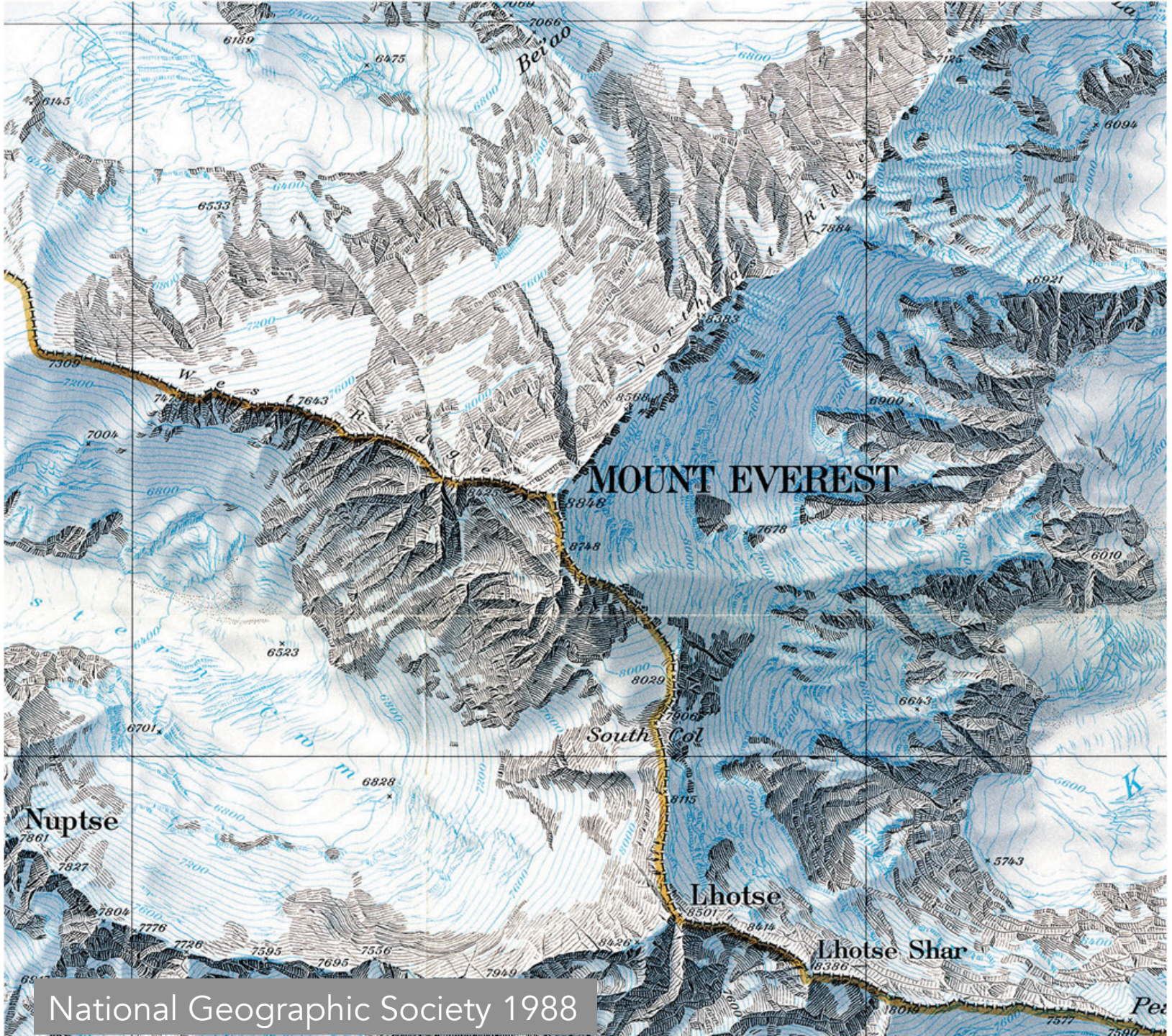
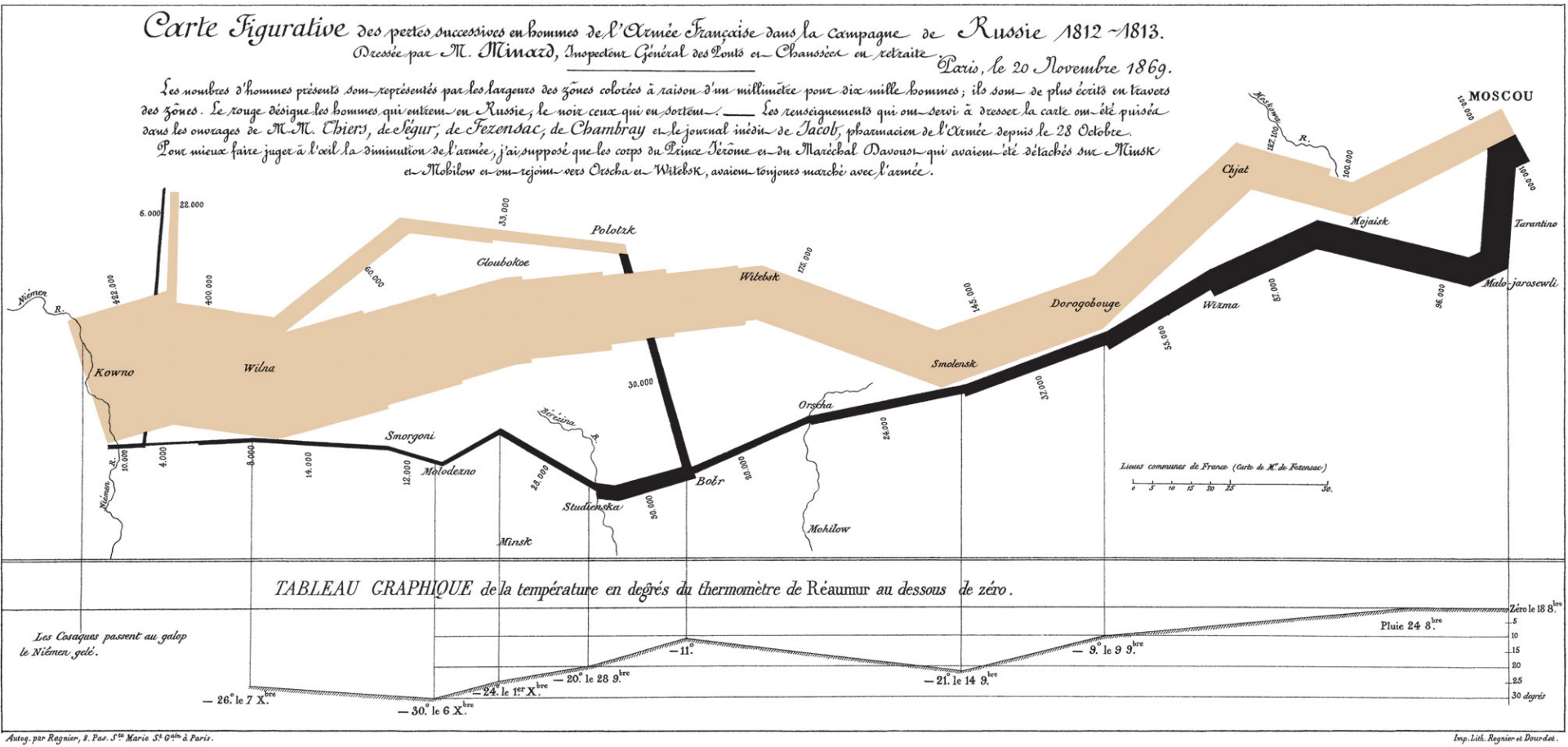
Emotional cartographies: understanding humans' experiences with maps

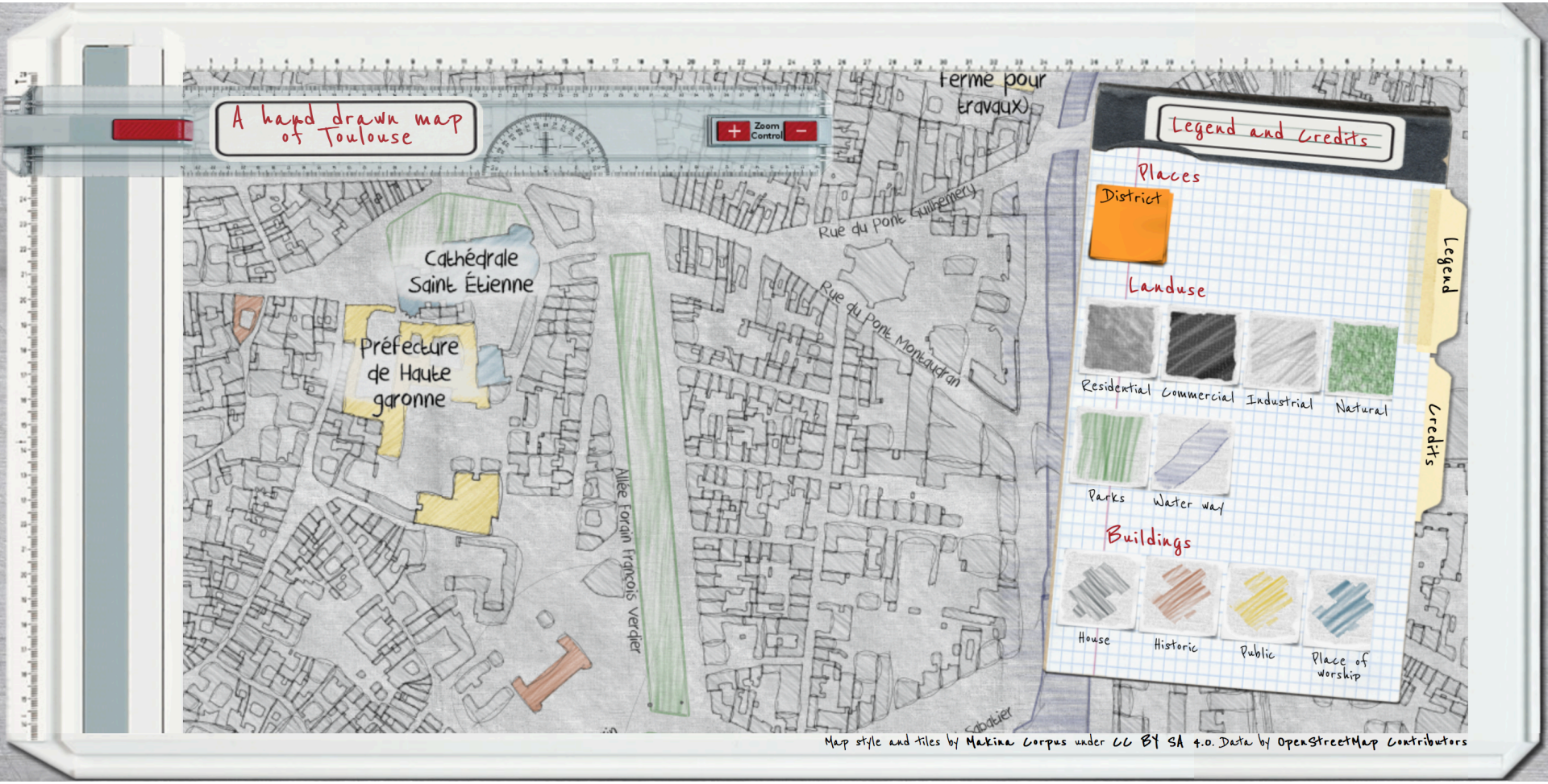
Amy L. Griffin
UNSW Canberra
25 November 2014



National Geographic Society 1988


Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.
Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite.
Paris, le 20 Novembre 1869.
Les nombres d'hommes présents sont représentés par les largeurs des zônes colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zônes. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. — Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M.M. Thiers, de Ségur, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.
Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davoust qui avaient été détachés sur Minsk et Mobilow et ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.
Niémen R.
Kowno
Wilna
Smorgoni
Minsk
Molodezno
Studienska
Bobr
Polotzk
Gloubokoe
Witebsk
Orscha
Mohilow
Smolensk
Dorogobouge
Wixma
Chjat
Mojaisk
Malo-jarosewli
MOSCOU
Tarantino
Kostkowo R.
Bérézina R.
Lieues communes de France (Carte de M.r de Fezensac)
TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.
Les Cosaques passent au galop le Niémen gelé.
— 26.° le 7 X.bre
— 30.° le 6 X.bre
— 24.° le 1.er X.bre
— 20.° le 28 9.bre
— 11.°
— 21. le 14 9.bre
— 9.° le 9 9.bre
Pluie 24 8.bre
Zéro le 18 8.bre
Autog. par Regnier, 8. Pas. S.te Marie S.t Gain à Paris.
Imp. Lith. Regnier et Dourdet.

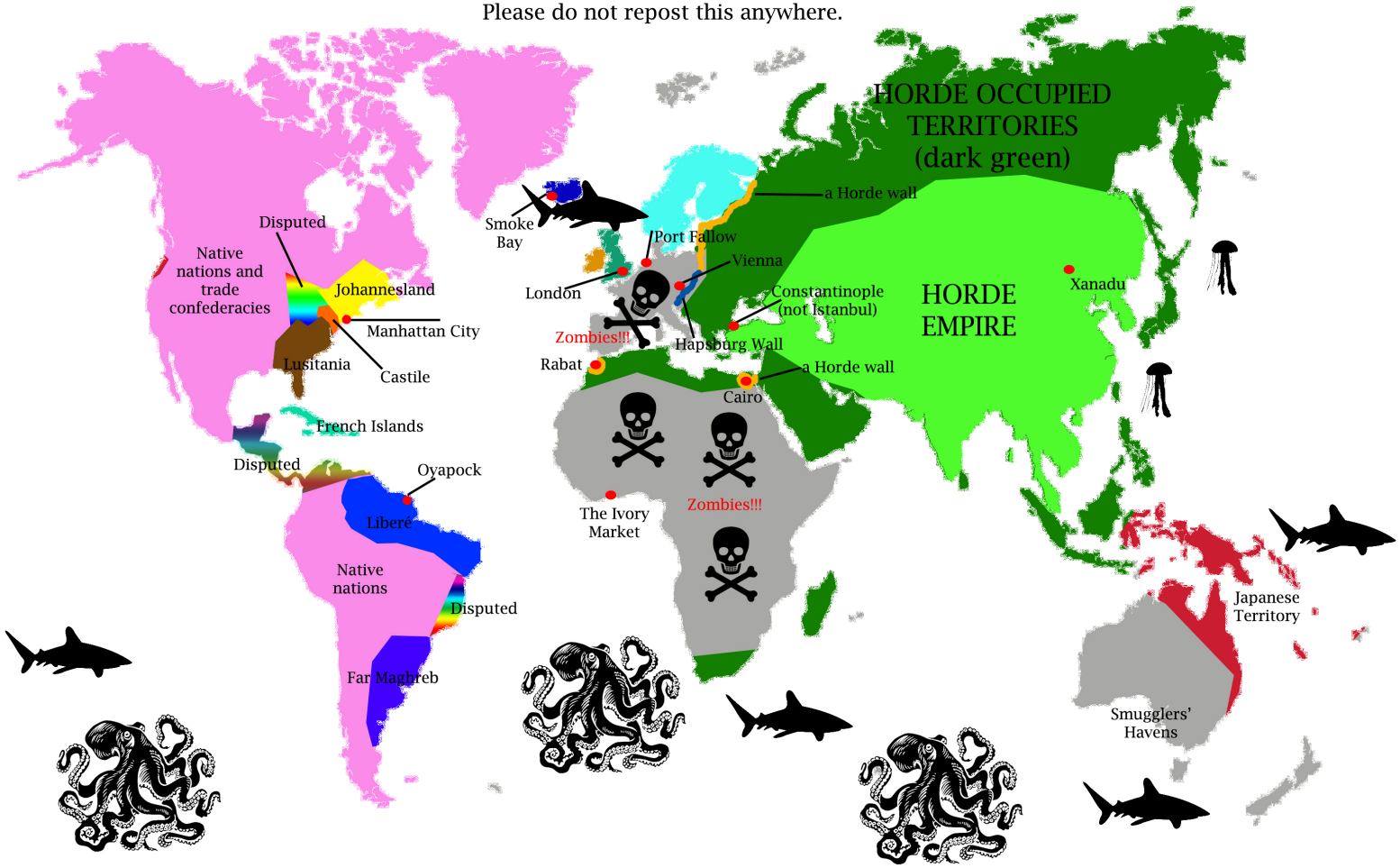
Minard 1861

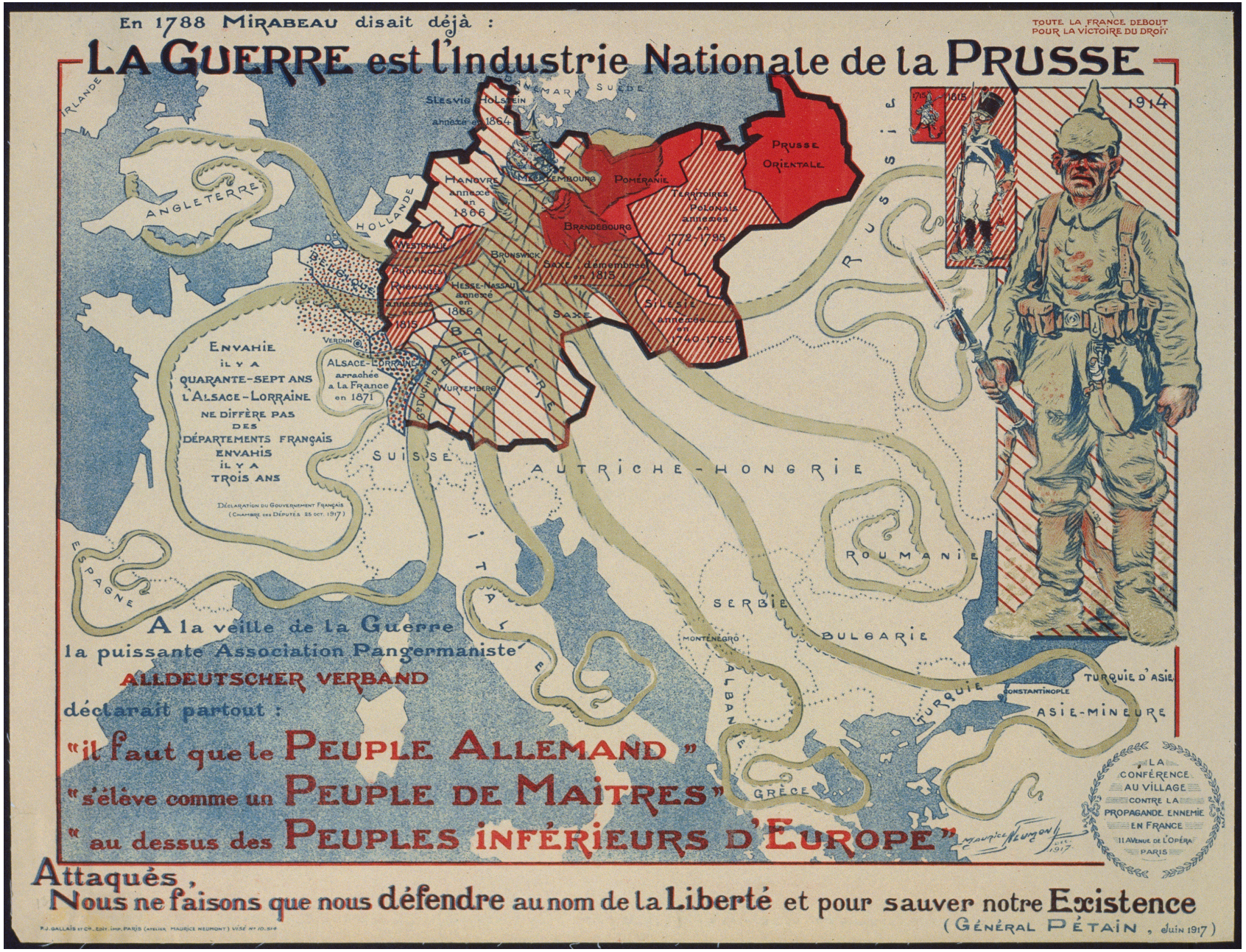


Makina Corpus (Karl Azémar, Eric Bréhault, Frédéric Bonifas, Mathieu Leplatre), 2014

The Iron Seas World

(incredibly ugly and basic map)
Please do not repost this anywhere.





Source: Bibliothèque Nationale et Universitaire de Strasbourg

Motivations for looking at emotion

Study of human experience often ignores one or more components of that experience.

Affect

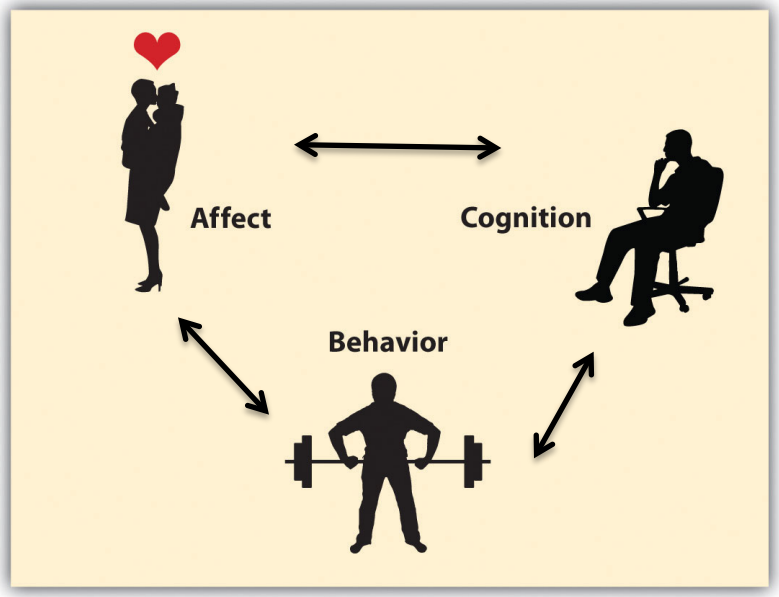
(emotions, feelings, moods)

Behaviour

(observable events or actions)

Cognition

(thoughts, attitudes)



Stangor 2013

Humanness, maps & emotion

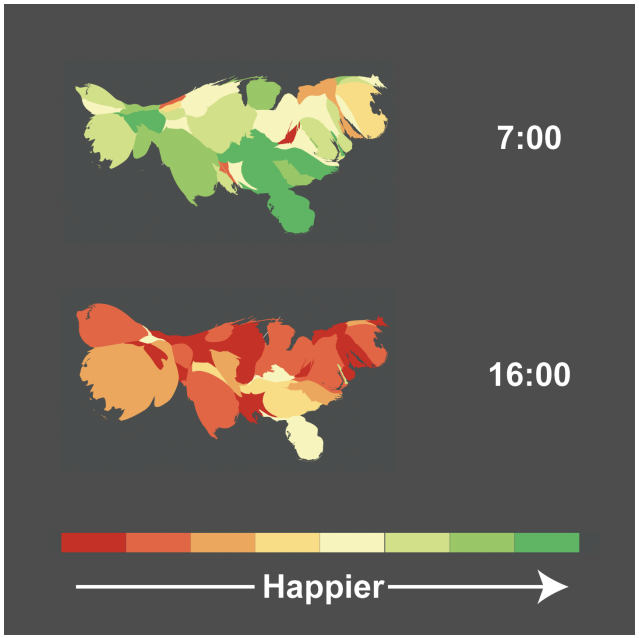
1) How can we use maps to help us understand the human experience more fully?
2) How does being human affect how we use maps?

Where do maps & emotions intersect?

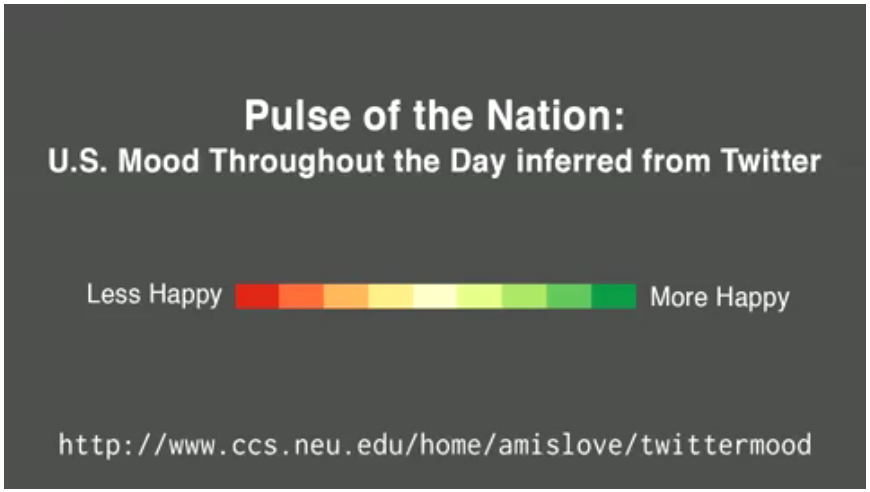
- How can we use maps to help us understand the human experience more fully?
  - How is emotion represented in maps?
  - How do researchers use maps to understand emotions in space?
- How does being human affect how we use maps?
  - How do/can maps provoke emotions?
  - How can we use theories of and knowledge about emotion and affective responses to inform the design of maps?

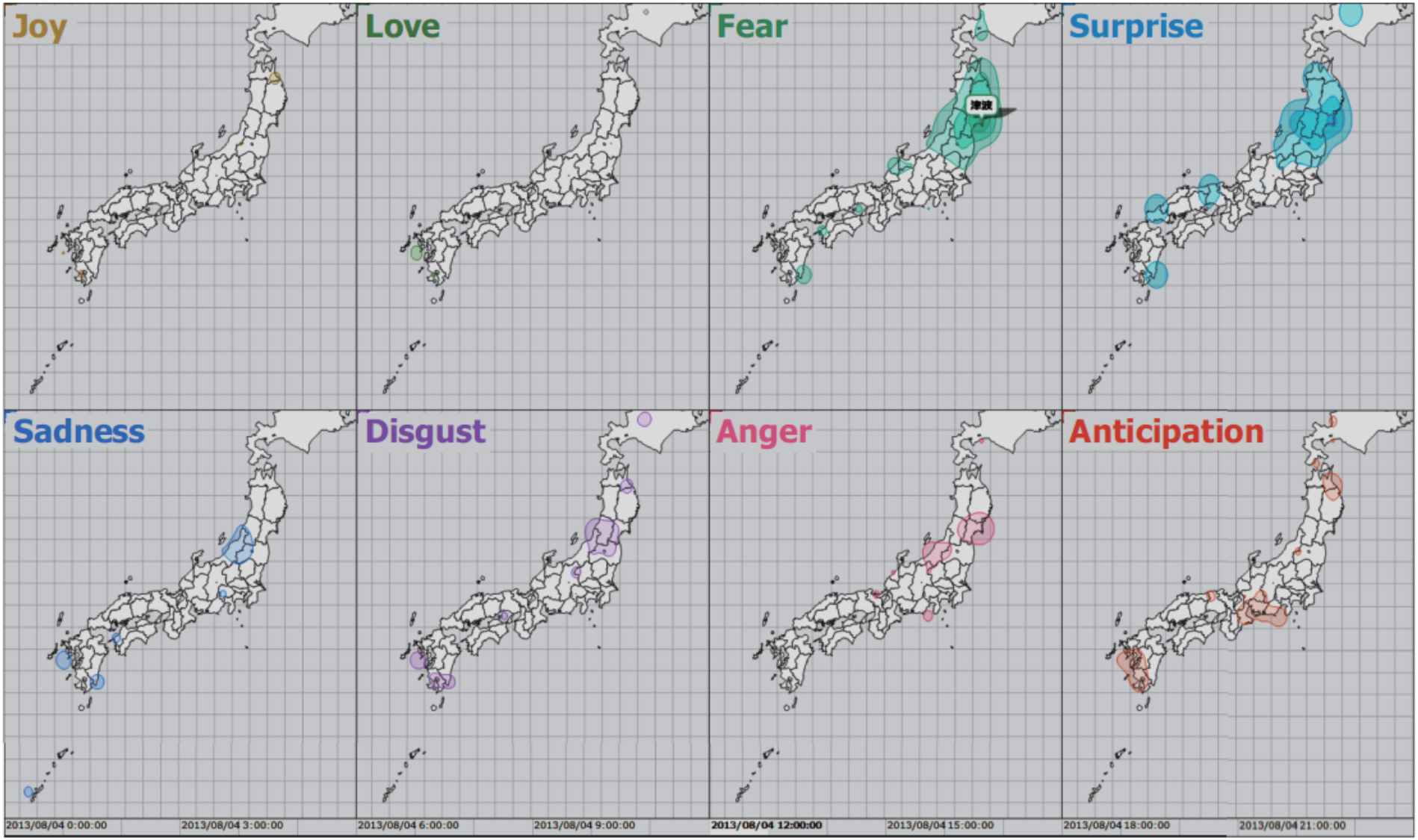
How is emotion represented in maps?

Maps of Emotions:
Web 2.0 as a source of emotion data

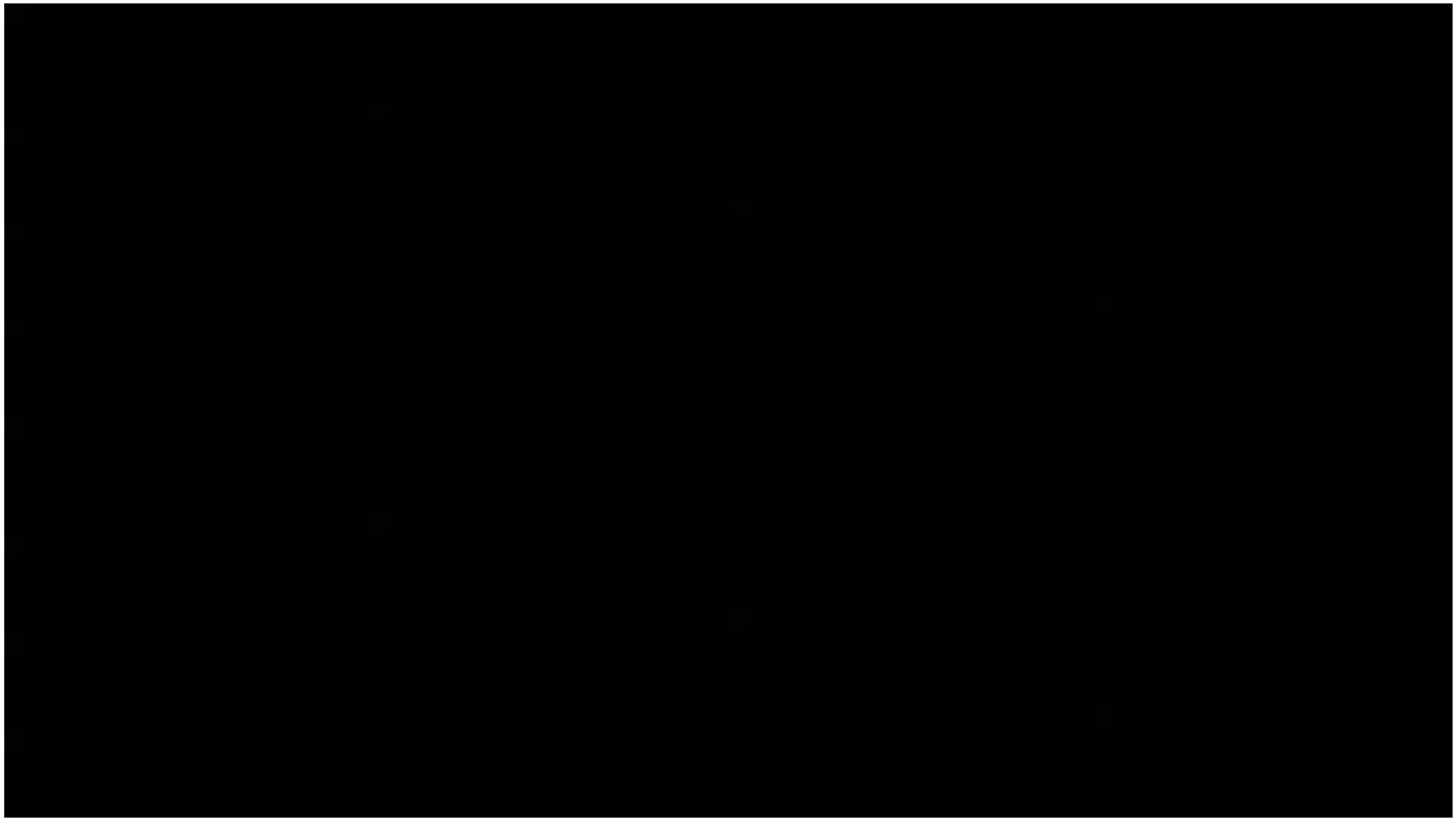


Mislove et al 2010

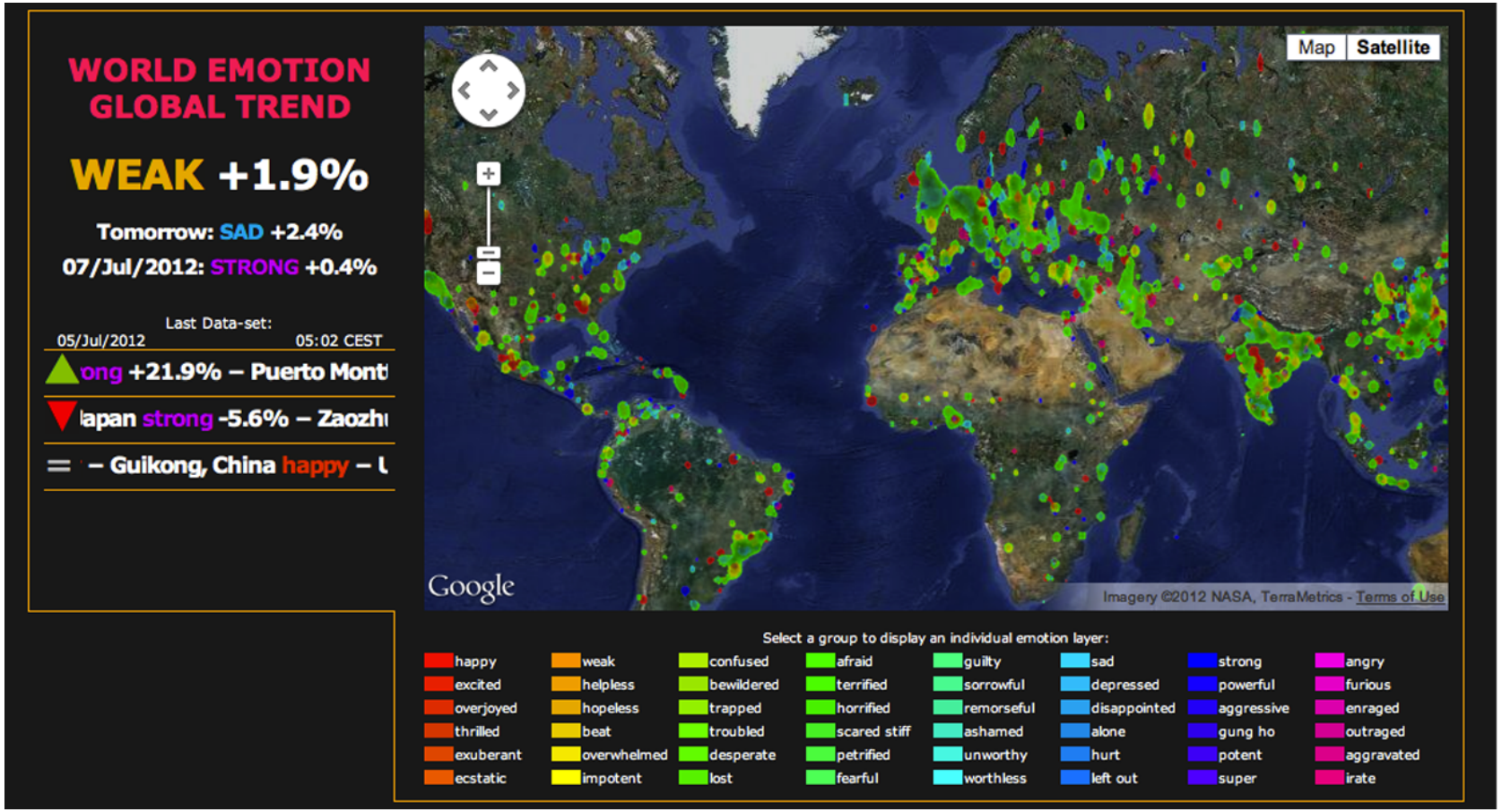




Misue and Taguchi 2014



Emography: Palmer & Rundkvist 2011



Benayoun 2012

How do researchers use maps to understand emotions in space?

STOCKPORT
EMOTION MAP

Artist CHRISTIAN NOLD & *Designer* DANIELA BORASCHI STOCKPORT – SEP. 2007

THE STOCKPORT EMOTION MAP

Whilst conventional maps show static architecture and exclude humans, this art project presents a vision of Stockport that represents the emotions, opinions and desires of local people. Over a period of two months in summer 2007, about 200 people took part in six public mapping events. This map collects together and shows the results of the two activities: Drawing Provocations & Emotion Mapping.

.. DRAWING PROVOCATIONS ..

People were asked to sketch their responses to a variety of serious and humorous provocations about their daily lives such as what really annoys them about Stockport, where they meet their friends, as well as who are the most important and dangerous people in town. Other provocations were focused on the town and its history, river and landmarks. As a result, people enthusiastically created a huge pile of drawings which were scanned and used to create this map. As far as possible, all the drawings were placed in their geographically correct position or where people mentioned them.

.. EMOTION MAPPING ..

The second activity involved people walking freely through Stockport equipped with a special device invented by the artist, that measured the emotional arousal in relation to their geographical location in the town. On the map, the walks are represented by thin angular lines tracing the paths that people walked. The emotional arousal is represented as a series of pillars at four different heights corresponding to the intensity of emotional arousal. Arousal is not necessarily positive and is best thought about in terms of heightened attention to ones body or surroundings. The textual annotations on the map were written by the participants themselves to describe the huge variety of events and sensory stimuli that caused their emotional reactions during their walks.

.. HOW TO READ THE MAP ..

It is important to notice that the whole of the map is orientated so that the River Mersey runs across the middle of the page, meaning that the top does not face North like most contemporary maps. This projection is based on historic maps of Stockport that placed the main focus on the river as a resource, source of identity and county boundary. This map follows the definition of older maps according to which the river Mersey does not start in Stockport but rather at the confluence of the river Goyt and Etherow. Curiously, modern North facing maps of Stockport appear to align with the M60 motorway in almost the same way. Looking at the overall pattern of the emotion pillars, it is possible to discern a number of high emotional arousal clusters. There are large clusters around the old market area and throughout the whole of Princes Street with smaller ones in Mersey Square and the Stockport Market area. In contrast, the Great Underbank and St. Petersgate areas are very calm. This pattern seems to correspond to the relative density of people and thus social interactions in those areas. It is also a reflection of the amount of visual distractions in those places. In addition to these broad patterns there are a number of individual high arousal spikes that seem to be caused by particular buildings like the brewery or by very personal contexts like an individual's annoyance at the graffiti on a medieval wall.

REFLECTIONS ON THE EMOTION MAP

Everyday we enter into discussions with people for different reasons. Sometimes, we have a particular purpose for communicating, but often we just want to talk to friends and strangers to hear their ideas and to express ourselves. The vast majority of these conversations quickly slip our mind and are never recorded because we think they are trivial. Yet, even in a time when our opinions are valued very highly. Everyone from politicians to market researchers are fascinated by how we feel about particular issues. Curiously though, when we enter into discussions in those contexts, we tend to use a very strange stilted and alienated language, that neatly packages our ideas. In addition, these discussions tend to focus only on a single issue, for example the building of an incinerator rather than asking wider questions about how our society produces and disposes of goods. This map suggests a model for recording the apparently trivial conversations and events of our everyday lives and allows us to see them all simultaneously without being constrained to a narrowly defined topic. When it is possible to see this overview, these apparently disconnected conversations show their true value and form clusters of issues and concerns.

Based on the process of talking to over 200 people in Stockport and analysing their drawings, we identified five overlapping issues of concern. Feel free to go to the project web-site and download all the original drawings and Emotion Map data.

Here are the five issues that we identified for Stockport:

1. The marginalised history of Stockport
2. The hidden river Mersey
3. Monolithic shopping
4. Semi-Public Space
5. Isolation of young people

.. THE MARGINALISED HISTORY OF STOCKPORT ..

While Stockport prides itself as a historic town and many people drive the looming train viaduct as a landmark, the history of Stockport was not very strongly represented in people's drawings. When asked, most did not think that the past was influencing their everyday life in Stockport. Even amongst those that thought it did affect them, some saw it as standing in the way of new developments. An example of this type of thinking is perhaps visible at the site of the Norman castle, then later cloth mill, which has today been turned into a very brash clothing shop. The recently covered market which was reverentially named the 'Glass Umbrella', is today neglected and hardly frequented. This space appears to have the potential for a conversion into a cultural centre that could act an example for sensitively combining the past and the present.

.. THE HIDDEN RIVER MERSEY ..

The building of the Merseyway road in 1826 which covered the river seems to be a pivotal point for Stockport. Not only did it unite Stockport into one town, it also meant that all the old factories and mills that lined the banks had to be knocked down. This is the reason why there are very few visible signs of Stockport's industrial heritage in the centre of town. The river which had been the basis for the town's founding, growth and identity was suddenly hidden away. Modern developments such as the cluster of supermarkets that block the river banks and allow only stolen glimpses exacerbate the problem. In fact, we found that the majority of young people that we talked to did not know that there was a river running below their feet. Most adults only had a vague idea about the course of the river and included it as a goodly trace on their mental maps. We suggest that there is a whole range of cultural and physical interventions that could allow people to re-engage with the river, such as canoeing trips under the Merseyway, marking the course of the river in the street or drilling up-holes through the road surface to allow people to see and hear the Mersey.

.. MONOLITHIC SHOPPING ..

The main thread that ran through people's drawings and tests was the subject of shopping. When asked to draw the most important people in Stockport, whilst some drew their friends and family, a large number drew smiling consumers holding branded shopping bags. There is little doubt that the main factor responsible is the Merseyway shopping area, which dominates the centre of Stockport and defines its identity. As far back as 1973, not long after the shopping centre was built, a local newspaper already referred to Stockport simply as "our shop window town". While many people seemed content with the shopping area, a fair number felt that it was "soccerless and outdated" and wanted more of a cafe street culture. Others expressed a worry that smaller, local shops were being forced out. Most of the shops that people drew were global brands and only a few sketched images of local shops or market stalls. Already in 1970 a local newspaper suggested that "... we cannot afford to loose the family-name businesses from Stockport" and that, 'what is lacking is something to attract people there apart from the shops. There is no real focal point...".

.. SEMI - PUBLIC SPACE ..

When talking to people it was surprising how few activities apart from shopping were mentioned. When asked about where they go to meet friends and relax, people drew images of corporate cafe chains and suggested that Stockport revolves around coffee. Walking around the town we noticed there is very little of what would be classically termed 'Public Space', i.e. places where there is no exclusion based on economic or social conditions. Most of the public life in Stockport seem to take place in semi-public spaces such as the shopping centre or cafes that require people to purchase or at least follow some behavioural rules to be allowed access. There are very few green spaces in the centre of Stockport that people can access without money and use as they like. On the whole there was a consensus that people wanted a less rigidly 'programmed' town centre. Current theories of public space agree and argue for areas that allow multiple interpretations and uses. One example of a missed opportunity is the Bear Pit on Mersey Square which is shaped like an amphitheatre and was meant to be for public use. When one looks at the featureless concrete design and the fact that one has to cross a busy road, it is not surprising that no one uses it. This is perhaps even sadder considering that Mersey Square is the site of the original Village Green where in the past, large social festivals took place and circuses pulled in. It is illustrative to look at an artist's impression from the 1970's for the redevelopment of Mersey Square, picturing an idyllic green area full of trees and benches contrasting strongly with the desolate traffic heavy area that it is now. We feel that this area has a lot of potential and that it would be worthwhile revisiting older visions of this space and bringing them back to life.

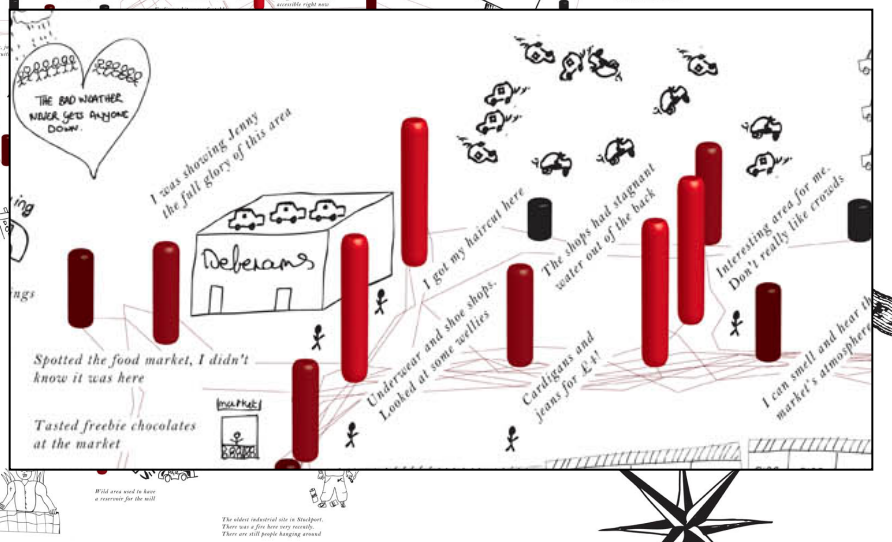
.. ISOLATION OF YOUNG PEOPLE ..

Young people seem to be a particularly marginalised group in Stockport with very little provision for them. When asked, they mentioned the only thing on-tap for them is a skate-park which they have to pay to enter. The council's youth provision also seems to be limited and focused on teenage pregnancy information. This lack of youth activities appears to increase the class division amongst the young people. Middle class teenagers seem to be invisible, while groups of working class teenagers are perceived to be the cause of anti-social behaviour including alcohol consumption, stealing and knife crime. We emphasise the importance of providing youth activities and services to bring the young people together and allow them to be included within the public life of Stockport.

.. SO WHERE DO WE GO FROM HERE ? ..

We hope that this map and text will stimulate personal reflections for people and then lead to a larger communal discussion that refines the issues of concern. Some of the topics we identified could be tackled by single individuals such as running youth workshops, while others require a group of people and collaborations with institutions.

It is heartening that 'friendly' was the most frequently used adjective for describing Stockport and we feel that this sense of community can nature a new vision for the town.



2007
Scale of Yards
100 200 300 400

Nold 2008

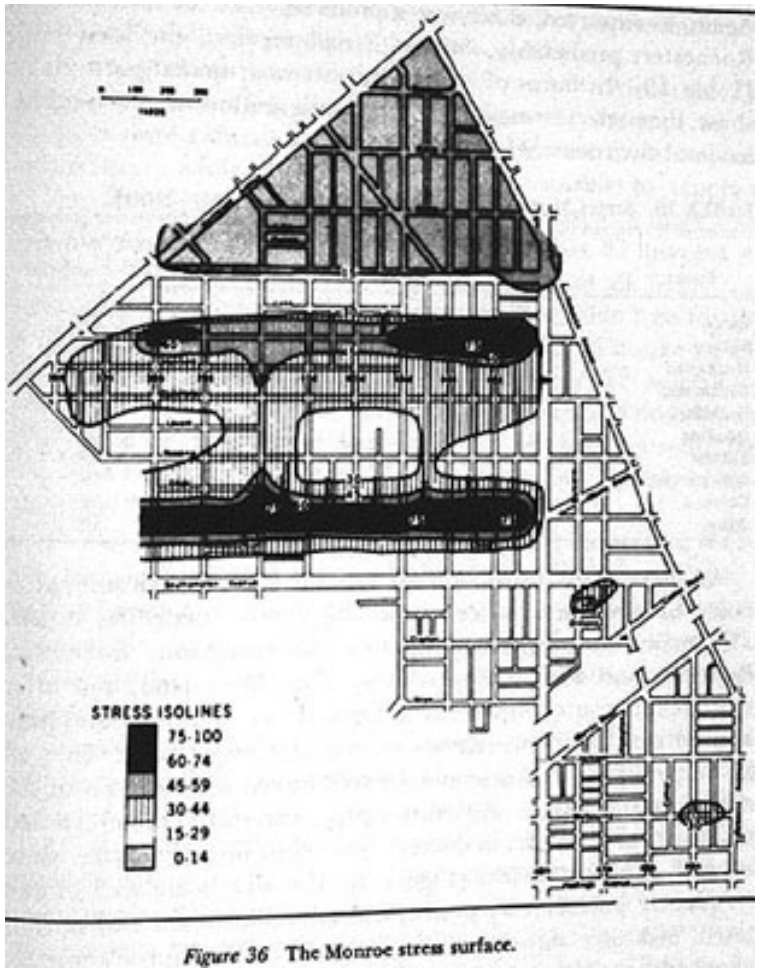
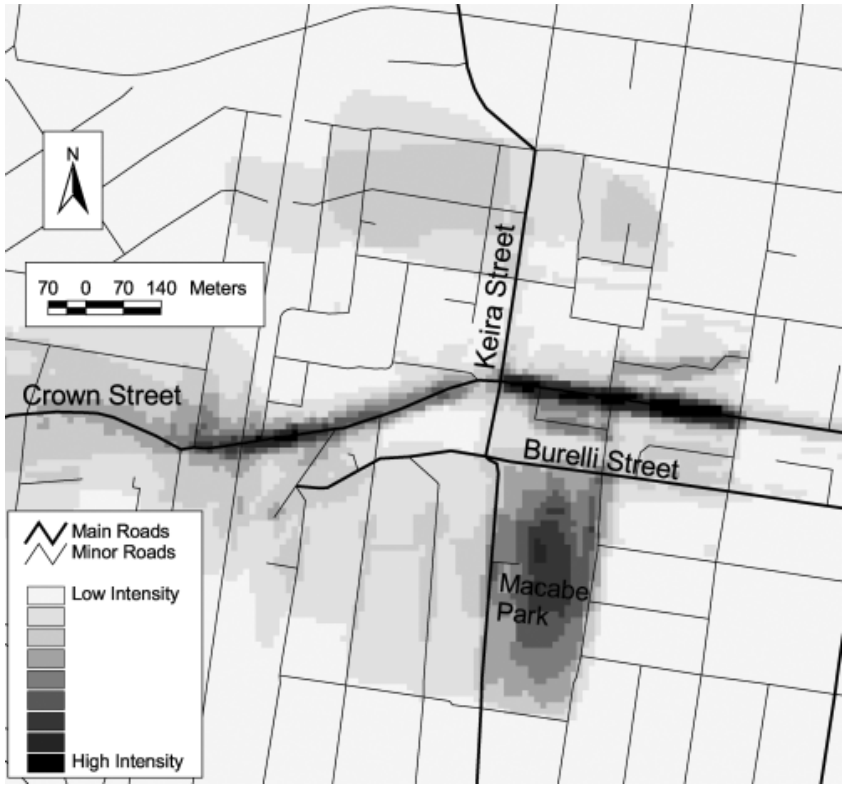


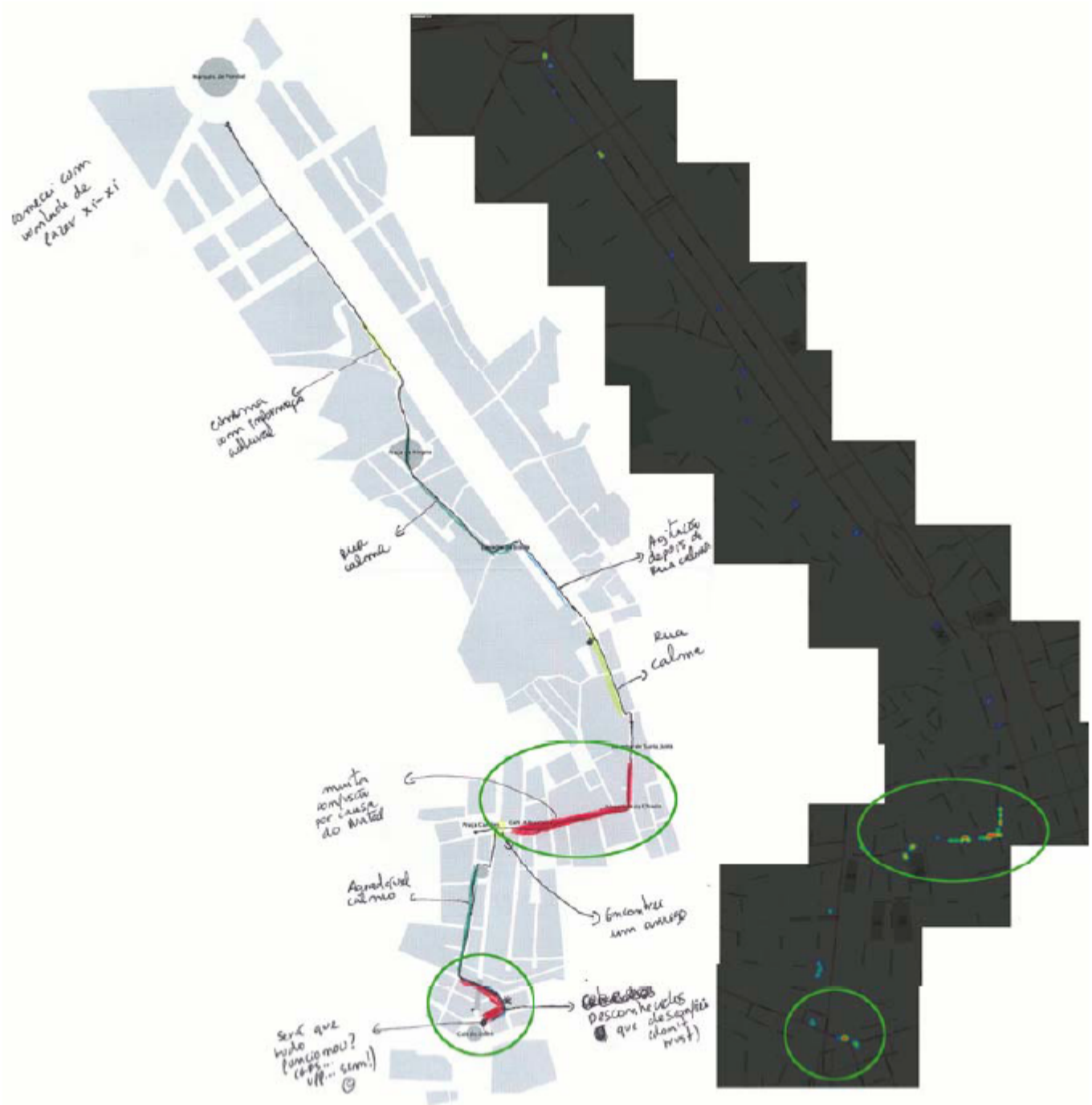
Figure 36 The Monroe stress surface.

Ley 1974

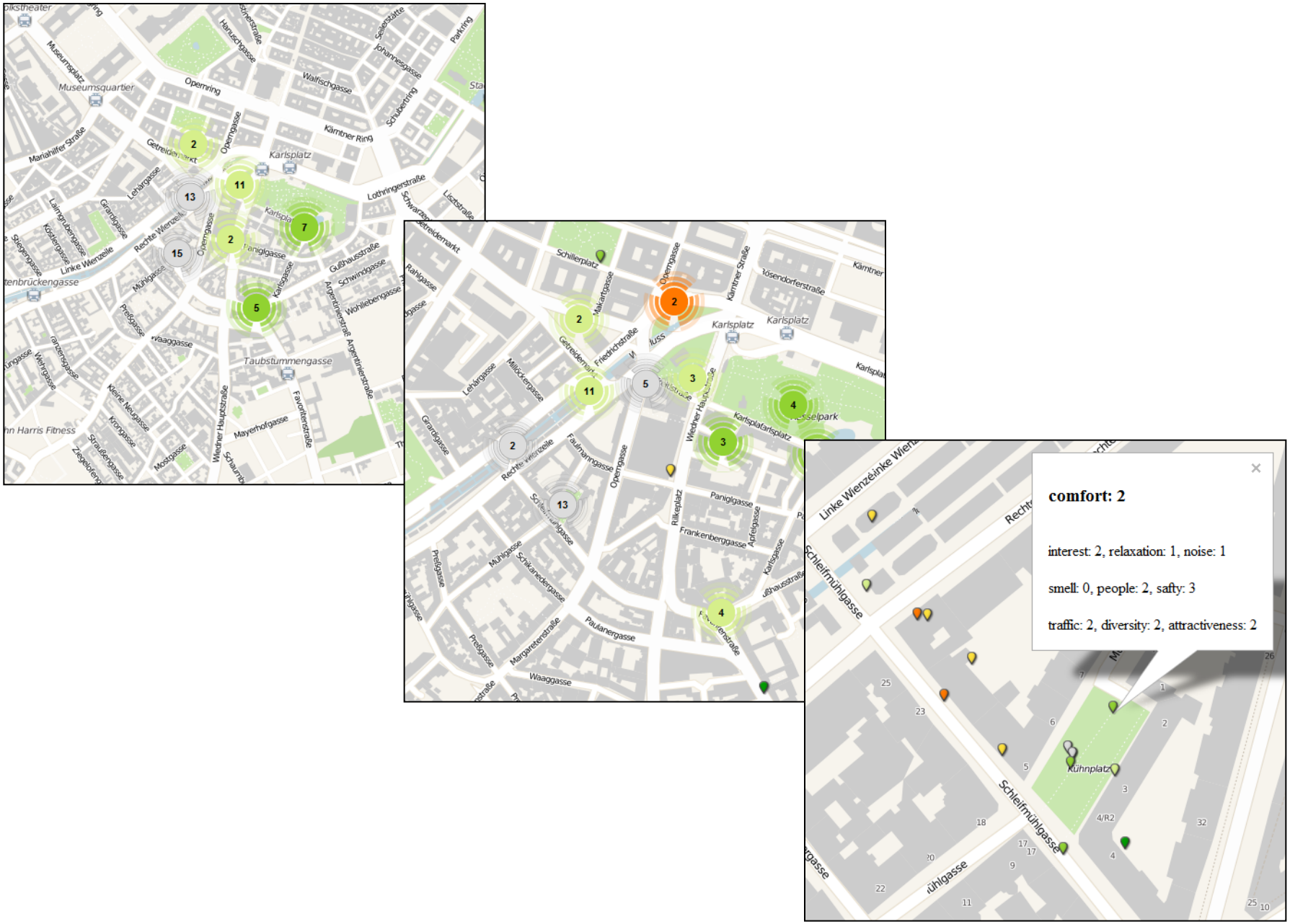
Areas of the CBD avoided between 5.30 and 7 pm



Doran & Lees 2005



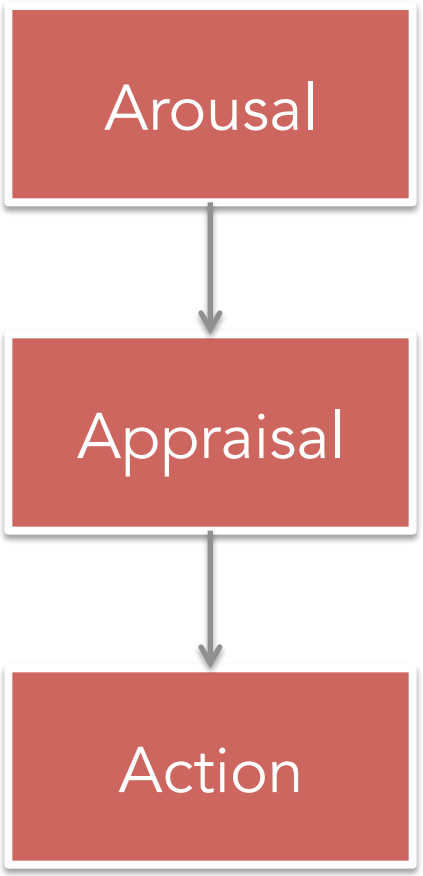
Hogertz et al 2010



EmoMap, Klettner & Gartner 2012

How do/can maps provoke emotions?

Emotional impacts of maps on users: the classic case of propaganda maps



Wikimedia 2006

Milder and (perhaps) less obviously directed attempts to produce an affective or emotional response.

Theories from Psychology

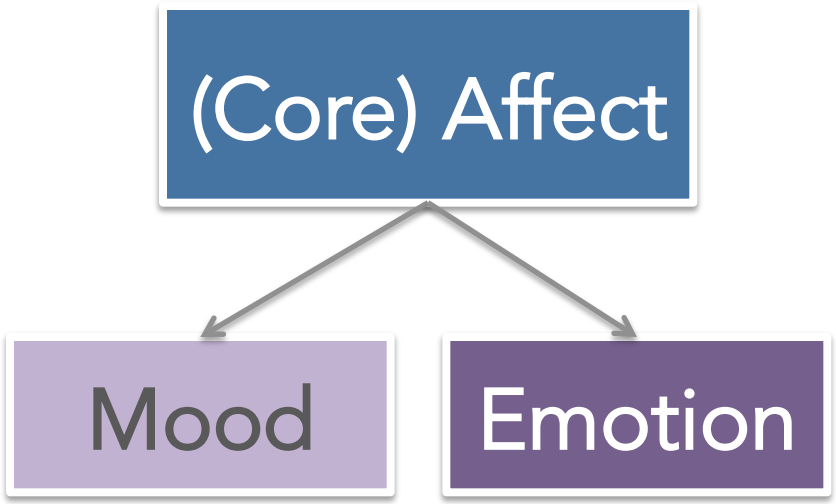
- There are **many** disagreements about terminology and definitions surrounding affective responses in psychology
- Is an emotion:
  - one of a set of categorical states?
  - a point on a continuum or multiple continua?
- Does understanding and measuring it require language?
  - are emotions different in different languages?
- There are many more questions that could be asked…

As many theories as authors…

There are three major psychological theories of emotion:

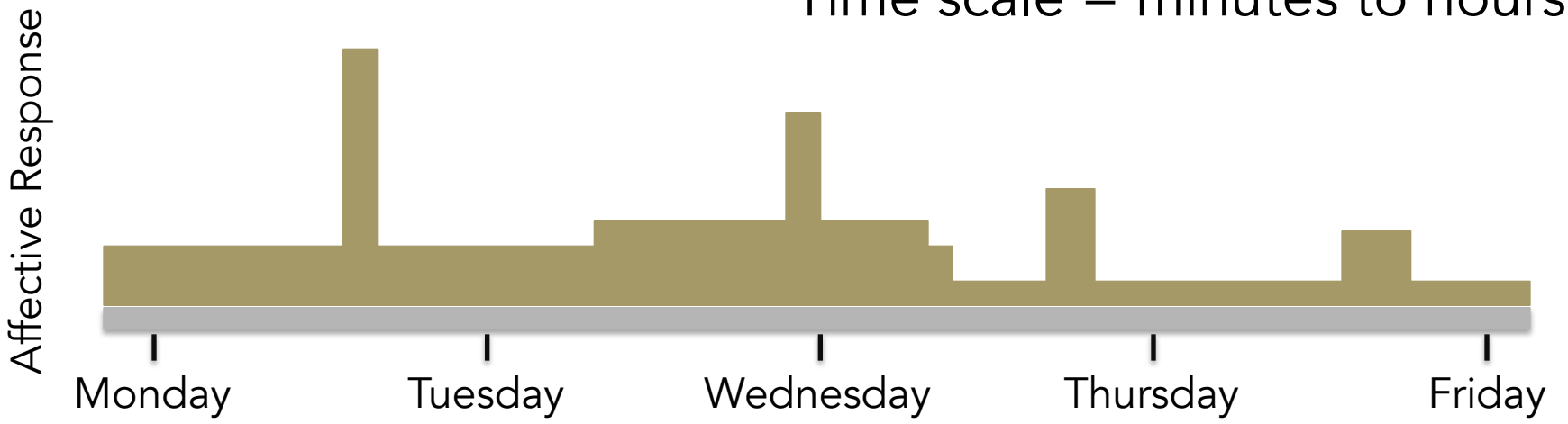
- Physiological: James (1884)
  - physiological state (interpreted)→ feel the emotion
- Neurological: Cannon-Bard (1931)
  - Concurrent brain state change & physiological state change → feeling an emotion
- Cognitive: Schachter-Singer (1962)
  - Physiological state → interpret and label the physiological state (including its cause) → feel the emotion

What is affect?

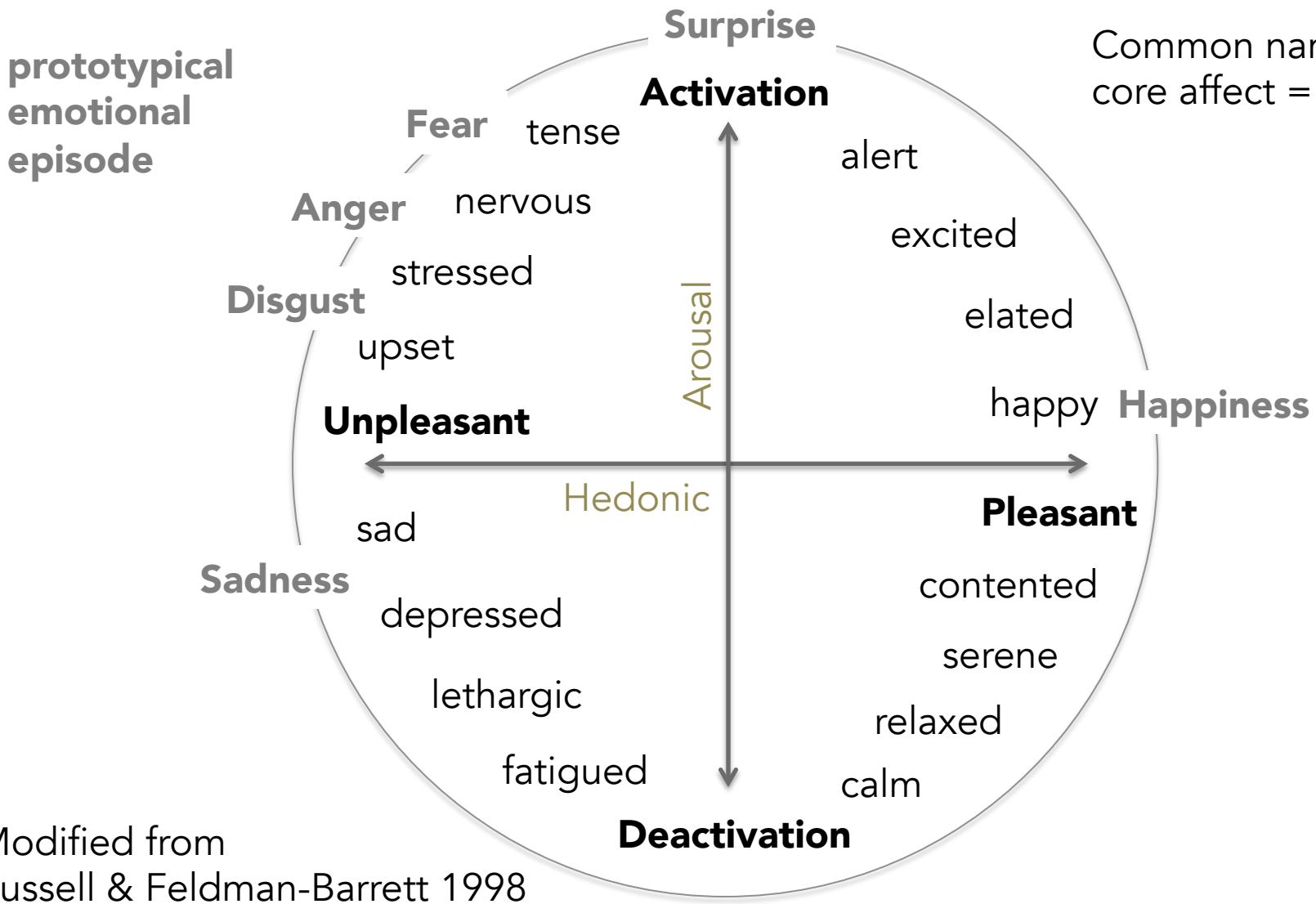


Moods:
Background feelings
Time scale ~ several hours/days

Emotions:
'sit on top' of moods
have temporally recent triggers
Time scale = minutes to hours



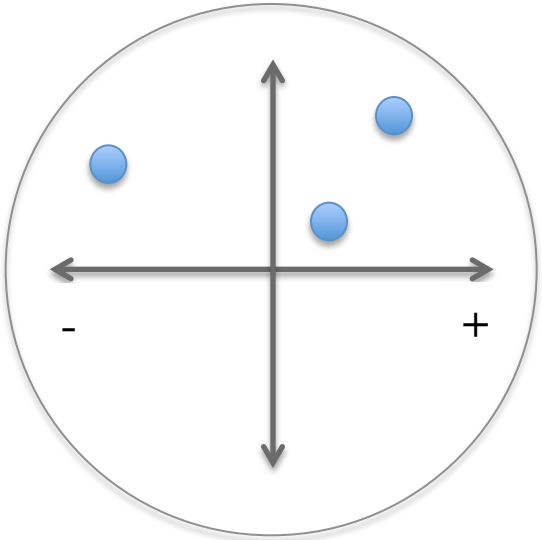
Current theories of emotion: Core affect characterization



Common name for core affect = **feeling**

Modified from
Russell & Feldman-Barrett 1998

An emotional episode



Attribution of change to trigger

Perception of affective quality of trigger event

emotional meta-experience

Arousal

Trigger event

Change in core affect

Behaviours enacted in response

Physiological and expressive changes

Implications of psychological theories of affective responses for map use studies

- In *most* cases, reading a map will not trigger an emotion…but not all!
- It is really *core affect* and *mood* rather than *emotion* that is interesting for understanding the effects of affective response on map use.

The ABCs of psychology

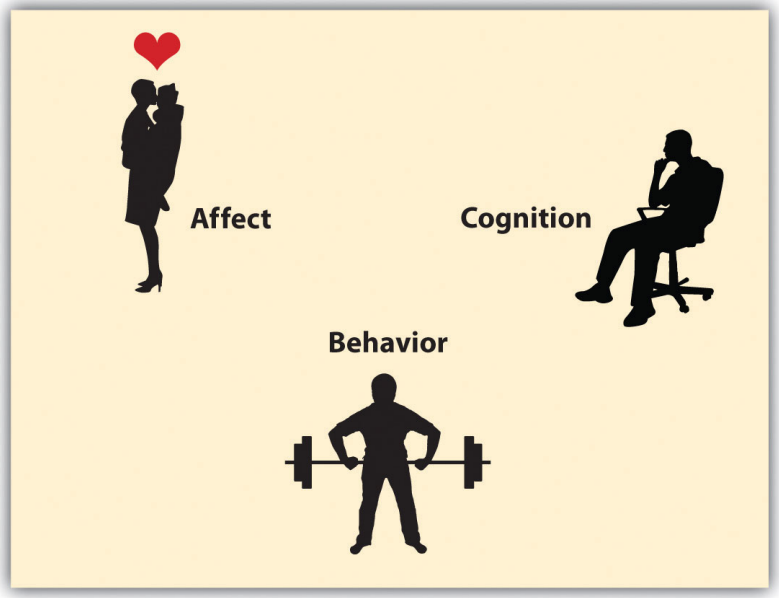
Affect (emotions, feelings, moods)

Behaviour (observable events or actions)

Cognition (thoughts, attitudes)

Many map use studies have focused on B/C (Montello 2002).

But can and/or should we ignore affect or separate affect from cognition?



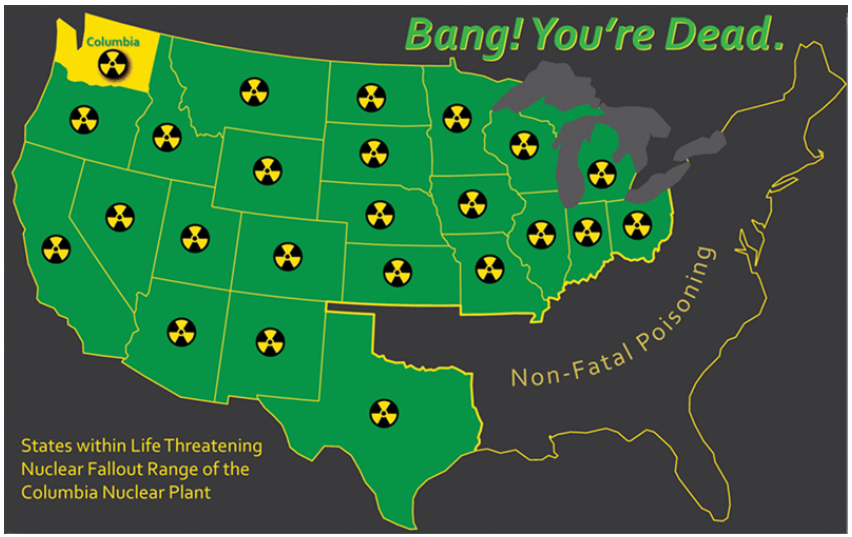
Stangor 2013

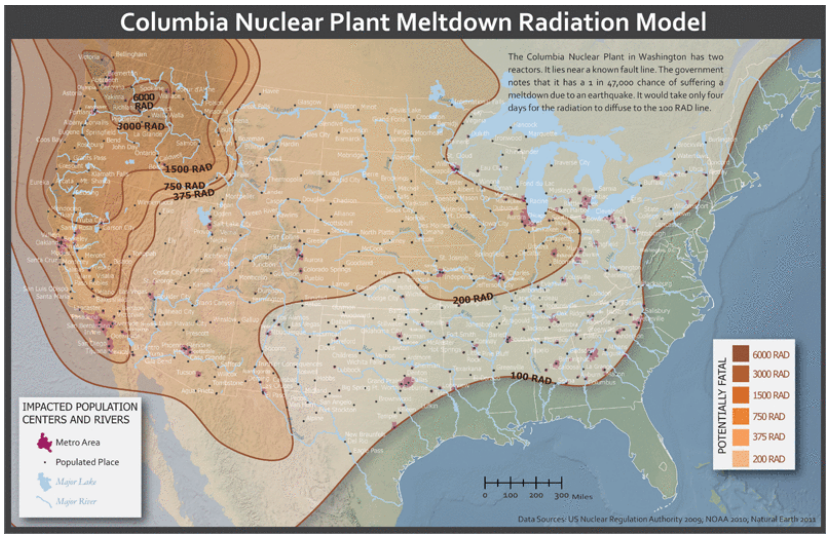
Why should we care about affective responses when studying map use?

Aspects of cognition influenced by affect:

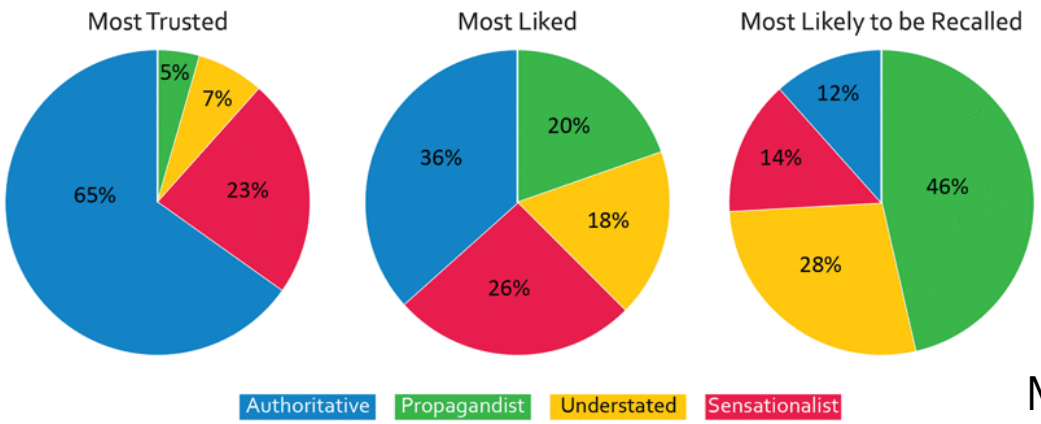
1) Perception and attention
   - viewing emotion-laden stimuli heightens attention
   - emotion-laden stimuli lessen attentional blinks
   - perception of emotion-laden stimuli may or may not be automatic, depending on context
2) Long-term memory and learning
   - improved memory for emotionally arousing information
   - but…when we store memories, we also store emotional state information. Ease of accessing memory depends on current affective state & affective state at time of memory storage (mood-congruent priming).
3) Working memory
   - positive emotional experiences enhance working memory, while negative ones decrease its capacity

Some evidence for cognitive effects of affective responses to persuasive maps





Propaganda rhetorical style



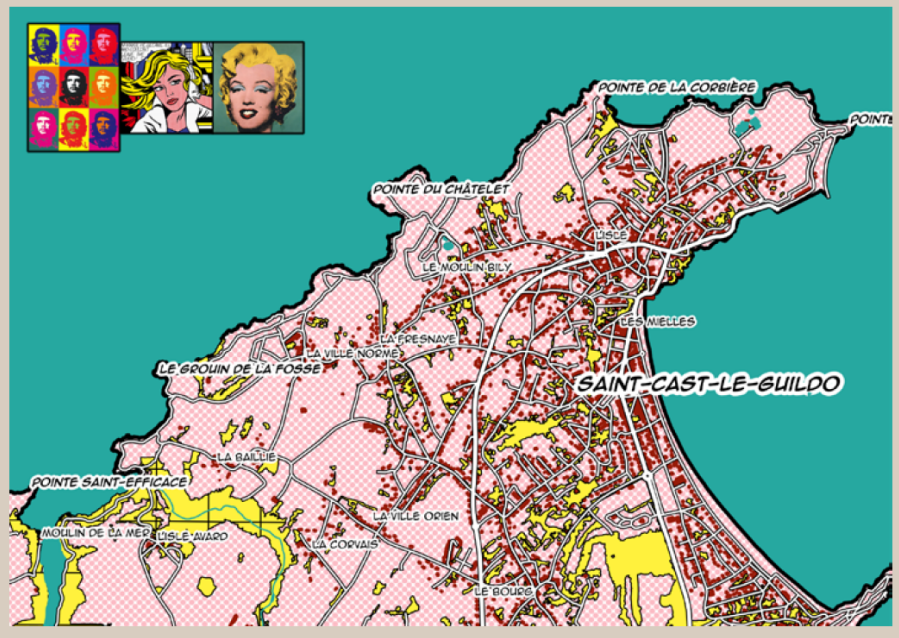
Authoritative rhetorical style

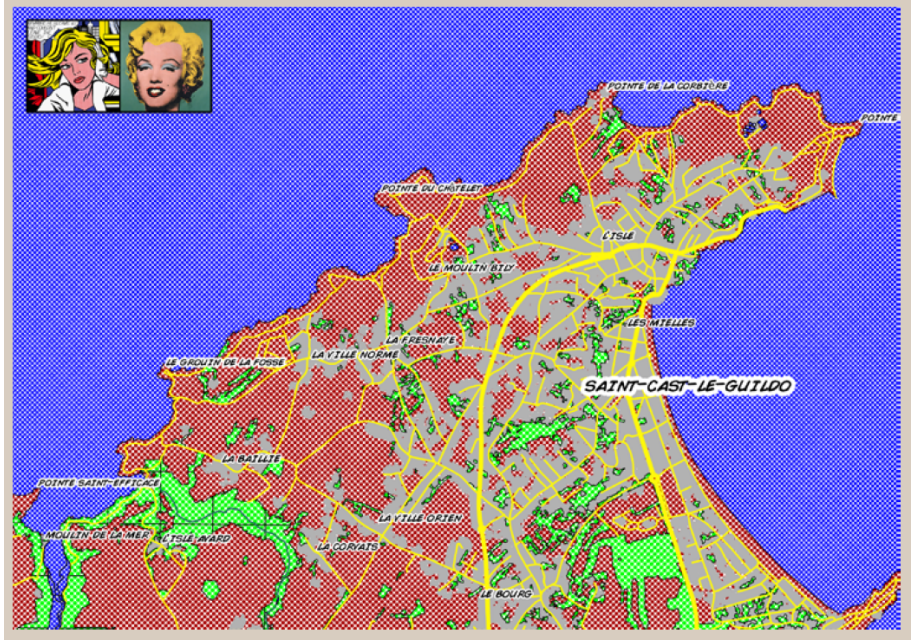
Mühlenhaus 2012

Affective responses and the aesthetic qualities of maps

Does asethetic quality improve map efficiency?
(Christophe & Hoarau 2012)

An open question: what is the relation between asethetic responses and affective responses?

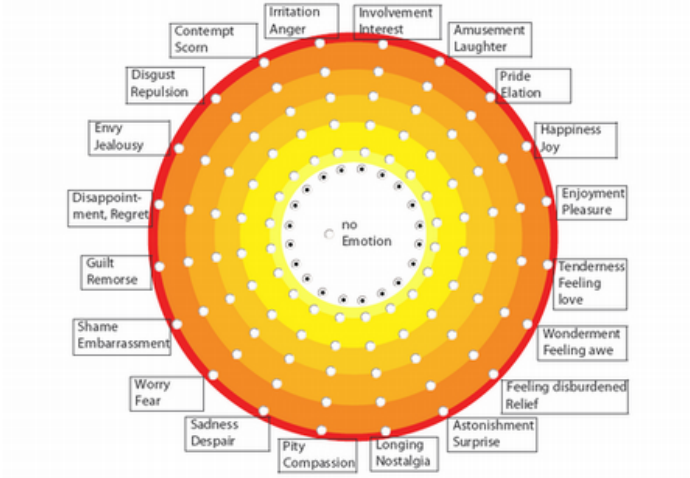




What can we actually measure and how can we measure it?

- Galvanic skin response, but it measures a physiological state – arousal.
  - Arousal = ½ of core affect
  - not emotion. no information about the trigger.
  - Feelings (tell us something about valence) can also be self-reported
- Emotion:
  - Direct self-reports
  - Language (indirect self-reports)

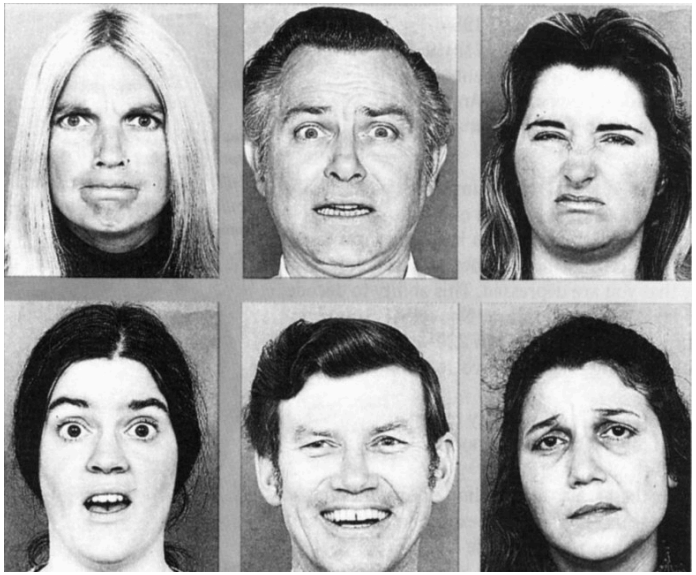
GSR monitor



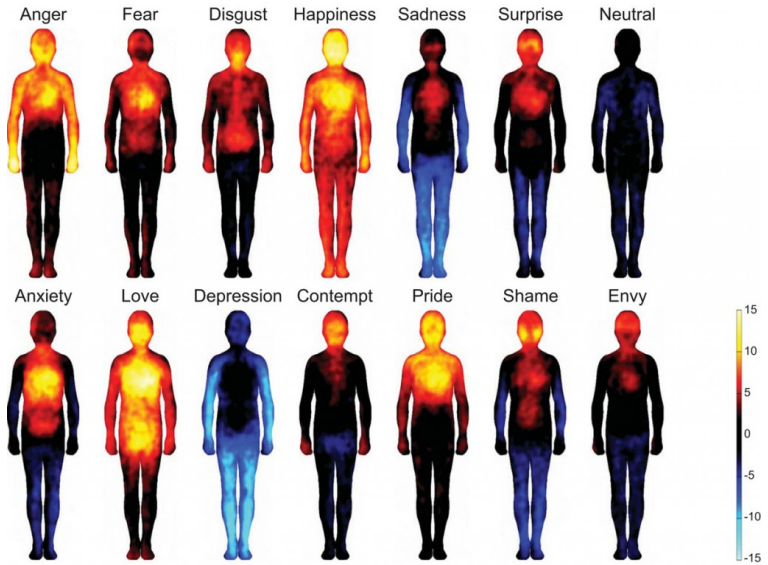
Geneva Emotion Wheel

What can we actually measure and how can we measure it?

- Emotion is embodied:
  - Behavioural observations like facial expressions
  - Self-reports of feelings in the body



Eckman 1975



Nummenmaa et al 2014

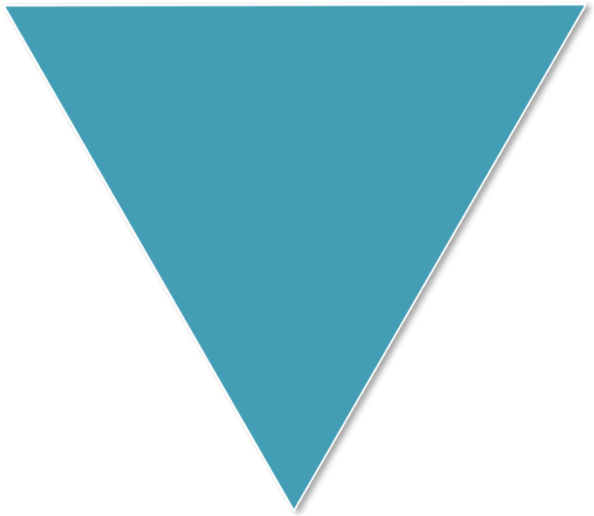
How can we use theories of and knowledge about emotion and affective responses to inform the design of maps?

Maps for communication

Theories from Communication & Rhetoric

Ethos
form
manner

Logos
idea
message



storytelling

Aristotle's Rhetorical Appeals

Pathos
force
emotion

Theories from Film à la Smith (2003): A model for cueing moods

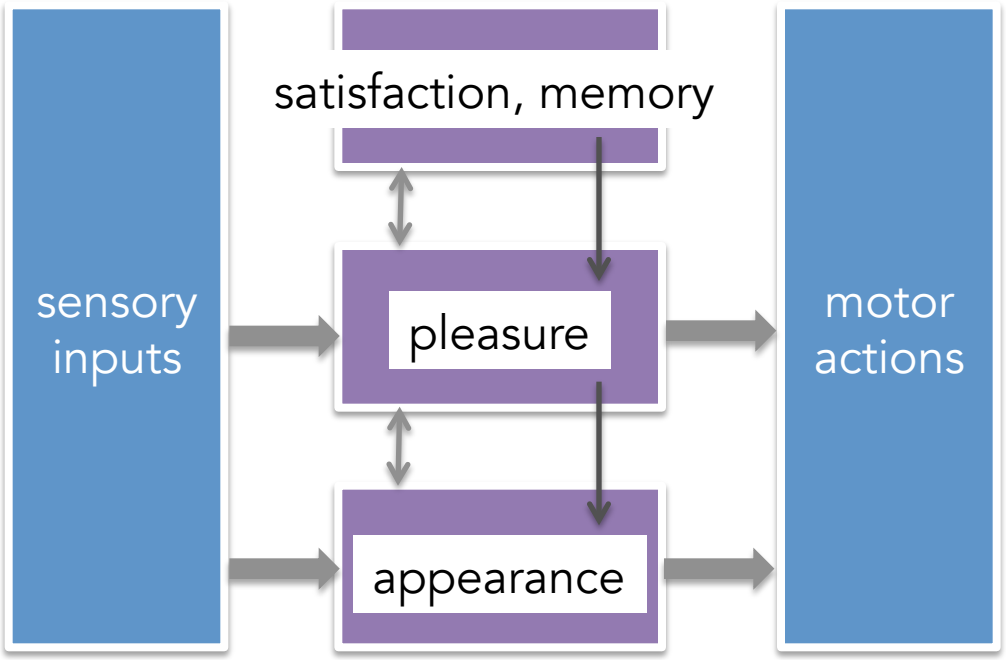
- Films extend 'invitations' for viewers to feel a particular emotion.
- Directors seek to create a mood through cues such as:
  - Facial expression, dialogue, tone, sound, music, set design, editing, camera (angle, distance, movement), depth of field, narrative, etc
- Mood → emotional orientation/likely interpretations
- Continued cuing needed to sustain mood

- What are the cartographic 'mood' cues?
  - Colour, movement (in animations/dynamic maps), selection of map elements (editing), typography, design of marginalia
  - A topic for further research!

Maps for exploration

Theories from Design

Emotional Design: the product (map/vis)



After Norman 2004

Model implies affect is always present

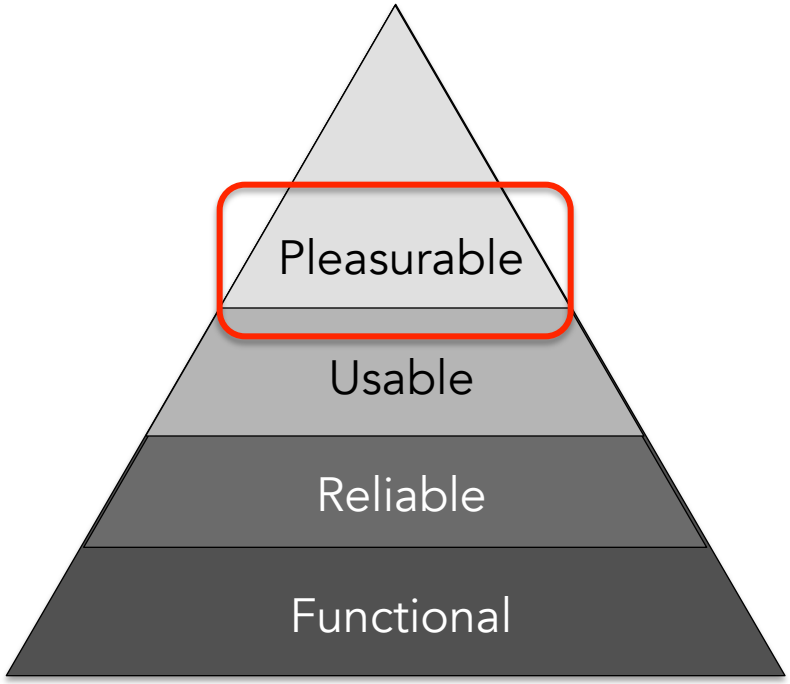
Negative affect: focus/ concentration; details

Positive affect: receptive to new ideas/events; overview

Theories from Design

Emotional Design: the interface

A translation of Maslow's hierarchy of needs for interfaces.



Walter 2011

Interfaces that induce a positive affective response from users enhance memory and lessen the need for the user to focus intently. How?

- Aesthetically pleasing (this is culturally specific)
- Incorporates (positive) surprise and breaks behavioural patterns
- Can be personalized

Theories from Design

Emotional design:

ACT model (van Gorp & Adams 2012)

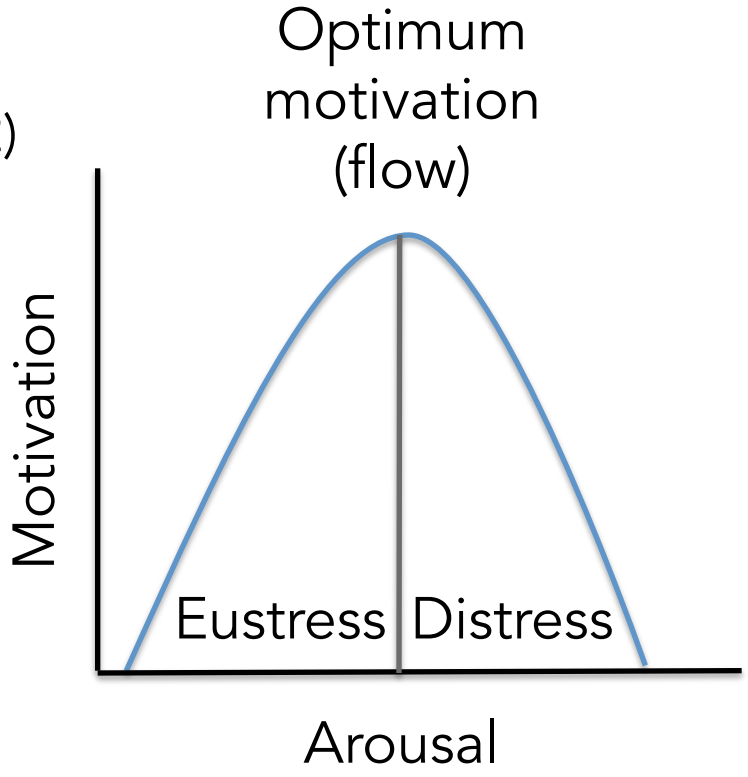
Attract (aesthetics oriented, desirable)

Converse (interaction oriented, usable)

Transact (function oriented, useful)

Recognizes the two dimensions of emotion:

- valence (friendly vs unfriendly)
- arousal (dominant vs submissive)



A modification of the Yerkes-Dodson Law

Concept of flow: Mihaly Csikszenthimihalyi

Theories from Design

The **ACT model**, visual & interaction characteristics that lead to different levels of arousal
(van Gorp & Adams 2012)

Dominant	Submissive
Angular	Curved
Heavy	Light weight
Uppercase	Lowercase
Rough	Smooth
Bigger	Smaller
High contrast	Low contrast
Leading or guiding the user	Allowing the user to choose the sequence of actions

What might these design theories be missing?

- Norman, Walter, van Gorp & Adams -> little engagement with **ideas** embodied in the products studied/ designed (e.g., computer software, functional objects like teapots)

- Maps:
  - Response to visual attributes: color/ balance/etc (perception/emotion)
  - Response to ideas/information in maps: semantic content/abstractness-realism/ symbolism (cognition)
  - Response to map related to expertise/ knowledge about the information in the map

Duchamp 'Fountain' replica: a work that is a vehicle for an idea[s]

Theories from Computer Science

Affective computing

Can we make interacting with computers more humane?

How do we let computing devices sense the affective states of their users?

To what extent should we a priori try to induce (ie design) affective states versus responding to those that are generated through HCI?

Summary and Conclusions, I

- Mapping and visualization can do much to help us understand both the spatiality and temporality of human emotion.
- Web 2.0 is providing rich new sources of individual-level data on emotion, and integrated sensing devices (e.g., skin conductance + GPS) allow us to collect information on individuals' affective responses to places.
- Affect and emotion may play an important role in how maps persuade → relevance for storytelling.

Summary and Conclusions, II

- Affective responses are an understudied aspect of map use.
- It is important to clearly specify the affective response that is being studied and measured, and which theoretical framework is used to understand affective responses.
- There is reason to believe that affective responses have effects on map use, both through maps themselves and the interfaces we use to interact with them.
- We should focus more on affect – there is much to learn and much benefit to be gained.

Est-ce qui’l y a des questions?