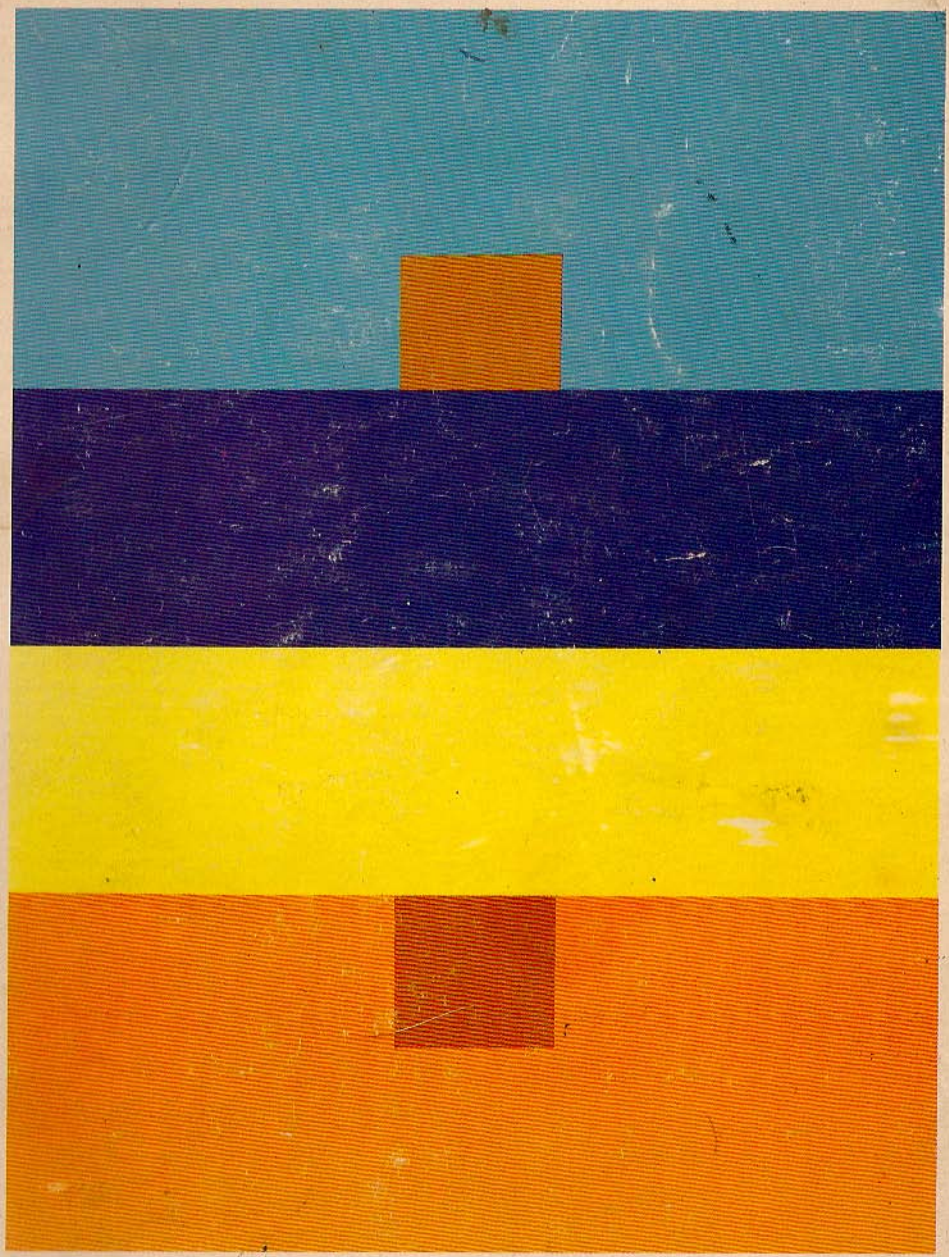
Interaction of Color

Josef Albers

Unabridged text and selected plates
Revised edition



Introduction

The book "Interaction of Color" is a record of an experimental way
of studying color and of teaching color.

In visual perception a color is almost never seen as it really is
-- as it physically is.
This fact makes color the most relative medium in art.

In order to use color effectively it is necessary to recognize
that color deceives continually.
To this end, the beginning is not a study of color systems.

First, it should be learned that one and the same color evokes
innumerable readings.
Instead of mechanically applying or merely implying laws and rules
of color harmony, distinct color effects are produced
-- through recognition of the interaction of color --
by making, for instance,
2 very different colors look alike, or nearly alike.

The aim of such study is to develop -- through experience
-- by trial and error -- an eye for color.
This means, specifically, seeing color action
as well as feeling color relatedness.

As a general training it means development of observation and articulation.

This book, therefore, does not follow an academic conception
of "theory and practice."
It reverses this order and places practice before theory,
which, after all, is the conclusion of practice.

Also, the book does not begin with optics and physiology of visual perception,
nor with any presentation of the physics of light and wave length.

Just as the knowledge of acoustics does not make one musical
-- neither on the productive nor on the appreciative side --
so no color system by itself can develop one's sensitivity for color.
This is parallel to the recognition that no theory of composition by itself
leads to the production of music, or of art.

Practical exercises demonstrate through color deception (illusion)
the relativity and instability of color.
And experience teaches that in visual perception there is a discrepancy
between physical fact and psychic effect.

What counts here -- first and last -- is not so-called knowledge
of so-called facts, but vision -- seeing.
Seeing here implies Schauen (as in Weltanschauung) and is coupled
with fantasy, with imagination.

This way of searching will lead from a visual realization
of the interaction between color and color
to an awareness of the interdependence of color with form and placement;
with quantity (which measures amount, respectively extension
and/or number, including recurrence);
with quality (intensity of light and/or hue);
and with pronouncement (by separating or connecting boundaries).

The table of contents shows the order
in which exercises usually lead our investigation.

Each exercise is explained and illustrated --
not to give a specific answer,
but to suggest a way of study.

I Color recollection -- visual memory

If one says "Red" (the name of a color)
and there are 50 people listening,
it can be expected that there will be 50 reds in their minds.
And one can be sure that all these reds will be very different.

Even when a certain color is specified which all listeners have seen
innumerable times -- such as the red of the Coca-Cola signs which is
the same red all over the country -- they will still think of
many different reds.

Even if all the listeners have hundreds of reds in front of them
from which to choose the Coca-Cola red, they will again select
quite different colors. And no one can be sure that he has found
the precise red shade.

And even
if that round red Coca-Cola sign with the white name in the middle
is actually shown so that everyone focuses on the same red,
each will receive the same projection on his retina,
but no one can be sure whether each has the same perception.

When we consider further the associations and reactions
which are experienced in connection with the color and the name,
probably everyone will diverge again in many different directions.

What does this show?

First, it is hard, if not impossible, to remember distinct colors.
This underscores the important fact that the visual memory is very poor
in comparison with our auditory memory. Often the latter is able
to repeat a melody heard only once or twice.

Visual memory poor

Second, the nomenclature of color is most inadequate.
Though there are innumerable colors -- shades and tones --
in daily vocabulary, there are only about 30 color names.

only 30 color names

VIII Why color deception?— after-image, simultaneous contrast

For a better understanding of why colors read differently
from what they really (physically) are, we show now
the cause of most color illusions.

In order to prepare for the second part of this demonstration, cut out in
red and white color paper 2 equal circles (of ca. 3-inch diameter)
and mark their centers with a small black dot.
(See plate VIII-2.)

Then paste them—horizontally related—the red circle to
the left and the white one to the right, on the blackboard or
a piece of black paper or black cardboard, ca. 10 inches high and
20 inches long, with about equal amounts of black before, between,
and after the 2 circles.

Now, by staring steadily at the marked center of the red
circle (up to half a minute) one soon discovers how difficult
it is to keep the eye fixed on a point. After a while,
moon-sickle shapes appear, moving along the circle's
periphery. In spite of this, one must continue to focus on
the red center point in order to assure the desired experience.
Then quickly shift the focus to the center of the white circle.

From the class one usually hears noises which indicate
surprise or astonishment. This happens because all normal eyes
suddenly see green or blue-green instead of white. This green
is the complementary color of red or red-orange.
The phenomenon of seeing green (in this case) instead of white
is called after-image, or simultaneous contrast.

A plausible explanation:

One theory maintains that the nerve ends on the human retina (rods and cones)
are tuned to receive any of the 3 primary colors (red, yellow,
or blue), which constitute all colors.

Staring at red will fatigue the red-sensitive parts, so that with
a sudden shift to white (which again consists of red, yellow, and blue),
only the mixture of yellow and blue occurs. And this is green,
the complement of red.

The fact that the after-image or simultaneous contrast
is a psycho-physiological phenomenon should prove
that no normal eye, not even the most trained one, is foolproof
against color deception.
He who claims to see colors independent of their illusionary changes
fools only himself, and no one else.

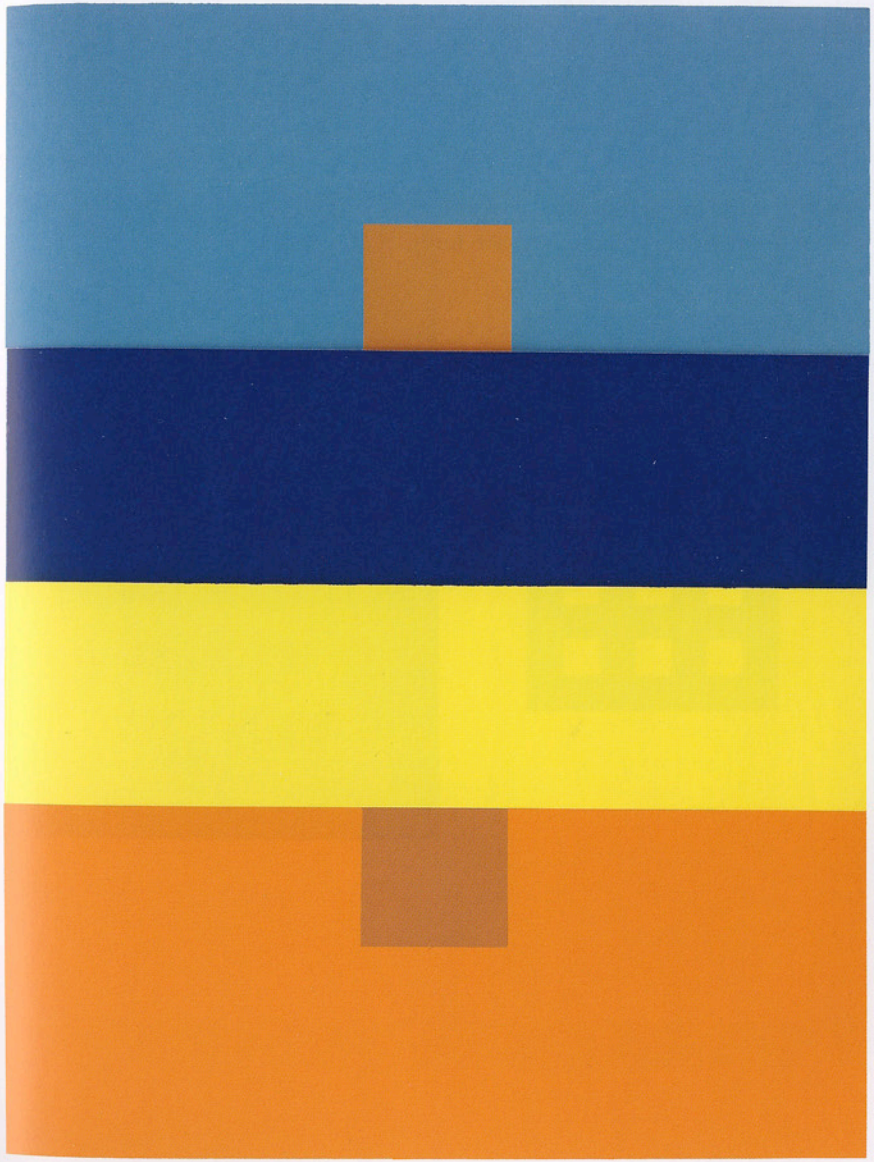
A color has many faces—the relativity of color

CHAPTER IV

IV-1 A color has many faces, and 1 color can be made to appear as 2 different colors. In the original design for the study IV-1, horizontal dark blue and yellow stripes were on a flap which could be lifted to show that a vertical stripe of ochre is the same color at the top as at the bottom.

Here it is almost unbelievable that the upper small and the lower small squares are part of the same paper strip and therefore are the same color.

And no normal human eye is able to see both squares—alike.



Note: Plate numbers correspond to Folder numbers in the original edition.

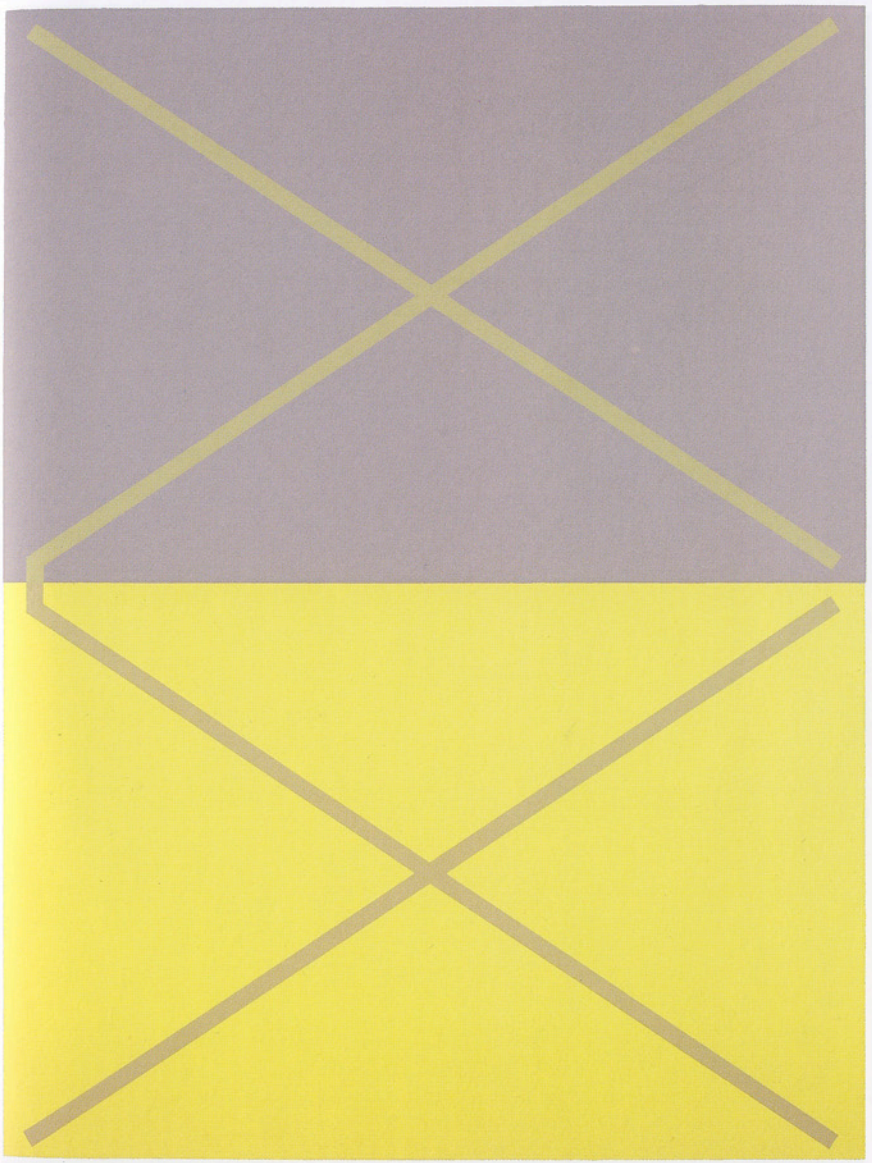
Reversed grounds

CHAPTER VI

VI-3 1 color looks like 2—or: 3 colors appear as 2. In plate VI-3 when you hold the yellow ground at the left, the X-form on it appears violetish and the X-form on the violet ground looks yellowish.

To show that both X's are the same color, see where they meet in the middle at the top.

The question that this study presents: What color is able to play such complementary roles in one show?



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