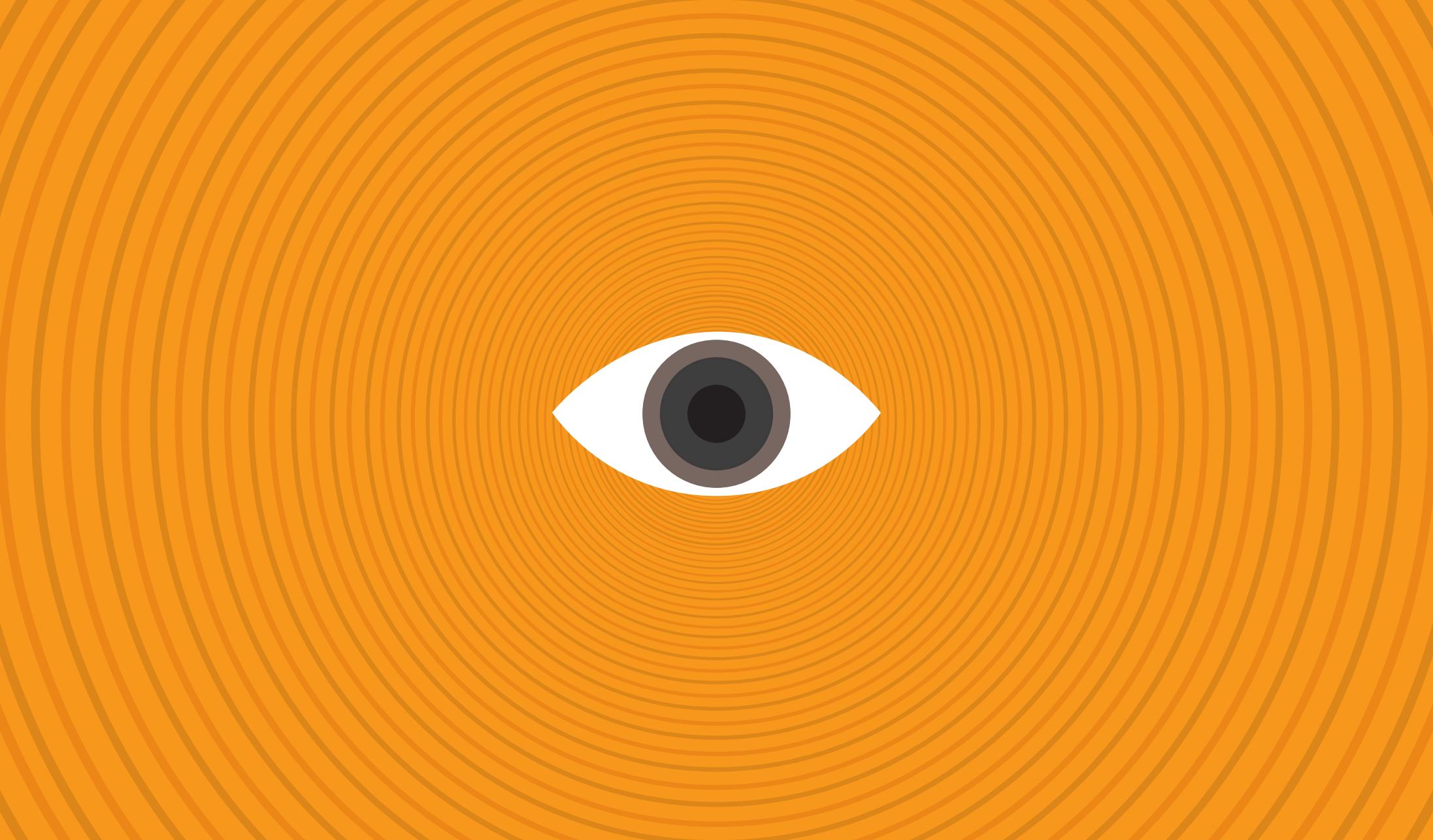




SOUND

AS A CALL WAS OUR WARNING,

AS SPEECH BECOMES OUR THOUGHTS.

AS MUSIC BECOMES OUR FEELINGS.

SIGHT *of* SOUND

an expression of *emotions*

SIGHT *of* SOUND

an *intuitive* mode of communication

an expression of *emotions*

SIGHT *of* SOUND

simulate a *synesthetic effect*
an *intuitive* mode of communication

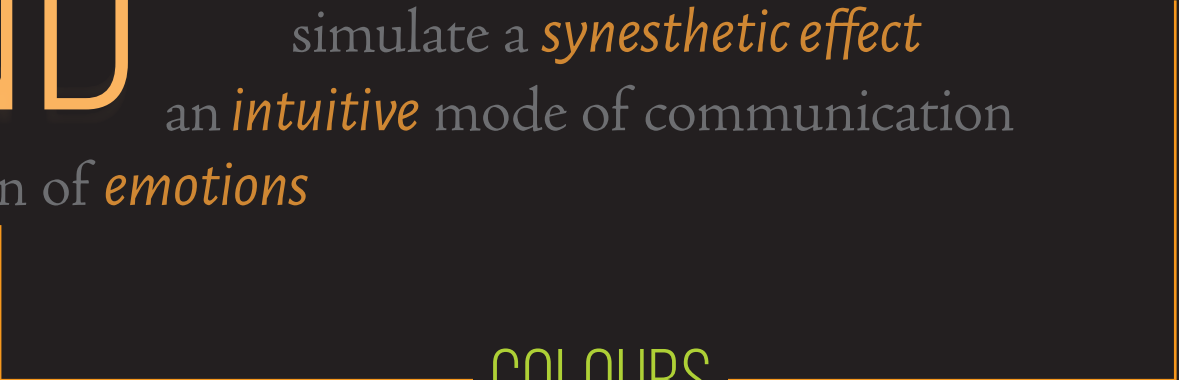
an expression of *emotions*

SIGHT *of* SOUND

by codification of *colour on sounds*
simulate a *synesthetic effect*
an *intuitive* mode of communication
an expression of *emotions*

SIGHT *of* SOUND

by codification of *colour on sounds*
simulate a *synesthetic effect*
an *intuitive* mode of communication
an expression of *emotions*



COLOURS

*“What would be truly surprising would be to find that
sound could not suggest colour,
that colours could not evoke the idea of a melody,
and that sound and colour were unsuitable for
the translation of ideas, seeing that things have
always found their expression through a system
of reciprocal analogy.”*

BAUDELAIRE, CHARLES,

The Painter of Modern Life and Other Essays,
transl. and ed. by Jonathan Mayne (Lon-
don:Phaidon, 1964),p. 116.

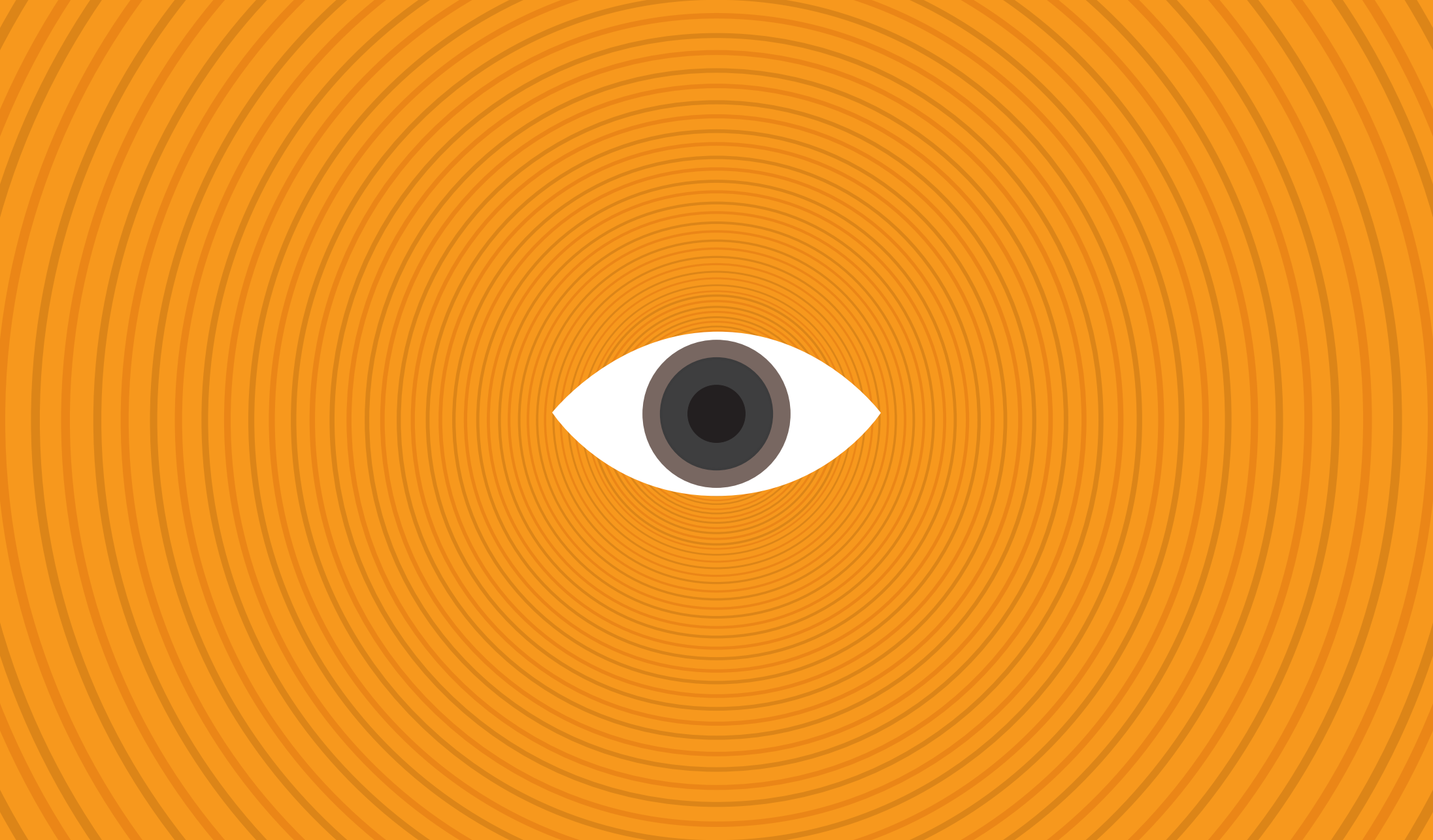
/ˌsɪn əsˈθi zə, -zi ə, -zi ə/

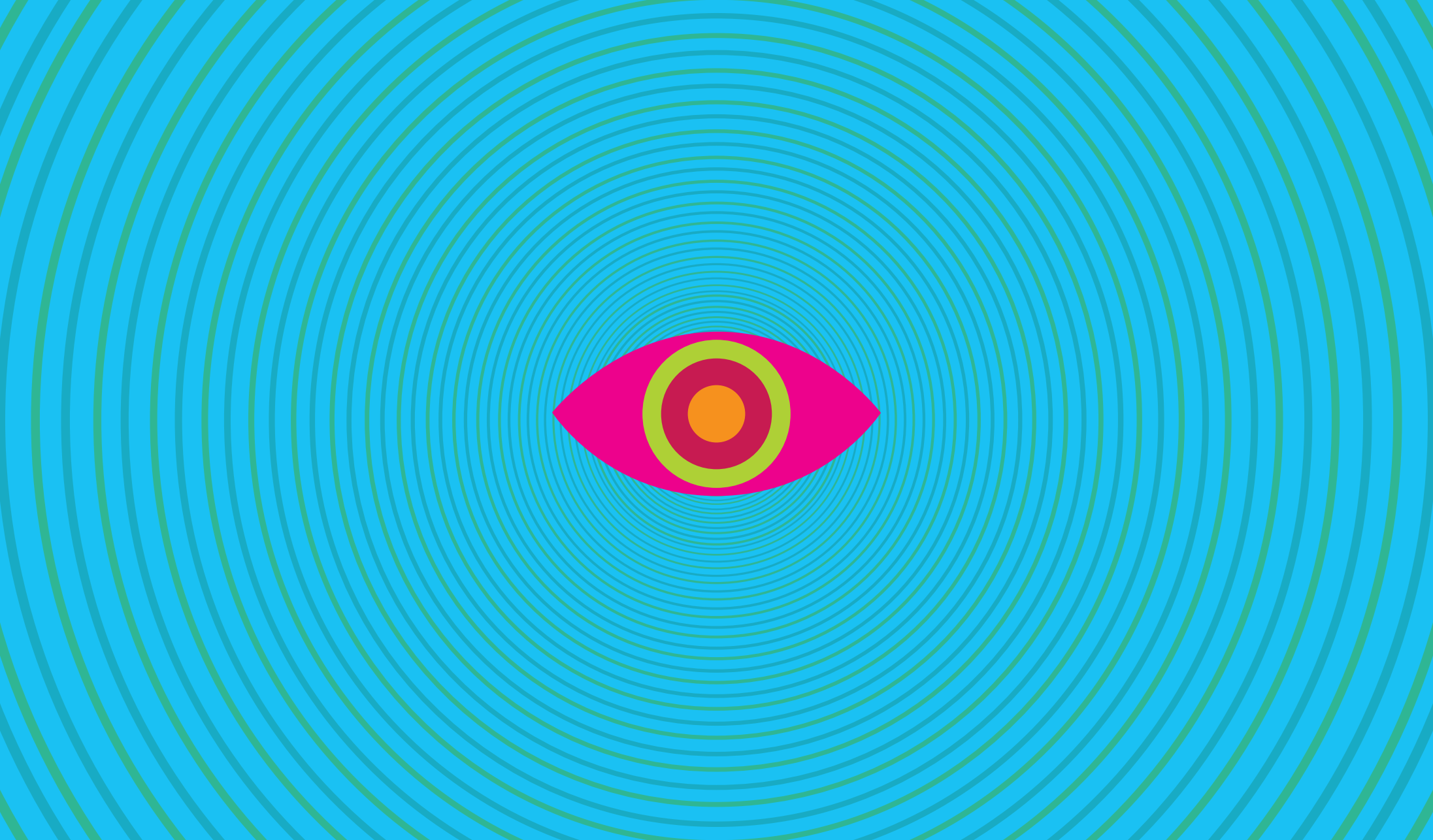
sin-uh s-thee-zhee-uh

SYNESTHESIA









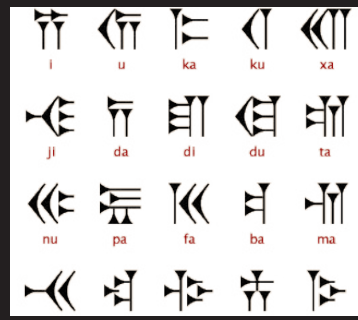
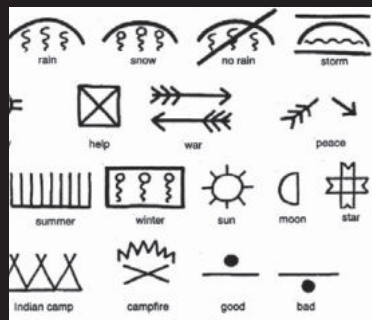


CONSTRAINT 1

OBJECTIVE**

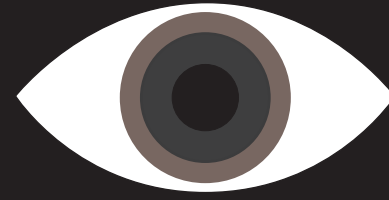
CODIFICATION

**just as music



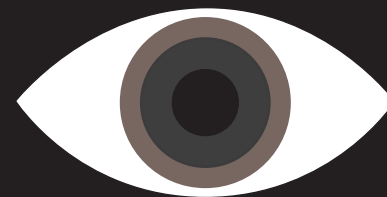
EVOLUTION OF THE ALPHABET										
PHOENICIAN	EARLY HEBREW	EARLY ARAMAIC	EARLY GREEK	CLASSICAL GREEK	ETRUSCAN	EARLY LATIN	CLASSICAL LATIN	RUSSIAN-CYRILLIC	GERMAN-GOTHIC	MODERN LATIN
𐤀	𐤁	𐤂	Α	Α	Α	Α	Α	А	𐌰	Aa
𐤃	𐤄	𐤅	Β	Β	Β	Β	Β	Б	𐌱	Bb
𐤆	𐤇	𐤈	Γ	Γ	𐌌	𐌌	𐌌	Г	𐌲	Cc
𐤉	𐤊	𐤋	Δ	Δ	𐌍	𐌍	𐌍	Д	𐌳	Dd
𐤌	𐤍	𐤎	Ε	Ε	𐌎	𐌎	𐌎	Е	𐌴	Ee
𐤏	𐤐	𐤑	Ζ	Ζ	𐌏	𐌏	𐌏	Ё	𐌵	Ff
𐤒	𐤓	𐤔	Η	Η	𐌐	𐌐	𐌐	Г	𐌶	Gg
𐤕	𐤖	𐤗	Θ	Θ	𐌑	𐌑	𐌑	И	𐌷	Hh
𐤘	𐤙	𐤚	Ι	Ι	𐌒	𐌒	𐌒	І	𐌸	Ii
𐤛	𐤜	𐤝	Κ	Κ	𐌓	𐌓	𐌓	К	𐌹	Jj
𐤞	𐤟	𐤠	Λ	Λ	𐌔	𐌔	𐌔	Л	𐌺	Kk
𐤡	𐤢	𐤣	Μ	Μ	𐌕	𐌕	𐌕	М	𐌻	Ll
𐤥	𐤦	𐤧	Ν	Ν	𐌖	𐌖	𐌖	Н	𐌼	Mm
𐤩	𐤪	𐤫	Ξ	Ξ	𐌗	𐌗	𐌗	О	𐌽	Nn
𐤬	𐤭	𐤮	Ο	Ο	𐌘	𐌘	𐌘	П	𐌾	Oo
𐤯	𐤰	𐤱	Π	Π	𐌙	𐌙	𐌙	Р	𐌿	Pp
𐤳	𐤴	𐤵	Ρ	Ρ	𐌚	𐌚	𐌚	С	𐍂	Qq
𐤷	𐤸	𐤹	Σ	Σ	𐌛	𐌛	𐌛	Т	𐍃	Rr
𐤺	𐤻	𐤼	Τ	Τ	𐌜	𐌜	𐌜	У	𐍄	Ss
𐤽	𐤾	𐤿	Υ	Υ	𐌝	𐌝	𐌝	У	𐍅	Tt
𐥀	𐥁	𐥂	Φ	Φ	𐌞	𐌞	𐌞	У	𐍆	Uu
𐥃	𐥄	𐥅	Χ	Χ	𐌟	𐌟	𐌟	У	𐍇	Vv
𐥆	𐥇	𐥈	Ψ	Ψ	𐌠	𐌠	𐌠	У	𐍈	Ww
𐥉	𐥊	𐥋	Ω	Ω	𐌡	𐌡	𐌡	У	𐍉	Xx
𐥌	𐥍	𐥎	Ι	Ι	𐌢	𐌢	𐌢	У	𐍊	Yy
𐥏	𐥐	𐥑	Ζ	Ζ	𐌣	𐌣	𐌣	У	𐍋	Zz

This table shows the evolution of the alphabet from the ancient Phoenician syllabary on which Greek script was based. The Russian Cyrillic alphabet was derived directly from Greek, whereas the English alphabet came from Greek through the medium of Etruscan and Latin.



Aa/ए





~~~~~Aa/ए

CONSTRAINT 2

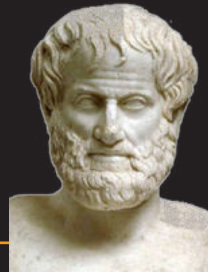
COHERENT\*\*  
CONNECTION

\*\* Unlike alphabets

# COLOUR to MUSIC

World

Aristotle *seven musical intervals*  
*seven colours*  
*seven planets*  
(discovered then)



439b–442a

Aristotle, De sensu et sensibilibus,

Newton *tonal intervals*  
*spectrum (vibgyor)*



1672

Louis-Bertrand Castel  
*musical notes*  
*colours*



1<sup>st</sup> optical  
harpsicord  
pressing every key  
would open a shaft  
of coloured light

1725

STUDY

# COLOUR to MUSIC

India

Indian Classical Music

*Hindustani & Caranatic*

*raga*

राग

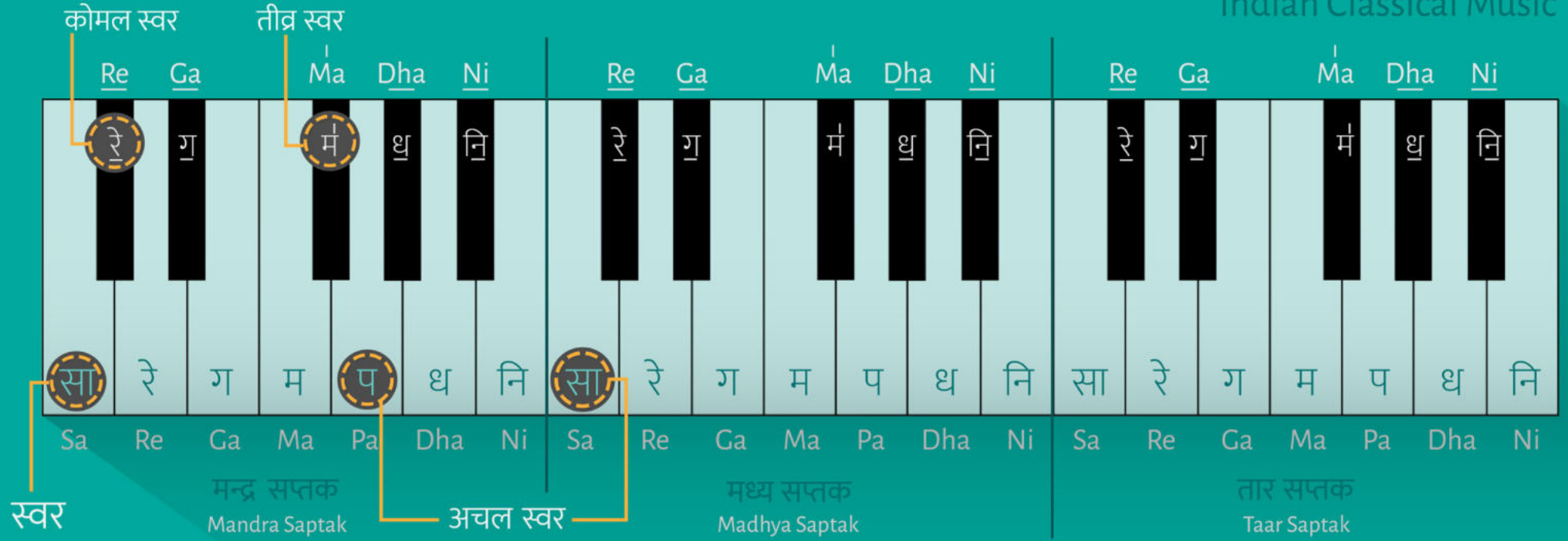
means 'colour' or 'that which

*colours the mind'*

an *elementary framework* of five  
or more notes/ swaras

basis of a *melody*

# भारतीय शास्त्रीय संगीत Indian Classical Music



STUDY

# COLOUR to MUSIC

India

Indian Classical Music

*Hindustani & Caranatic*

*raga* राग

associated with  
*a time of the day*  
and/or *seasons*

are said to  
*create a mood*  
or induce *Rasa*



shringar  
hasya  
karuna  
raudra  
veera

bhayanaka  
bibhatsa  
adbhuta  
shanta

STUDY

# COLOUR to MUSIC

India

Indian Classical Music

*Hindustani & Caranatic*

*raga* राग

associated with  
*a time of the day*  
and/or *seasons*

are said to  
*create a mood*

or induce *Rasa* ——— *Colours*



Shringara

Haasya

Bhayanaka

Bibhatsa

Shanta

Adbhuta

Karuna

Raudra

Veera

|          |             |           |        |
|----------|-------------|-----------|--------|
| shringar | Light Green | bhayanaka | Black  |
| hasya    | White       | bibhatsa  | Blue   |
| karuna   | Grey        | adbhuta   | Yellow |
| raudra   | Red         | shanta    | White  |
| veera    | Golden      |           |        |

STUDY

# रागमाला *paintings*



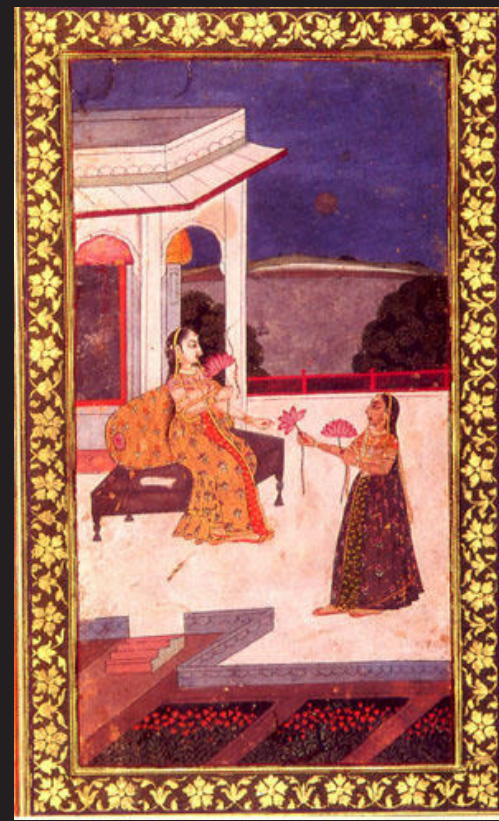
Raga Hindol



Raga Hindol



Raga Hindol



Raga Yaman

राग & रस

# राग & रस

psychophysical  
tempo dimensions  
timbre  
rhythmic complexity  
melodic complexity  
pitch

shringar  
hasya  
karuna  
raudra  
veera  
bhayanaka  
bibhatsa  
adbhuta  
shanta

A Cross-Cultural Investigation of the Perception of  
Emotion in Music: Psychophysical and Cultural Cues  
by **Laura-Lee Balkwill & William Forde Thompson**;  
Atkinson College, York University  
© 1999 by the regents of the University of California

# राग & रस

psychophysical  
tempo dimensions  
timbre  
rhythmic complexity  
melodic complexity  
pitch

shringar — Raga Khamaj  
hasya —  
karuna — Raga Bhairavi  
raudra — Raga Malkauns/  
veera Hindol  
bhayanaka  
bibhatsa  
adbhuta  
shanta — Raga Yaman

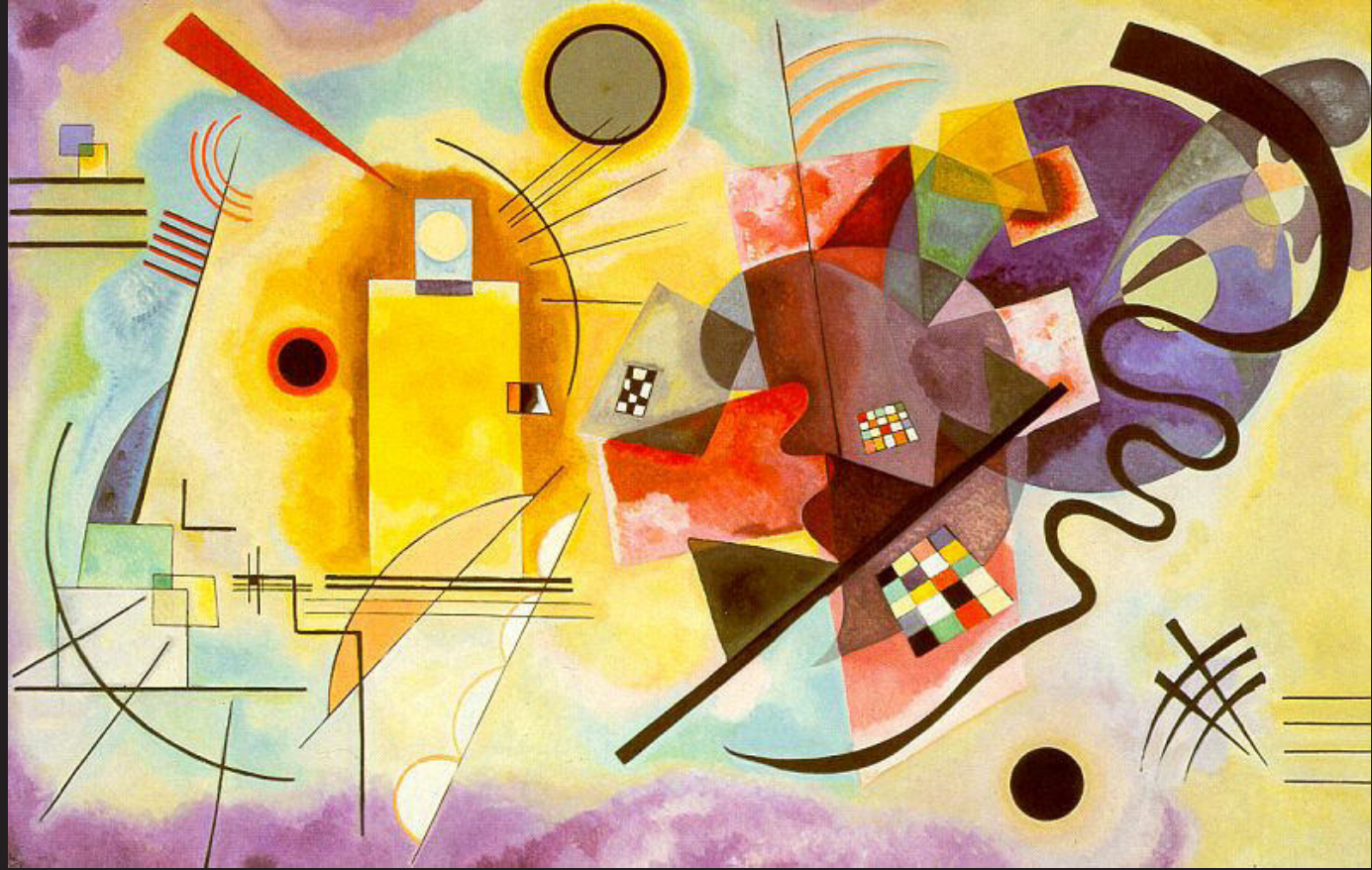
A Cross-Cultural Investigation of the Perception of  
Emotion in Music: Psychophysical and Cultural Cues  
by **Laura-Lee Balkwill & William Forde Thompson**;  
Atkinson College, York University  
© 1999 by the regents of the University of California

# MUSIC<sup>to</sup> COLOUR

## Art & New Media

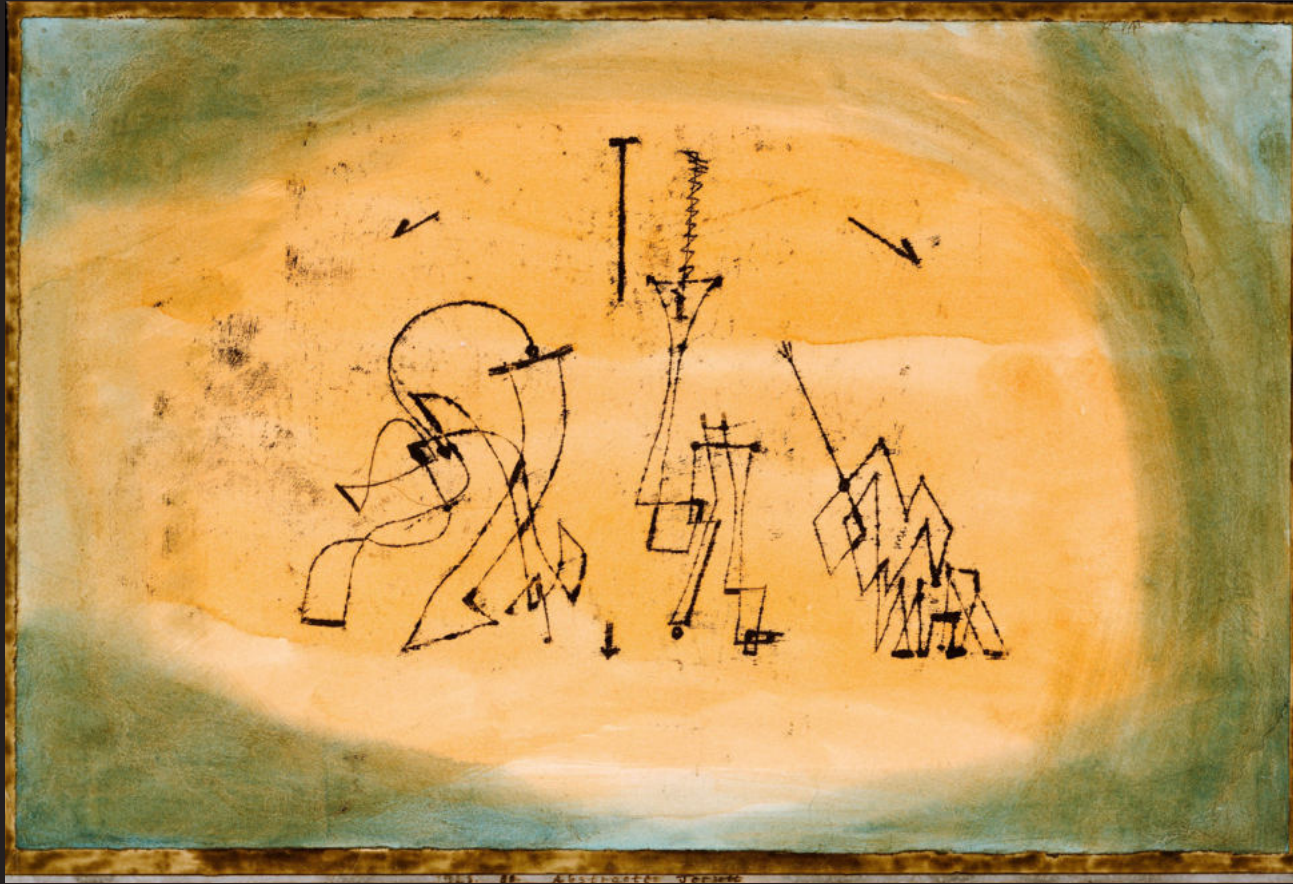
*“...abstract art, what people would perhaps consider the most emotionally subjective form of art, is actually completely objective... the emotional objectivity of abstract art lies in the characteristics of the colors and their interactions with one another.”*

Wassily Kandinsky



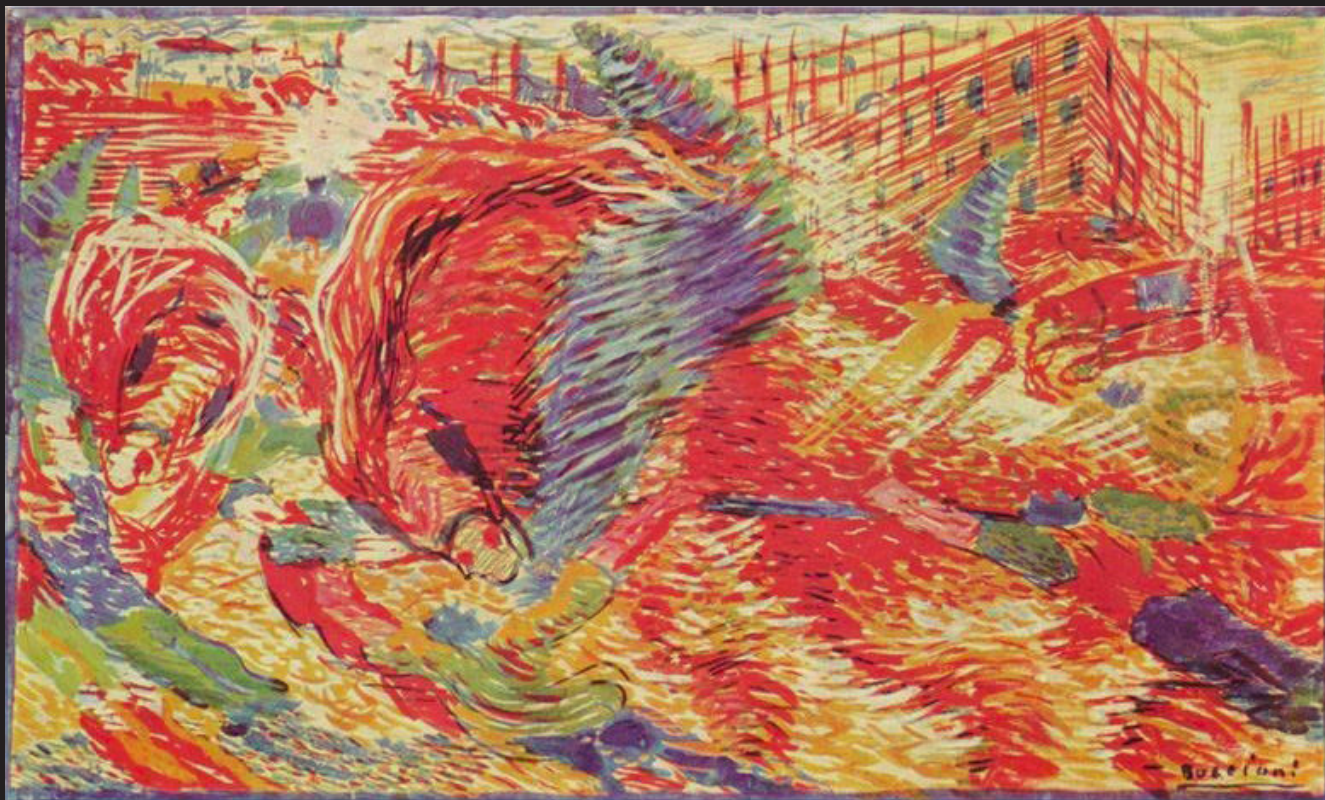


WASSILY KANDINSKY

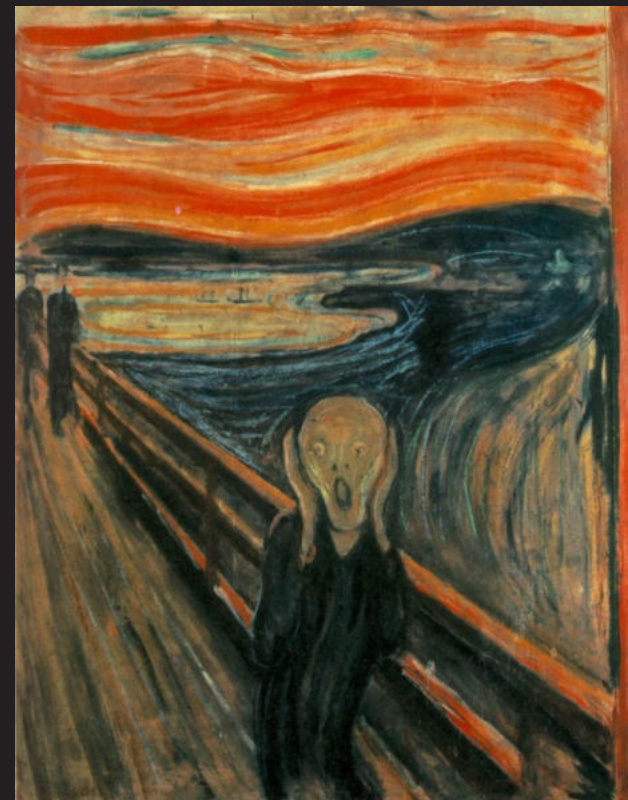


PAUL KLEE

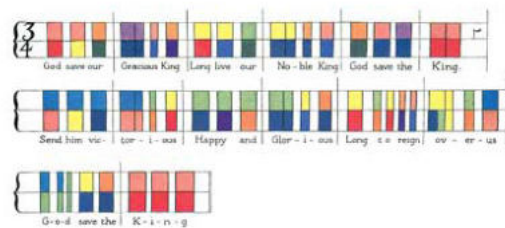




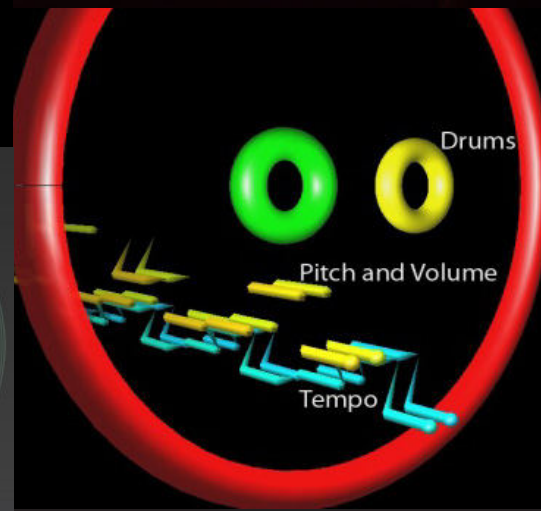
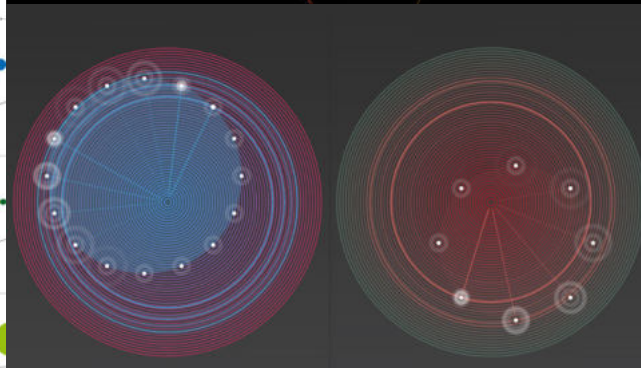
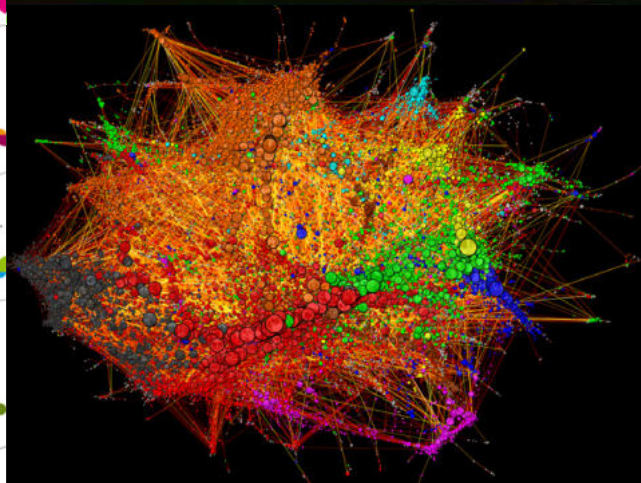
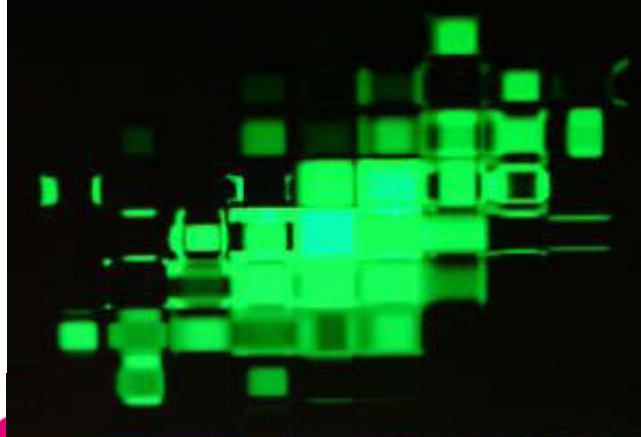
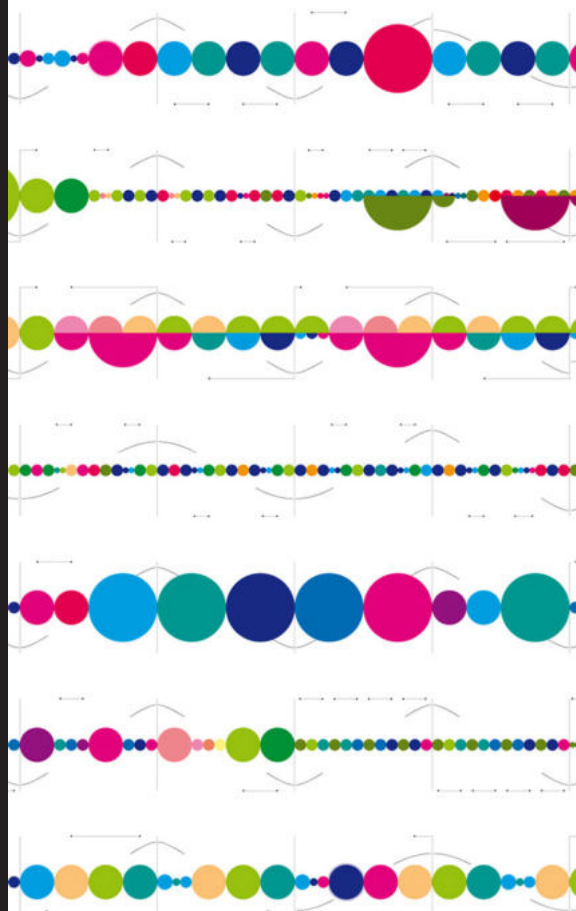
UMBERTO BOCCIONI



EDVARD MUNCH



(C) "God Save The King." Representation in colours according to E. J. Lind





mostly self  
*expression*

visual art for  
*aesthetic*  
pleasure

PRIMARY RESEARCH

# DEFINING COLOURS

To know what kind of *colour palette* can express the chosen emotions and to *substantiate* the reason for using *movement in colours* as well as to understand *which elements of art* or visuals *play a vital role* in evoking emotions in the viewers I created a survey.

# SURVEY \*\*

---

CAN ART REALLY EVOKE AN EMOTION?

---

DO THESE EMOTIONS VARY FROM PERSON TO PERSON?

---

OR ARE THEY SIMILAR FOR MOST PEOPLE?

\*\* collected 50 complete responses and around 76 partial surveys where 16 surveys had data for 6 or more than 6 questions and thus were considered in the inferences.

To know what kind of *colour palette* can express the chosen emotions and to *substantiate* the reason for using *movement in colours* as well as to understand *which elements of art* or visuals *play a vital role* in evoking emotions in the viewers I created a survey.

# SURVEY \*\*

*12 Paintings* (largely from the abstract expressionist movement)

Mix of *Single* Paintings and *Two* Paintings put together

Choice of Images – Four *chosen rasas or emotions*  
Karuna, Raudra, Hasya/Sringhar and Shant.

Order to expose the survey-takers to *a range of visual variables—colours, strokes, painting technique, content*

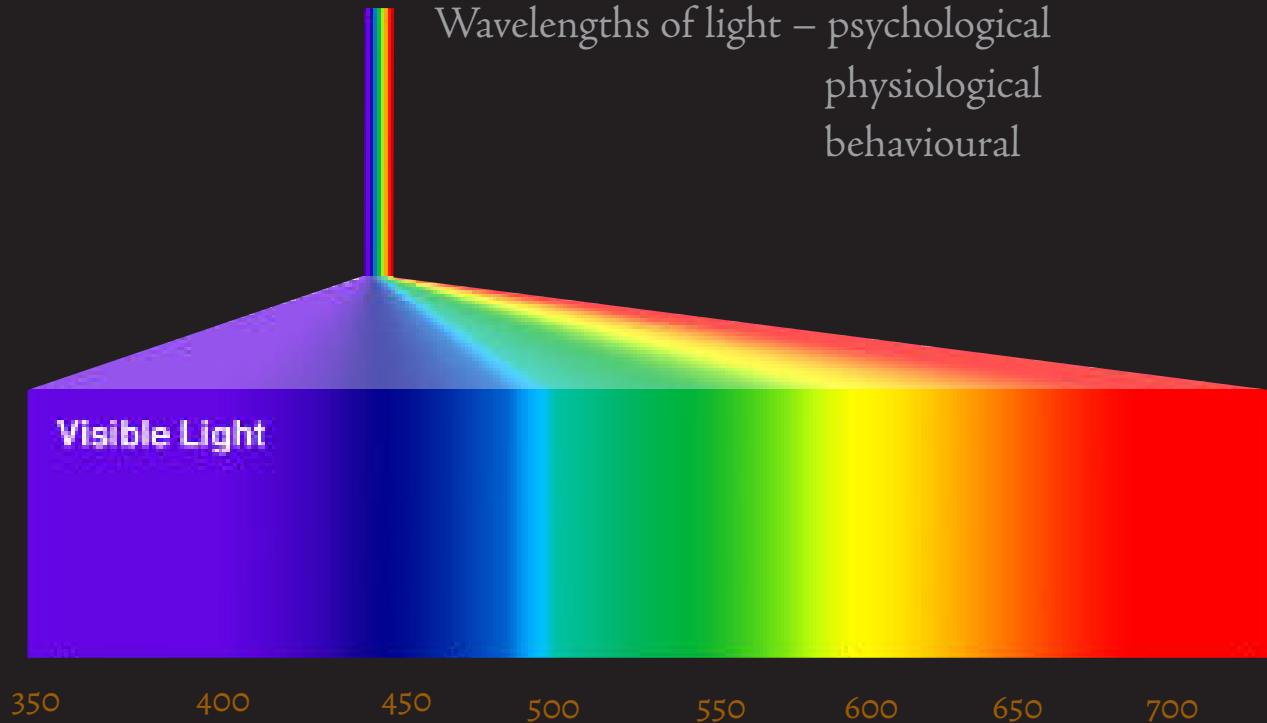
Paintings were placed – *less abstract to more abstract*

most questions as *subjective*

\*\* collected 50 complete responses and around 76 partial surveys where 16 surveys had data for 6 or more than 6 questions and thus were considered in the inferences.

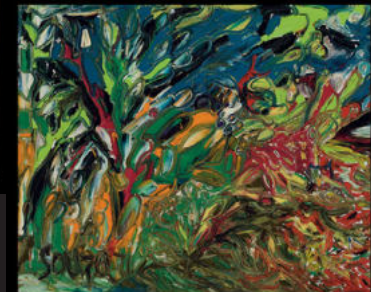
## Light – Human Circadian Rhythm

Wavelengths of light – psychological  
physiological  
behavioural



*\*\* (Goethe) suggest that there are positive and negative sides of colours where yellow, red-yellow (orange), yellow-red lie on the positive side triggering positive emotions like quick, lively or aspiring. He states that Yellow is the colour nearest to light while, blue has a slight darkness in it.*

Johann Wolfgang von Goethe,  
published his 'Theory of Colours'



PAINTINGS USED FOR SURVEY

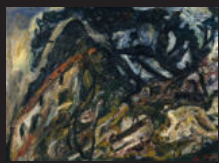
# QUESTIONS

- Does the painting generate an emotion? If yes, what kind of emotion, please elaborate?
- Rate the intensity of your emotions  
(on a scale of extremely negative – Nothing – extremely positive; this had values of -3 to +3)
- Which elements help generate this emotion? Please elaborate your choice of response.
  - Chosen Colours
  - Painting Techniques
  - Content or Characters in the painting
  - Movement of strokes  
(soft and flowy/pointy and jagged)
  - Nothing
- Do the above two paintings generate an emotion? If yes, what kind of emotion, please elaborate?
- Rate the intensity of your emotions for both  
(on a scale of extremely negative – Nothing – extremely positive; this had values of -3 to +3)
- Do you think the emotions are similar or dissimilar? Kindly state reasons for the same.
- Which elements help generate this emotion? Please elaborate your choice of response.
  - Chosen Colours
  - Painting Techniques
  - Content or Characters in the painting
  - Movement of strokes  
(soft and flowy/pointy and jagged)
  - Nothing

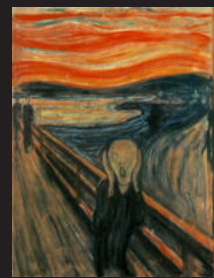
# RESULTS

# NEGATIVE EMOTIONS

Does the painting generate an emotion? If yes, what kind of emotion, please elaborate?



according ambiguous anger art bore certain **chaos** clumsy cold  
**confusion** curiosity **dark** design destruction **disgust**  
 disturbed dread dull **evil** examination **generate** hate indeed irksome jolly life manner  
 matter morbid morose necessarily **negative** none putrid revulsion sad sake scary  
 schizophrenic sinister slippery **struggle** sunny sure taking trap ugly vaguely warrior-  
 fighter wrath



alarmed alone amazed anger **anxiety** bad bold **chaos** chaotic compel  
 complementary **dark** deep despair disturbing doom edginess eeriness  
 evoke face **fear** felling flow hear helplessness horror  
 impending later life living man moment mysterious nightmare orange panicking past relaxed **scared**  
**scary** **scream** security shock slipping sorrow surprise terror  
 whimsy whole woman



abstract ambiguous anger apathy art behaviour **calm** cant caught certainty chaotic choppiness  
 claustrophobic cofusion cold **confused** content control design  
 dissatisfaction **disturbed** dread dull empathy evokes forward **gloomy** grab holds  
 keep life looks manage messy negative objective people positive ship significant slightly speed **storm**  
**stormy** strong struggled stuck sympathy upheaval waves



anger art ate **chaos** chaotic colour **conflict**  
**confusion** cruel design direction **disturbance** fights  
 flowing freedom give **growth** idea image indicates inspiring lacks life  
**looks** magnanimity **messy** nature nourishing ok oooo palette  
 pandemonium particular **people** person picture plans  
**positive** provide revolution sharp something talking technique top  
 ughhhh understated used **war** watching

# NEGATIVE EMOTIONS

Which elements help generate this emotion? Please elaborate your choice of response.

add aggressive alarmed along boundaries build central **character**  
chosen **colors colour** combination convey  
created **dark** different elements else environment  
evoke **expression** face far **fear figure** flow foreground  
form generate **give** help kinda lines **main movement** name okay  
orange perhaps play red **scream** simplification sky something  
**strokes** strong tend used wide

alongwith art beautifully bit **blue** brush cant chaotic cold **color**  
**colour** composition concept confidence **confusion** content  
convey depressing devoid effect entangled greenish hey impossible interest interpret keep life  
looks lost middle nothing overthinking power **random** represent rough ruined rushing  
soothing **strokes** strong subject toddler tone  
**understand used** whatever work yellow

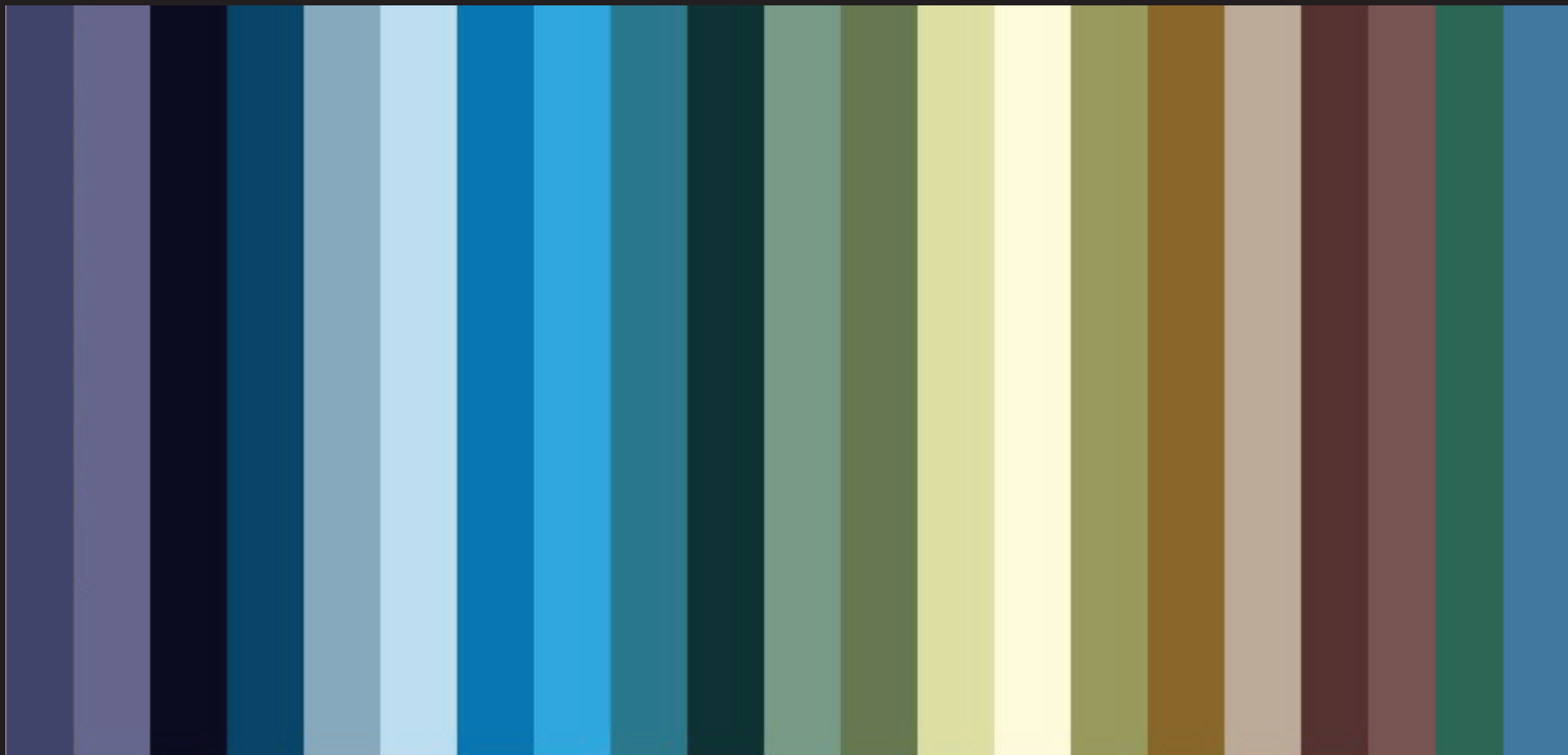
altogether amid **bad black** bold boorish canvas **chaotic**  
clearly **colors colours** contribute convey **dark**  
depressing elements **feels** figure **form** fossils happening head  
hopelessness lack life **light** living meaning mess mountains  
**negative** none path picture positive power predominantly rocky  
rotten rough **something** spider **strokes**  
**structure** subjugating **together** underlying uneasiness  
used view

**COLOURS** Dark, high contrast, rotten, murky, greys, blues, depressing tones, Dull, BLACK, Cold

**STROKES** Broken, Rash, Rough, Chaotic, Boorish, Hurried, Disturbance, Random, Ragged, Bold, Thick



Colour Palette of 21 colours for  
*'Raudra'*



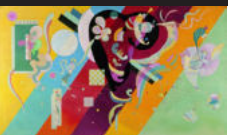
Colour Pallete of 21 colours for  
*'Karuna'*

# POSITIVE EMOTIONS

Does the painting generate an emotion? If yes, what kind of emotion, please elaborate?



agitated brings calm cases chaos confusion creates curiosity danger depressive  
destruction drama element energy enlightened evoke faith fierce fiery figure freedom gone happen  
hazy helplessness hope hopelessness humility inconsequential inner journey later  
losing lost middle mystical peace reaching religious retrospective scheme sea something storm  
survival toil top towards turmoil waves



abstract accord animals beacuse brain bright brighten brightly  
celebration childlike colors confusion done  
dresses evoke experience experimentation feelin female forms frankly fresh geometrical give  
growing growth induces interpret light lil meaning mood none nothing numbers  
organic placement playful positive presents quixotic richness  
shapes something sophisticated supplement tiny trippiness used wanting



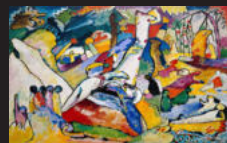
anger bad based beginning bloom calm clearly cold collected  
convey cool dark deep depressed different energetic  
energy excited full gloomy growing hand hope  
inducing life light loneliness looks lower memory negative  
night peaceful phase positive pros relaxed  
remind resembles rough sea solace stabilizes sun sunrise twilight used  
wanting warm warmth



along authentic battle birth calm calmth cold colors content contrasting design divine  
dumb energetic energy enlightened exactly extensive flower form half heaven heavenly infertility  
insides life light longer lower meditate peace peacece power relax religious  
remind restless serene sexual shades slit something  
soothing space spiritual spiritualistic strong top tranquility wars



bedtime calm chill city cold concrete content convey coz dark depressive diagonal  
door draw gentle gloomy homely horizon illusion jigsaw light logic lonesome mysterious name  
negative night pattern peace pity places relaxed settling shadows shady shapes  
sleep slightly small solitude soothing stillness structured texture  
tranquility unable uniformity wanting winter wow



around art bright celebration chaos cheer collaboration  
colors colours confusion creating curiosity  
distinguished draw elements energetic energy enthusiasm  
excited experience form freedom fun game happening interpret  
irritates joy life loss lost madness mamantaram meaningless mix nude people playful  
positive revolution scheme something squashing strong suppose  
surprised together unsure used zesty

# POSITIVE EMOTIONS

Which elements help generate this emotion? Please elaborate your choice of response.

add bright characters cheerful childlike choice colors  
colours corner create destruction direction energy eye festive  
follow freedom fun general going happening impression intriguing later lost moment  
mood neutral nightmare nourishing object ounces piece plan playful reminiscent responded rest role  
seeing shapes something strokes style tends things used  
vibrant whatsoever wide

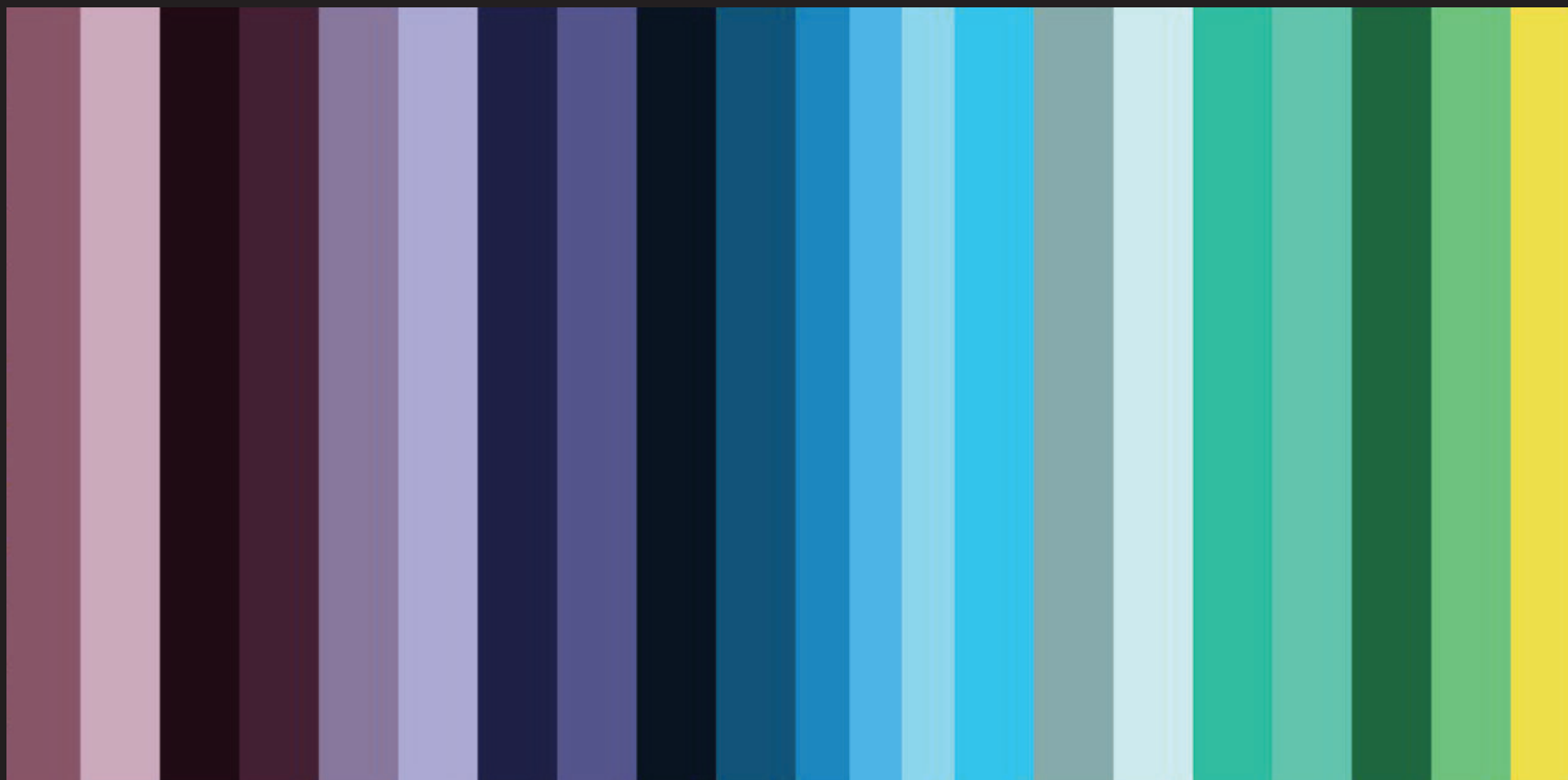
attention bigger bottom calm cant center channeling cold colors  
colours content criss-crossing depicts desolated direction edges  
elements evoke form hopeful image intensity largely light looks  
movement na non-clarity pattern peace positive powerful previous  
role sem stimulus stokes storm strength strokes style suggest  
survival technique top towards unsettle used view warm  
abstract appear art bar bright cheerful colors  
colours contemporary content controls convey creates defined  
elements fall figure forms fresh geometric give happening highly  
interest lacks life light meaningless objects odd overall pattern placement play positive  
relate rigid role shapes something strange structure  
symbols tends tentacles unique unrelatable unusual vibrant whole

add balance blue bring calm candle certain colors  
colours combined contrasting cool created direction energy flow flowy focus form  
freedom half image light looks mind movement overall peace picture positive quite  
relaxed serene shades smooth soft soothing space spiritual  
strokes strong suggest symbol symmetry top tranquil used white whole  
yellow

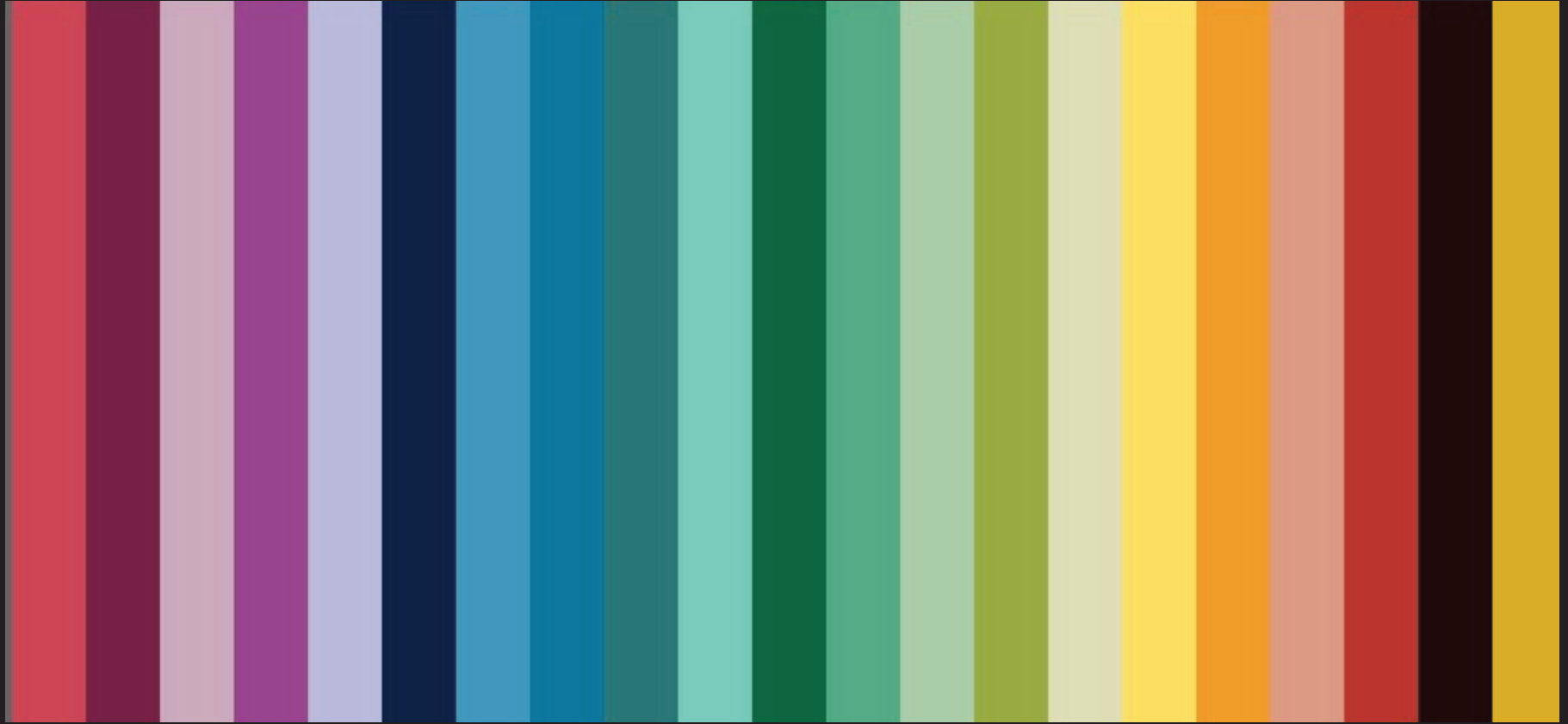
blocked blue calmness cold colors colour  
combined comforting contemplative cool create depression  
distinct elements evening evokes extremely give goal illusion life  
lines moon mundane mysterious night peace positive power  
prettiness quite relaxed reveals room scheme shades shapes sky  
slightly soft sole soothing sun taking thoughts used walk  
warm winter yellow

COLOURS Cool, serene, soothing, light, glow, vibrancy, colourful, harmonious, positive, vivid, festive, prosperous

STROKES soft, organic, smooth, free-flowing, unidirectional, structured, delicate, bending



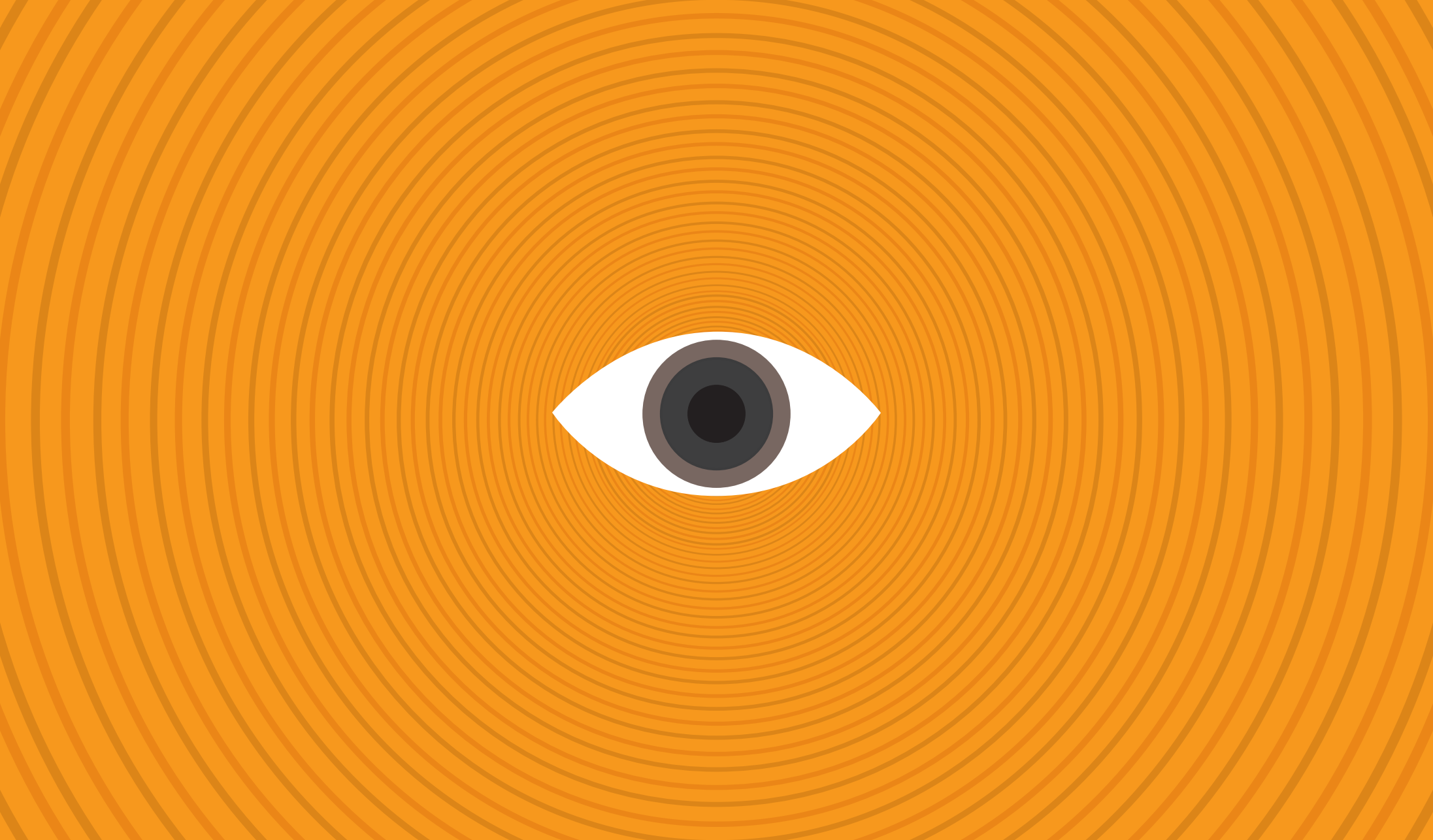
Colour Palette of 21 colours for  
*'Shant'*



Colour Palette of 21 colours for  
*'Hasya'*

APPLICATION

# LEARNING BY DOING



APPLICATION

# VISUAL-ACOUSTIC \*\* INTERACTION

*to enable the user to play with  
colour and sound in real time*

\*\* acoustic space, where both the senses together can be stimulated







Leap Motion is a computer hardware *sensor device* that supports *hand and finger movements* as input without any contact or touch. Leap Motion allows the user to move in *X, Y and Z axis* and can detect the entire *hand skeleton*.



DESIGNING A

# VISUAL-ACOUSTIC INTERACTION

# •rang रग & raga राग

colours

(x and y axis)

swaras

lightness

(darker, main, lighter)

three saptak

(low, mid, upper)

movement

in z and y axis

modulation

strokes

in x and y axis

fluidity

size

of the brush

pitch

shape

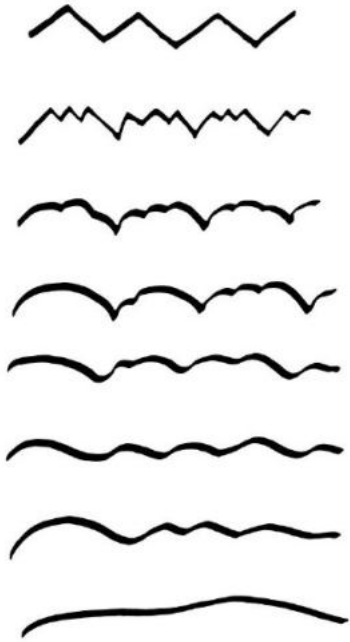
of the brush

timbre

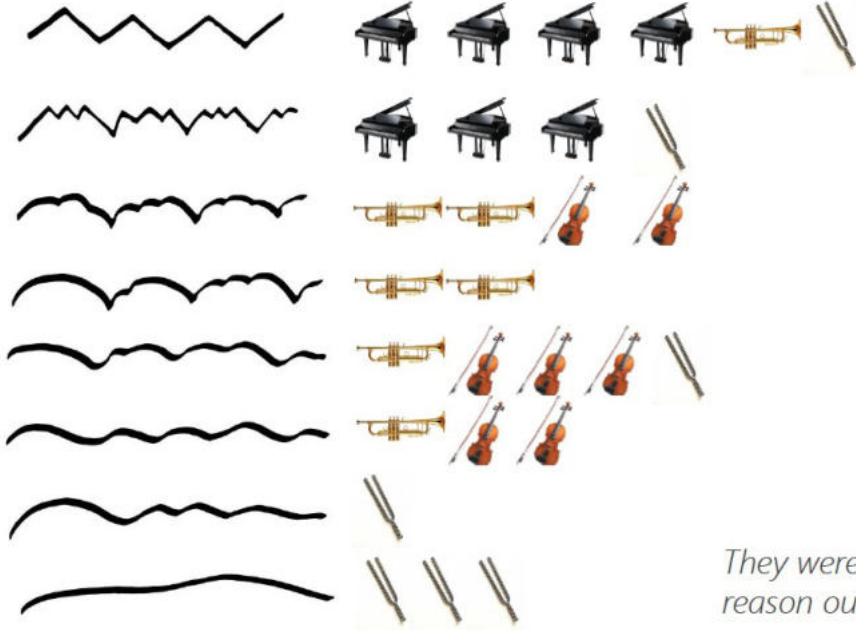
opacity

intensity of sound

# Visualizing Timbre



*4 completely different instruments were chosen for the visualization check ( since designing for children with cochlear implants )*



*They were also asked to reason out their choices..*

# Visualizing Timbre



"Piano..", "abrupt", "discrete",  
"breaks", "sharp"...  
*were the words used*



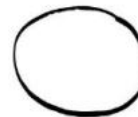
"pom pom!", "windy", "cloudy",  
"blowing", "bending notes"...  
*were the words used*



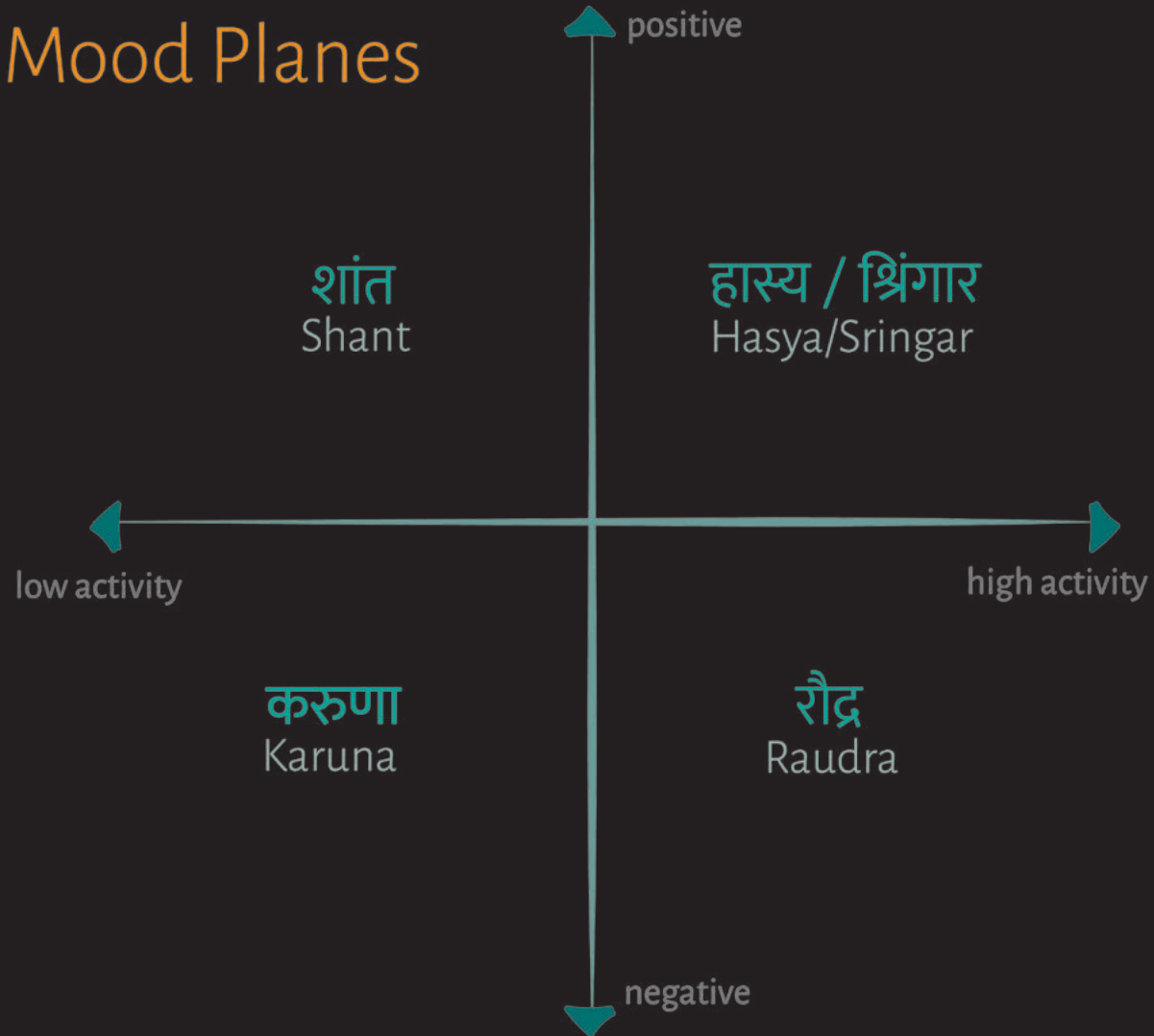
"Wavy", "flowy", "vibrating",  
"soft"...  
*were the words used*



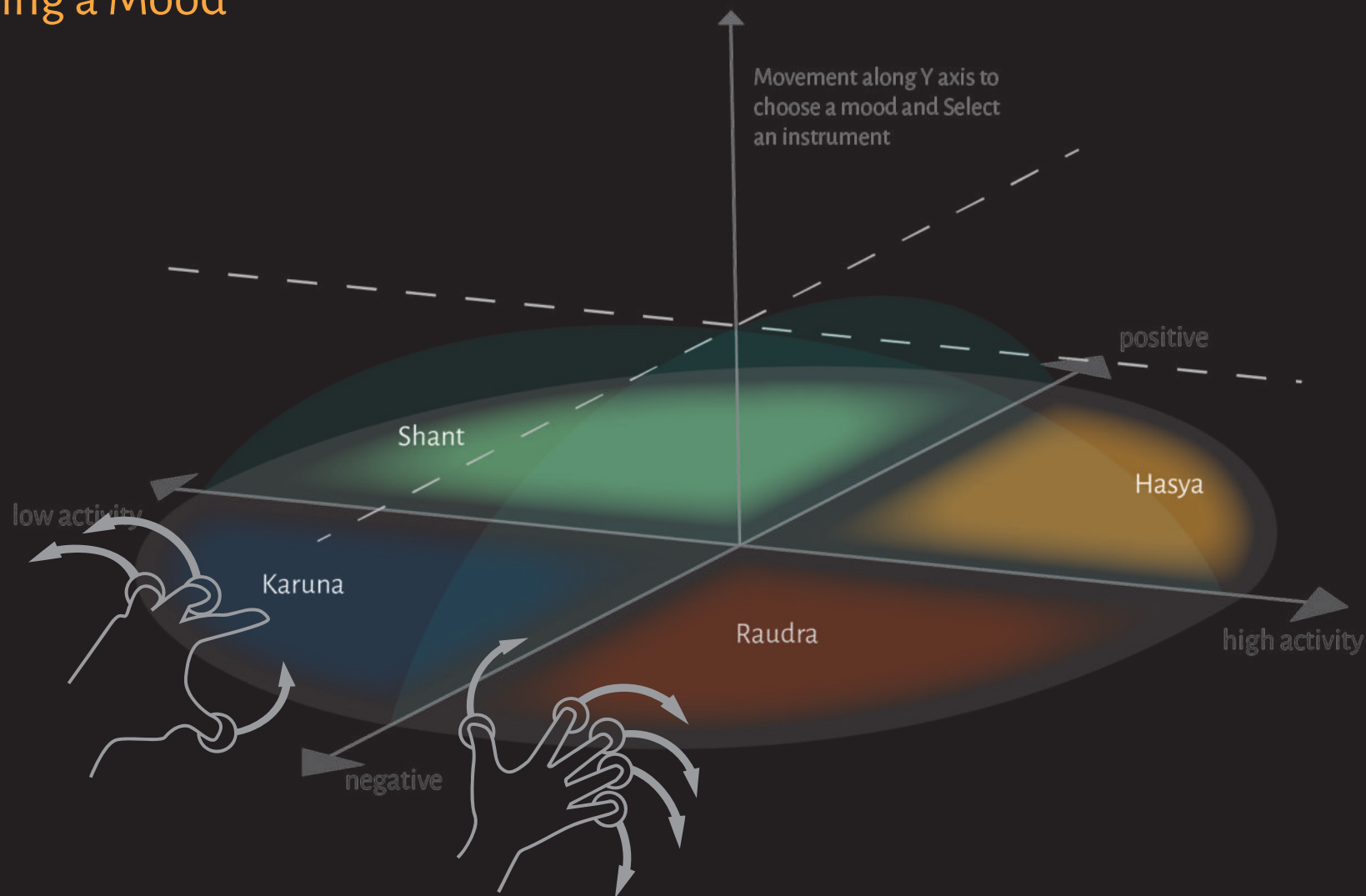
"plain", "flat", "simple" ...  
*were the words used*

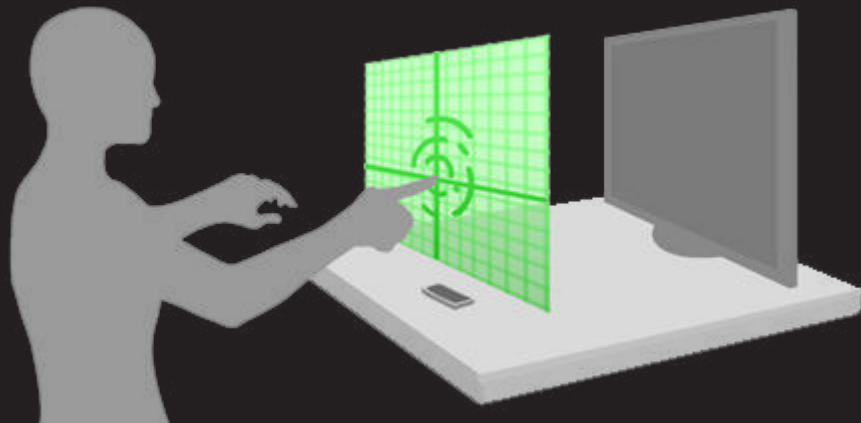


# Mood Planes

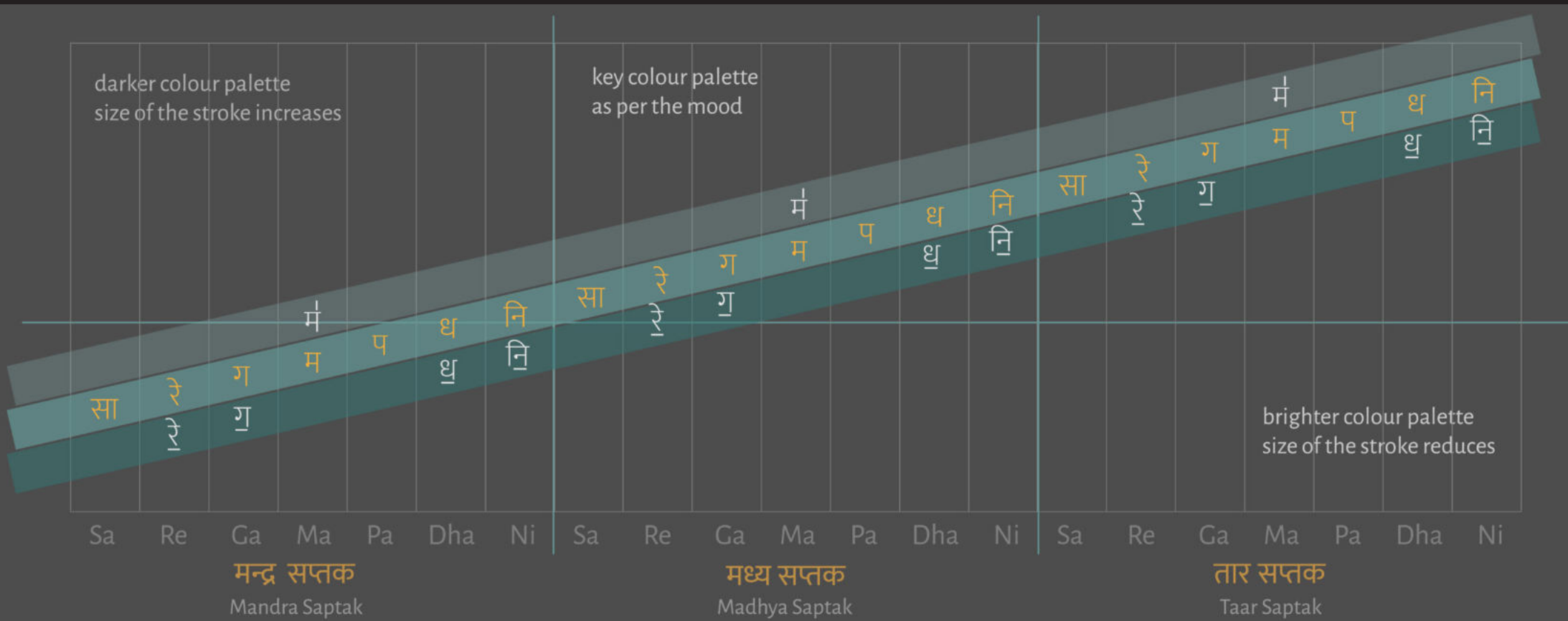


# Choosing a Mood





USER INTERFACE GRID



Basic Grid for the Interface

work in progress

# DEFINED GESTURES



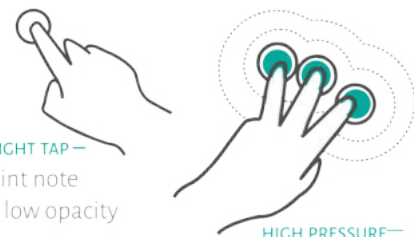
Can be played with both hands



Tap



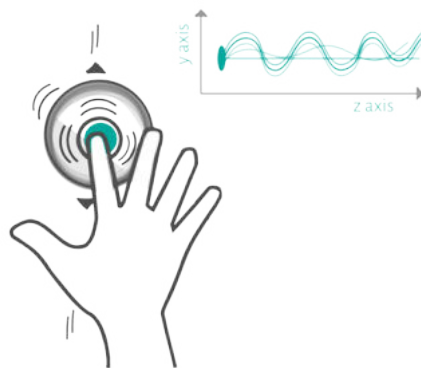
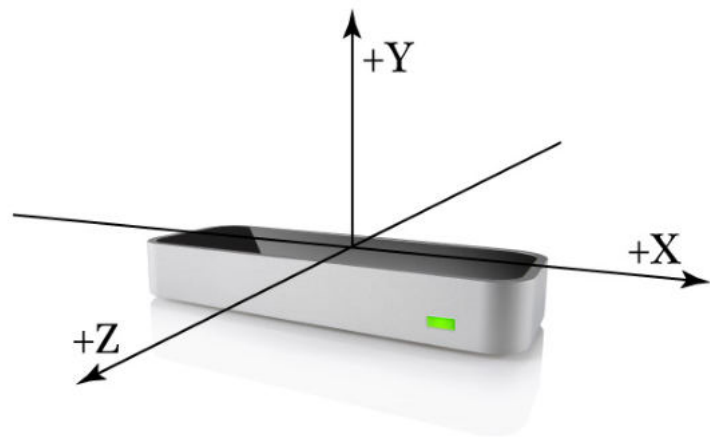
Hold



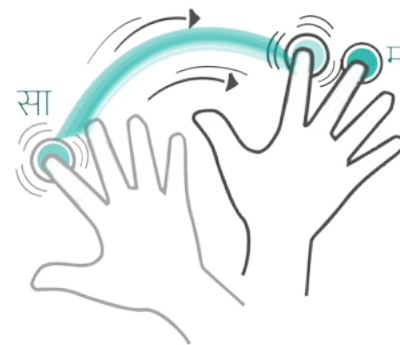
SLIGHT TAP —  
faint note  
& low opacity

HIGH PRESSURE —  
loud 'n clear note  
& high opacity

Pressure (movement in z axis) on  
each note denotes clarity of sound



Hold the note & move it vertically  
Causes modulation in the note



Tap 'n Hold a note & move it along a path.  
Sound fades out along the path

# FUTURE \*\* SCOPE

\*\* Sight of Sound, as a project, is currently at a very nascent stage, where it is trying to define its basic ground. Thus, the stated scope of the project may not be a direct application anytime soon but with due amount of work and in due course of time it could work in these afore mentioned directions.

# FUTURE \*\* SCOPE

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DEFINING A NEW LANGUAGE

---

PERFORMANCE AND STORYTELLING

---

VISUAL MUSIC HEALING

---

HELPING THE IMPAIRED

\*\* Sight of Sound, as a project, is currently at a very nascent stage, where it is trying to define its basic ground. Thus, the stated scope of the project may not be a direct application anytime soon but with due amount of work and in due course of time it could work in these afore mentioned directions.

# CHALLENGES LEARNINGS