the autonomic physiology component, the action tendency component, the expressive component, the subjective feeling component).

So far, we constructed the questionnaire (see Appendix A), and pre-tested it over a small subset of the emotional terms selected for comparison. A first version of the questionnaire has been implemented into a web-based questionnaire, to assess the feasibility of the study. This first pre-test allowed us to modify the questionnaire, and a second version of it has been used during the WP3 Summer School "Autumn Academy in Affective Sciences", held in Geneva, October 2005 (see D1f "Proceedings of the Autumn Academy in Affective Sciences"). The results are being analyzed, and the knowledge gained from it will allow us to launch the full study in the next year (see above for further details).

4.2.1 Participants

Individual	Affiliation	Commitment
Etienne Roesch	**UNIGE**	+++
Klaus Scherer	UNIGE	+++
David Sander	UNIGE	++
Tanja Bänsiger	UNIGE	++
Johnny Fontaine	Non-HUMAINE	N/A

4.2.2 Publications

An example of the questionnaire can be found in Appendix A.

4.2.3 Follow-up in progress

In order to pre-test the questionnaire, we used a small subset from the emotional terms that we selected for comparison. The terms have been selected on the basis of a two-dimensional scale crossing the dimension of Control over the dimension of Valence.

We are currently analyzing the data that has been gathered. Further steps will involve the testing of all the emotional terms.

	Negative	Positive
Low control	Anxiety	Admiration/Awe
	Boredom	Being touched
	Desperation	Compassion
	Disappointment	Feeling love
	Fear	Humility
	Guilt	Interest
	Longing	Relaxation
	Sadness	Affection
	Shame	Contentment
	Tension/Stress	Stupefaction
High control	Anger	Amusement
	Contempt	Gratitude
	Disgust	Happiness
	Dissatisfaction	Hope
	Envy	Joy
	Hatred	Lust
	Irritation	Pleasure/ Enjoyment
	Jealousy	Pride
	Frustration	Elation
	Surprise	Relief

4.3 Achievement 3: A "Design-feature" approach to emotional phenomenon (WG2)

Using a design feature approach to distinguish emotion from other affective phenomena

In the framework of the Component Process Model, emotion is defined as *an episode of interrelated, synchronized changes in the states of all or most of the five organismic*

subsystems in response to the evaluation of an external or internal stimulus event as relevant to major concerns of the organism (Scherer, 1987, 2001). Defining emotion as such allows us to suggest five types of affective phenomena that should be distinguished from emotion proper although there may be some overlap the meaning of certain words: preferences, attitudes, affective dispositions, and interpersonal stances. How can we differentially define these phenomena in comparison to emotion?

The difficulty of differentiating emotion from other types of affective phenomena is reminiscent of a similar problem in defining the specificity of language in comparison with other types of communication systems, human or animal. The anthropological linguist Charles Hockett made a pioneering effort to define elementary 13 design features of communication systems, such as semanticity, arbitrariness, or discreteness, that can be used for the profiling of different types of communication, allowing him to specify the unique nature of language (Hockett, 1960; see summary in Hauser, 1996, pp. 47-48).

It is thus proposed that we use some of the elements of the definition of emotion suggested above for such a distinction. These elements of features can be seen as equivalent to design features in the sense of Hockett. These features will now be described in detail:

Event focus. In this theoretical framework, it is suggested that emotions are generally elicited by *stimulus events (Scherer, 1987, 2001)*. This term implies that something happens to the organism that stimulates or triggers a response after having been evaluated for its significance. Often such events will consist of natural phenomena like thunderstorms or the behaviour of other people or animals that may have significance for our well-being. In other cases, one's own behaviour can be the event that elicits emotion as in the case of pride, guilt, or shame. In addition to such events that are more or less external to the organism, *internal events* are explicitly considered as emotion elicitors by the definition. These could consist of sudden neuroendocrine or physiological changes or, more typically, of memories or images that might come to our mind. These recalled or imagined representations of events can be sufficient to generate strong emotions (see also the debate between Goldie, 2004, Parkinson, 2004, and Scherer, 2004a). The need for emotions to be somehow connected to or anchored in a specific event, external or internal, rather than being free-floating, resulting from a strategic or intentional decision, or existing as a permanent feature of an individual, constitutes the event focus design feature.

Appraisal driven. A central aspect of the component process definition of emotion is that the eliciting event and its consequences must be *relevant to major concerns of the organism*. This seems rather obvious as we do not generally get emotional about things or people we do not care about. Very aptly, Frijda (1986 – ref?) talks of emotions as *relevance detectors*. Componential theories of emotion generally assume that the relevance of an event is determined by a rather complex, yet very rapidly occurring evaluation process that can occur on several levels of processing ranging from automatic and implicit to conscious conceptual or propositional evaluations (Leventhal & Scherer, 1987; van Reekum & Scherer, 1997). The component process model postulates that different emotions are produced by a sequence of cumulative stimulus evaluation or appraisal checks with emotion-specific outcome profiles (Scherer, 1984, 1993, 2001). For the purposes of design feature analysis it is suggested to distinguish between intrinsic and extrinsic appraisal. Intrinsic appraisal evaluates the feature of an object or person independently of the current needs and goals of the appraiser, based on genetic (e.g., sweet taste) or learned (e.g., bittersweet food) preferences (see Scherer, 1987, 1988). Transactional appraisal (see Lazarus, 1968, 1991) evaluates events and their consequences with respect to their conduciveness for salient needs, desires, or goals of the appraiser. The design features event focus and appraisal basis are linked, highlighting the

adaptational functions of the emotions, helping to prepare appropriate behavioural reactions to events with potentially important consequences.

Response synchronization. This design feature of the proposed emotion definition is also implied by the adaptational functions of emotion. If emotions prepare appropriate responses to events, the response patterns must correspond to the appraisal analysis of the presumed implications of the event. Given the importance of the eliciting event, which disrupts the flow of behaviour, all or most of the subsystems of the organism must contribute to response preparation. The resulting massive mobilization of resources must be coordinated, a process which can be described as *response synchronization* (Scherer, 2000; 2001). It is believed that this is in fact one of the most important design features of emotion, one that in principle can be operationalized and measured empirically.

Rapidity of change. Events, and particularly their appraisal, change rapidly, often because of new information or due to re-evaluations. As appraisal drives the patterning of the responses in the interest of adaptation, the emotional response patterning is also likely to change rapidly as a consequence. While we are in the habit of talking about "emotional states" these are rarely steady states. Rather, emotion processes are undergoing constant modification allowing rapid readjustment to changing circumstances or evaluations.

Behavioural impact. Emotions prepare adaptive action tendencies and their motivational underpinnings. In this sense they have a strong effect on emotion-consequent behaviour, often interrupting ongoing behaviour sequences and generating new goals and plans. In addition, the motor expression component of emotion has a strong impact on communication which may also have important consequences for social interaction.

Intensity. Given the importance of emotions for behavioural adaptation, one can assume the intensity of the response patterns and the corresponding emotional experience to be relatively high, suggesting that this may be an important design feature in distinguishing emotions from moods, for example.

Duration. Conversely, as emotions imply massive response mobilization and synchronization as part of specific action tendencies, their duration must be relatively short in order not to tax the resources of the organism and to allow behavioural flexibility. In contrast, low intensity moods that have little impact on behaviour can be maintained for much longer periods of time without showing adverse effects.

Types of Affect / Design Features	Intensity	Duration	Synchro-nization	Event focus	Appraisal elicitation	Rapidity of change	Behavior impact
Emotions: *angry, sad, joyful, fearful, ashamed, proud, elated, desperate*	●	•	●	●	●	●	●
Moods: *cheerful, gloomy, irritable, listless, depressed, buoyant*	●	●	•	•	•	●	•
Interpersonal stances: *distant, cold, warm, supportive, contemptuous*	●	●	•	●	•	●	●
Preferences/Attitudes: *liking, loving, hating, valuing, desiring*	●	●	•	•	•	•	●
Affect dispositions: *nervous, anxious, reckless, morose, hostile*	•	●	•	•	•	•	●

Following Hockett's example of characterizing different animal and human communication systems with the help of a set of design features, the above table shows an attempt to specify the profiles of different affective phenomena and the emotion design features described above (the table shows a revised version of the matrix first proposed in Scherer, 2000). Based on these assumptions, the following attempts to differentially define affective phenomena in distinguishing them from emotions:

1) *Preferences*. Relatively stable evaluative judgments in the sense of liking or disliking a stimulus, or preferring it or not over other objects or stimuli, should be referred to as *preferences*. By definition, stable preferences should generate intrinsic appraisal (intrinsic pleasantness check), independently of current needs or goals, although the latter might modulate the appraisal (Scherer, 1988). The affective states produced by encountering attractive or aversive stimuli (event focus) are stable, of relatively low intensity, and do not produce pronounced response synchronization. Preferences generate unspecific positive or negative feelings, with low behavioural impact except tendencies towards approach or avoidance.

2) *Attitudes*. Relatively enduring beliefs and predispositions towards specific objects or persons are generally called attitudes. Social psychologists have long identified three components of attitudes (see Breckler, 1984): a) a cognitive component (beliefs about the attitude object), an affective component (consisting mostly of differential valence), and a motivational or behavioural component (a stable action tendency with respect to the object, e.g., approach or avoidance). Attitude objects can be things, events, persons, and groups or categories of individuals. Attitudes do not need to be triggered by event appraisals although they may become more salient when encountering or thinking of the attitude object. The affective states induced by a salient attitude can be labeled by terms such as hating, valuing, or desiring. Intensity and response synchronization are generally weak and behavioural tendencies are often overridden by situational constraints. While it may seem prosaic, it is suggested to treat *love* as an interpersonal attitude with a very strong positive affect component rather than an emotion. The notion of loving someone seems to imply a long-term affective disposition rather than a brief episodic feeling, although thoughts of or the interaction with a loved person can produce strong and complex emotions, based on intrinsic

and transactional appraisal and characterized by strong response synchronization. This is an example of how more stable affect dispositions can make the occurrence of an emotion episode more likely as well as introduce specific response patterns and feeling states.

3) *Mood*. Emotion psychologists have often discussed the difference between mood and emotion (e.g., Frijda, 2000). Generally, moods are considered as diffuse affect states, characterized by a relative enduring predominance of certain types of subjective feelings that affect the experience and behaviour of a person. Moods may often without apparent cause that could be clearly linked to an event or specific appraisals. They are generally of low intensity and show little response synchronization, but may last over hours or even days. Examples are being cheerful, gloomy, listless, depressed, or buoyant.

4) *Affect dispositions*. Many stable personality traits and behaviour tendencies have a strong affective core (e.g., nervous, anxious, irritable, reckless, morose, hostile, envious, jealous). These dispositions describe the tendency of a person to experience certain moods more frequently or to be prone to react with certain types of emotions, even upon slight provocation. Nor surprisingly, certain terms like irritable or anxious can describe both affect dispositions as well as momentary moods or emotions and it is important to specify whether the respective term is used to qualify personality disposition or an episodic state. Affect dispositions also include emotional pathology; while being in a depressed mood is quite normal, being always depressed may be a sign of an affective disturbance, including a clinical syndrome of depression requiring medical attention.

5) *Interpersonal stances*. The specificity of this category is that it is characteristic of an *affective style* that spontaneously develops or is strategically employed in the interaction with a person or a group of persons, coloring the interpersonal exchange in that situation (e.g., being polite, distant, cold, warm, supportive, contemptuous). Interpersonal stances are often triggered by events, such as encountering a certain person, but they are less shaped by spontaneous appraisal than by affect dispositions, interpersonal attitudes, and, most importantly, strategic intentions. Thus, when an irritable person encounters a disliked individual there may be a somewhat higher probability of the person adopting an interpersonal stance of hostility in the interaction as compared to an agreeable person. Yet, it seems important to distinguish this affective phenomenon from other types, because of its specific instantiation in an interpersonal encounter and the intentional, strategic character that may characterize the affective style used throughout the interaction.

Adding to the above descriptions, it has recently been suggested the need to distinguish between different types of emotions: *aesthetic* emotions vs. *utilitarian* emotions (Scherer, 2004b). The latter correspond to the garden variety of emotions usually studied in emotion research such as anger, fear, joy, disgust, sadness, shame, guilt. These types of emotions can be considered utilitarian in the sense of facilitating our adaptation to events that have important consequences for our well being. Such adaptive functions are the preparation of action tendencies (fight, flight), recovery and reorientation (grief work), motivational enhancement (joy, pride), or the creation of social obligations (reparation). Because of their importance for survival and well-being, many utilitarian emotions are high-intensity emergency reactions, involving the synchronization of many organismic subsystems, as described above.

In the case of *aesthetic emotions*, the functionality for an immediate adaptation to an event that requires the appraisal of goal relevance and coping potential is absent or much less pronounced. Kant defined aesthetic experience as "interesseloses Wohlgefallen" (disinterested pleasure; Kant, 2001), highlighting the complete absence of utilitarian considerations. Thus, the aesthetic experience of a work of visual art or a piece of music is not shaped by the

appraisal of the work's ability to satisfy my bodily needs, further my current goals or plans, or corresponds to my social values. Rather, aesthetic emotions are produced by the appreciation of the intrinsic qualities of the beauty of nature, or the qualities of a work of art or an artistic performance. Examples for such aesthetic emotions are being moved or awed, full of wonder, admiration, bliss, ecstasy, fascination, harmony, rapture, solemnity.

The absence of utilitarian functions in aesthetic emotions does not mean that they are disembodied. Music and many other forms of art can be demonstrated to produce physiological and behavioural changes (Bartlett, 1999; Scherer & Zentner, 2001). However, these bodily changes are not in the service of behavioural readiness or the preparation of specific, adaptive action tendencies (Frijda, 1986). For example, the most commonly reported bodily symptoms for intense aesthetic experiences are goose pimples, shivers, tinkling on the spine, or moist eyes – all rather diffuse responses which contrast strongly with the arousal and action-oriented responses for many utilitarian emotions.

4.3.1 Participants

Individual	Affiliation	Commitment
Klaus Scherer	**UNIGE**	+++
Etienne Roesch	**UNIGE**	+++

4.3.2 Publications

The above attempt to constrain emotional phenomenon constitutes a draft for a document that is being circulated within the network. Comments and edits will be made on this basis to ensure that the theoretical content that is described in details suit the needs for theoretical explanations expressed by the network.

A finale version of this document will be made available to the network by using both the portal and others dissemination mechanisms (i.e., the HUMAINE handbook produced at the end of the funding period).

4.4 Achievement 4: Clarifications and dissemination of available theoretical approaches (WG2)

As planned in the TA, WP3 organized a summer school aimed at introducing the members of the network to the different theoretical approaches of emotions. The summer was held in Geneva from September 27th to October 5th 2005. This event has been organized in conjunction of the official opening of the National Center of Competence in Research for the Affective Sciences, and the 9th Congress of the Swiss Society of Psychology 2005.

The event gathered the major proponents of the different theories of emotion. In addition to the talks that each of them gave to the audience, a debate has been organized, during which theories were confronted.

4.4.1 Publications

Tuesday, September 27th, 2005

15:00 – 16:00   Registration

16:30 – 20:00   **Official opening ceremony of the NCCR for the Affective Sciences**

Wednesday, September 28th, 2005

08:45 – 09:00   **OPENING REMARKS**

Klaus R. Scherer (University of Geneva)

09:00 – 12:00   **COLLOQUIUM – PSYCHOPHYSIOLOGY**

Speaker: **Gary G. Berntson** (Ohio State University) – The neuroarchitecture of emotion

Chairperson: **Guido Gendolla** (University of Geneva)

14:00 – 17:00   **COLLOQUIUM - HEALTH**

Speaker: **Howard Leventhal** (Rutgers University, New Jersey) – Affect, cognition, and health

Chairperson: **Norbert Semmer** (University of Bern)

19:00 – 21:30   **DEBATE: WHAT IS AN EMOTION?**

A debate between categorical, dimensional, and componential theorists
Chairperson: **Paula M. Niedenthal** (University Blaise Pascal, Clermont-Ferrand)
Discussants: **Gary G. Berntson** (Ohio State University)
Carroll E. Izard (University of Delaware, Newark)
Howard Leventhal (Rutgers University, New Jersey)
Paula M. Niedenthal (University Blaise Pascal, Clermont-Ferrand)
Klaus R. Scherer (University of Geneva)

Thursday to Saturday, October 1st, 2005

9th Congress of the Swiss Society of Psychology 2005

"**Approaches to emotion**"

Sunday, October 2nd, 2005

13:00 – 14:30   **COMPUTATIONAL MODELLING / NEURAL NETWORKS**

John Taylor (King's College London) – Building a model of the interaction of attention & emotion in the brain

14:30 – 16:00   **AFFECTIVE NEUROSCIENCES**

Patrik Vuilleumier (University of Geneva) – Neural systems for interactions between emotion and attention

16:30 – 18:30   **ROUND TABLE**

AFFECTIVE NEUROSCIENCES (NEURAL MODELS)

Discussants: **John Taylor** (King's College London)

Patrik Vuilleumier (University of Geneva)

18:30 – 19:30   **POSTER SESSION 1**

Monday, October 3rd, 2005

09:00 – 10:30   **VOICE**

Patrick N. Juslin (Uppsala University)—Vocal affect expression: Promises and problems

11:00 – 12:30   **ELECTROENCEPHALOGRAPHY**

Luis Carretié (Universidad Autónoma de Madrid) – Event-related potentials elicited by emotional stimuli: Methodological : issues and recent findings

14:00 – 15:30   **FACIAL EXPRESSION**

Susanne Kaiser (University of Geneva) – Facial expression and emotion: Competing theoretical approaches

16:00 – 17:30   **PERIPHERAL MEASURES AND PSYCHOLOGICAL MODELS**

Anders Flykt (Mid Sweden University) – Physiological correlates of emotion

17:30 – 19:00   **VISIT TO MIRALAB (HUMAINE)**

Nadia Magnenat-Thalmann (University of Geneva)

19:30 – 22:30   **SOCIAL EVENT**

Tuesday, October 4th, 2005

09:00 – 13:00   **WORKSHOP: VOICE**

Tanja Bänziger (University of Geneva) & **Daniel Arfib** (University of Geneva) – Emotions expressed by the voice and their perception. How are they measured?

09:00 – 13:00   **WORKSHOP: ELECTROENCEPHALOGRAPHY**

Didier Grandjean (University of Geneva) & **Elise Dan Glauser** (University of Geneva) – Measures and analyses of EEG

09:00 – 13:00   **WORKSHOP: ARTIFICIAL NEURONAL NETWORKS**

Matthew Hartley (King's College London) – Introduction to ANNs

14:30 – 18.30   **WORKSHOP: FACIAL**

Susanne Kaiser (University of Geneva) & **Stéphane With** (University of Geneva) – Coding facial expressions with FACS

14:30 – 18.30   **WORKSHOP: PSYCHOPHYSIOLOGY**

Tatjana Aue (University of Geneva) – Measures and analyses of the peripheral nervous system

18:30 – 19:30   **POSTER SESSION 2**

Wednesday, October 5th, 2005

09:00 – 13:00   **WORKSHOP: FACIAL**

Susanne Kaiser (University of Geneva) & **Stéphane With** (University of Geneva) – Coding facial expressions with FACS

09:00 – 13:00   **WORKSHOP: PSYCHOPHYSIOLOGY**

Tatjana Aue (University of Geneva) – Measures and analyses of the peripheral nervous system

09:00 – 13:00   **WORKSHOP: ARTIFICIAL NEURONAL NETWORKS**

Matthew Hartley (King's College London) – Introduction to ANNs

14:30 – 18.30   **WORKSHOP: VOICE**

> **Tanja Bänziger** (University of Geneva) & **Daniel Arfib** (University of Geneva) – Emotions expressed by the voice and their perception. How are they measured?

14:30 – 18.30   **WORKSHOP: ELECTROENCEPHALOGRAPHY**

> **Didier Grandjean** (University of Geneva) & **Elise Dan Glauser** (University of Geneva) – Measures and analyses of EEG

4.4.2 Follow-up in progress

The proceedings of the Autumn Academy in the Affective Sciences (D1e) will be posted on the portal, including the powerpoint presentations of the speakers.

4.5 Achievement 5: Contribution to dissemination efforts of available material within the network: The bibliography tool and the Toolbox (WG2)

WG2 took part in the elaboration of two tools, both implemented on the portal and therefore described in further details in other deliverables. The "bibliography tool" is a tool that allows the dissemination of relevant literature on the portal. In addition to the publications for each of the members of the network, it contains pointers to the literature that is relevant to the network.

The toolbox (see D3b for additional information) aims at aims at providing the HUMAINE community with a set of standard tools. Those tools include measurements instruments, methods and models that are commonly referred to by the research community. It does not intend to be an exhaustive list; rather it should remain focused on the fundamental working models that are specifically adapted to the aims of the network and the concerns that are expressed in its framework.

As specified in the Technical Annex, the toolbox will be made available to the broad public who access the portal. For each of the tools available, descriptions, comments, examples, and articles, will be made available via a section of the portal. For the tools that require it, the download process will include an open-license agreement act by which each user agree to provide the community with feedback information, such as results and comments. This explicit agreement is made in accordance with the ethic policy that has been agreed upon within the community.

4.5.1 Participants

Individual	Affiliation	Commitment
Etienne Roesch	UNIGE	+++
Marc Schröder (coordinator of the portal)	DFKI	+++

4.5.2 Follow-up in progress

The bibliography toolbox is already available on the portal. The toolbox is still in the test phase, and should be available to the network by March 2006.

5 Conclusion

5.1 Obstacles encountered or foreseen

One of the obvious obstacles that WP 3 is sometimes faced with is the difference of perspectives that multi-disciplinary dialogs bring together. It is fairly easy to spot the differences of interpretation over the theoretical material that is being manipulated, however the task of creating a real dialog between different cultures is harder, and we often encounter the need to spend more time than expected framing things in suitable ways.

Nevertheless, the framework provided by HUMAINE offers great tools to overcome those difficulties. The visibility of the portal, for instance, provides a sound place for such inter-disciplinary dialogs.

5.2 Evidence of esteem and relation to the state of the art

WP3 and HUMAINE, on a broader scale, have strong ties with one of the most cutting edge research center in Affective Sciences, as Geneva has recently been awarded a National Competence Center for Research in Affective Sciences, bringing to the HUMAINE community the most up-to-date insights in theoretical research on emotions.

Science often explains human behaviour as resulting from rational decision making. But in recent years a paradigm shift has occurred, with increasing evidence for the influence of emotional factors on judgment and behaviour—not only in the world of science but also in politics and economics. For example, in economics, previously a bastion of rational models of behaviour, Nobel Prizes are being awarded to researchers who study the role of emotional factors in judgment, decision making, cooperation and competition. Cognitive scientists are discovering the importance of "hot cognitions". Scholars in law are examining the conditions under which sanctions are experienced as fair and just. Historians are analyzing affective frames of mind typical of earlier civilizations. Engineers are attempting to endow computers with a certain amount of emotional competence. And psychologists and neurologists are finally unraveling the architecture of emotion. The NCCR Affective Sciences is at the cutting edge of this "affective revolution".

The NCCR Affective Sciences is one of the first interdisciplinary research networks worldwide to study emotions in such a comprehensive fashion. Research on the psychobiological mechanisms of emotion will help to improve physical and psychological health and to foster well-being in the workplace and the family. Because emotions play a central role in social relationships and groups; the social stability of modern societies depends upon how well people are able to deal with their feelings. The results of the research in the NCCR can help to further these social functions.

The NCCR is centred at the University of Geneva and directed by Prof. Klaus Scherer, head of the Geneva Emotion Research Group. NCCR members represent the fields of anthropology, history, neurology, philosophy, psychology, law, religion and economics at five different Swiss universities. Over a period of up to 10 years, twelve individual projects will conduct research into how feelings are produced and perceived, how they are controlled, and what social functions they serve; jointly developing and applying advanced methods and instruments. Researchers will synthesize their findings along three major axes cutting across all projects: Pro and anti-social behaviour (violence), gender differences, and emotional

development throughout the life span. In collaboration with partner institutions in politics, business, and health care, the NCCR will emphasize the applications of research results.

6 References

Bartlett, D.L. (1999). Physiological responses to music and sound stimuli. In D.A. Hodges (Ed.), *Handbook of music psychology* (2nd ed, pp.343-385). San Antonio: IMR.

Ben Ze'ev, A 2005 "Detattachment: The Unique Nature of Online Romantic Relationships," in Y. Amichai-Hamburger (Ed.), *The Social Net: The Social Psychology of the Internet.* Oxford: Oxford University Press, 2005, pp. 115-138.

Ben-Ze'ev, A. and Revhon, N., (2004). "Emotional Complexity in Everyday Life," *Social Science Information*, *43*, 581-589.

Breckler, S. J. (1984). Empirical validation of affect, behavior, and cognition as distinct components of attitude. *Journal of Personality and Social Psychology , 47 ,* 1191-1205.

Cowie, R. (2005). What are people doing when they assign everyday emotion terms?. Psychological Inquiry, 16(1), pp 11-48.

Cowie, R. (under preparation). Towards an intuitive overview of emotional life.

Cowie, R, Douglas-Cowie, E., Cox, C. (2005) Beyond emotion archetypes: databases for emotion modelling using neural networks. Neural Networks, 18, pp 371-88.

Doring, S. (2003) Explaining Action by Emotion. The Philosophical Quarterly, 53, pp. 214-30.

Doring S. (2005) Die Renaissance des Gefühls in der Gegenwartsphilosophie. Information Philosophie, 4, pp. 1-13.

Doring S. (submitted for publication). Emotions and the limits of Consequentialism.

Doring S. (submitted for publication). Explaining action by emotion.

Frijda, N. H. (1986). *The emotions.* Cambridge, UK: Cambridge University Press.

Frijda, N. H., Markam, S., Sato, K., & Wiers, R. (1995). Emotion and emotion words. In J. A. Russell, J-M. Fernández-Dols, A. S. R. Manstead, & Wellenkamp (Eds.), Everyday conceptions of emotion (pp. 121-144). Dordrecht : Kluwer.

Frijda, N. H. (2000). The psychologist´s point of view. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of emotions*, 2nd edition (pp. 59 – 74). New York: Guilford.

Goldie, P. (2004). The life of the mind: commentary on "Emotions in everyday life". *Social Science Information, 43*, 591-598.

Hauser, M. D., (1996). *The evolution of communication*. Cambridge, Mass: The MIT Press.

Hockett, C. F. (1960). The origin of speech. *Scientific American 203: 88-96.* Reprinted in *Human communication: language and its psychobiological bases: readings from Scientific American.* San Francisco: W. H. Freeman , pp. 5-12.

Kant, I. (2001). *Kritik der Urteilskraft*. Hamburg: Meiner.

Kramer, R., & Parkinson, B. (2005). Generalisation of mere exposure to faces viewed from different horizontal angles. Social Cognition, 22, 125-136.

Lazarus, R. S. (1968). Emotions and adaptation: Conceptual and empirical relations. In: W. J. Arnold (Ed.), *Nebraska Symposium on Motivation* (Vol. 16, pp. 175-270). Lincoln, NE: University of Nebraska Press.

Lazarus, R.S. (1991). *Emotion and adaptation*. New York: Oxford University Press

Leventhal, H., & Scherer, K. R. (1987). The relationship of emotion to cognition: A functional approach to a semantic controversy. *Cognition and Emotion*, *1*, 3-28.

Parkinson, B. (2004). Auditing emotions: What should we count? Social Science Information, 43, 633-645.

Parkinson, B. (2005). Do facial movements express emotions or communicate motives? Personality and Social Psychology Review, 9, 278-311.

Parkinson, B., Fischer, A., & Manstead, A. S. R. (2005). Emotion in social relations: Cultural, group, and interpersonal processes. Philadelphia, PA: Psychology Press.

Parkinson, B., & Lea, M. F. (in press). Video-linking emotions. In A. Kappas (Ed). Emotions across the internet. Cambridge: Cambridge University Press.

Parkinson, B. What makes different emotions different? Anger and embarrassment as relational modes. (Aug 2005) Invited plenary presentation at conference on "Emotion, other and the self," Abo Akademi University, Finland. (Published in conference proceedings.)

Parkinson, B. (Jul 2005) Blame and relationship repair: Does feeling guilty require guilty thoughts? Paper presented at the 14th meeting of the European Association of Experimental Social Psychology, Wuerzburg, Germany.

Parkinson, B. (Jul 2005) Emotion and relation alignment at work. Invited contribution to workshop on "emotion in organizations" Rotterdam, The Netherlands.

Scherer, K. R. (1984). On the nature and function of emotion: A component process approach. In K. R. Scherer & P. Ekman (Eds.), *Approaches to emotion* (pp. 293-317). Hillsdale, NJ: Erlbaum.

Scherer, K. R. (1987). Toward a dynamic theory of emotion: The component process model of affective states. *Geneva Studies in Emotion and Communication, 1,* 1-98. Retrieved July 3, 2002, from http://www.unige.ch/fapse/emotion/genstudies/genstudies.html

Scherer, K. R. (1988). Criteria for emotion-antecedent appraisal: A review. In V. Hamilton, G.H. Bower, & N.H. Frijda (Eds.). *Cognitive perspectives on emotion and motivation.* (pp. 89-126). Dordrecht: Kluwer.

Scherer, K. R. (1994). Toward a concept of "modal emotions". In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 25-31). New York/Oxford: Oxford University Press.

Scherer, K. R. (2000). Emotions as episodes of subsystem synchronization driven by nonlinear appraisal processes. In M. D. Lewis & I. Granic (Eds.) *Emotion, development, and self-organization: Dynamic systems approaches to emotional development* (pp. 70-99). New York/Cambridge: Cambridge University Press.

Scherer, K. R. (2001). Appraisal considered as a process of multi-level sequential checking. In K. R. Scherer, A. Schorr, & T. Johnstone (Eds.). *Appraisal processes in emotion: Theory, Methods, Research* (pp. 92-120). New York and Oxford: Oxford University Press.

Scherer, K. R. (2004). Ways to study the nature and frequency of our daily emotions: Reply to the commentaries on "Emotions in everyday life". *Social Science Information, 43(4),* 667-689. (a)

Scherer, K. R. (2004). Which emotions can be induced by music? What are the underlying mechanisms? And how can we measure them? *Journal of New Music Research, 33(3),* 239-251. (b)

Scherer, K. R. & Zentner, K. R. (2001). Emotional effects of music: production rules. In P. N. Juslin & J. A. Sloboda (Eds) *Music and emotion: Theory and research* (pp. 361-392). Oxford: Oxford University Press.

Scherer, K. R., Schorr, A. & Johnstone, T. (Eds.). (2001). *Appraisal processes in emotion: Theory, Methods, Research*. New York and Oxford: Oxford University Press.

van Reekum, C. M. & Scherer, K. R. (1997). Levels of processing for emotion-antecedent appraisal. In: G. Matthews (Ed.), *Cognitive Science Perspectives on Personality and Emotion*. (pp. 259-300). Amsterdam: Elsevier Science.

7 Appendix

Appendix A. The "Grid Study"

Assessing the semantic spaces
of affect labels across languages

Autumn Academy in Affective Sciences
September 27th – October 5th, 2005 – Geneva, Switzerland

The following is the piloting of a study meant to collect the semantic profiles of everyday emotion words.

By asking you to fill in this questionnaire, we are hoping to draw the semantic profiles of the people who have some literacy in the emotion theories, and to gather your comments and feedback about this study. This document has been structured in such a way as to allow you to comment any part of the questionnaire. Please do not hesitate to give us feedback, should it remain anonymous or not.

Given the multicultural setting of this particular event, we ask you to answer the questionnaire in English, knowing that it might not be your mother language. Please refer to a member of the staff if you are not sure about the meaning of the words you are asked to define. You will then be assigned to different emotion words.

We are interested in your particular views about each of these words, and therefore we would be grateful if you did answer the questionnaire without referring to other attendees.

Answering this questionnaire should not be too long of an exercise. However, should you need more time, you can take the questionnaire home and send it back at the following address (i.e., remember that you have a couple of hours to kill before arriving home):

Roesch Etienne (Office 5137)
Geneva Emotion Research Group
University of Geneva
40, Boulevard du Pont d'Arve
1205 Genève
SWITZERLAND

Once filled in, hand in the questionnaire to a member of the staff, any time during the event.

Finally, if you are interested in bringing a copy of the questionnaire with you but still want to hand it in, feel free to ask a member of the staff to provide you with extra copies.

We thank you in advance for your time and cooperation.

Roesch Etienne, Univ. Geneva, Switzerland
Fontaine Johnny, Univ. Ghent, Belgium
Scherer Klaus, Univ. Geneva, Switzerland

Instructions

Around the world, people use words to describe their ongoing or past emotional experiences. By using a single emotion word, people can convey a lot of information. They can refer to their interpretation of the situation that caused the emotional experience, to the ensuing bodily symptoms, to the way they expressed this emotional experience, to the way they wanted to react to the situation, or to their actual feelings.

In the present study, we would like to compare cultural groups on the basis of the information that can be inferred when persons use emotion words to describe their emotional experience. In other words, we are interested in understanding the *explicit and implicit meanings* of emotion words across cultures.

In the following, we would like to ask you to define the meaning of four different emotion words, as commonly used in your cultural group, according to a set of emotion features. These features are grouped in the following categories:

• Evaluation – features regarding the person's evaluation or appraisal of the event, conscious or not.

• Physiological symptoms – features regarding the bodily symptoms that tend to occur during the ensuing emotional state.

• Expressions – features regarding the expressions generally shown during the emotional state.

• Action tendencies – features regarding behavioral response tendencies generated during the emotional state.

• Subjective feeling – features regarding the subjective experience that characterizes the emotional state.

• Cultural qualifiers – features regarding cultural specificities about the emotional state.

We would like you to focus as much as possible on the meaning of each of the four emotion words in your cultural group. Please rate *the likelihood with which each emotion feature can be inferred when each emotion word is used in your cultural group to describe an emotional experience.*

For each feature, you can use the following nine-point response scale to indicate the likelihood that the emotion feature can be inferred when a person in your cultural group uses a specific emotion word to describe her or his emotional experience:

> 1 Extremely unlikely
>
> 2
>
> 3
>
> 4
>
> 5 Nor unlikely, neither likely
>
> 6
>
> 7
>
> 8
>
> 9 Extremely likely

We thank you for your participation.

The four emotion words we ask you to define are the following.

Please give a direct translation of them into your mother language, along with a short definition.

Your mother language is:

- "Admiration":

- "Affection":

- "Anger":

- "Irritation":

Category: Evaluation

In the following section, you will be presented with features regarding the evaluation or appraisal (conscious or not), of the situation that led to the emotional state.

1 extremely unlikely	2	3	4	5 neither likely nor unlikely	6	7	8	9 extremely likely

If a person in your cultural group uses the following emotion words
to describe an emotional experience, how likely is it that the person experienced an event

	"Admiration"	"Affection"	"Anger"	"Irritation"
1. … that occurred suddenly?	☐	☐	☐	☐
2. … that was familiar?	☐	☐	☐	☐
3. … that was predictable?	☐	☐	☐	☐
4. … that was in itself pleasant?	☐	☐	☐	☐
5. … that was in itself unpleasant?	☐	☐	☐	☐
6. … that was important and relevant, for the person's goals, or needs?	☐	☐	☐	☐
7. … that was caused by chance, or natural causes?	☐	☐	☐	☐
8. … that was caused by the person's own behavior?	☐	☐	☐	☐
9. … that was caused by somebody else's behavior?	☐	☐	☐	☐
10. … that was caused intentionally?	☐	☐	☐	☐
11. … of which the consequences were predictable?	☐	☐	☐	☐
12. … of which the occurrence at that moment was unexpected?	☐	☐	☐	☐
13. … of which the consequences were positive, desirable (i.e., to achieve a given goal)?	☐	☐	☐	☐
14. … of which the consequences were negative, undesirable (i.e., to achieve a given goal)?	☐	☐	☐	☐
15. … that required an immediate response?	☐	☐	☐	☐
16. … of which the consequences were still avoidable, or modifiable?	☐	☐	☐	☐
17. … for which the person would have enough resources to avoid or modify its consequences? (i.e., through her or his own power, or helped by others)	☐	☐	☐	☐
18. … with such consequences that the person would still be able to live with it and adjust to it?	☐	☐	☐	☐
19. … that was inconsistent or incongruent with the image that the person had of her/himself?	☐	☐	☐	☐
20. … that violated laws or socially accepted norms?	☐	☐	☐	☐

Category: Bodily symptoms

In the following section, you will be presented with features regarding the bodily symptoms that can occur during the emotional experiences.

1 extremely unlikely	2	3	4	5 neither likely nor unlikely	6	7	8	9 extremely likely

If a person in your cultural group uses the following emotion words
to describe an emotional experience, how likely is it that the person

	"Admiration"	"Affection"	"Anger"	"Irritation"
21. … felt shivers (in the neck, or chest)?	☐	☐	☐	☐
22. … felt weak limbs?	☐	☐	☐	☐
23. … got pale?	☐	☐	☐	☐
24. … had the feeling of a lump in throat?	☐	☐	☐	☐
25. … had stomach troubles?	☐	☐	☐	☐
26. … felt her or his heartbeat slowing down?	☐	☐	☐	☐
27. … felt her or his heartbeat getting faster?	☐	☐	☐	☐
28. … felt her or his muscles relaxing (whole body) ?	☐	☐	☐	☐
29. … felt her or his muscles tensing (whole body) ?	☐	☐	☐	☐
30. … felt her or his breathing slowing down?	☐	☐	☐	☐
31. … felt her or his breathing getting faster?	☐	☐	☐	☐
32. … felt warm (whole body) ?	☐	☐	☐	☐
33. … perspired, or had moist hands?	☐	☐	☐	☐
34. … sweated (whole body) ?	☐	☐	☐	☐
35. … felt hot (puff of heat, cheeks or chest) ?	☐	☐	☐	☐
36. … blushed?	☐	☐	☐	☐
37. … felt cold (whole body)?	☐	☐	☐	☐
38. … had no bodily symptoms at all?	☐	☐	☐	☐

Category: Expression

In the following section, you will be presented with features regarding the expressions that can be shown during emotional experiences.

1 extremely unlikely	2	3	4	5 neither likely nor unlikely	6	7	8	9 extremely likely

If a person in your cultural group uses the following emotion words
to describe an emotional experience, how likely is it that the person

	"Admiration"	"Affection"	"Anger"	"Irritation"
39. … smiled?	☐	☐	☐	☐
40. … had the jaw drop?	☐	☐	☐	☐
41. … pressed lips together?	☐	☐	☐	☐
42. … had eyebrows go up?	☐	☐	☐	☐
43. … frowned?	☐	☐	☐	☐
44. … closed her or his eyes?	☐	☐	☐	☐
45. … opened her or his eyes widely?	☐	☐	☐	☐
46. … showed tears?	☐	☐	☐	☐
47. … did not show any changes in her or his face?	☐	☐	☐	☐
48. … produced abrupt body movements?	☐	☐	☐	☐
49. … moved toward people or things?	☐	☐	☐	☐
50. … withdrew from people or things?	☐	☐	☐	☐
51. … moved against people or things?	☐	☐	☐	☐
52. … did not show any changes in gestures or movements?	☐	☐	☐	☐
53. … increased the volume of her or his voice?	☐	☐	☐	☐
54. … decreased the volume of her or his voice?	☐	☐	☐	☐
55. … had a trembling voice?	☐	☐	☐	☐
56. … had an assertive voice?	☐	☐	☐	☐
57. … fell silent?	☐	☐	☐	☐
58. … produced a short utterance?	☐	☐	☐	☐
59. … produced a long utterance?	☐	☐	☐	☐
60. … changed the melody of her or his speech?	☐	☐	☐	☐
61. … produced speech disturbances?	☐	☐	☐	☐

1	2	3	4	5	6	7	8	9
extremely unlikely				neither likely nor unlikely				extremely likely

	"Admiration"	"Affection"	"Anger"	"Irritation"
62. … spoke faster?	☐	☐	☐	☐
63. … spoke slower?	☐	☐	☐	☐
64. … did not show any changes in her or his vocal expression?	☐	☐	☐	☐

Category: Action tendencies

In the following section, you will be presented with criteria regarding behavioral response tendencies that can be generated during an emotional experience.

If a person in your cultural group uses the following emotion words to describe an emotional experience, how likely is it that the person	"Admiration"	"Affection"	"Anger"	"Irritation"
65. … wanted to go on with what he or she was doing?	☐	☐	☐	☐
66. … wanted the ongoing situation to last or be repeated?	☐	☐	☐	☐
67. … felt the urge to stop what he or she was doing?	☐	☐	☐	☐
68. … wanted to undo what was happening?	☐	☐	☐	☐
69. … felt inhibited or blocked?	☐	☐	☐	☐
70. … wanted to be in command of others?	☐	☐	☐	☐
71. … wanted to be in control of the situation?	☐	☐	☐	☐
72. … wanted to take initiative her-himself?	☐	☐	☐	☐
73. … wanted to comply to someone else's wishes?	☐	☐	☐	☐
74. … wanted to hand over the initiative to someone else?	☐	☐	☐	☐
75. … wanted to submit to the situation as it comes?	☐	☐	☐	☐
76. … wanted someone to be there to provide help or support?	☐	☐	☐	☐
77. … felt an urge to be active, to do something, anything?	☐	☐	☐	☐
78. … wanted to move?	☐	☐	☐	☐
79. … felt an urge to be attentive to what is going on?	☐	☐	☐	☐
80. … lacked the motivation to do anything?	☐	☐	☐	☐
81. … wanted to do nothing?	☐	☐	☐	☐

1 extremely unlikely	2	3	4	5 neither likely nor unlikely	6	7	8	9 extremely likely

	"Admiration"	"Affection"	"Anger"	"Irritation"
82. … lacked the motivation to pay attention to what was going on?	☐	☐	☐	☐
83. … wanted to flee?	☐	☐	☐	☐
84. … wanted to keep or push things away?	☐	☐	☐	☐
85. … wanted to prevent or stop sensory contact (e.g., seeing, hearing, smelling or touching) ?	☐	☐	☐	☐
86. … wanted to disappear or hide from others?	☐	☐	☐	☐
87. … wanted to withdraw into her-himself?	☐	☐	☐	☐
88. … wanted to be hurt as little as possible?	☐	☐	☐	☐
89. … wanted to make up for it for what she or he had done?	☐	☐	☐	☐
90. … wanted to move against people or things?	☐	☐	☐	☐
91. … wanted to do damage, hit, or say something that hurts?	☐	☐	☐	☐
92. … wanted to break contact with others?	☐	☐	☐	☐
93. … wanted to oppose?	☐	☐	☐	☐
94. … wanted to show off?	☐	☐	☐	☐
95. … wanted to be seen, to be in the center of attention?	☐	☐	☐	☐
96. … wanted to tackle the situation?	☐	☐	☐	☐
97. … wanted to overcome an obstacle?	☐	☐	☐	☐
98. … wanted to take care of another person or cause?	☐	☐	☐	☐
99. … wanted to be near or close to people or things?	☐	☐	☐	☐
100. … wanted to be tender, sweet and kind?	☐	☐	☐	☐
101. … wanted to run away in whatever direction?	☐	☐	☐	☐
102. … wanted to destroy whatever was close?	☐	☐	☐	☐
103. … wanted to act, whatever action it might be?	☐	☐	☐	☐
104. … wanted to sing and dance?	☐	☐	☐	☐
105. … wanted to get totally absorbed in the situation?	☐	☐	☐	☐

Category: Subjective feeling

In the following section, you will be presented with features regarding the subjective experience inferred by the emotion words.

1 extremely unlikely	2	3	4	5 neither likely nor unlikely	6	7	8	9 extremely likely

If a person in your cultural group uses the following emotion words
to describe an emotional experience, how likely is it that the person

	"Admiration"	"Affection"	"Anger"	"Irritation"
106. … was in an intense emotional state?	☐	☐	☐	☐
107. … experienced the emotional state for a long time?	☐	☐	☐	☐
108. … felt excited?	☐	☐	☐	☐
109. … felt strong?	☐	☐	☐	☐
110. … felt positive?	☐	☐	☐	☐
111. … felt negative?	☐	☐	☐	☐
112. … felt weak?	☐	☐	☐	☐
113. … felt relaxed?	☐	☐	☐	☐
114. … felt dominant?	☐	☐	☐	☐
115. … felt submissive?	☐	☐	☐	☐

Category: Cultural qualifiers

In the following section, you will be presented with features regarding certain aspects that can be specific to your cultural group.

	"Admiration"	"Affection"	"Anger"	"Irritation"
116. How frequently is this state generally experienced in your society? (1, very rare – 9, very frequent)	☐	☐	☐	☐
To what extent is it socially accepted to …				
117. … experience this emotional state in your society? (1, not accepted – 9, accepted)	☐	☐	☐	☐
118. … display signs of this emotional state in your society? (1, not accepted – 9, accepted)	☐	☐	☐	☐

Personal information

To be able to compare the results across cultures and languages, we need some background information. Thank you for answering the following questions.

119. Sex: Male   /   Female

120. How old are you?

121. Where were you born?

122. How many brothers and sisters do you have?

123. Where did you spend most of your life?

124. Did you live in   a town   /   a city

125. Where do you live now?

126. Do you live in   a town   /   a city

127. What are the nationalities of your parents?

128. How often do you travel abroad?   Never   /   1-2/year   /   3-5/year   /   More

129. How many languages do you speak regularly?

130. What is the language you spoke at home during childhood?

131. What is the first language you speak now (spoken and written)?

132. What is the second language you speak now (spoken and written)?

133. What is the highest academic degree you received so far?   None   /   High-school degree   /   Bachelor   /   Master   /   Doctorate

134. How long did it take to answer this questionnaire?