

# The Interaction<sup>®</sup> Principle

The relativity of color in dental ceramic  
restorations based on of the color studies  
*Interaction of Color* by Josef Albers  
(Yale University 1963)

# The Interaction® Principle

The book:

After Josef Albers had worked on it for eight years, in 1963  
the Yale University Press published his book:

*Interaction of Color.*

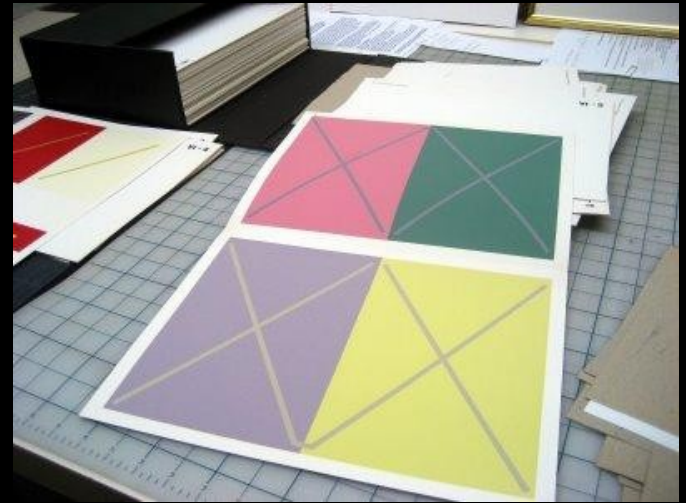
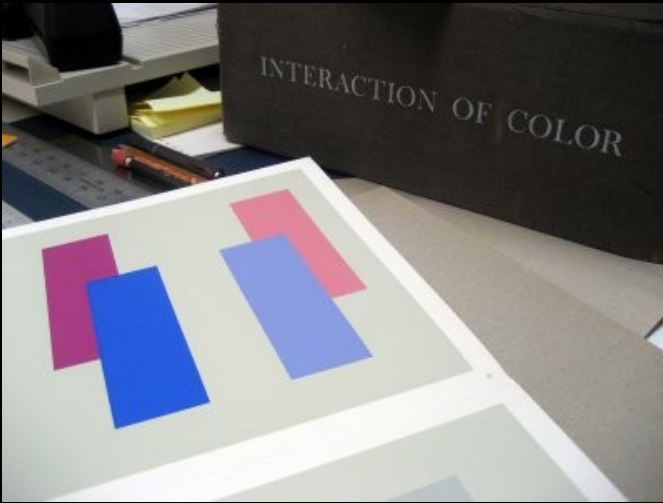
In this book he presents his theory that colors are governed  
by an internal and deceptive logic.



*Josef Albers (1888-1976)*

Photo by Arnold Newman 1948

# The Interaction® Principle



*portfolios from the original book (Yale University Press, 1963)*

*Photo's Artist Joanna Mattera, New York USA*

# The Interaction® Principle

## Quotes:

“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 dealing with color relativity or color illusion, it is practical to distinguish factual facts from actual facts.”

“The mutual influencing of colors we call – Interdependency  
Seen from the opposite viewpoint, it is – Interaction.”



1970



1971



1975



1997



2006

# The Interaction® Principle

Learning's (1):

The findings after performing the studies from the book *Interaction of Color* have a significant relevance when it comes to the creation of natural looking dental restorations:

First, when focusing on factual colors in the area of shade taking in the mouth, one is tended to think and communicate in these colors although the actual colors will most certainly differ.

The section: “*Color recollection – visual memory*” in this presentation will clearly show why this is the case.

# The Interaction® Principle

Learning's (2):

The findings after performing the studies from the book *Interaction of Color* have a significant relevance when it comes to the creation of natural looking dental restorations:

Second, colors perceived by the human eye are composed out of surface colors, influenced by the color effects volume color and film color.

The section: “*Surface-, Film- and Volume-color*” in this presentation will indicate the relevance for dental restorations.

# The Interaction® Principle

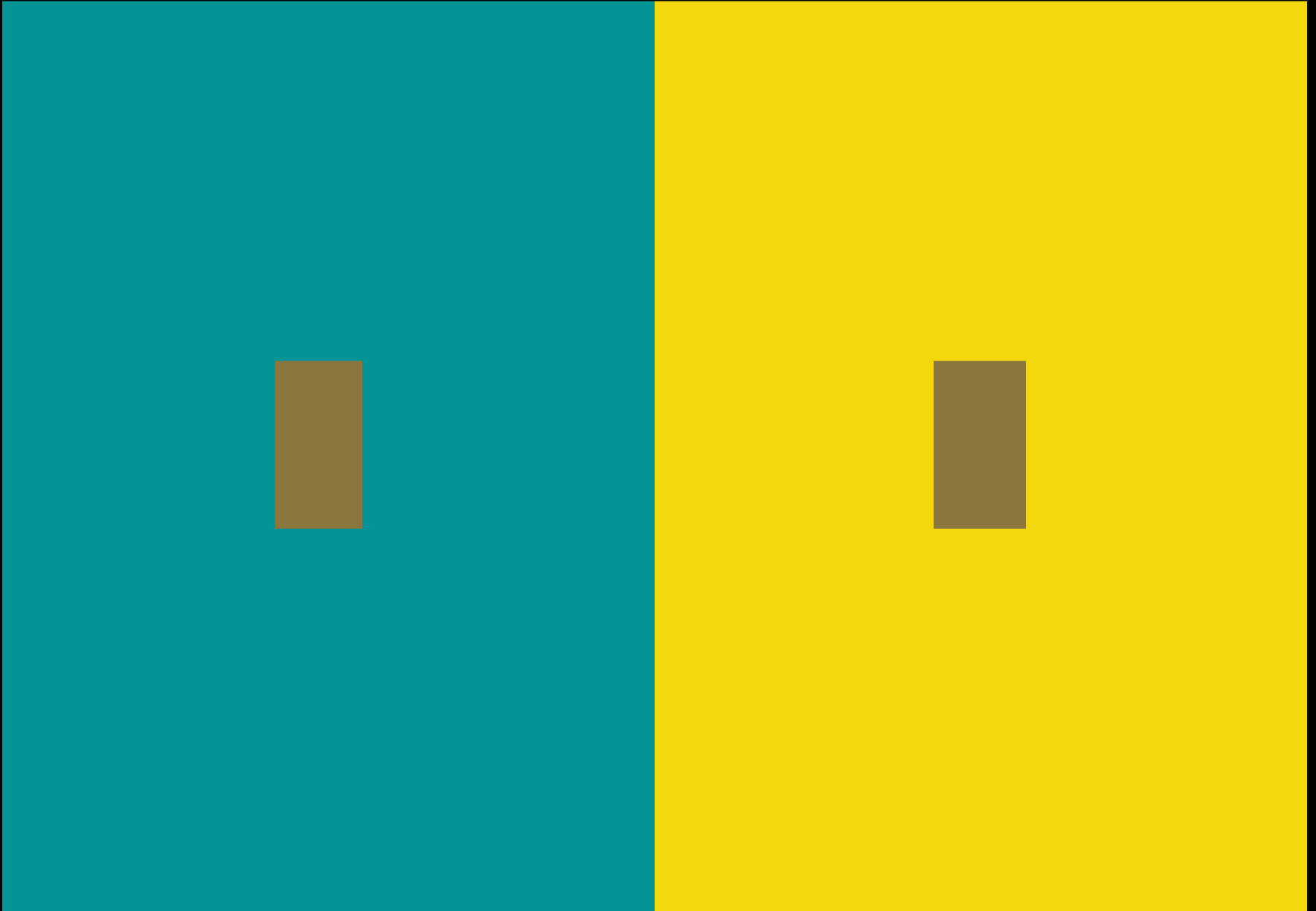
Learning's (3):

The findings after performing the studies from the book *Interaction of Color* have a significant relevance when it comes to the creation of natural looking dental restorations:

Third, knowing that when we perceive colors, they will always interact with their environment. When we know how to use this interaction than we can control the perception of a final dental restoration in the mouth.

The section: “*Color interaction & subtraction*” in this presentation will show us how this can help us when communicating and creating dental restorations.

# Color interaction and subtraction





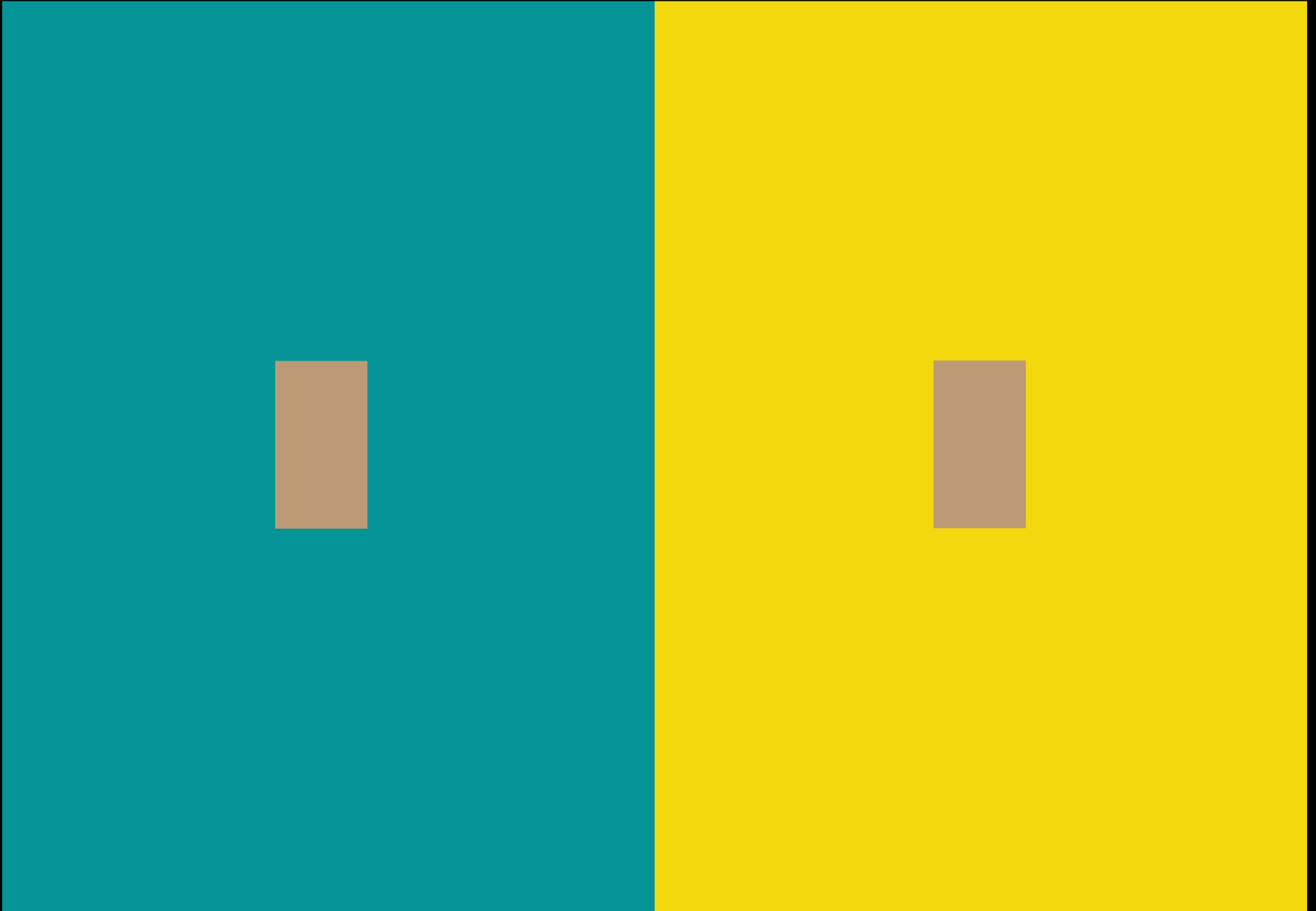
# Color interaction and subtraction



# Color interaction and subtraction



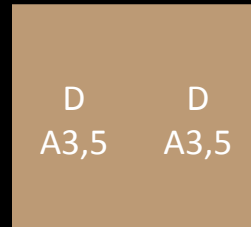
# Color interaction and subtraction



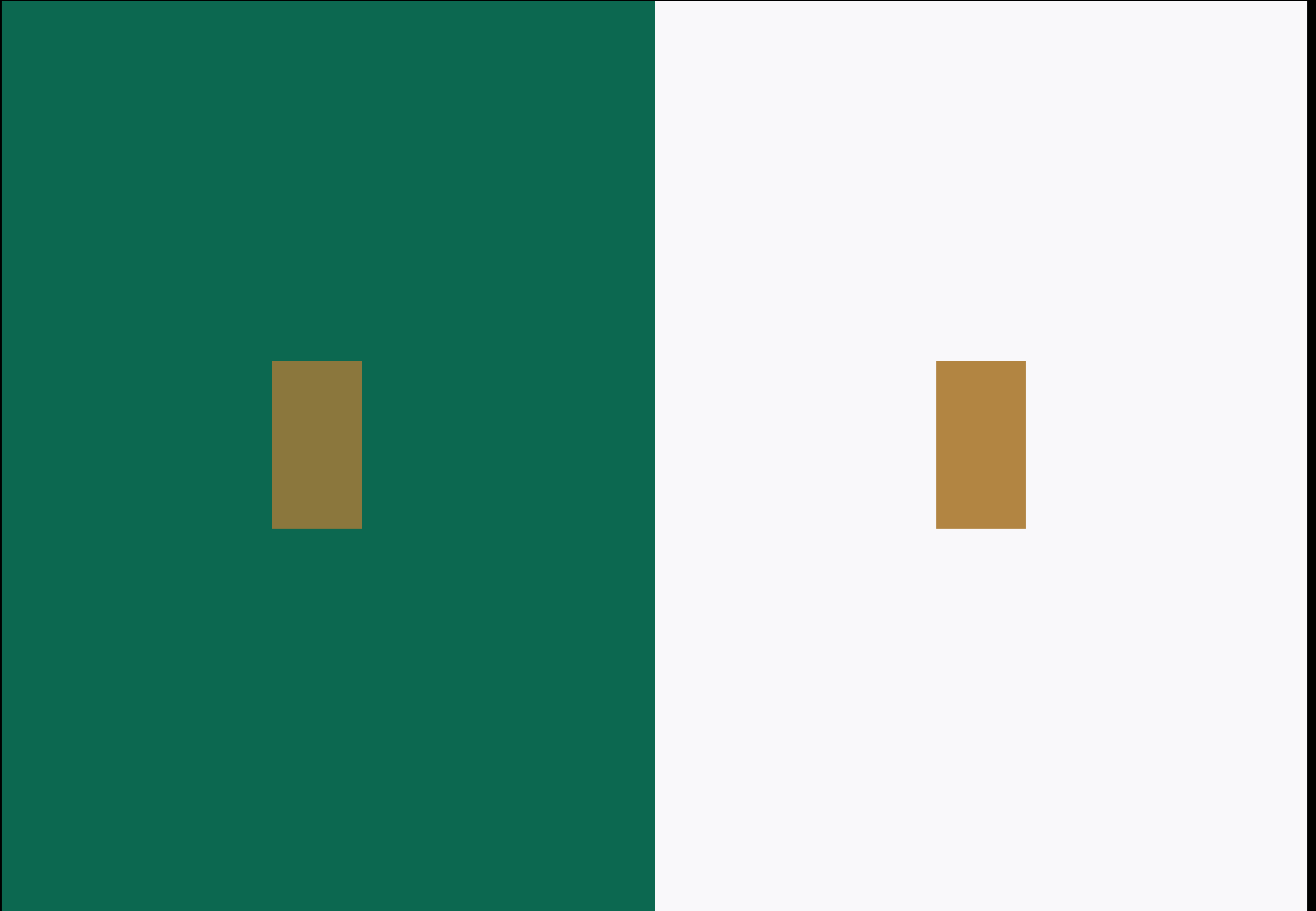
# Color interaction and subtraction



# Color interaction and subtraction



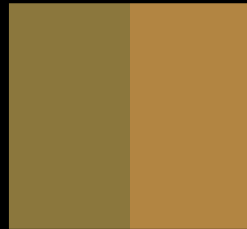
# Color interaction and subtraction



# Color interaction and subtraction

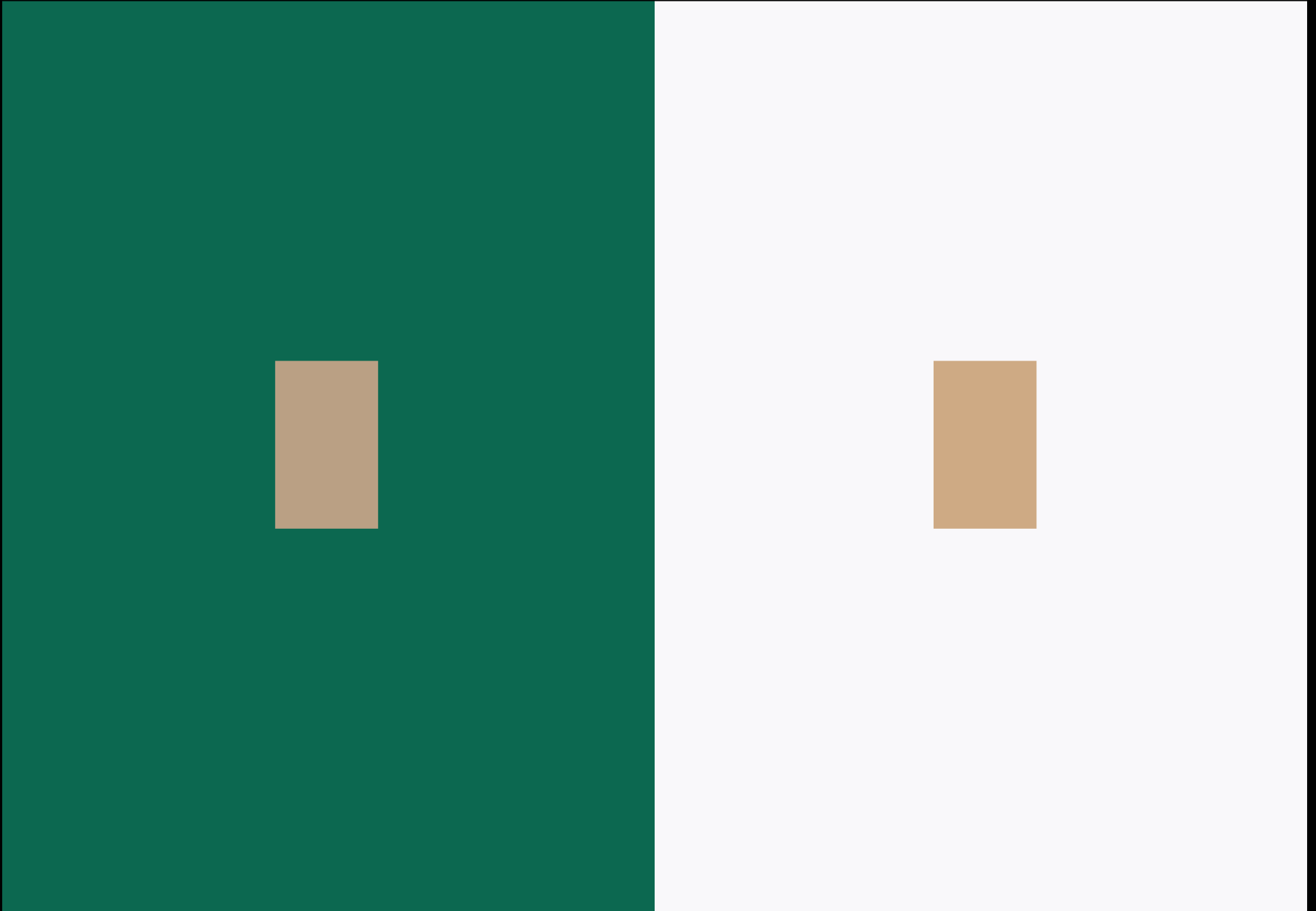


# Color interaction and subtraction





# Color interaction and subtraction



# Color interaction and subtraction



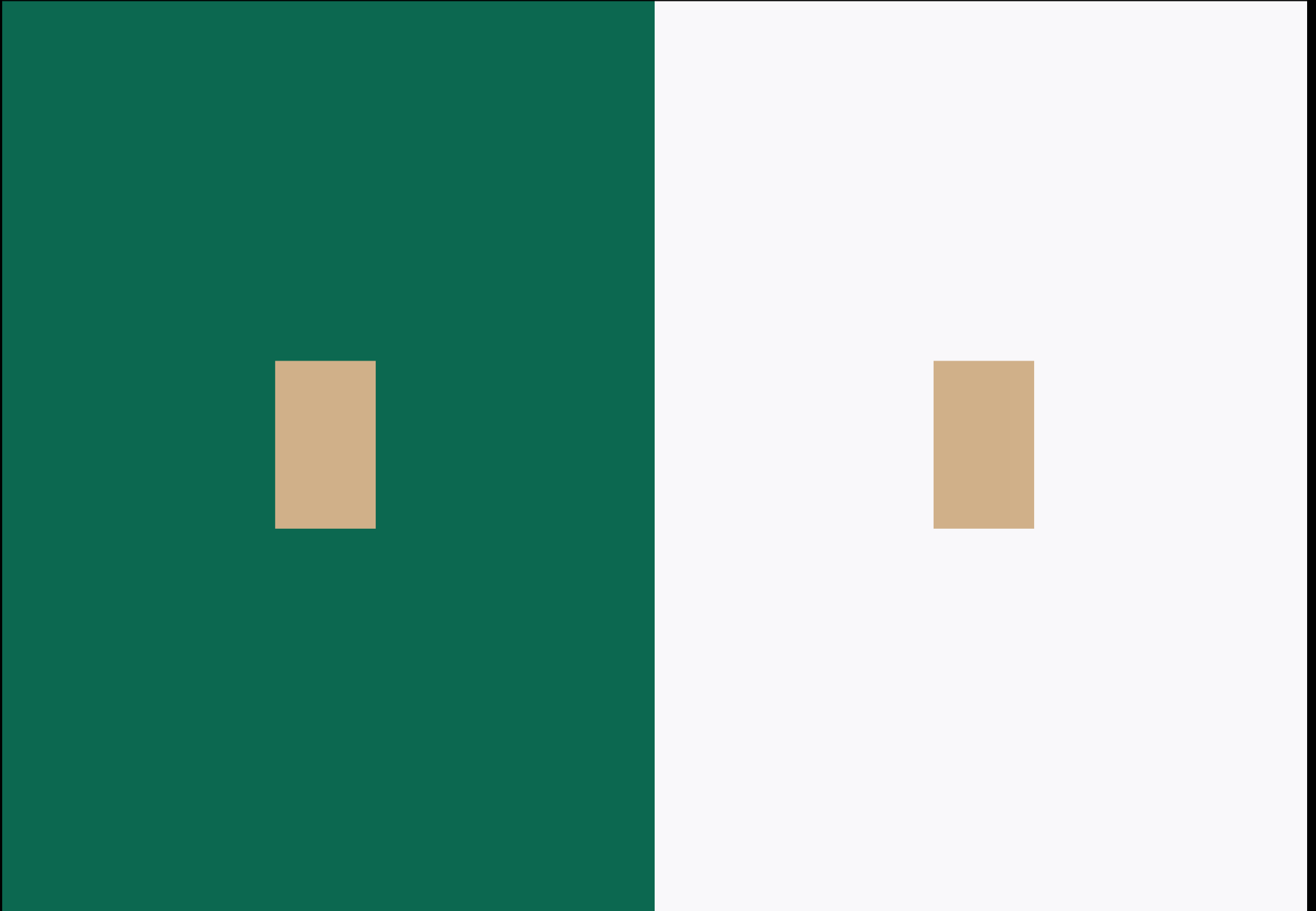
D  
D3

D  
A3

# Color interaction and subtraction



# Color interaction and subtraction



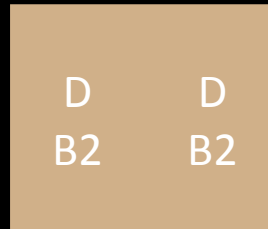
# Color interaction and subtraction



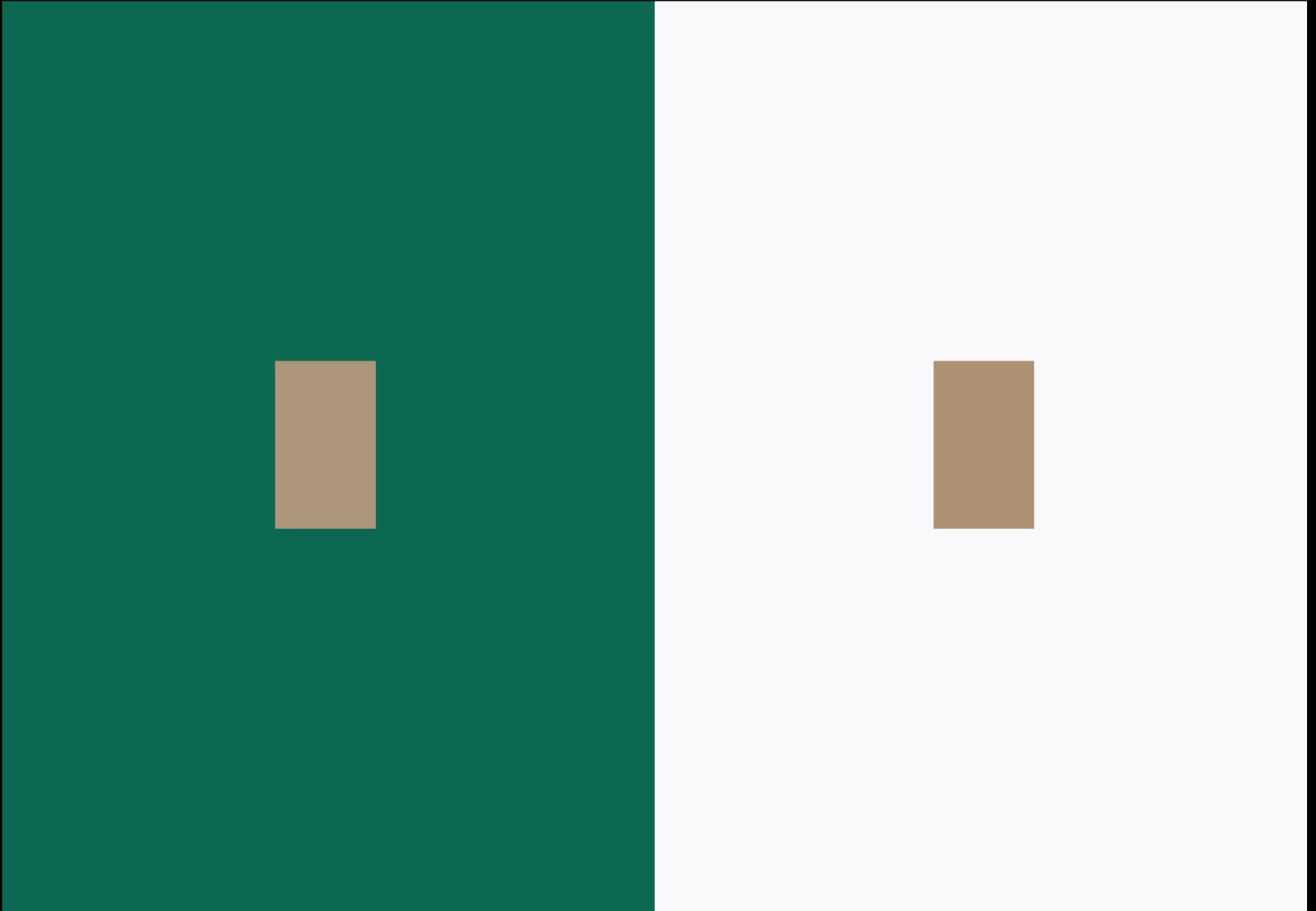
D  
B2

D  
B2

# Color interaction and subtraction



# Color interaction and subtraction



# Color interaction and subtraction

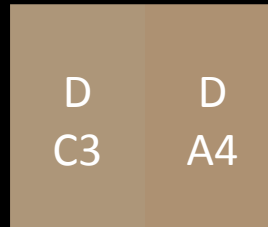


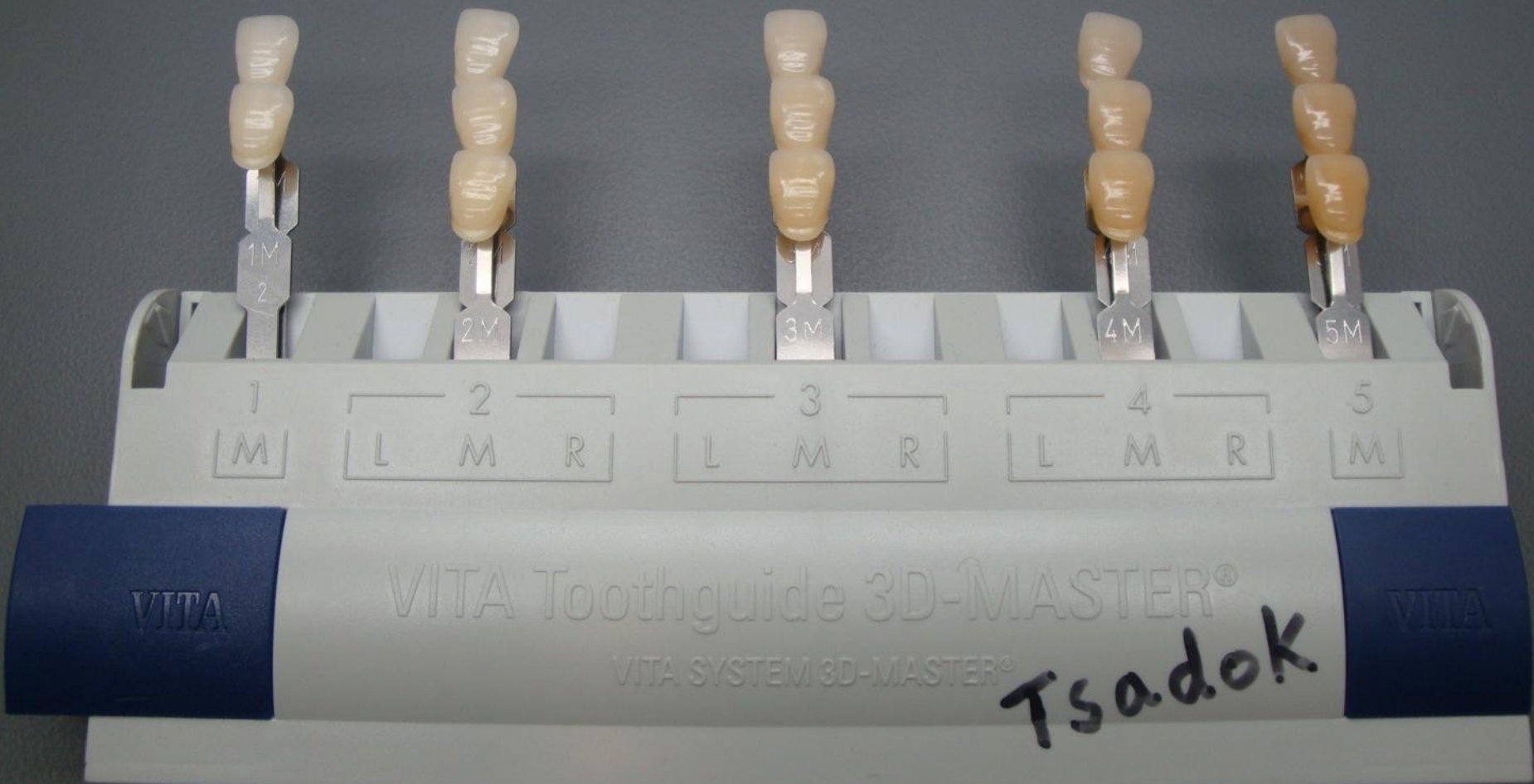
D  
C3

D  
A4



# Color interaction and subtraction







Lumin VACUUM

1 M 2 L M R 3 L M R 4 L M R 5 M

VITA Toothguide 3D-MASTER®

VITA SYSTEM 3D-MASTER®

Tsadok






















# Color interaction and subtraction

Chu, Devigus & Mieleszko:

“Value based color systems are a precise tool to select colors. “

EXTRA LIGHT		LIGHT				MEDIUM				DARK				EXTRA DARK	
D B1	D A1														
		D A2	D B2	D C1	D D2	D C2	D D3	D A3	D D4	D B3	D A3,5	D B4	D C3	D A4	D C4
															
“1M”		“2M”				“3M”				“4M”				“5M”	

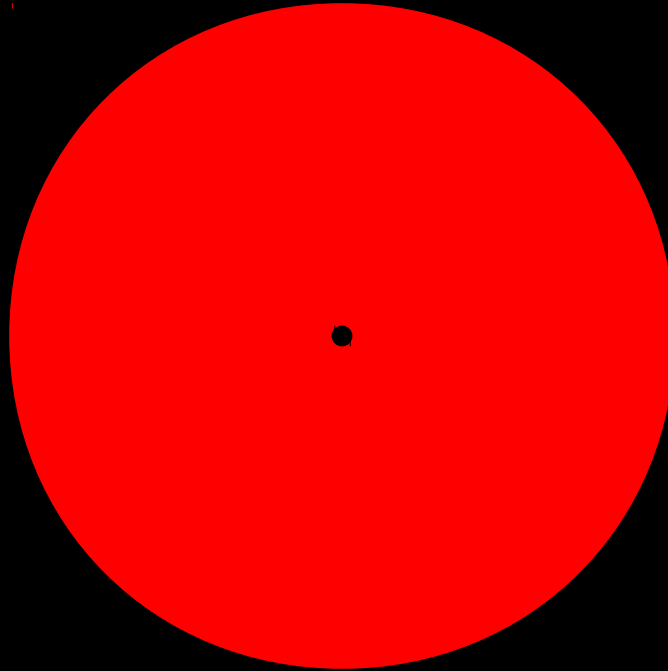
# Color interaction and subtraction

How applied knowledge off interaction in dental ceramic can help to enlarge the aesthetic acceptance of the created dental restorations in the mouth.

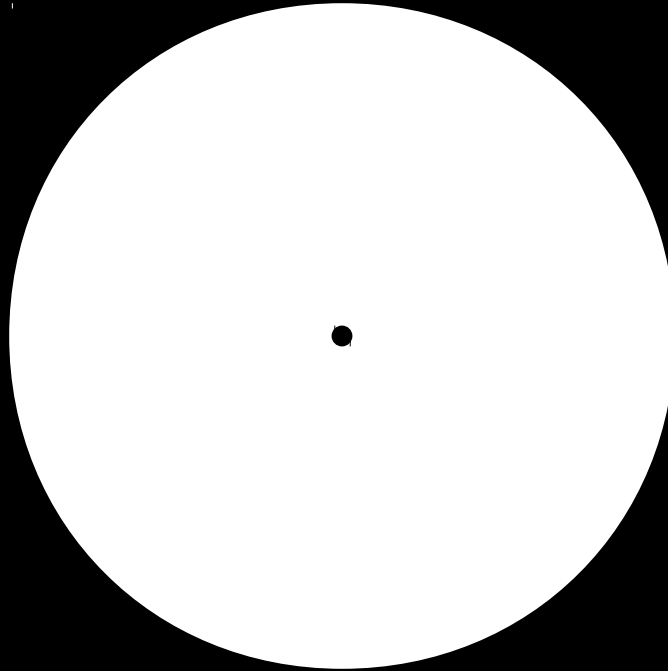
# Color interaction and subtraction

The after image effect

# Color interaction and subtraction



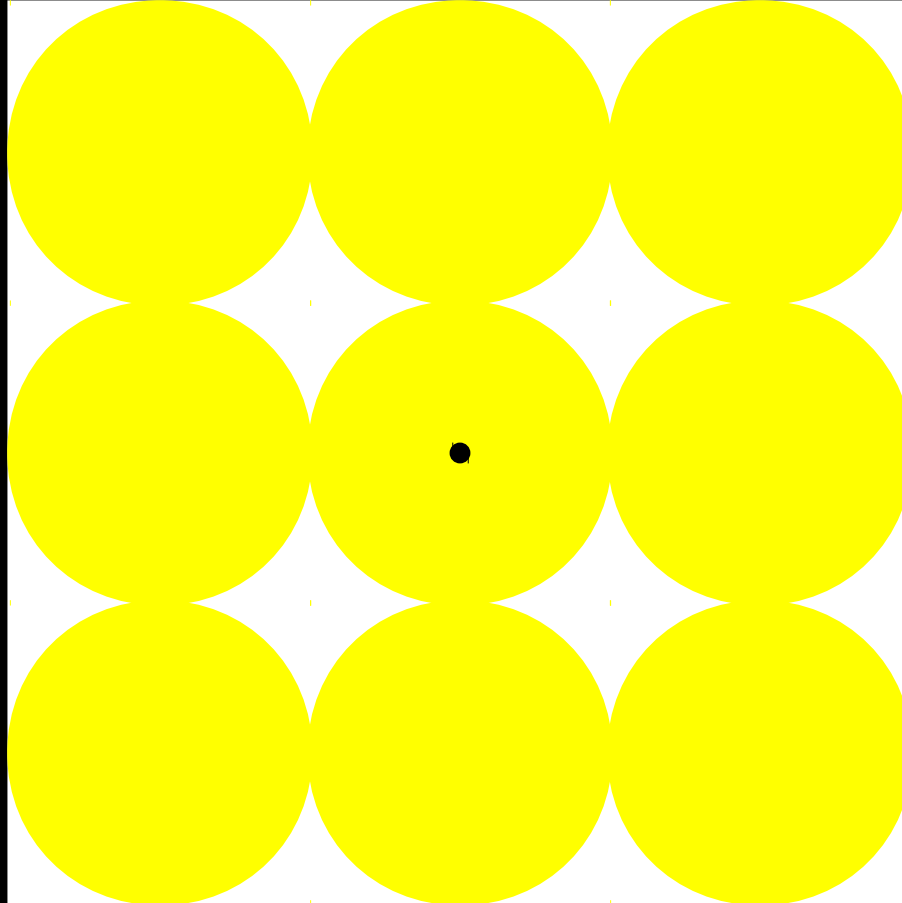
# Color interaction and subtraction



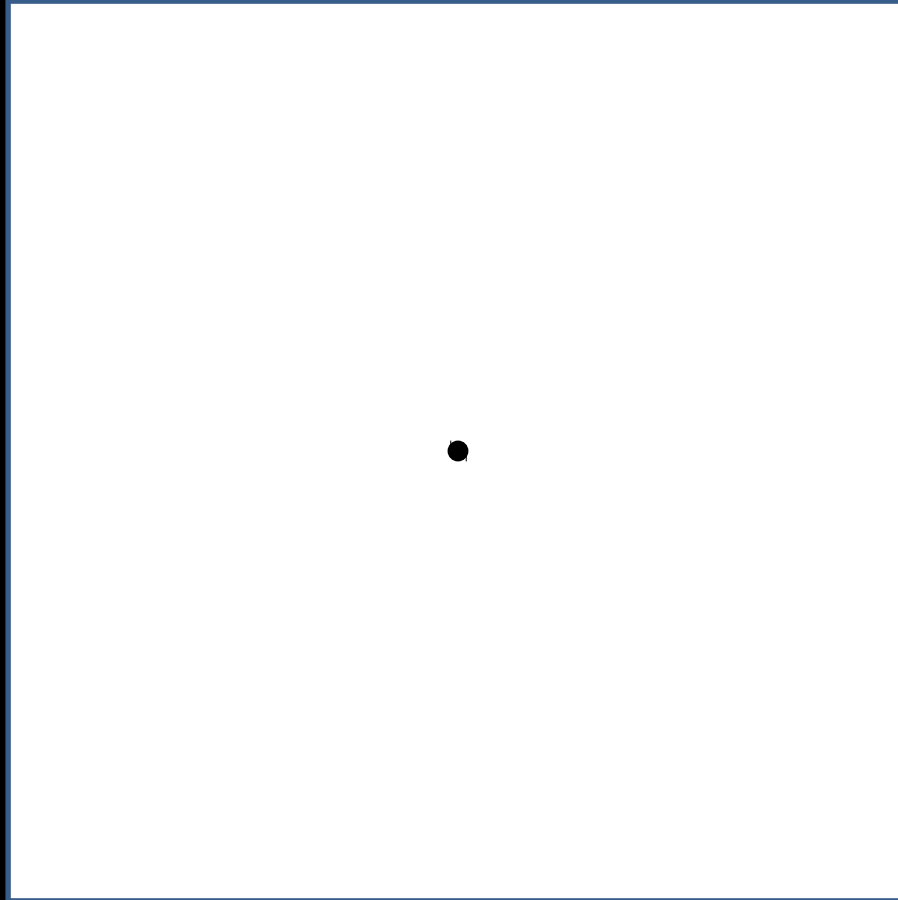
# Color interaction and subtraction

The reversed after image effect  
(or contrast reversal)

# Color interaction and subtraction



# Color interaction and subtraction





# Color interaction and subtraction

Lighter and/or darker – light intensity, lightness

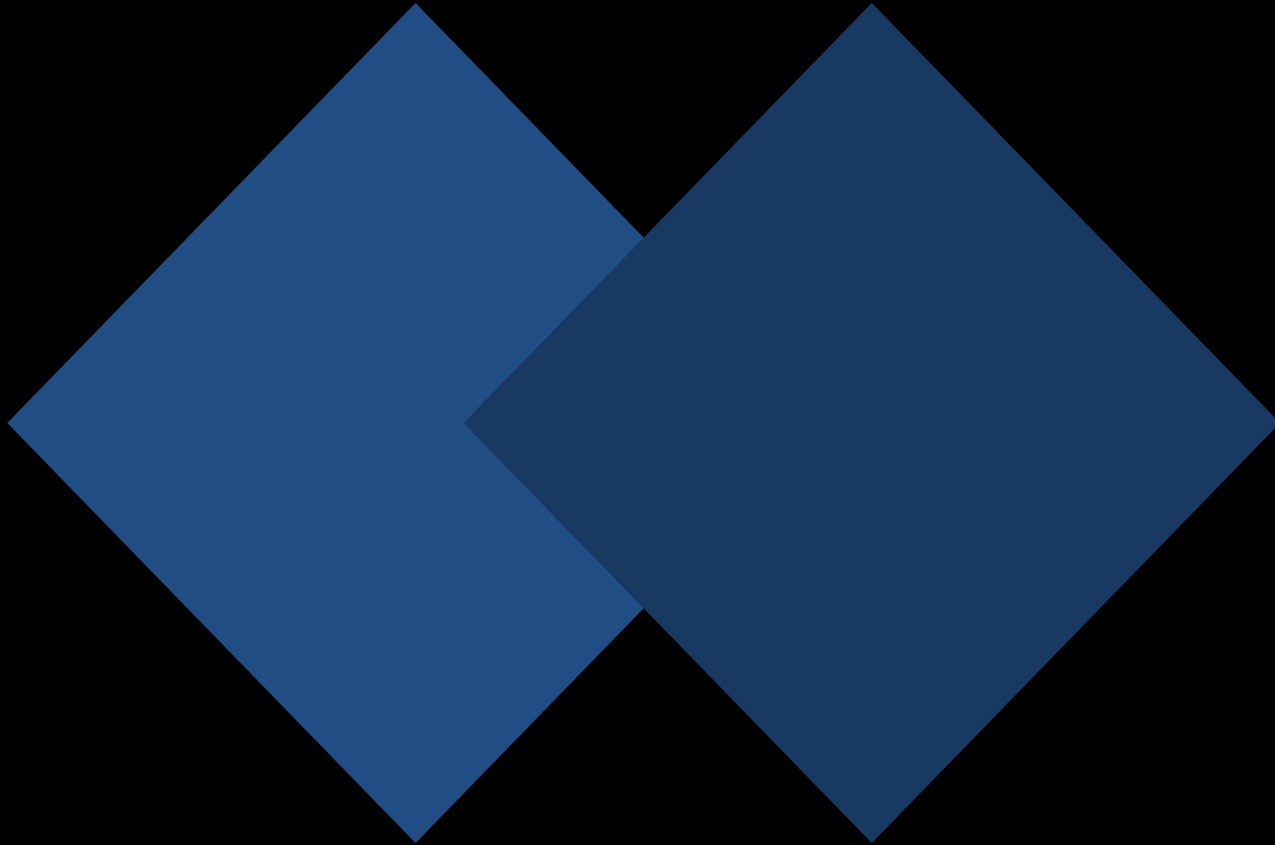
Josef Albers:

“If one is not able to distinguish the difference between a higher and a lower tone, one probably should not make music.

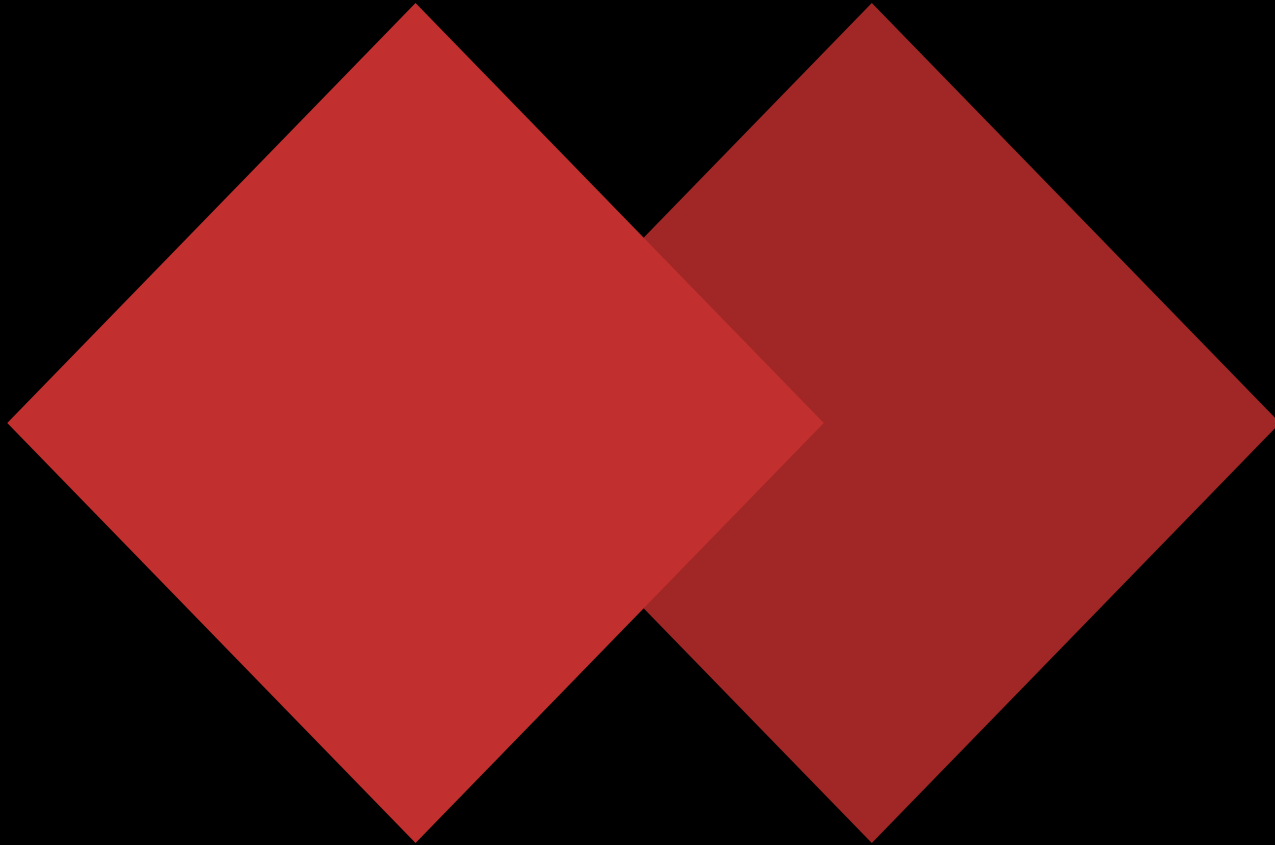
Few are able to distinguish higher and lower light intensity (usually called higher and lower value) between different hues. ”

To help the human eye one should use the after image effect to help distinguishing the value.

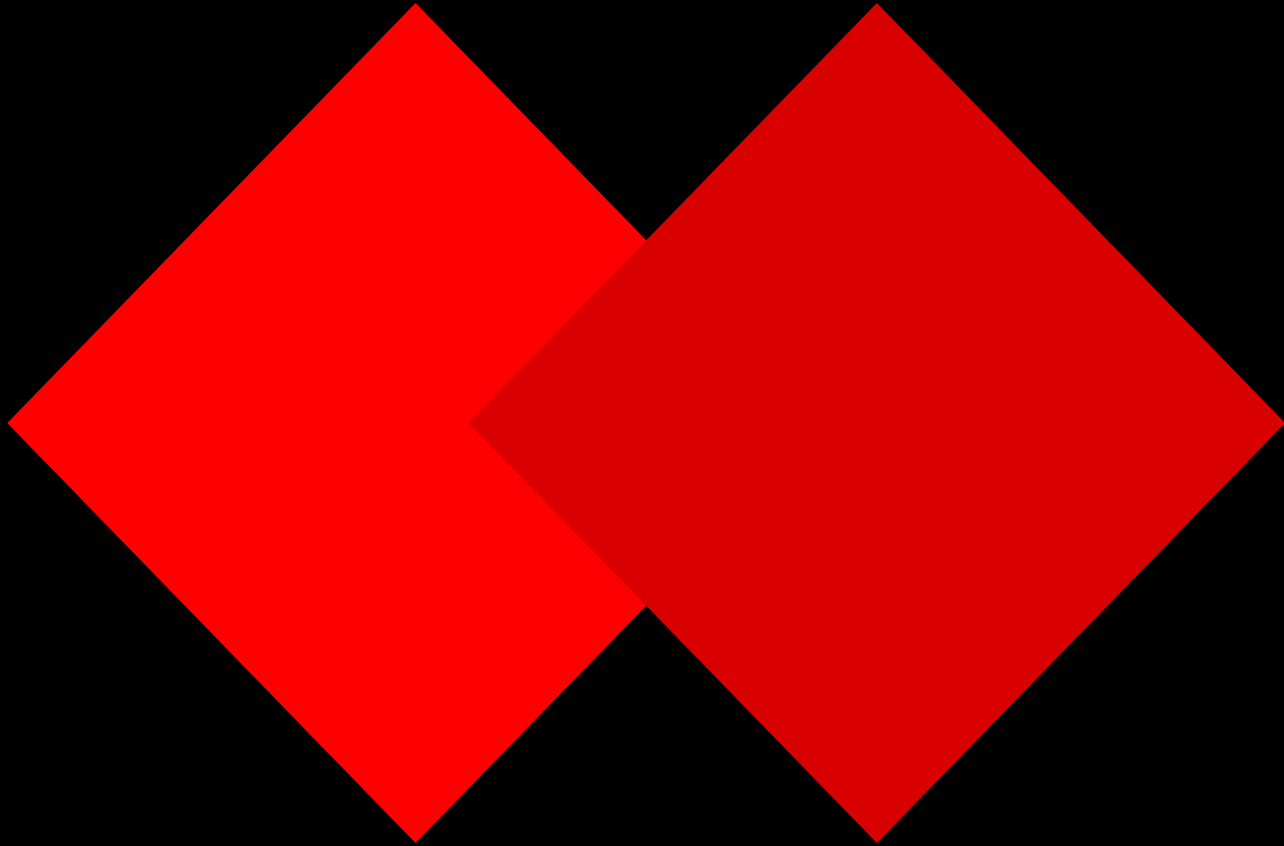
# Color interaction and subtraction



# Color interaction and subtraction



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# Color interaction and subtraction

