

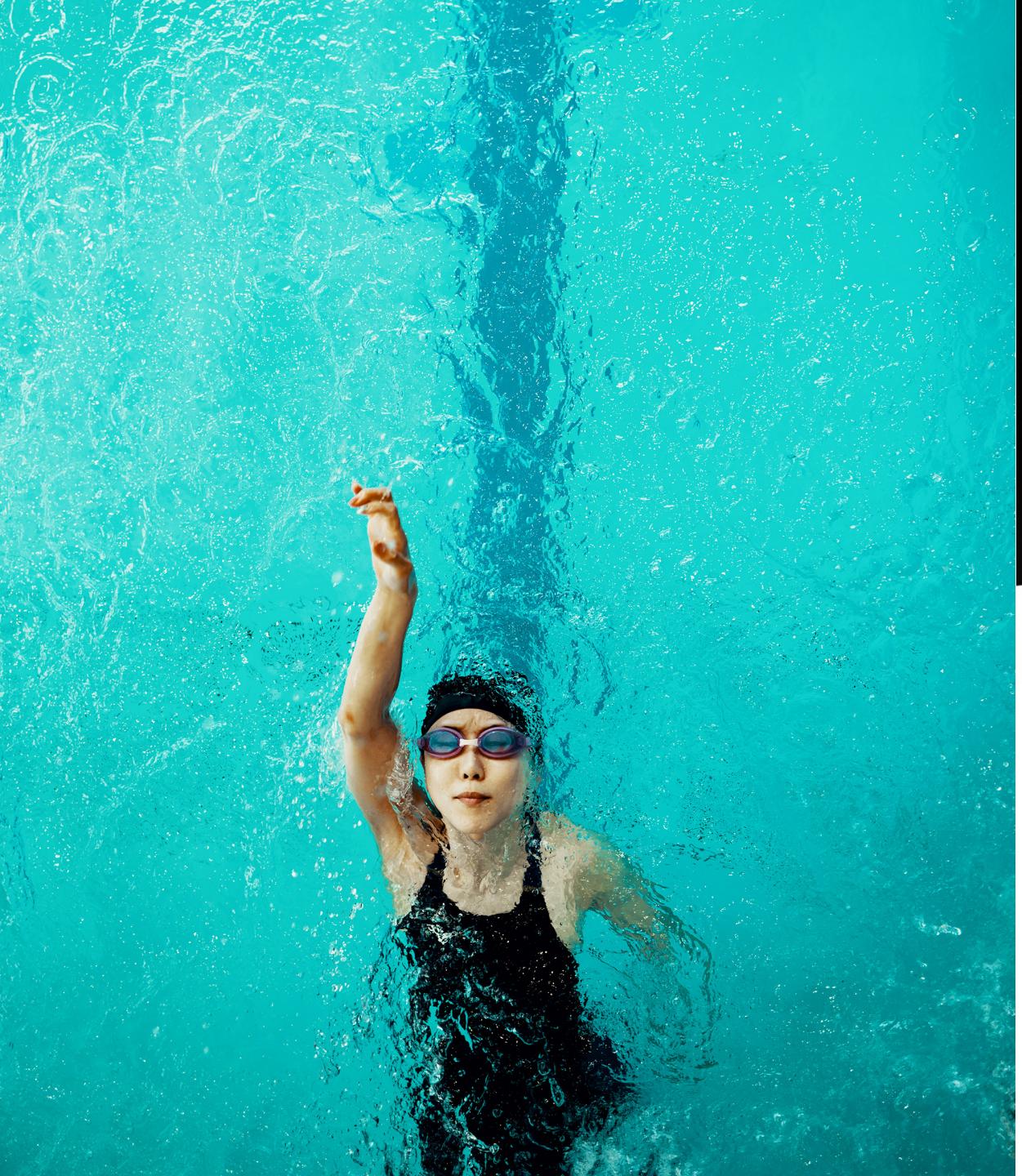
Urban Lifestyle Revealed Through Consumption Patterns

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LIFESTYLE

: The way someone lives, including their thoughts, interests, values, and environment.





Lifestyle can only be fully understood within the context of multidimensional and complex dynamics.

Why Do Liberals Drink Lattes?¹

Daniel DellaPosta, Yongren Shi, and Michael Macy
Cornell University

Popular accounts of “lifestyle politics” and “culture wars” suggest that political and ideological divisions extend also to leisure activities, consumption, aesthetic taste, and personal morality. Drawing on a total of 22,572 pairwise correlations from the General Social Survey (1972–2010), the authors provide comprehensive empirical support for the anecdotal accounts. Moreover, most ideological differences in lifestyle cannot be explained by demographic covariates alone. The authors propose a surprisingly simple solution to the puzzle of lifestyle politics. Computational experiments show how the self-reinforcing dynamics of homophily and influence dramatically amplify even very small elective affinities between lifestyle and ideology, producing a stereotypical world of “latte liberals” and “bird-hunting conservatives” much like the one in which we live.

In content, status honor is normally expressed by the fact that above all else a specific *style of life* can be expected from all those who wish to belong to the circle. . . . As soon as there is not a mere individual and socially irrelevant imitation of another style of life, but an agreed-upon communal action of this closing character, the “status” development is under way.

(Max Weber, *Class, Status, and Party*)

What do I think? Well, I think Howard Dean should take his tax-hiking, government-expanding, latte-drinking, sushi-eating, Volvo-driving, *New York Times*-reading, body-piercing, Hollywood-loving left wing freak show back to Vermont where it belongs.

(2004 Club for Growth TV advertisement)

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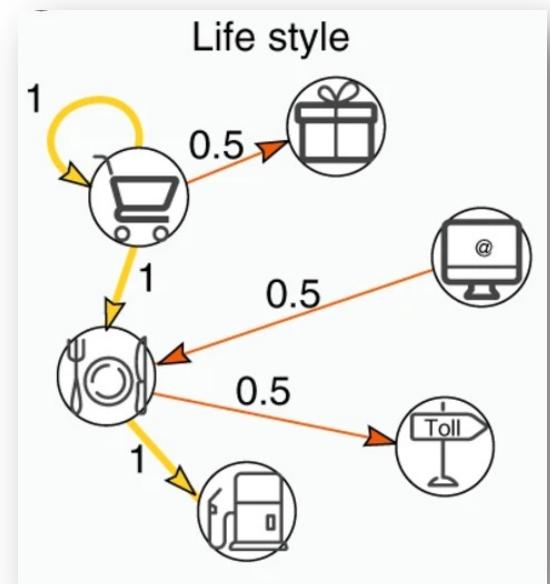
ARTICLE

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Sequences of purchases in credit card data reveal lifestyles in urban populations

Riccardo Di Clemente^{1,2}, Miguel Luengo-Oroz³, Matias Travizano⁴, Sharon Xu¹, Bapu Vaitla⁵ & Marta C. González^{1,6,7}

Zipf-like distributions characterize a wide set of phenomena in physics, biology, economics, and social sciences. In human activities, Zipf's law describes, for example, the frequency of appearance of words in a text or the purchase types in shopping patterns. In the latter, the uneven distribution of transaction types is bound with the temporal sequences of purchases of individual choices. In this work, we define a framework using a text compression technique on the sequences of credit card purchases to detect ubiquitous patterns of collective behavior. Clustering the consumers by their similarity in purchase sequences, we detect five consumer groups. Remarkably, post checking, individuals in each group are also similar in their age, total expenditure, gender, and the diversity of their social and mobility networks extracted from their mobile phone records. By properly deconstructing transaction data with Zipf-like distributions, this method uncovers sets of significant sequences that reveal insights on collective human behavior.



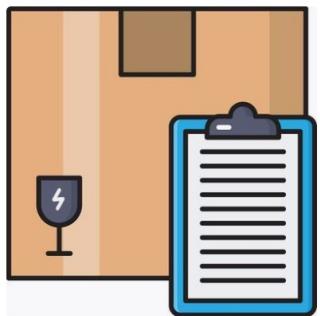
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Extracting Urban Lifestyles through “detailed” consumption data

Data
Period
Spatial Unit

- Invoice information for all parcels delivered to **Seoul** during the survey period (CJ olive networks)
- 2018 - 2022 / Only June each year / **Monthly aggregated**
- The unit of geographical information is a 50m x50m grid unit.

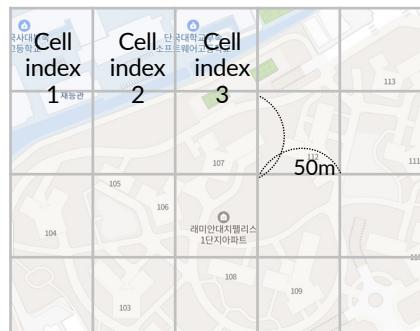
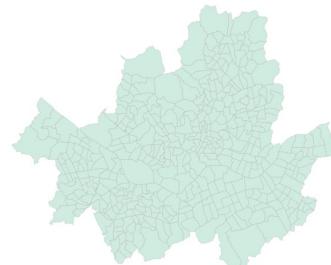
Delivery Invoice



Address
(Sender/ Recipient)

Product
(Large/Middle/Small Categories)

Parcels delivered to Seoul
Delivery information aggregated
into 50m x 50m grid cell



Data

Sender's address (admin. unit)	Recipient's address (cell)	Item (500 Categories)	Quantity (Box)
Neighborhood 1	Cell index 1	Furniture / Carpet	1
Neighborhood 1	Cell index 1	Clothes / Pants	2
Neighborhood 1	Cell index 3	Furniture / Carpet	3
Neighborhood 2	Cell index 1	Food / Fruits	1
Neighborhood 2	Cell index 4	Food / Ramen	5

PRODUCT CO-CONSUMPTION PATTERN

Sender's address (admin. unit)	Recipient's address (cell)	Item (Categories)	Quantity (Box)
Neighborhood 1	Cell index 1	Furniture / Carpet	1
Neighborhood 1	Cell index 1	Clothes / Pants	2
Neighborhood 1	Cell index 3	Furniture / Carpet	3
Neighborhood 2	Cell index 1	Food / Fruits	1
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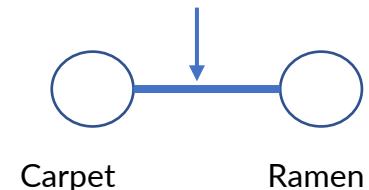
NETWORK CONSTRUCTING FILTERING

Measuring probability of co-consumption among products¹

$$RCA_{cp} = \frac{x_{cp}}{\sum_i x_{cp}}$$

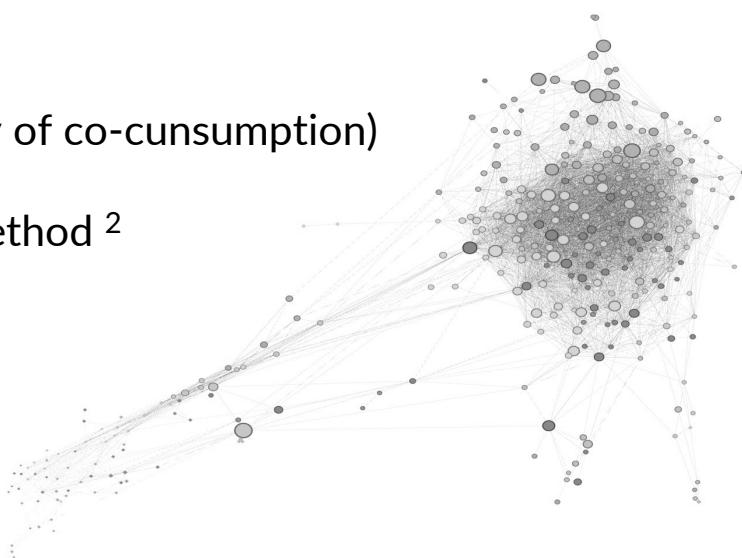
$$M_{cp} = \begin{cases} 1 & \text{if } R_{cp} \geq R^* \\ 0 & \text{if } R_{cp} < R^* \end{cases}$$

$$\phi_{pp'} = \frac{\sum_c M_{cp} M_{cp'}}{\max(M_p, M_{p'})}$$



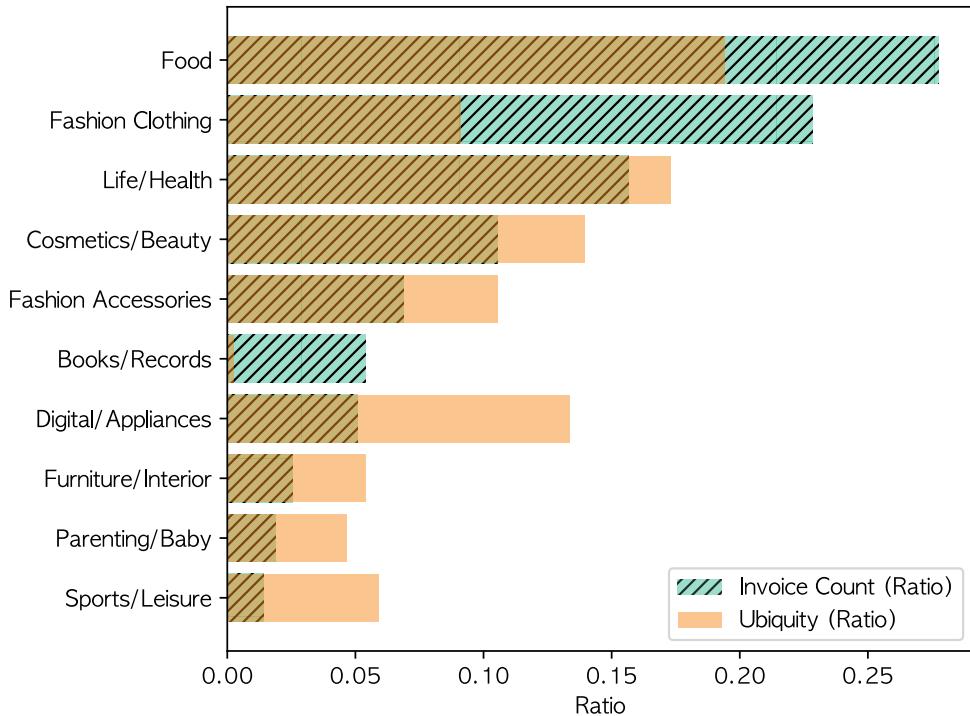
Constructing a **Co-consumption Network**
(Node : Product / Edge weight : probability of co-consumption)

Filtering network with disparity filtering method²



¹ Hidalgo et al., (2007) Science
² Serrano et al., (2009) PNAS

CONSUMPTION VOLUME UBIQUITY



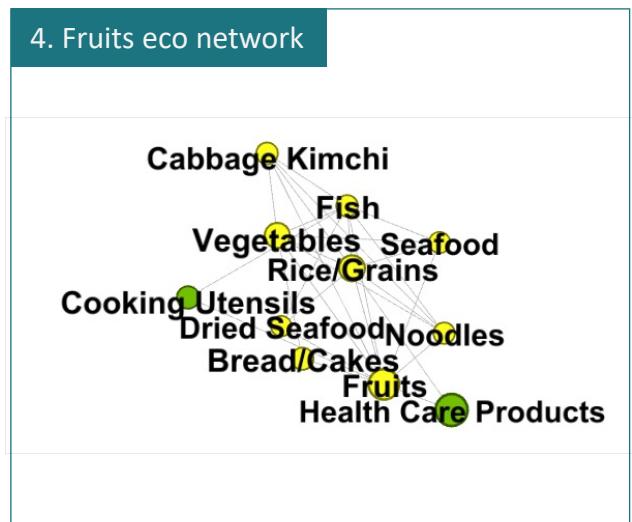
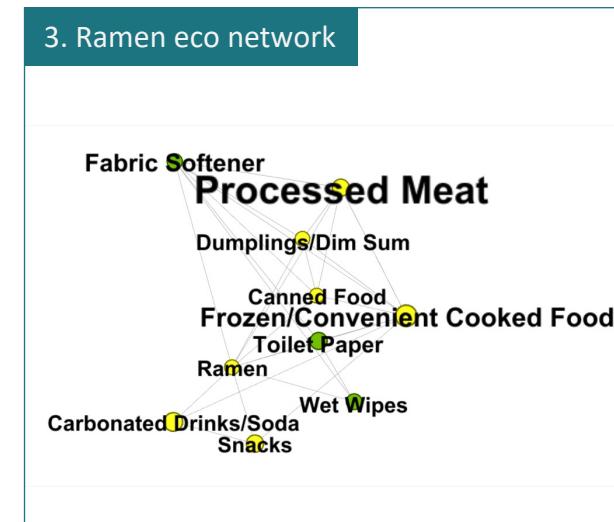
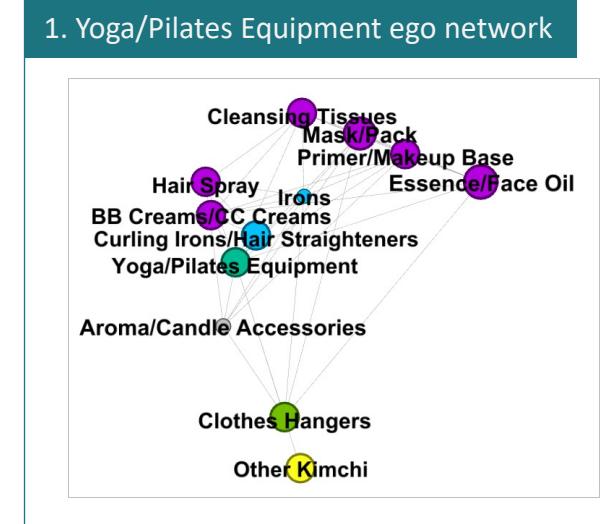
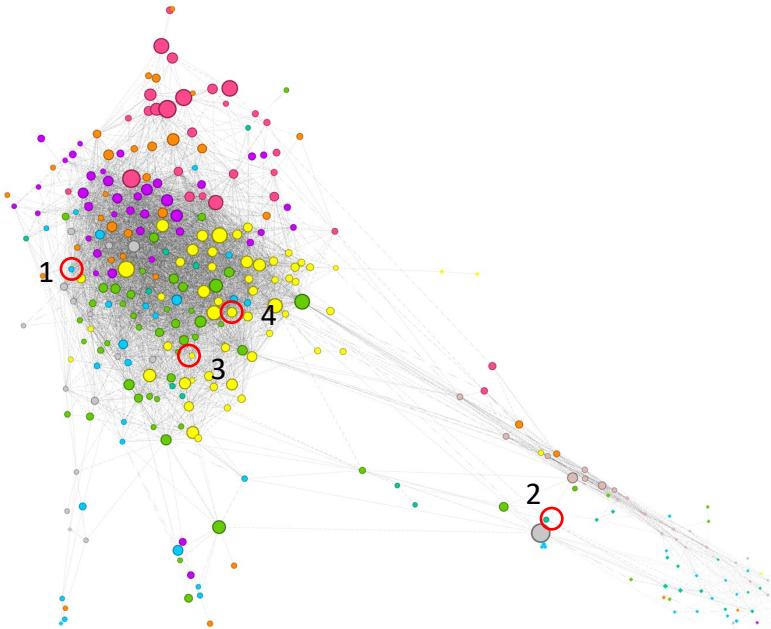
Most frequently consumed goods

Processed Meat	Wallpaper/Wallpaper
Detergent/Fabric Softener	Learning Devices
Frozen/Convenient Cooked Food	Sterilization/Sanitization Products
Other Health Foods	Entryway Items
Bras/Panties	Skiing/Boarding Equipment
Bedding	Other Hygiene Products
Pest Control Products	Car Convenience Accessories
Fabric Softener	Sensory Development Toys
Dehumidifier/Air Freshener/Deodorizer	Charger/Battery
Mineral Water	Monitor
Shampoo/Conditioner	Power Supply
Other Home Appliances	Dishwasher/Dryer
Other Household Items	Car Seats/Car Seat Accessories
T-shirts	Baby Bags
Cream	Silverware
Fan/Cooler	Other PC Peripherals
Fragrances	Keyboard Accessories
Cleansing Foams/Cleansing Gels	Basketball Accessories
Socks	Kimchi Made with Green Onions
Supplements	Healthcare Products
Dietary Supplements	Baby Outing Products
Toilet Paper	Other Sports/Leisure Items
Vegetables	Kick Scooters/Electric Scooters
Massage Tools	Flash/Lighting Accessories
Bread/Cakes	RAM
Slippers	Gold Jewelry
Soy Milk	Baseball Equipment
Fish	Films/Related Items
Body Cleaners	Water Ionizers

Least frequently consumed goods

Product Consumption network

- Co-consumption pattern describes how people perceive each consumer good.

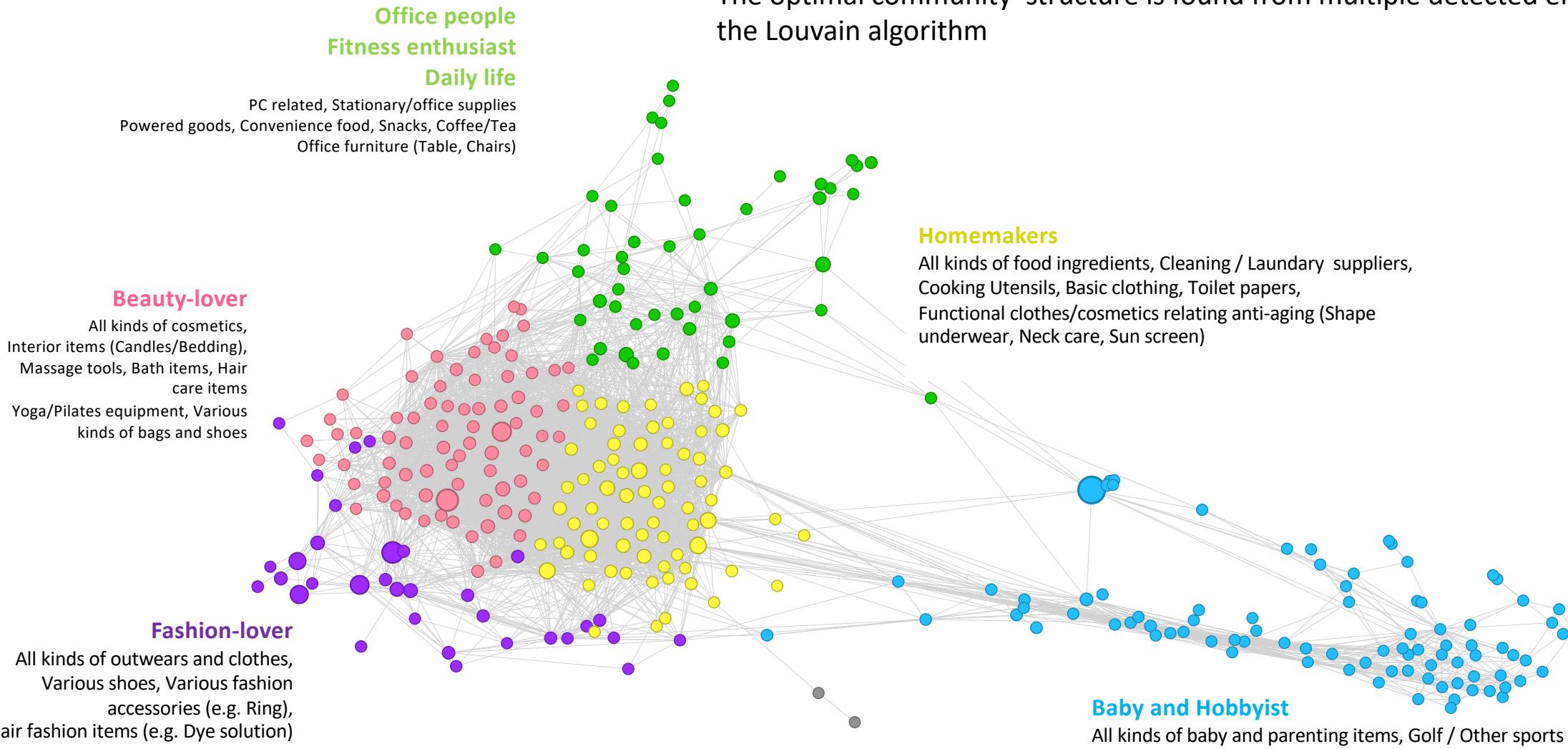


VS.

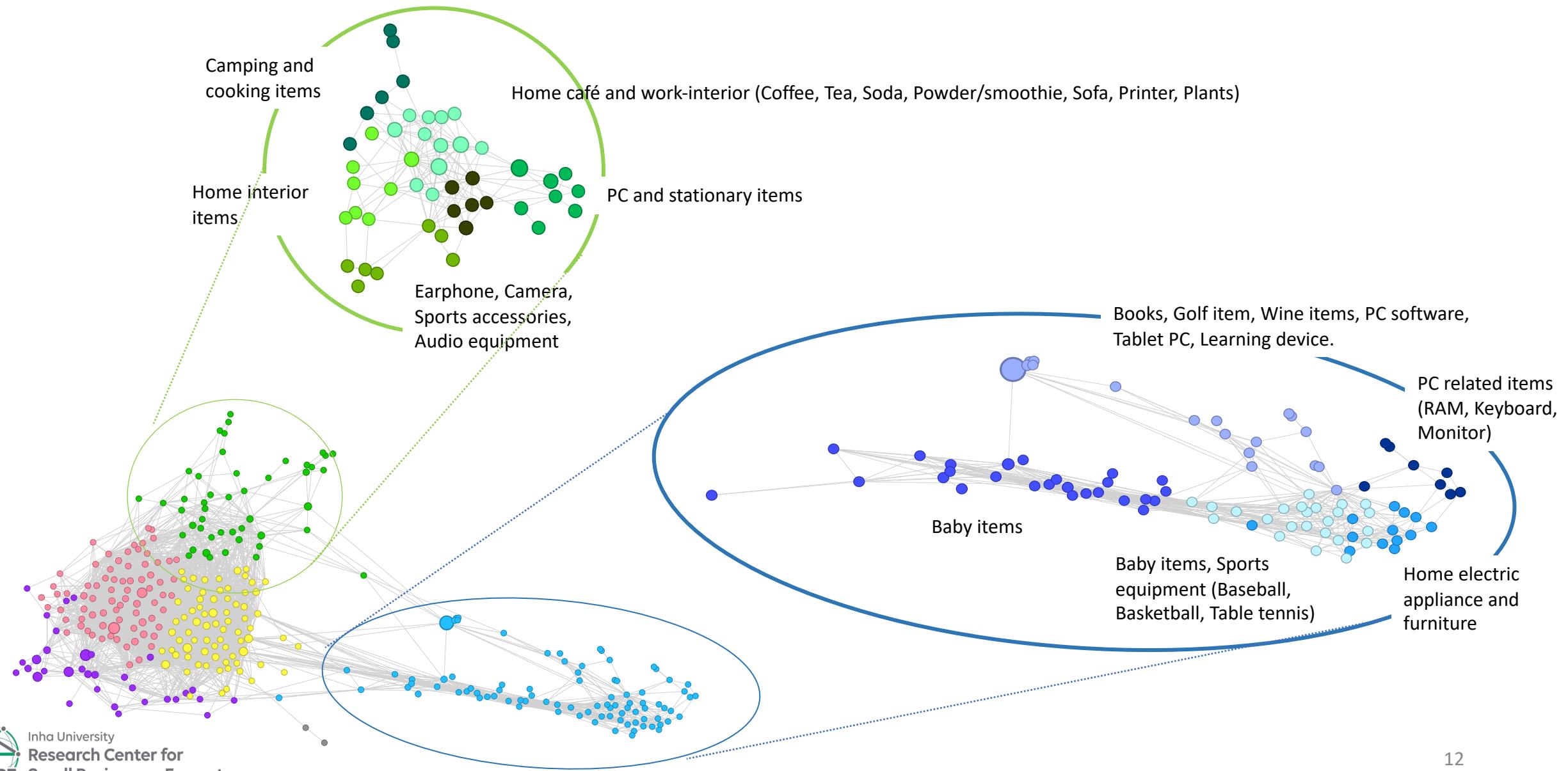
VS.

Lifestyle from product consumption network

- Community structure exhibits several basket groups of consumer goods
- The optimal community structure is found from multiple detected ensembles of the Louvain algorithm

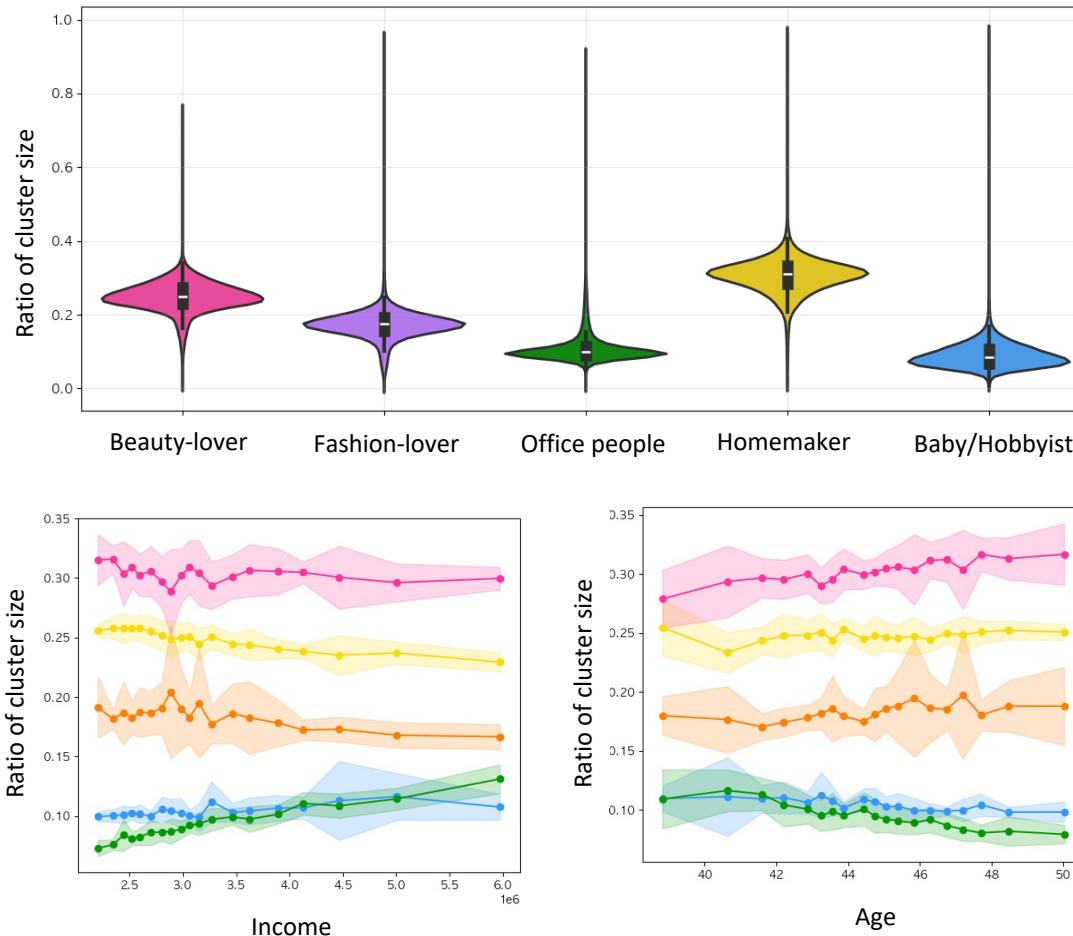


Lifestyle from product consumption network (higher resolution)



Lifestyles and social attributes

- Lifestyles are intricately linked to social attributes in various ways.
- Lifestyles exhibit shared patterns but remain uniquely defined by subtle distinctions.



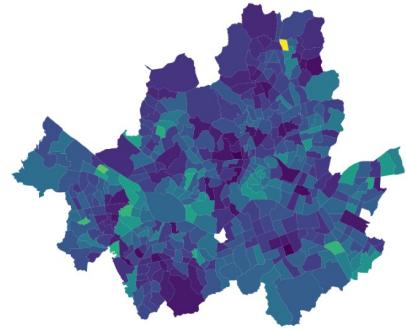
	Dependent variable: <i>lifestyle ratio</i>				
	Beauty-lover	Fashion-lover	Office people	Homemaker	Baby / hobbyist
	(1)	(2)	(3)	(4)	(5)
<i>log(income)</i>	-0.028*** (0.003)	-0.006 (0.010)	0.005 (0.004)	-0.010 (0.007)	0.039*** (0.004)
<i>log(birth)</i>	-0.003* (0.001)	-0.004 (0.002)	-0.001 (0.002)	0.007** (0.002)	0.001 (0.001)
<i>log(single household)</i>	0.008*** (0.002)	0.007 (0.005)	0.007*** (0.001)	-0.018*** (0.003)	-0.007*** (0.002)
<i>log(average age)</i>	-0.054*** (0.013)	0.020 (0.021)	-0.038* (0.017)	0.135*** (0.028)	-0.056*** (0.010)
<i>Fixed-effects</i>					
district	✓	✓	✓	✓	✓
Observations	372	372	372	372	372
R ²	0.600	0.256	0.404	0.456	0.788
R ² Within	0.442	0.043	0.130	0.314	0.692

*p<0.1; **p<0.05; ***p<0.01

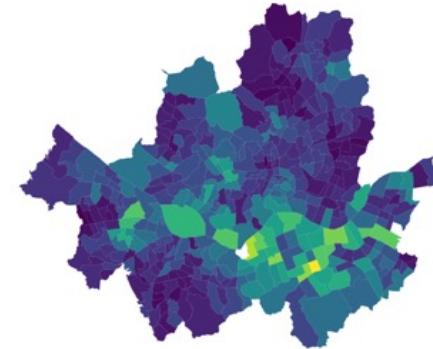
Spatial pattern of lifestyle is complex

- Most areas exhibit diverse lifestyle patterns
- In some extreme cases, lifestyles are partially segregated and form distinct clusters.

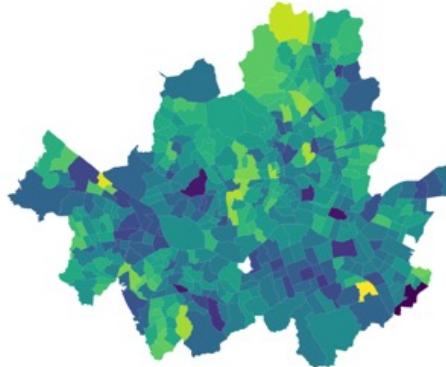
Birth ratio



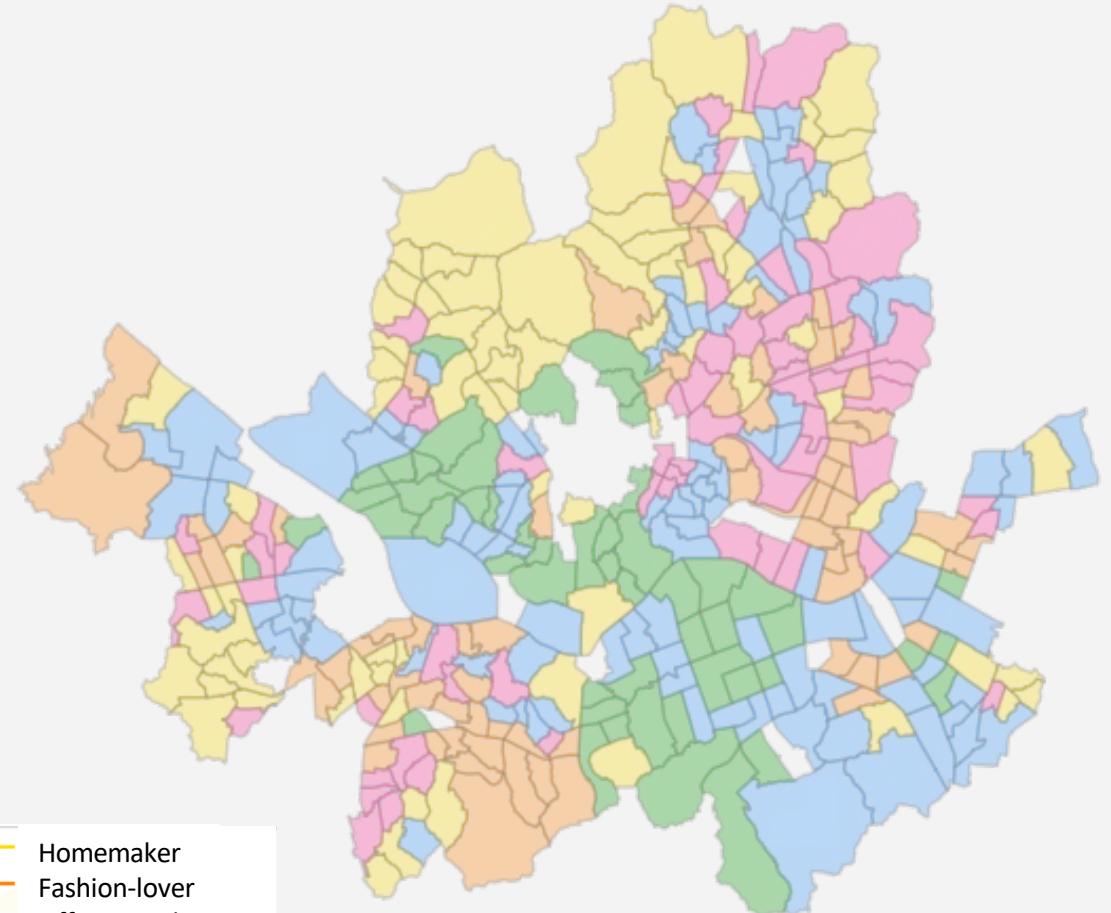
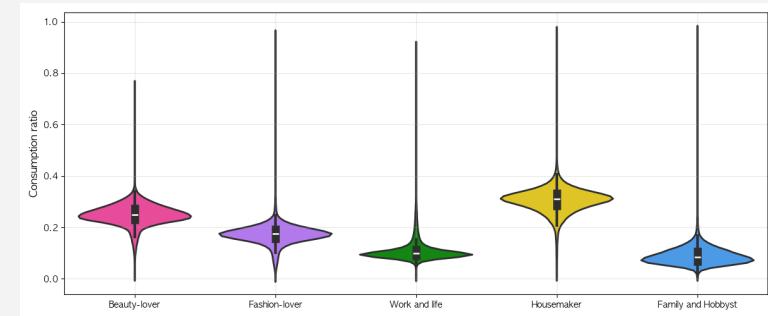
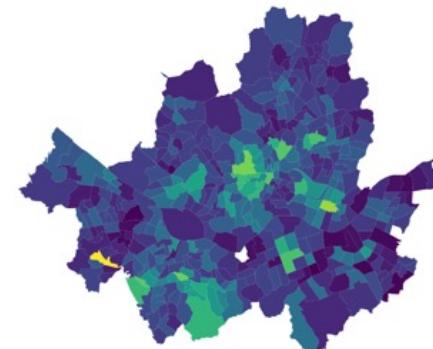
Monthly income



Average age



Single-household ratio



Conclusion

1. Micro-consumption data, represented as networks, reveals urban lifestyles.
2. Lifestyles are intricately tied to consumers' socioeconomic characteristics.
3. While lifestyles are spatially mixed across the city, extreme neighborhoods exhibit segregation.
4. Future work: Investigating social questions, such as lifestyle homophily.

THANK YOU

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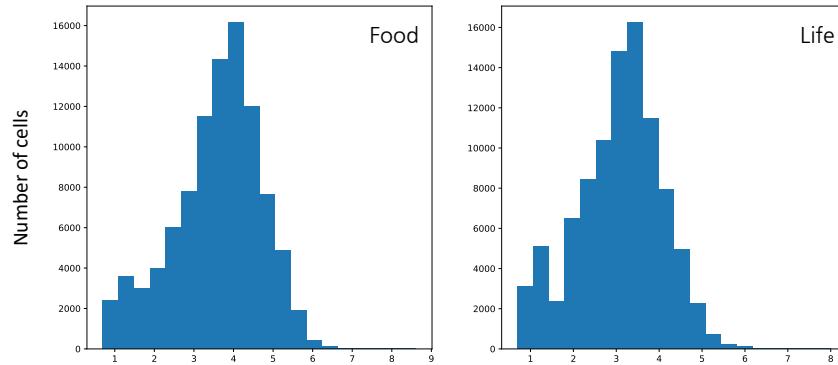
In collaboration with Hokyung Kim, Bogang Jun and Jaehyuk Park



The spatial distribution of consumption varies depending on the product.

- Products of some categories (Basic necessities) are more evenly distributed, while products of other categories (non-essentials) are more concentrated on a few areas.

< Basic necessities >

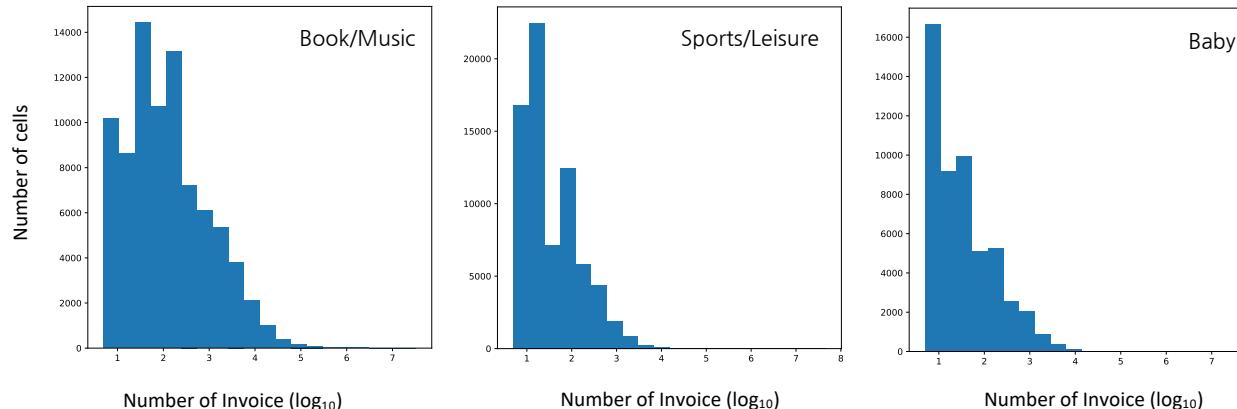


Food

Life

Fashion Clothing

< Non-essentials >



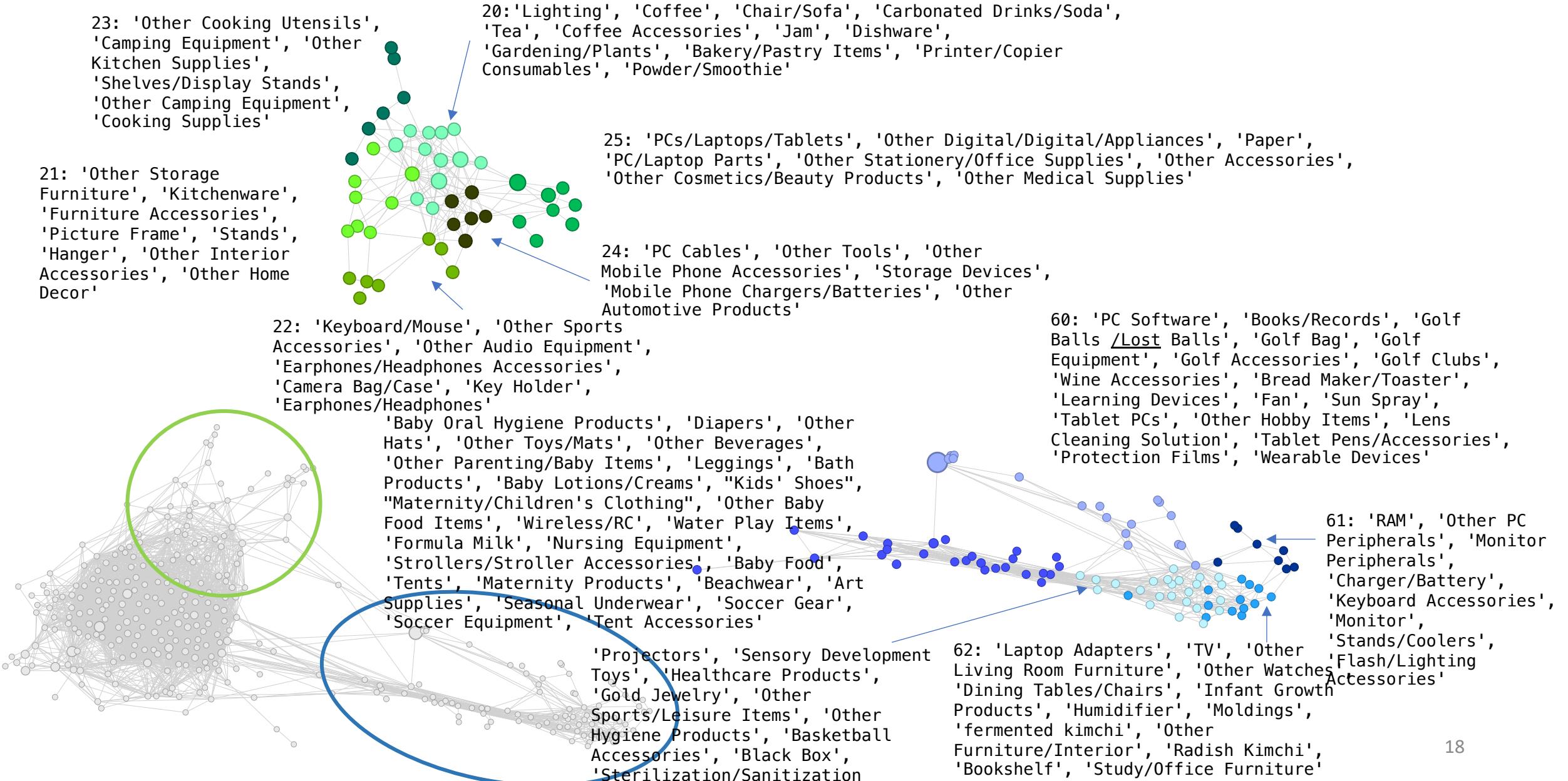
Food

Book/Music

Number of
Invoice (\log_{10})

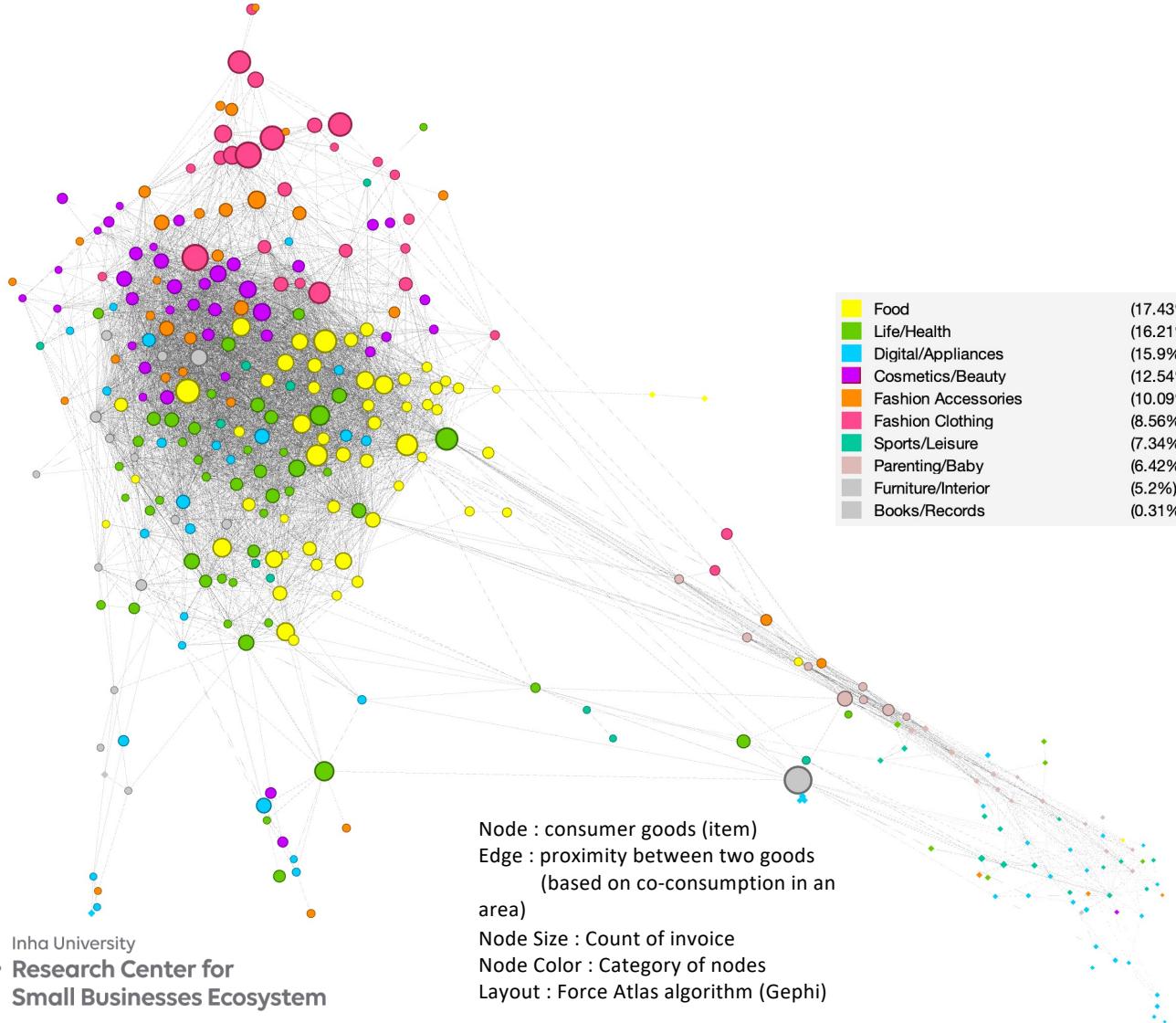


Community structure of product consumption network



Product Consumption network

- Product consumption network captures the general consumption patterns.
- Products in different categories are also frequently co-consumed .



Top 20 highly related product pairs.

Snacks/Pet Food	Other Pet Supplies
Fruits	Vegetables
Frozen/Convenient Cooked Food.	Processed Meat
Snacks/Pet Food	Pads/Pet Diapers
Fruits	Rice/Grains
Pants	T-shirts
Fish	Vegetables
Pants	Blouses/Shirts
Snacks/Pet Food	Health Management Products
Fish	Cabbage Kimchi
Fabric Softener	T-shirts
Diapers	Formula Milk
Other Health Foods	Supplements
Fabric Softener	Detergent
Rice/Grains	Vegetables
Dietary Supplements	Supplements
Fruits	Fish
T-shirts	Fragrances
Vegetables	Cabbage Kimchi
Diapers	Nursing Equipment
Bras/Panties	Fabric Softener