



POLITECNICO
MILANO 1863

Course presentation

Analytics for business lab

17.Feb.2025 | Piercesare Secchi & Lucio Lamberti

Teaching staff

Piercesare Secchi

Professor of Statistics at the Department of Mathematics, Politecnico di Milano, member of MOX, the departmental laboratory in modelling and scientific computing, and faculty member of the Data Analytics and Decision Science doctoral program.



His recent research interests focus on statistical methods for object oriented spatial statistics, classification of complex data, functional data analysis, data fusion and integration. He is member of the Società Italiana di Statistica, of the Institute of Mathematical Statistics and of the American Statistical Association. He joined many different important research projects both privately and publicly funded. He coordinated the statistical unit within the Aneurisk Project. He directed the research activity sponsored by the Italian Regulatory Authority for Electricity and Gas (AEEG) for the development of statistical models and methods aiming at quality of service evaluation and control in energy distribution. He was, and still is, principal investigator for different blue sky research projects financed by ENI at the Politecnico di Milano. He contributed to the development of Urbanscope, a new macroscope for the analysis of the digital traces generated by urban systems, and is now member of the Trespassing transdisciplinary research group at the Politecnico di Milano. He is among the founders of Moxoff, a spin-off of the Politecnico di Milano. From 2017 to 2020 he has been coordinator for Polimi of the Center for Analysis, Decision and Society (CADS), a joint research center between Politecnico di Milano and the Human Technopole research infrastructure based in MIND, Milano; in 2021 CADS has been renamed center for Health Data Science and he became part of its steering committee.

Teaching staff

Lucio Lamberti

Professor of Marketing at the Department of Management, Economics and Industrial Engineering, Politecnico di Milano, coordinator of Ph.E.E.L. (pheel.polimi.it), physiology, emotion and experience lab, director of the AXD Lab and of the Metaverse Marketing Lab, director of the International Master in Media & Communication Management (@POLIMI GSOM), visiting professor at Solvay Business School and Shanghai Tongji University. He is the Delegate for China Development Unit at the Graduate School of Management.

His research interests are in the field of CRM and quantitative marketing and in the area of applied neuroscience for customer behavior analysis. His collaborations include Google, RAI, Meta, Huawei, Nestlé, Fastweb, Lamborghini, Novartis Group, SAP, Edison, Prada, Hyundai, Amazon, Coop, CRAI



Teaching staff



Michele Di Dalmazi



Marc-Antoine Fortin



Gloria Peggiani



Matteo Tracci

Course Schedule

Day	Timetable	Room
Monday	15.30-19.00	B8.06
Tuesday	15.30-19.00	BL27.01

Details on schedule and course calendar are available on Webeep, together with an indication of the Webex room of reference for each session

Course objectives

- Introduce frontiers in the use of analytics in business decisions
- Hands-on approach on real business cases to develop concrete and actionable solutions using top-notch methods and approaches
- Lab format: the core of the course is the development of the course assignment, which will be a call for a business solution in a real context

Course architecture

Seminars

- Vertical sessions on advanced analytical methods and tools
- Co-teaching, to favor the integration between theoretical advances and application

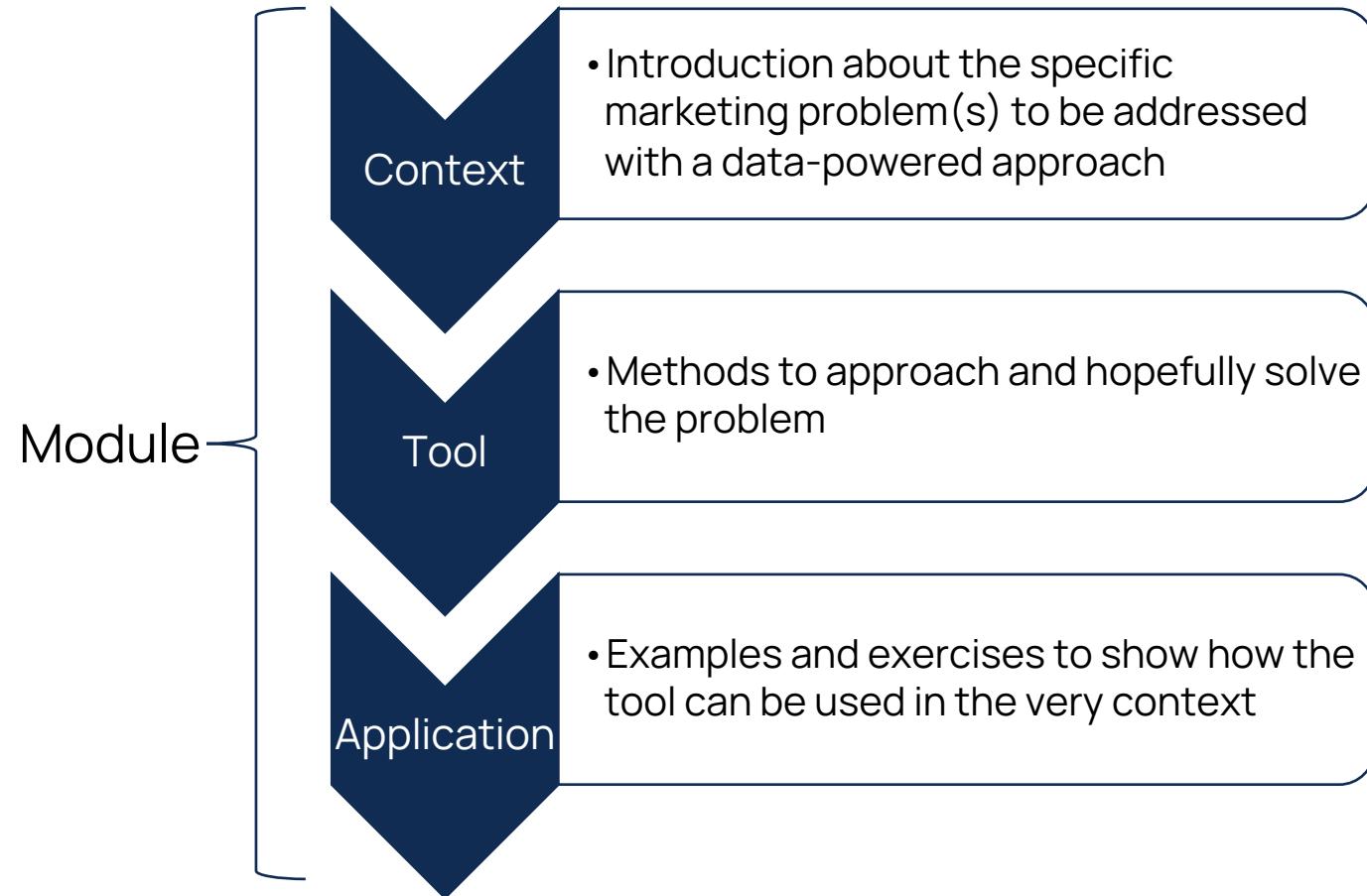
Course project introduction and launch

Teamwork

Mid-term workshop

Project presentation

Our approach



«Solutions without problems are a lot like shooting at ghosts. You don't hurt the ghosts, but you wreak havoc with anyone or anything in your line of fire»
Earl Babbie, Ph.D., Campbell Professor Emeritus in Behavioral Sciences, Chapman University

«In theory, there is no difference between theory and practice, while in practice, there is»
Benjamin Brewster, The Yale Literary Magazine 1882

Seminars

Advanced CRM methods

- Churn analysis (Survival analysis, Markov Chain)
- Applications of association rules
- Gamma Poisson methods for CLV

Anomaly Detection Methods

- The philosophical and ethical side of analytics

Marketing mix and attribution modelling

- Frontiers in MMM
- Attribution modelling

Regression and causation

- Applications of causal models to regression analysis

Survival Analysis and HMM

- Methods for churn prevention in contractual settings

Course architecture

Seminars

- Vertical sessions on advanced analytical methods and tools
- Co-teaching, to favor the integration between theoretical advances and application

Course project introduction and launch

- Conference with practitioners to contextualize the course assignment

Teamwork

- Arrangement in groups of 4-6 students
- Different possible tracks
- Supervised teamwork (with our teaching assistants; each group will have a tutor)

Mid-term reviews with professors

- Tutorship sessions with the professors to share doubts and perspectives (2 along the term)

Project presentation

- Poster session in which groups introduce their main outcomes to peers and teachers.
- A peer review will be asked

Our partners (and growing...)



Advanced CRM



Marketing mix
modelling



Influencer marketing
practices



Attribution modelling

Course project: rules of the game

- Team size: **3-4** students
- Team composition is responsibility of the students but we may have the necessity to add students to teams if the minimum number of students is not met by the group
- We will upload a form on Webeep after the contextualization of the tracks we will present in class. Deadline for your application: **March 28th, 2025 at 11:59 PM.**
- Each team has to define a team representative. The appointed **team representative** will manage all communication with the tutors
- Each team will be assigned to a Polimi Tutor and will have **three scheduled reviews with them** during the course (dates TBD). Moreover, for any doubt or issue you should contact the tutor to whom your team refers to.
- Two project review sessions will be arranged by professors along the term
- Also company tutors will be introduced and may provide feedbacks and suggestions

Key milestones

March 28th: deadline for group application

April 8th: mid-term review with professors

May 6th: mid-term review with professors

TBD: poster session

Mailing list

- Piercesare Secchi: piercesare.secchi@polimi.it
- Lucio Lamberti: lucio.lamberti@polimi.it
- Marc-Antoine Fortin: marcantoine.fortin@polimi.it
- Michele Di Dalmazi: michele.didalmazi@polimi.it
- Matteo tracci: matteo.tracci@polimi.it
- Gloria Peggiani: gloria.peggiani@polimi.it

Analytics for business

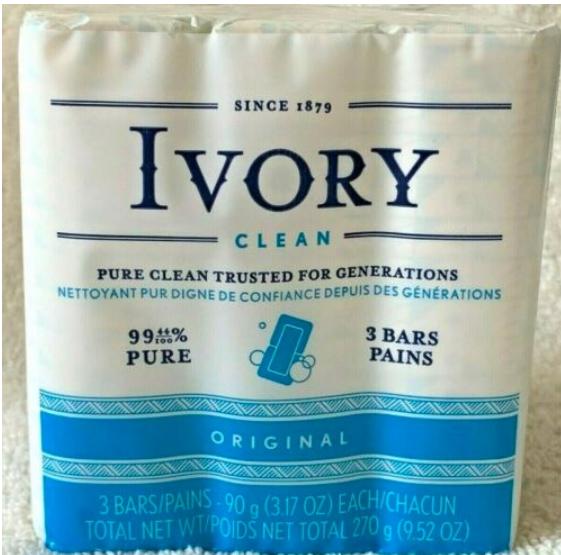
Straightforwardness

Implications

Parsimony

Straightforwardness

Early 1990s: success of the so-called «clear craze» design



Straightforwardness

Pepsi launches the Crystal Pepsi



Main characteristics:

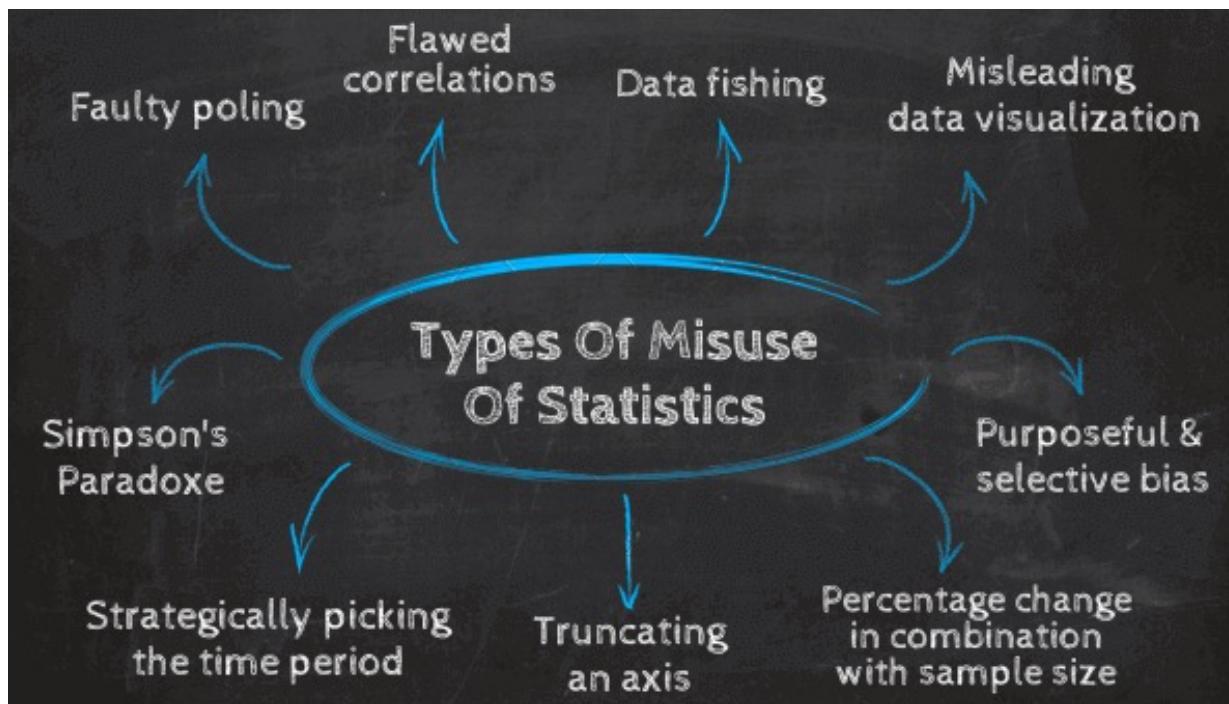
- Transparent
- tasting *almost* like Pepsi Cola (a little less acid)
- -15% calories circa

Launch: 1992-1993

Withdrawal: 1994

Straightforwardness

Possible statistical misuses:



Straightforwardness

Faulty polling: biasing questioning

- Do you believe that it is a good idea to give money so that people can decide not to work?
- Do you think that a subsistence for poor people is a good idea?

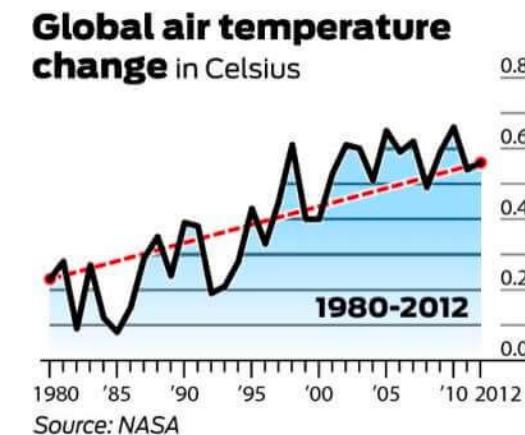
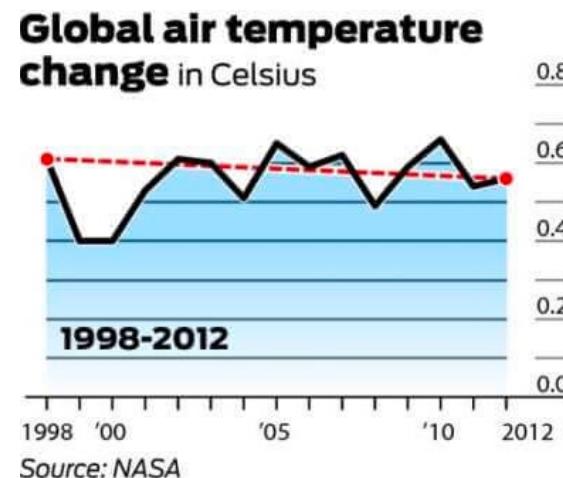
Flawed correlations: confounding correlation and causation

Let's assume that a study shows that there is a positive correlation between the increase of car accidents and an increase in garbage in the streets of a city. What can you conclude?

Straightforwardness

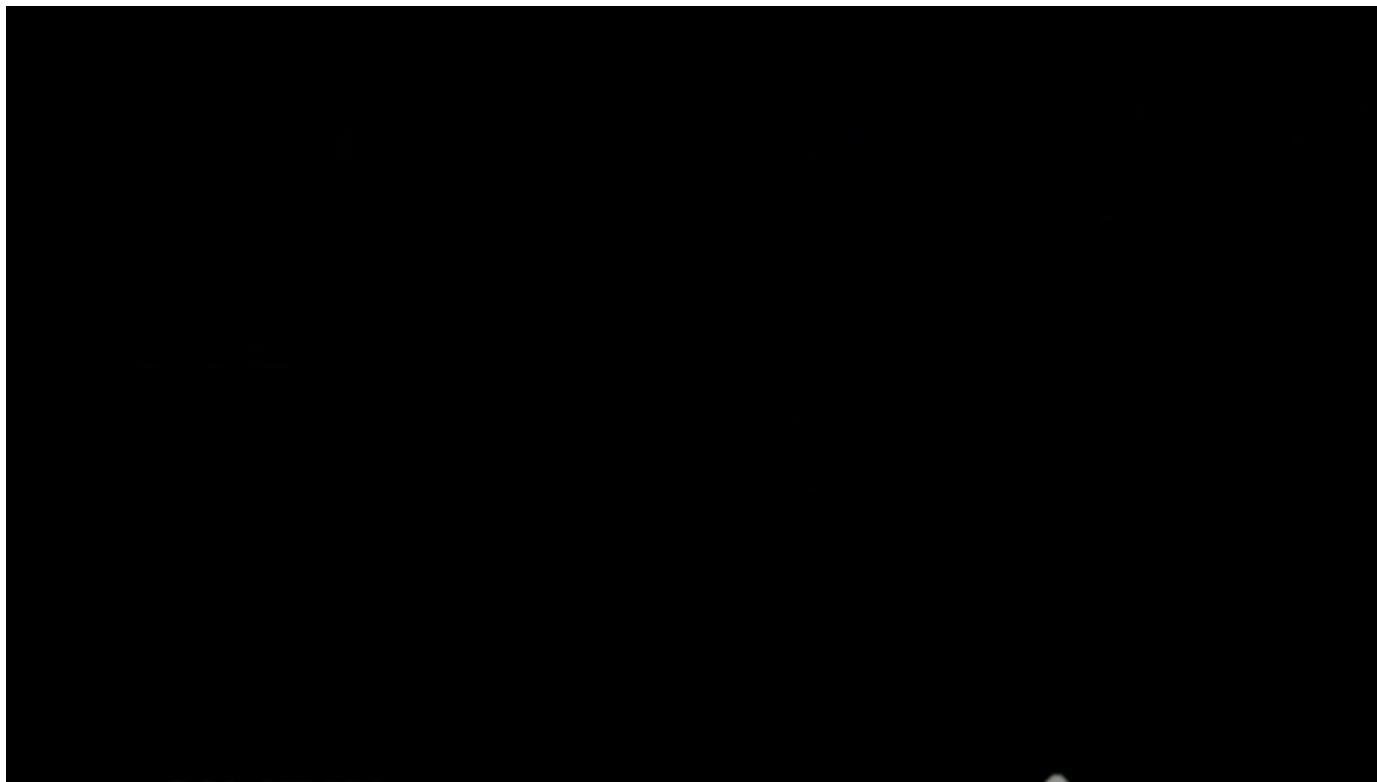
Data fishing: if you have enough data, you will find something with a significant correlation

Misleading data visualization/strategically picking the time period



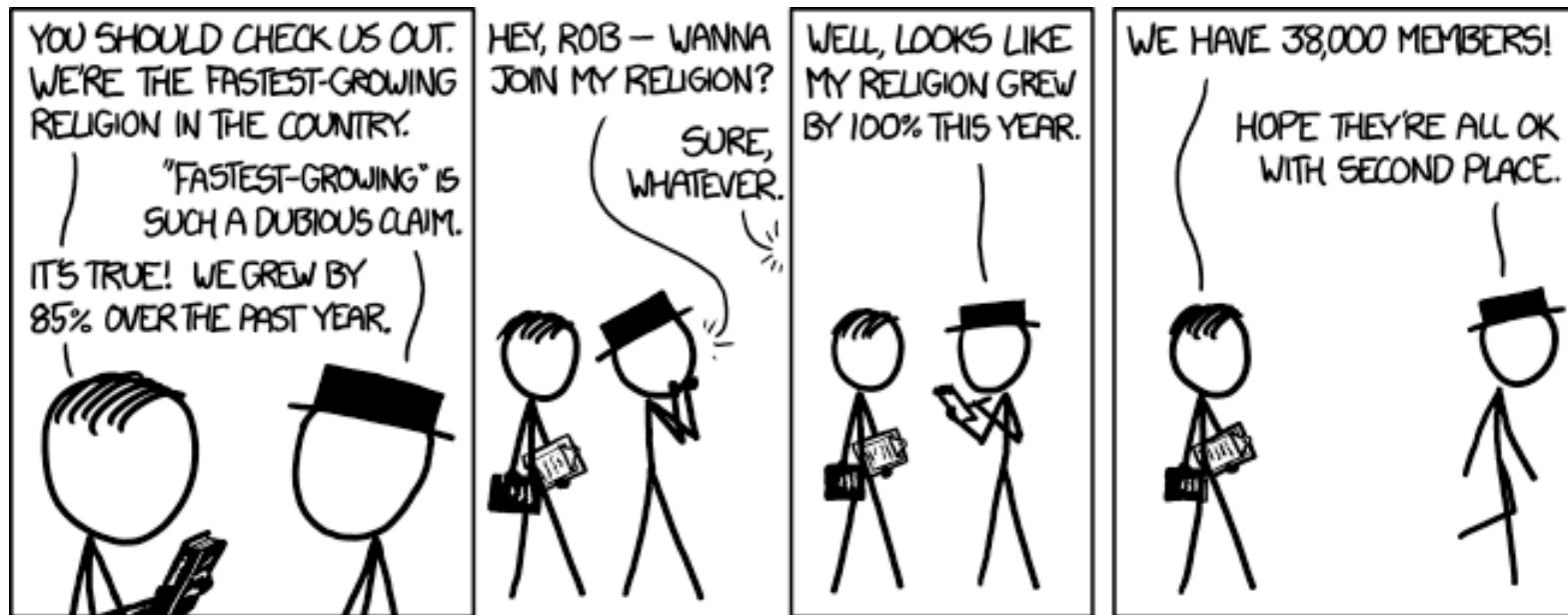
Straightforwardness

Purposeful or selective bias:



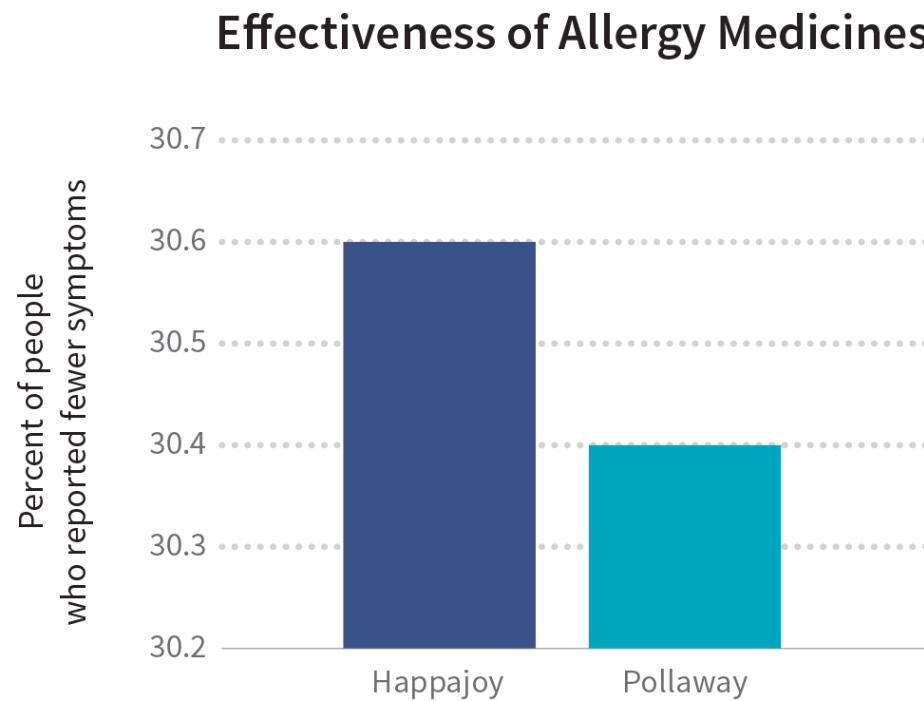
Straightforwardness

Percentage change in combination with a small sample size



Straightforwardness

Truncating axis



Straightforwardness

Simpson's paradox: statistical phenomenon where an association between two variables in a population emerges, disappears or reverses when the population is divided into subpopulations

	Treatment A	Treatment B
High fever	Group 1 90.36% (75/83)	Group 2 88.36% (243/275)
Low fever	Group 3 82.48% (226/274)	Group 4 76.83% (63/82)
Both	84.31% (301/357)	85.71% (306/357)