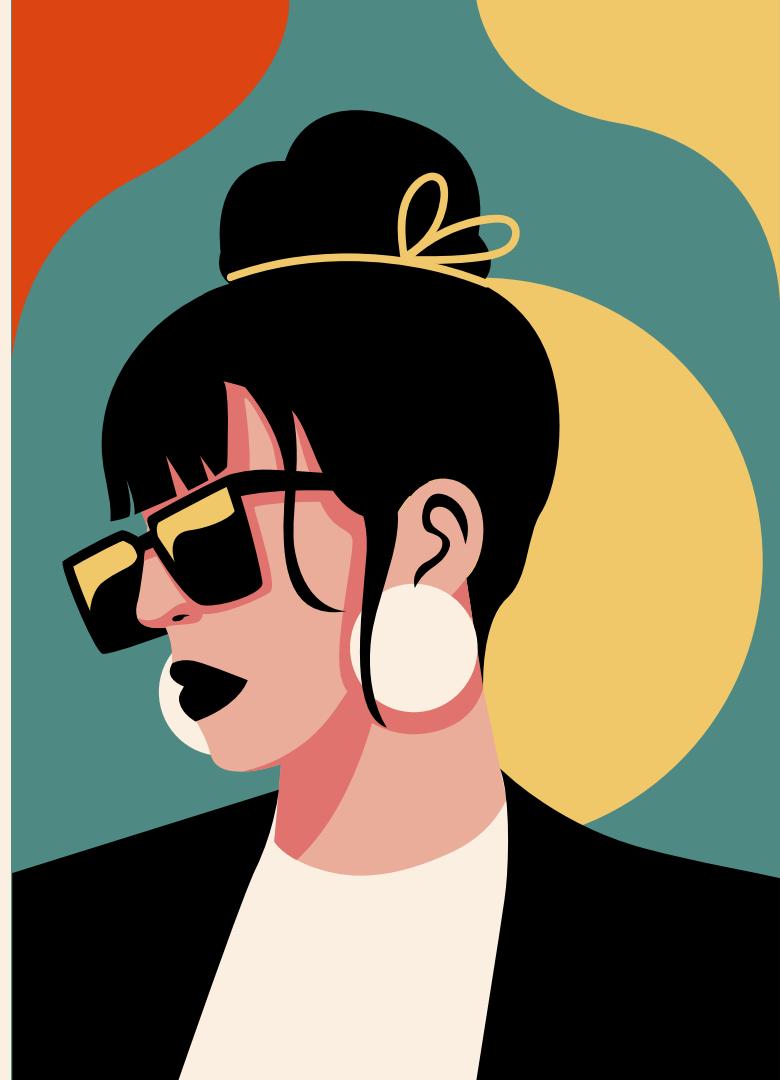


# **Brand Marketing Strategies and the Competition Between Two Clothing Brands**

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Agan, Cheng, Palo, Tinio  
CSCI 115 Group 8



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# 01

## INTRODUCTION



# BACKGROUND

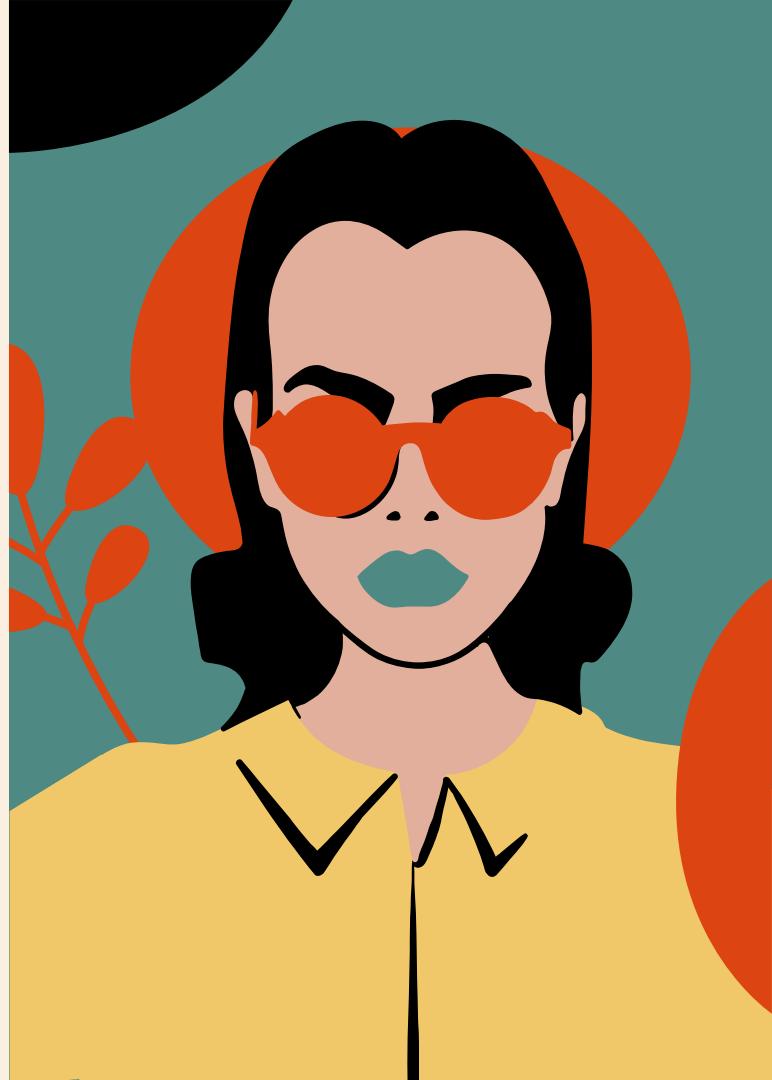
Market behavior



Marketing strategy



Customer  
decision-making



A stylized, colorful illustration of a Black man's face and shoulders. He wears dark sunglasses and has a mustache. He is dressed in a bright orange jacket over a black shirt. The background behind him is composed of large, overlapping organic shapes in shades of orange, yellow, teal, and cream.

# OBJECTIVES

- To develop a model that simulates the **distribution of the product use** of two different brands
- To investigate factors both in the customer and brand aspect that affect market behavior
- To recommend the **most effective marketing strategies** based on simulation results

# SCOPE AND LIMITATIONS

<b>Modeling Technique</b>	ABM based on the Boids Flocking Model
<b>Agents</b>	<ul style="list-style-type: none"><li>● Consumers in the clothing market</li><li>● Assumed to be homogeneous in demographic</li><li>● Cannot use both products at the same time</li></ul>
<b>Time</b>	Simulation takes place across 365 days, with 1 timestep = 1 day.
<b>Products</b>	<ul style="list-style-type: none"><li>● Identical products</li><li>● The objective quality of the products are not considered</li></ul>
<b>Parameters and Agent Conditions</b>	



# **SIGNIFICANCE OF THE STUDY**

- Informs companies what marketing methods are the most optimal for their market.
- Educates companies in effective, and economical strategies to overtake their main competitor brands in brand awareness.



# 02

## REVIEW OF RELATED LITERATURE

# The “Consumer” Agent

Traditional versus fast fashion supply chains in the apparel industry: an agent-based simulation approach (Backs et al., 2020)

01

Parameters include the **awareness of the product** and awareness of product attributes

02

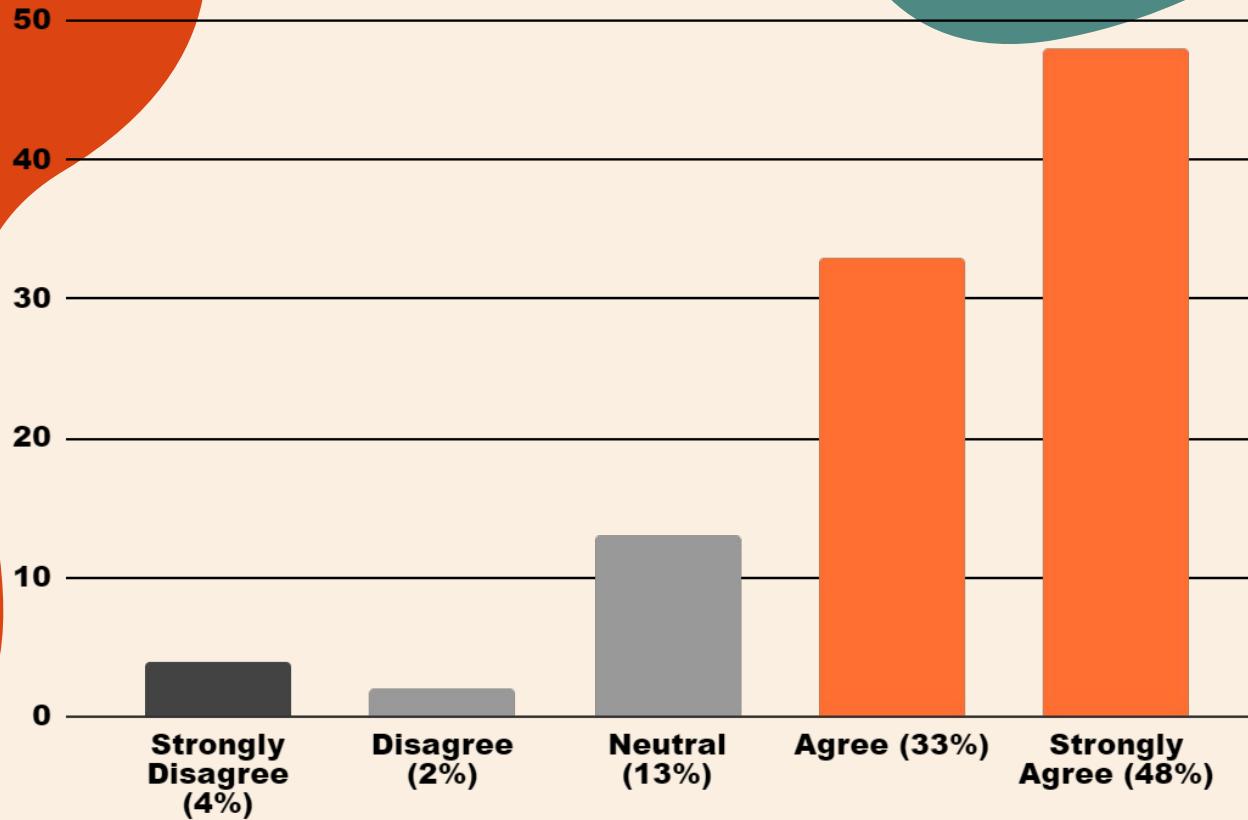
Consumers gain information on parameters through different **modes of communication**

03

Characterized by their individual purchase and **communication behavior**

# ONE AGENT TO ONE AGENT: CASE I

- **Word-of-mouth (WoM)** is widely accepted as an important determinant of consumer behavior in marketing communication (Mantiri et al., 2020)
- If the second agent does not know about the product, there is a chance of them being aware of it through WoM by probability **exposure rate**



The exposure rate  
is assigned to be  
 $0.33 + 0.48 = \mathbf{0.81}$ .

Source: Malmgren (2022)

Survey Question: "I would recommend \_ products to my friends."

# ONE AGENT TO ONE AGENT: CASE II

- If the second agent is already aware of that product, there is a chance (**usage rate**) of them using it
- Usage is equivalent to purchasing intention
  - The part of consumer behavior where the customer decides to purchase the product.
  - The study's results showed the coefficients for WoM with respect to purchase intention is 0.318
- The usage rate is assigned to be  **$0.318 \times 0.81 \approx 0.26$**



# ONE AGENT TO MANY AGENTS

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## INFLUENCER MARKETING

- Influencer marketing is an important tool in influencing buyer behavior (Chen et al., 2021)
- Influencer has a higher probability of influencing normal consumer agents that enter their **Radius of Influence**

# ONE AGENT TO MANY AGENTS

## INFLUENCER MARKETING

- Zak & Hasprova (2020): "Influencer marketing is an important tool to influence buying behavior... marketers target a sub-population of influential people, instead of the entire base of potential buyers."
- In the survey they conducted, **45%** of respondents say that an influencer would influence their decision to buy clothes
- The **influencer factor** is assigned to be influencer power/exposure rate + 1, which is  **$0.45/0.81 + 1 = 1.56$**

# ONE AGENT TO MANY AGENTS

## REACH OF INFLUENCERS

### Instagram Influencer Share Worldwide, by Number of Followers, July 2018

% of total



Note: influencers who published at least one post within the past 90 days, have published less than 10 posts per day on average in the past 4 weeks and have a like/follower ratio of 0.3% or higher

Source: InfluencerDB, "State of the Industry - Influencer Marketing in 2019," Nov 21, 2018

245096

[www.emarketer.com](http://www.emarketer.com)

- The average person knows 615 people (McCormick et al., 2010).
- We assume that a microinfluencer has a minimum following of 15,000 people.
- We also assume that a macroinfluencer has a minimum following of 500,000 people.

Source: Droeisch (2019)

# ONE AGENT TO MANY AGENTS

## REACH OF INFLUENCERS

Type of Agent	Detection Radius
Normal consumer	$\log_{10}(615) = 2.79$
Microinfluencer	$\log_{10}(15,000) = 4.18$
Macroinfluencer	$\log_{10}(500,000) = 5.70$

# GEOGRAPHICAL ADVERTISING AND FIRSTHAND EXPERIENCE

- Outdoor advertising is able to directly expose customers to brand messaging (Anam et al., 2023)
- Better store image implies a higher purchase intention and brand awareness. (Rizal et al., 2022)
- Both types of communications come in the form of static rectangles
  - **Billboards** (30 days, larger) and **Physical Shops** (permanent, smaller)
  - One normal agent enters these spaces and **automatically** becomes a user of that specific product

# BRAND LOYALTY

Based on the review of Kumar and Shah (2018) on information spread models, we can consider a population with the following conditions: normal (consumer agent) or forceful (influencer agent)

- N + N: both adapt a combination of each others' beliefs
  - in our version of the model, nothing happens since there is no "average" of the beliefs
- F + F: their beliefs do not change
  - We assume that influencer agents will stay influencers of the same brand throughout the entire simulation.
- N + F: **only the normal node changes their beliefs**

# BRAND LOYALTY

- A user of brand A/B switches to the other brand after interacting with an influencer with a probability of **Brand Loyalty**
- Malmgren, 2022: to brand loyalty found that it has a correlation coefficient of 0.462 with respect to WoM (Communication 1, Case 1)
- With respect to exposure rate = 0.81, brand loyalty is assigned to be  **$0.462 \times 0.81 \approx 0.37$** .

# BOIDS MODEL

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## RULE 1

Boids fly towards the center of the position of their neighbors



## RULE 3

Boids align their velocity with their neighbors



## RULE 2

Boids keep a distance from their neighbors



## RULE 4

Boids change direction when near the border of the space



# 03

## SIMULATION AND MODELING



# PARAMETERS (CONSTANT)

PARAMETER	DESCRIPTION	VALUE
eA / eB (exposure rate)	probability that an agent unaware of A becomes aware of A through WoM / influencer	0.81
uA / uB (usage rate)	probability that an agent aware of A becomes a user and spreader of A through WoM / influencer	0.26
iA / iB	extra <b>influencer factor</b> multiplied to the exposure and user probabilities when an influencer of A is involved	1.56
LA / LB	<b>loyalty factor</b> of a user A to product A	0.37
micro_radius	detection radius for microinfluencers	4.18
macro_radius	detection radius for macroinfluencers	5.70

# PARAMETERS (VARIABLE)

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PARAMETER	DESCRIPTION
nmA / nmB	number of <b>microinfluencers</b> for A
nMA / nMB	number of <b>macroinfluencers</b> for A
nbA / nbB	number of <b>billboards</b> for A size of billboard: 20 x 10 rectangle
nsA / nsB	number of <b>shops</b> for A size of shop: 10 x 10 rectangle

# AGENT STATES

Type of Agent	Awareness	Usage and Spread	State No. & Abbreviation
Normal	None	None	0 OO
	A	None	1 AO
	A	A	2 AA
	B	None	3 BO
	B	B	4 BB
	A and B	None	5 CO
	A and B	A	6 CA
	A and B	B	7 CB
Microinfluencer	A	A	8 mA
	B	B	9 mB
Macroinfluencer	A	A	10 MA
	B	B	11 MB

# TRANSITION TABLE (A2A)

	0 OO	1 AO	2 AA	3 BO	4 BB	5 CO	6 CA	7 CB
0 OO	nothing							
1 AO	nothing	nothing						
2 AA	OO→AO: eA AA: nothing	AO→AA: uA AA: nothing	nothing					
3 BO	nothing	nothing	AA: nothing BO→CO: eA	nothing				
4 BB	OO→BO: eB BB: nothing	AO→CO: eB BB: nothing	nothing	BO→BB: uB BB: nothing	nothing			
5 CO	nothing	nothing	AA: nothing CO→CA: uA	nothing	BB: nothing CO→CB: uB	nothing		
6 CA	OO→CA: eA CA: nothing	AO→AA: uA CA: nothing	nothing	BO → CO: eA CA: nothing	nothing	CO→CA: uA CA: nothing	nothing	
7 CB	OO→CB: eB CB: nothing	AO→CO: eB CB: nothing	nothing	BO → BB: uB CB: nothing	nothing	CO→CB: uB CB: nothing	nothing	nothing
8 mA / 10 MA	OO→AA: uA*iA OO→AO: 1-uA*iA	AO→AA: uA*iA	nothing	BO→CA: uA*iA BO→CO: 1-uA*iA	BB→CA: uA*iA*LB BB→CB: 1-uA*iA*LB	CO→CA: uA*iA	nothing	CB→CA: uA*iA*LB
9 mB / 11 MB	OO→BB: uB*iB OO→BO: 1-uB*iB	AO→CB: uB*iB AO→CO: 1-uB*iB	AA→CB: uB*iB*LA AA→CA: 1-uB*iB*LA	BO→BB: uB*iB	nothing	CO→CB: uB*iB	CA→CB: uB*iB*LA	nothing

# TRANSITION TABLE (B/S)

<b>State Number and Abbreviation</b>	<b>Billboards and Shops of A</b>	<b>Billboards and Shops of B</b>
0 OO	AA	BB
1 AO	AA	CB
2 AA	nothing	CB
3 BO	CA	BB
4 BB	CA	nothing
5 CO	CA	CB
6 CA	nothing	CB
7 CB	CA	nothing

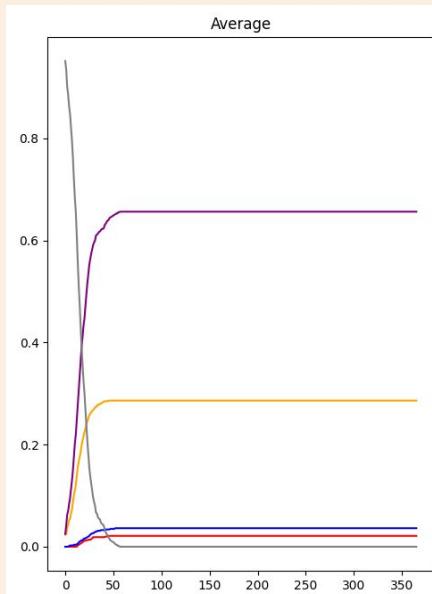


# 04

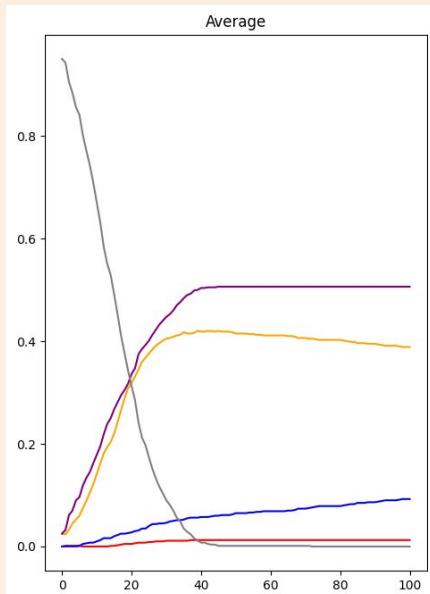
## RESULTS AND DISCUSSION

# BASELINE SIMULATIONS (B)

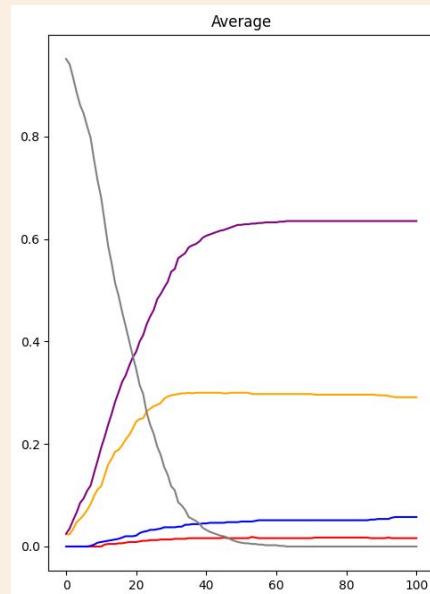
- AA
- BB
- CA
- CB
- neither



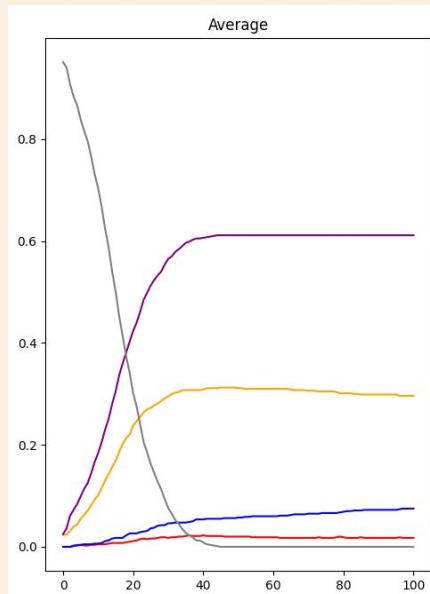
1 Billboard



1 Shop



1 Microinfluencer



1 Macroinfluencer

# SIMULATION PAIRS (A VS B)

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MICROINFLUENCER

VS

BILLBOARD

MACROINFLUENCER

VS

BILLBOARD

BILLBOARD

VS

SHOP

MICROINFLUENCER

VS

MACROINFLUENCER

MICROINFLUENCER

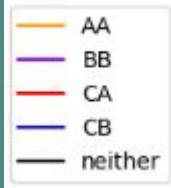
VS

SHOP

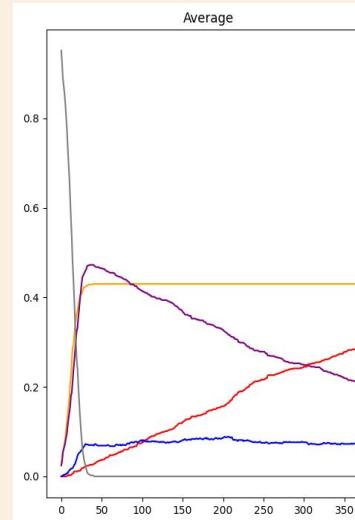
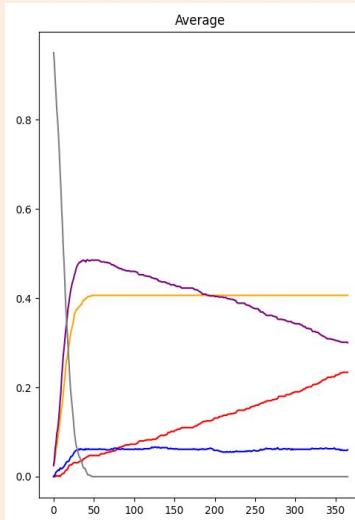
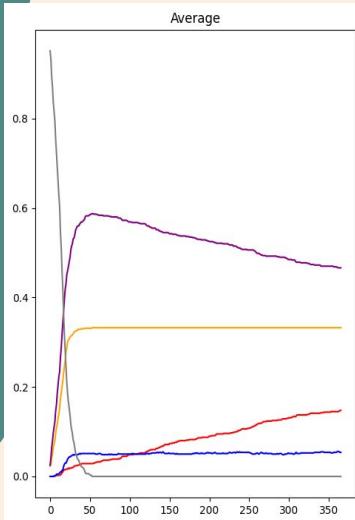
MACROINFLUENCER

VS

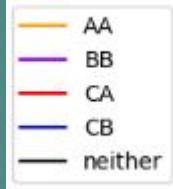
SHOP



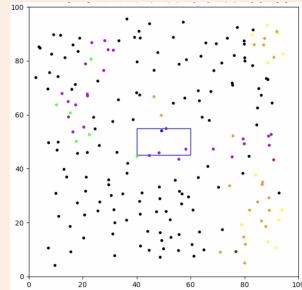
# MICROINFLUENCER vs BILLBOARD



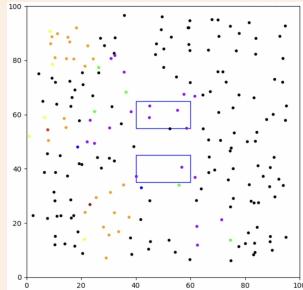
- Billboard (BB & CB) have an initial “head start”
  - More influencers weakens head start
- As BB decreases, CA increases
- AA reaches a limit and plateaus
- **1 Billboard > 1 microinfluencer**
- **2 microinfluencers > 1 Billboard**



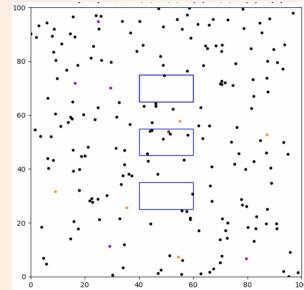
# MACROINFLUENCER vs BILLBOARD



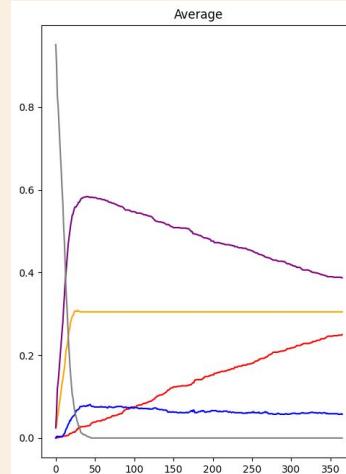
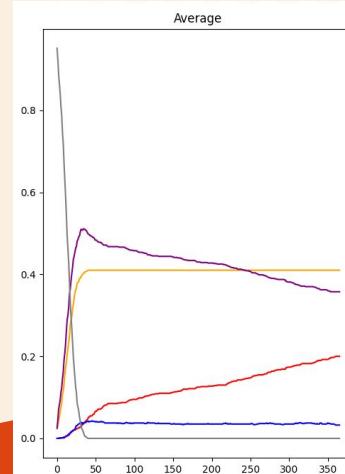
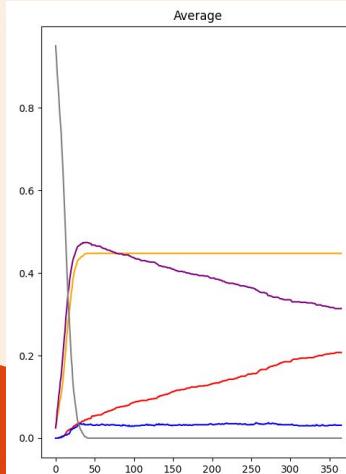
1 MI vs 1 Bill

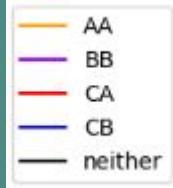


1 MI vs 2 Bill

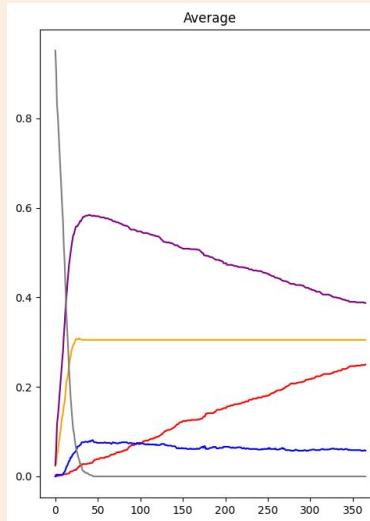
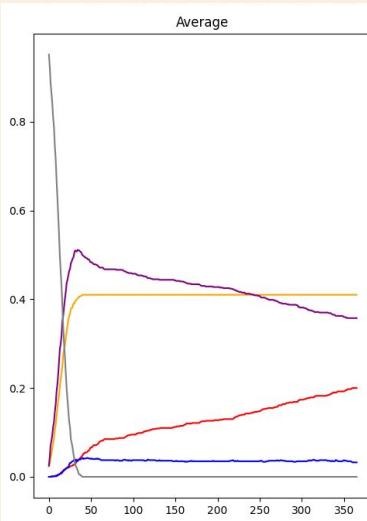
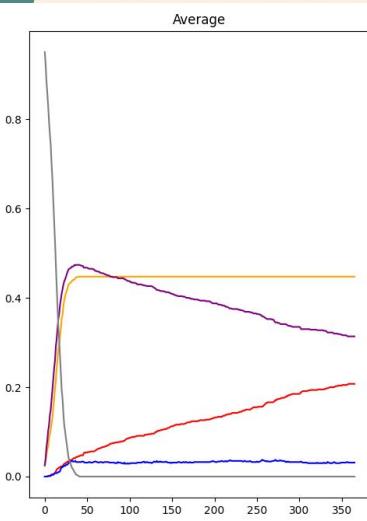


1 MI vs 3 Bill

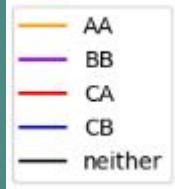




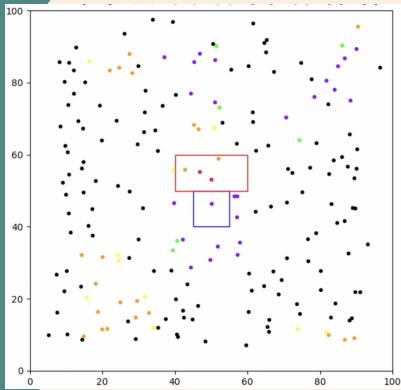
# MACROINFLUENCER vs BILLBOARD



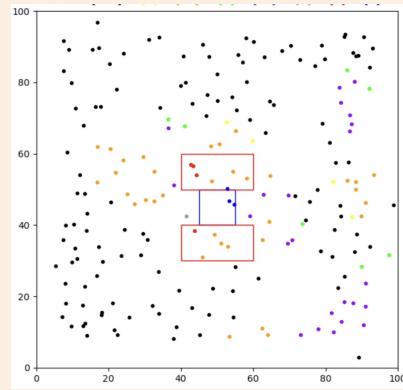
- More billboards:
  - Lower AA maximum
  - Higher BB head start
- As BB decreases, CA increases
- AA reaches a limit and plateaus
- **1 Macroinfluencer > 1 Billboard**
- **3 Billboards > 1 Macroinfluencer**



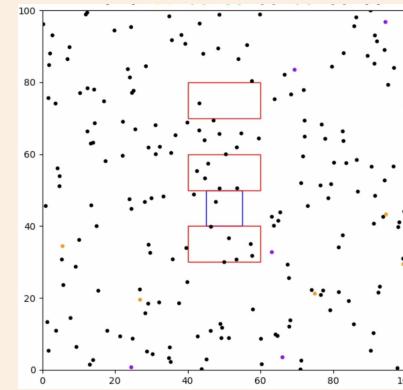
# BILLBOARD vs SHOP



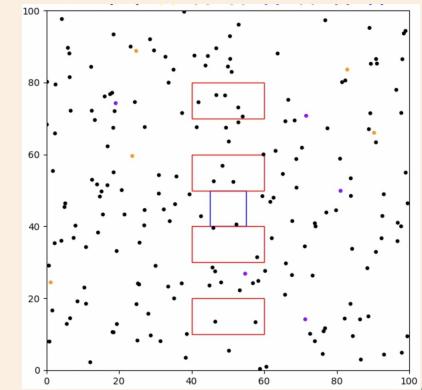
**1 Bill vs 1 S**



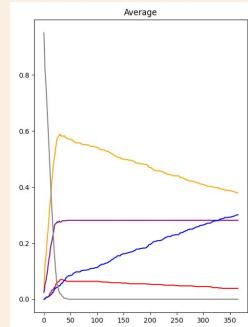
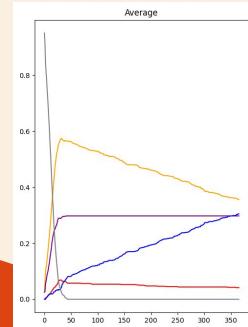
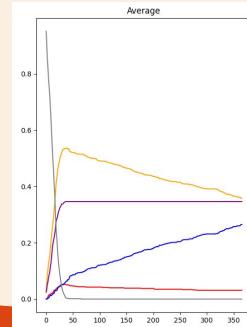
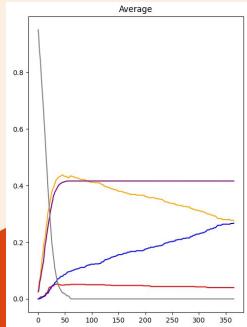
**2 Bill vs 1 S**

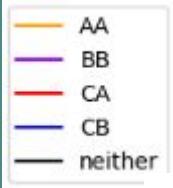


**3 Bill vs 1 S**

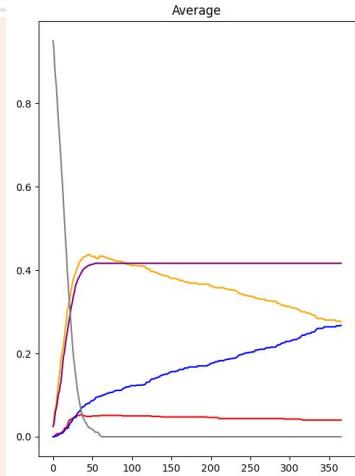


**4 Bill vs 1 S**

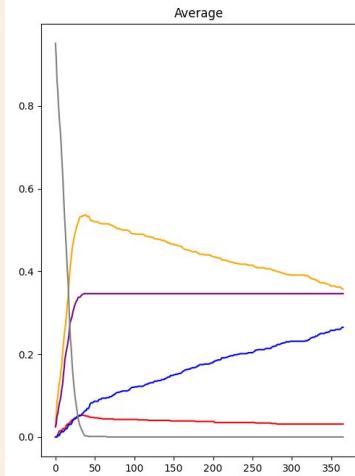




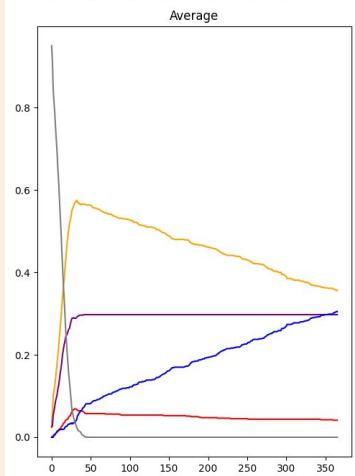
# BILLBOARD vs SHOP



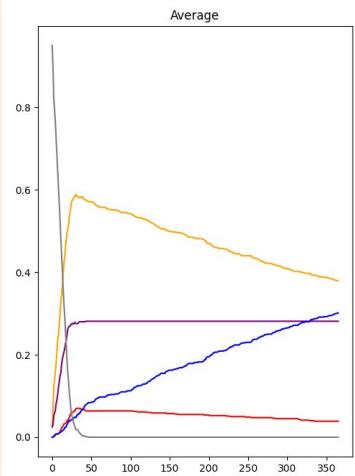
**1 Bill vs 1 S**



**2 Bill vs 1 S**



**3 Bill vs 1 S**

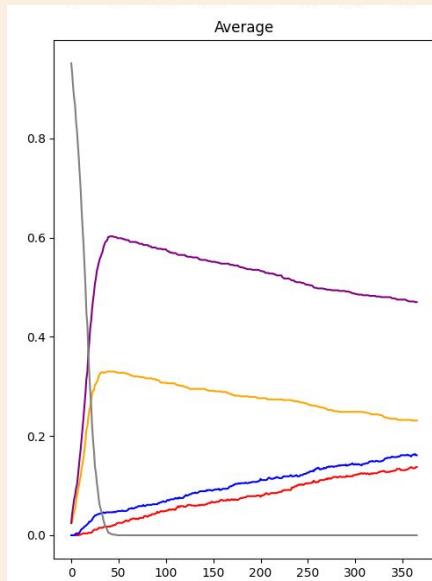


**4 Bill vs 1 S**

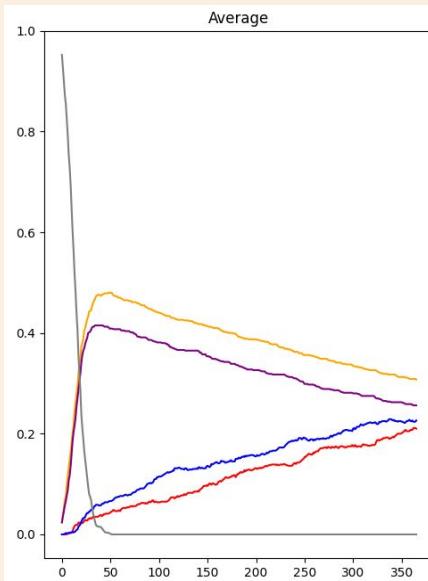
- As more billboards are added, BB plateaus at a lower value, while AA & CA have a larger head start
- Brand B always wins, even as more Brand A billboards are added

**1 Shop > 1 Billboard**

# MICROINFLUENCER vs MACROINFLUENCER

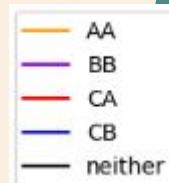


**1 mI vs 1 MI**



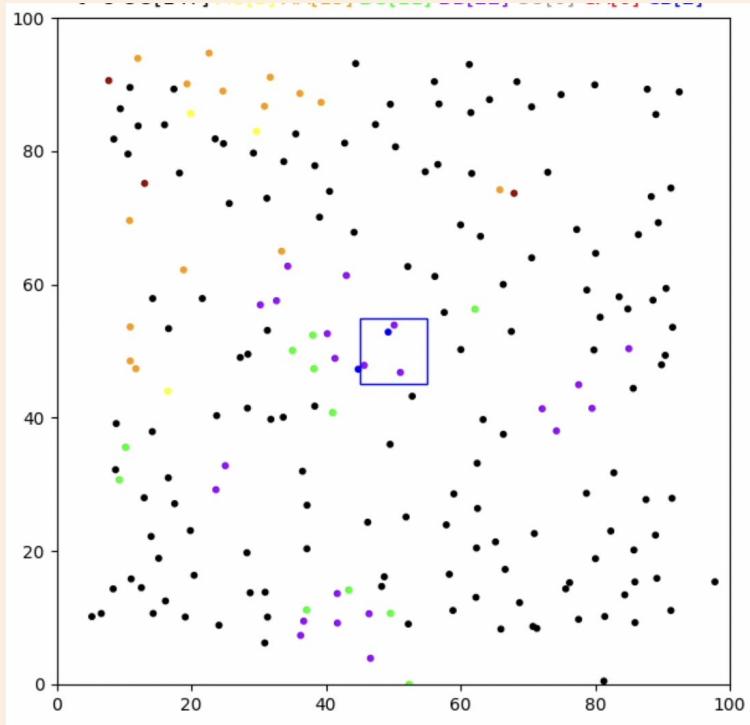
**2 mI vs 1 MI**

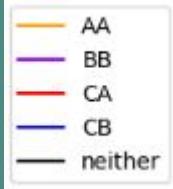
- More brand switching happens, due to the characteristics of the influencer
- **1 Macroinfluencer > 1 Microinfluencer**
- **2 Microinfluencers > 1 Macroinfluencer**



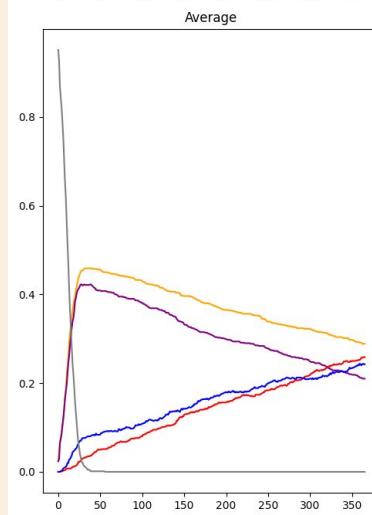
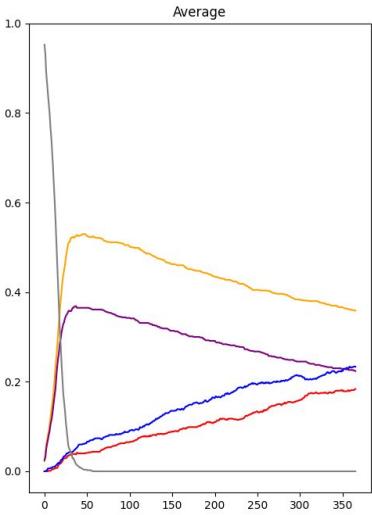
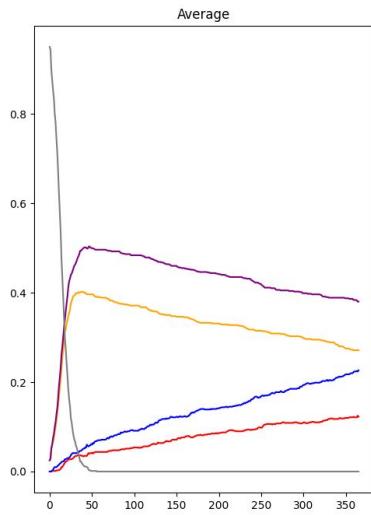
- AA
- BB
- CA
- CB
- neither

# MICROINFLUENCER vs SHOP





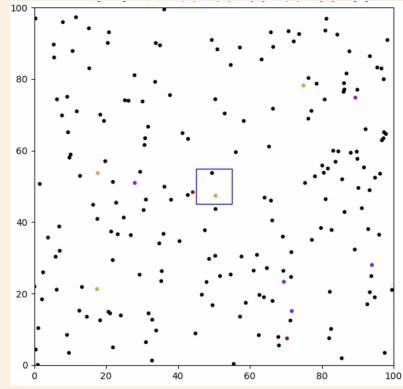
# MICROINFLUENCER vs SHOP



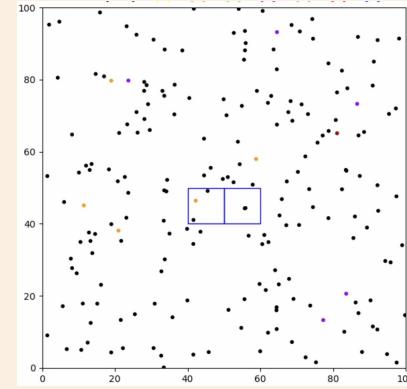
- More brand switching
- Both AA (mI) and BB (S) decrease over time, convert to CB and CA
- **1 Shop > 1 Microinfluencer**
- **3 Microinfluencers > 1 Shop**

- AA
- BB
- CA
- CB
- neither

# MACROINFLUENCER vs SHOP

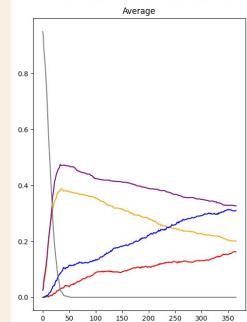
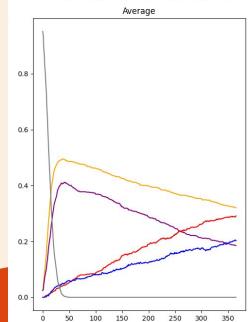
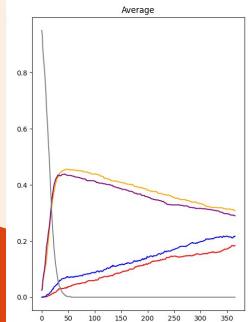


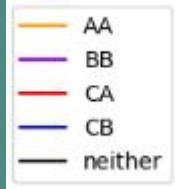
**1 MI vs 1 S**



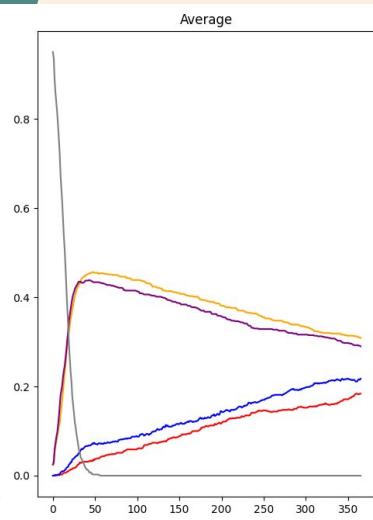
**2 MI vs 1 S**

**3 MI vs 1 S**

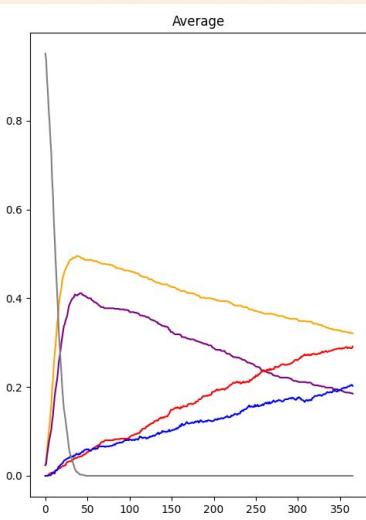




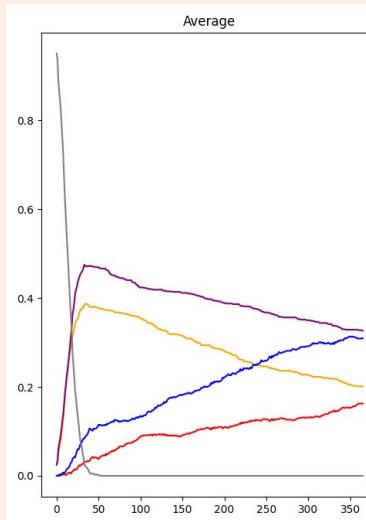
# MACROINFLUENCER vs SHOP



**1 MI vs 1 S**



**2 MI vs 1 S**



**1 MI vs 2 S**

- Both advertising methods have **extremely similar** levels of effectiveness
- Both AA (mI) and BB (S) decrease over time, convert to CB and CA
- **1 Macroinfluencer > 1 Shop**
- **2 Shops > 1 Macroinfluencer**

# SIMULATION PAIRS (A VS B)

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MICROINFLUENCER

VS

BILLBOARD

MACROINFLUENCER

VS

BILLBOARD

BILLBOARD

VS

SHOP

MICROINFLUENCER

VS

MACROINFLUENCER

MICROINFLUENCER

VS

SHOP

MACROINFLUENCER

VS

SHOP

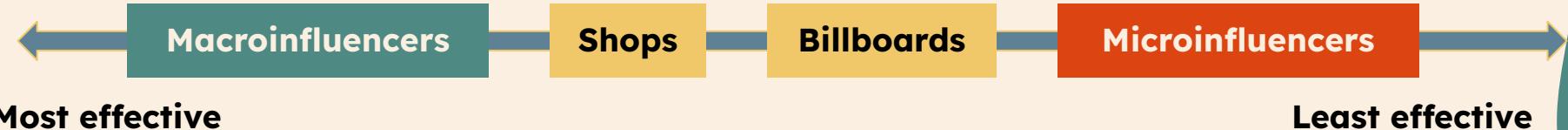


# CONCLUSION AND RECOMMENDATIONS

# 05



# In conclusion,



## Recommendations for Further Study

- Consider demographic as a factor affecting consumer behavior
- Assume that the brands have different levels of popularity
- Investigate cases where influencers/billboards have varying time intervals
- Impact of the location of the billboard/shop
- Implement more trials per simulation

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