INRC Group Structures in Color Aesthetics

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 The consciousness of color in human experience
 are very important, and most of all they are
loaded with significant menaings. In fine art, a revolution in
color was made by impressionist painters, and the colors used by
impressionists have influenced many streams of the 20th century
modern arts. Seurat, for instnace, employed the Chevreull's color
law, and created his pointilism: Pointilism means that justaposing
two contrasting colors make each color be more vivid(Welton, 1993).
What is distinct in impressionism is that each color symbolized some
meaning, and Delacroix, for instnace, was the forerunner of the color
theory of meaning. Delacroix hypothesizes that colors symbolize human
emotional consciousnesses(Birren, 1986).In the filed of fine art,
there have been various attempts to identify the laws undlerlying
the colos system perceiavable by humans(Birren, 1987; Gerstner,1986).
Howver, no distinct law has been so far emerged. Especially, it has
not yet been thought of that the color system can be analyzable by
any logico-mathematical laws.

This study has
has two objectives: (1) Identifying the laws of color system, and (2)
identifying the laws of human consciousenss of colors. The conclusion
that will be drawn is that some logico-mathematical laws are embedded
in the color system which can be perceived by a man. This stsudy
takes a priori analytic approach. The present investigater has
been keeping the hypothesis that any human conscious experiences
can be analyzable by Piaget-Inhelder's INRC Group structural laws,
if the conscious experiences are really matured human experiences.
Therefore, this study starts with the assumption that human
consciousnesses in colors can be analyzable with
Piaget-Inhelder's INRC group structural laws, and the
color system per se can be analyzable with Piaget-Inhelder's INRC
group structural laws.

Piaget-Inhelder's group structural laws are (1) Identity which
means
a proposition as it is, (2) Negation which means the nullifying the
proposition, (3) Reciprocity which means the opposite proposition,

and (4) Correlativity which means the nullifying the Reciprocity
proposition: Mathematically speaking, if the Identity means "+5",
then the Negation means "+0", the Reciprocity means "-5", and the
Correlativity means "-0". This study samples one particular
color, Mauve as a starting point of this study: This means the
Mauve is Identity. If so, its Negation means negating the color of
Mauve, and here is means light Pinkish Mauve or Pink. The
Reciprocity of the Mauve is Yellow, and its negation which
is Correlativity is Light-Yellow. Painter can and often use the four
colors in their paintings: But they were not conscious of the INRC
group structural laws embedded in the four color system.

 What has been attempted here is to

identify the aesthetic semantics of the four color system, and
the laws embedded in the aesthetic semantics. Mauve is the color
symbolizing the Nobility or Heaveness, and Yellow is the color
symbolizing the Humanness or Earthiness. In these semantics, the
semantics of their Negation or Correlativity can be automatically
generated. If so, the semantics of the four colors also keep the
INRC group structural laws? This is the question pursued here
seriously. The statistical model to test the hypotheses here
is LISREL. Even though INRC relationships can not be perfectly
tested with LISREL, the causality of LISREL is hypothetically
equated with logical transformations of the four group structural
laws. For instance, if Identity is to be transformed to Negation,
the causality direction is from the Identity to the Negation,
although path coefficients may not be decreased. If, the
direction of causal movement is proceeded from the Idnetity
constrsuct to the Negation construct, then the logico-mathetical
relationship is hypothesized to be observed. Therefore, a
theoretical model is hypothetically constructed, which is
shown in Appendix-A.

What culminated in Piaget-Inhelder's INRC group structural laws
is the equlaibrium relationship between
Identity and Reciprocity: Equilibrium is the combination of Negation
with Reciprocity. Here, if the color of Mauve is reciprocal to the
color of Yellow, then they can form an equlibrium relationship
meaning that Mauve and Yellow counterbalances each other. The
proposition that Mauve and Yellow counterbalances each other means
that if Mauve is getting darker, then Yellow will be also darker, or
the Yellow can negate the darkeness of Mauve to the exntent that the
darkness of Mauve will be equal to the darkness of the Yellow. It may
be interesting to analyze paintings with Yellow and Mauve, to see
whether the darkenss of Mauve and Yellow are equal or different.
It is the hypothesis of this study that a painter would not paint a too
dark mauve flower with a very light yellow and vica versa.

The color aesthetic semantics identified here are also tested with
INRC group structural laws. That is, it is tested whether the
meaning of Mauve which is Heavenly is reciprocal to the meaning of
Yellow which is Earthy or not. And it is explored how is the semantic
relationship between the Mauve and Pink, and between the Yellow and
Light-Yellow. LISREL permits to test the causality between Pink and
Mauve, but the direction of causality permitted is from Pink and Mauve;
however, it permits to test the direction of causality between Yellow
and Light-Yellow from the Yellow to the LIght-Yellow. Because of
the limit imposed by LISREL Piaget-Inhelder's INRC group structural
laws are not perfectly statistically tested. But it is explored how
Piaget-Inhelder's groups structural laws can be configurated
statistically.

In testing the four colors and the semantic laws with
INRC group structural laws, a particular assumption is made here: That
human aesthetic consciousensses in colors are cognitive and are the
cognition is nothing but logico-mathetical. Romanticists and the
moderen aesthetic ideologies like Surrealists claim that aesthetic
human consciousness are emotional. But this study takes the
classical views on Art, meaning that Arts are the
representations of human reasons which are the laws of
order, harmony and beautiful ratio. One thing this study adds to
the classcism on Art is that the laws of order, harmony and
beautiful ratio is like Piaget-Inhelder's INRC group
structural laws and its equlibrium law.

The type of modern art theory arguing that Art
is the product of human bodily libido energy is to be negated with
the result of this study on color aesthetics. The reason for why
colors insted of forms are tested is because colors are
traditionally interpreted as the symbol for human
emotions. Here it is tested that even human emotions or color
consciousness is cognitive. The artist like Yve Kline who paints with
human body or like Jackson Pollock who paints with sexually violent
action should be prepared with the scientifically valid empirical
data showing that color consciouness or aestheic consciousness are
generated by human bodily libido. This means their beloved human
body and sex for art should be empirically analyzed into testable
constructs and the constructs should be tested quantitatively. When
here the quantitative test for human cognition in color aesthetics is
done, why not they.

 Methods

Subjects: 206(m=85 and f=121)subjects
were randomly selectted from K-University. The subjects were the

students enrolled introductory psychology in K-University.

Tools(Scales) Used: Eight scales were developed by the present
investigater. Originally four universal scales(one scale for each
color) were developed, and factor-analyses selected the final
items, and constructed the final eight scales(twe scales for each
color). The itmes with their factor loading of above .40 were
selectted as valid items.

Four paintings of flowere were made by the present investigater:
Mauve Flower painting,
Pink Flower painting, Yellow Flower painting, and Light-Yellow Flower
painting. The four paintings were identical in their form, only the
color of flowers were different from each other. Mauve represents
Idnetity, Pink represents its Negation, Yellow represents its
Reciprocity, and Light-Yellow represents the negation of
Reciprocity. (Please see the actual paintings.)

Procedures:(1) Itemconstruction: 100(m=50, f=50) subjects who were the
psychology major students viewed each painting, and stated their
impressions or feelings or thoughts on each painting in a delcarative
sentence form. On the basis of the students' responses, the present
investigater constructed the universal four scales.

(2) Final Study: About 70
students in one time as a group viewed each painting, and rated its
likeliness on the 8-points scale. For instance, if the subject
felt toward Mauve-Flower as "mystic" strongly, then s/he rated from
7 to 8 point. The total time taken to complete the scales was about 20
minutes.

Statistical Analyses: (1)Factor-Analysis: Principal component analysis
with
Varimax rotation was used for the construction of the final eight
scales. Spss-x package was used.

(2) Final Study: LISREL 7.16 was used for the final convariance
stsructure analysis.

Results

The obtained data were analyzed into a correlation
matrix: The analyzed correlations were shown in the Table-1.
Correlation data were used for the LISREL analysis. As you can see
in the Appendix-1, the obtained path-coefficients were quite good.
First of all, the Goodness of Fit Index was .972 which is very
significant, and its Adjusted Goodness of Fit Index was .934.

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These statistics show that the theoretical model constructed here
has been proved as a valid model. Each measured variable was also
significantly explained by their theoretical variables. GA11 was
strong, BE21 was even stronger, and BE32 was strong: Interestingly
engough, BE12 was negative, which was -2.74. Whether the sign
difference between BE21 and BE12 can be interpreted as the
statistical indication of Piaget-Inhelder's equilibrium should be
further discussed, however, this study interpretes that it is not.
Rather it shows that when Mauve gets strong, its Reciprocal Yellow
gets also strong, but when Yellow gets strong, its Reciprocal Mauve
get weaker. These semantics are very difficult to interprete,
although they are very interesting. These will be discussed in
the Discussion.

Table 1: Correlations among Variables

Results
As the two GFI show, the theoretical
model constructed here has been proved to be a valid model. What this
model explains, thoguh, need some discussions. This study present the
following five explanatory interpretations as to the present
theoretical model for color aesthetics:

(1)As far as Piaget-Inhelder's INRC group structural laws are concerned,
the equilibrium relationship which is expressed as the reciprocal
causality shown in the model has been shown to be some particular
causality; BE21 was +2.17 amd BE12 was -2.74; the two absolute values
were quite balanced, however the sign of each number is opposite; BE21
shows that Mauve and Yellow get stronger with equal powers, when the
color moves from Mauve to Yellow; however, Yellow causes less
Mauve, when the color moves from Yellow to Mauve; what these two
findings are telling us?; it seems the following four theoretical
propositions as to the two colors can be drawm;

(a) if Mauve is the major color in a painting and
Yellow is the minor color, then the darkness or lightness of the two
colors are equal;

 (b) if Yellow is the major color and Mauve is
the minor color in a painting, then Yellow opporesses Mauve; this
oppression means if Yellow is strong, its minor Mauve should be
light;

(c) it is more likely that a painter paints Mauve as the
first expression of color than Yellow, if the darknesses of the
two colors are to be identical;

(d) it is more likely that a painter paints
Yellow as the first expression of color than Mauve, if the darknesses
of the two colors are to be different.

 (2) GA11(1.08) shows a very meaning statistical
power; this finding shows that the logic of color expression in
painting moves from light Mauve or Pink to a darker Mauve rather
than vica versa; of course, some painter starts his/her color
expression beginning with dark Mauve and moves to light Pink;

however, the finding of this study shows, it is more causally logical
to move from light to dark, which here from Pink to Mauve; this logic
shows a crecendo-like color expression rather a decrecendo-like color
expression; and it is very likely that many painter starts their
color expression from light to dark; another interesting finding
was GA31(.243); this statistic shows there is a moderate level of
causality from Pink to Lihgt-Yellow, which shows another type of
equlibrium relationship; this is Piaget-Inhelder's equilibrium
relationship showing that if Pink gets stronger, then its
Reciprocity Lihgt-Yellow gets also stronger, and not vica versa.

(3) BE32 was 1.05, which
shows that there is a very meaingful causality from Yellow to
Light-Yellow; the direction of causality was from Yellow to
Light-Yellow; this direction shows that the logical direction of
color expression is from Yellow to Light-Yellow, meaning that it is
more logical to paint starting with Yellow and move to Light-Yellow
rather than vica versa. It is a very good empirical question, whetner
any painter first expresses Yellow and then expresses Light-Yellow or
not.

(4) The model as a whole tells that the universal
causality moves starting from Pink, to Mauve, to Yellow, and
finally to Light-Yellow, and not from Yellow to Mauve; this
relationship tells us that the logic of color expression
starts from a light, then to a dark, and then its reciprocal
dark, and finally to a light. Psychologically interpreting, the
color expression in aesthetics begins with some light, tender, and
soft thoguhts and feelings, and then move to dark, strong, and
rational thoughts and feelings which coudl be the themes of one
aesthetic substance, and then expresses their reciprocal thoughts and
feelings with an equal strength, and finally concludes with a
reciprocal, but light, tender, and soft thoughts and
feelings; these psychological processes of color aesthetics
are experimented here with Pink, Mauve, Yellow and Light-Yellow.

(5) As a
conlusive explanation, human color consciousnesses can be
analyzed into four major components, which are INRC group
structural laws; and the psychological meaning of color
aesthetics can be quantitatively explored, and semantically
interpreted depending on the particular colors tested; in here the

four colors, Mauve, Pink, Yellow and Light-Yellow are explored as to
their expressive logic and genertive causality; humans expresse or
generate color logics not randomly or not by bodily libido, but by
logico-mathematical laws; and any colors can be logically grouped, and
the artistic or aesthetic grouping of various colors are law-binded
like INRC group structural relationships; why a painter expresses
one color with another color is also logically explainable and
analyzable; and finally the human psychic consciousnesses of
color aesthetics are also law-binded like INRC group structural
laws.

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