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crowds

exhibition
18 October 2022
— 07 January 2024

PRESS KIT

EDITORIAL

In a real world densely populated by humans or a virtual world full of social media avatars, our day-to-day lives increasingly involve crowds. Crowds that sometimes make good sense for instance, with the development of participative initiatives on the Web. But when, on the contrary, it features all the vices of classic culture, as we might experience on public transport, at a match or during a public event, a crowd is likely to generate unease and anxiety raising certain questions. But what exactly happens when we find ourselves in a crowd? How can we explain this unique phenomenon that is much more than the mere sum of its components?

Crowds is an exhibition that calls upon a wide array of scientific disciplines, ranging from physics to behavioural science, to analyse the multiple and complex mechanisms that come into play between individuals whenever a crowd is formed. It explores the profoundly social nature of human beings and invites us to reflect on the concept of individuality at a time when we increasingly face collective challenges.

Bruno Maquart,
Chairman and CEO of Universcience

CONTENTS

↦Trilingual exhibition (French, English, Spanish).

↦From 10 years old.

↦In partnership with the Max Planck Institute for Human Development.

↦ *Crowds* is part of the "Societyscience / The way our world is changing" editorial line. This thematic line features exhibitions dealing with changes in science and technology and their impact on our individual and collective lives. They therefore offer a valuable insight into social sciences and other major issues affecting society.

INTRODUCTION

↦ A crowd is individuals interacting

In the midst of others, we are carried away by enthusiasm or jostled about randomly. While it may be pleasant to be surrounded by supporters at a match, like-minded citizens at a demonstration, or marathon runners driven by a desire to win, it can also be frightening to feel trapped in a metro train, a procession or a religious pilgrimage. **All these situations have one thing in common: the individual only exists in interaction with others. From these interactions emerge the collective phenomena that the *Crowds* exhibition aims to study.**

↦ Density is the exhibition's underlying theme

The exhibition begins with an analysis of dense crowds, then moves on to the more scattered ones, ending with more distant crowds: virtual crowds. **The exhibition is built around the unit of measurement of a crowd: density**, which is simply the number of people per square metre. **At high density**, the crowd is considered to be a group composed of a large number of interacting individuals and allows us to analyse, **thanks to the laws of physics**, different types of components: human, animal, grains, particles... **As soon as the density decreases, behavioural sciences** become increasingly important to explain urban choreographies and any kind of collective movement.

↦ A modern view of the crowd

In collective imagination, crowds are frequently seen as something negative, like strange creatures that may even cause concern. Based on the most contemporary interdisciplinary research, ***Crowds* seeks to deconstruct and renew the negative image it has been attributed for so long**.
Using an innovative scenographic device, the exhibition puts the visitor inside the crowd to better experience it, and outside it to better understand it: **from participant to observer, and for the duration of the exhibition, the visitor becomes a real "crowdologist"**.

THE EXHIBITION TOUR

Room after room, the crowds analysed become less dense: as the exhibition progresses, we move from a very tightly packed crowd to one increasingly dispersed. The first three parts present elements that can be manipulated and each is accompanied by a large videowall that introduces and defines the type of crowd in question. Between each room, mysterious pieces, 'experimental capsules', invite the audience to experience intriguing phenomena... Surprises!

ENTRANCE

DENSITY, THE UNDERLYING THEME OF THE EXHIBITION, IS A KEYSTONE OF CROWDOSCOPY*, ONE OF THE ESSENTIAL PARAMETERS FOR UNDERSTANDING, QUESTIONING AND STUDYING THE CROWD.

Samples of crowds

The public is introduced to the exhibition with the installation *Samples of Crowds*, produced by the artist Iommy Sanchez. Five booths, each measuring one square metre, are displayed in front of the public, each containing in turn 1, 3, 5, 7 and up to 9, full scale 3D-printed characters. The sixth booth is empty: visitors enter alone or with others and **experience the concept of density through their senses.**

DEFINITION

*** Crowdoscopy**: a term coined by Marion Montaigne, the author of the graphic blog *Tu mourras moins bête* and later adopted by the researcher Mehdi Moussaïd, the exhibition's scientific curator.

PART 1

Compact crowds

IT IS IN THE HEART OF A VERY DENSE CROWD THAT OUR FREEDOM OF MOVEMENT AND ACTION IS MOST RESTRICTED. INSTABILITY, TURBULENCE, MOVEMENTS, UPHEAVALS ARISE SPONTANEOUSLY AND SOMETIMES GIVE RISE TO A FEELING OF INSECURITY.....

Movements of very dense crowds

At this level of density, **the crowd behaves like a fluid and the compression waves that can be observed with the naked eye between individuals resemble those that propagate in water**. On the wall, extracts from concerts, religious and sporting gatherings show the propagation of these waves of jostling. Powerless, individuals find themselves pushed against each other. A parallel is drawn with a wave aquarium set up in front of this giant screen.

Alongside, the audience discovers a physics experiment on collective movements... but at a completely different scale: **millions of moving polystyrene microbeads end up aligning themselves spontaneously**. In a crowd of humans, a flock of birds, a colony of bacteria or inside our cells, **organisation emerges without a programme or leader**. There are no conscious movements: **spontaneous interactions alone are enough to cause these group movements**.

Knowing this, how do you survive in a tight crowd? "Try to stay on your feet", "Look for the exits", "Save your oxygen", "Stay together": on the wall are a few tips to keep the experiences of a dense crowd as pleasant as possible.
Counting the crowd? Not that easy! A little further on, a cheerful carnival of Playmobil® figurines allows you to give it a try. The public can use their ingenuity to make their own estimate. **There are several counting methods, some of which are more accurate than others...**

Evacuation in an emergency

In a very dense crowd, **people are like grains that, by pressing together, can obstruct each other**: how to avoid the worst and extricate yourself from a crowd? Using hourglasses, the visitor will have fun trying to discover one of the possible tricks: **would an obstacle help you to get out faster after all?**
Alongside this, *Keep moving, there's nothing to see* is a simulation game that allows visitors to play architect by changing the exits, walls and obstacles of different buildings.

In the same space, a film featuring researcher Mehdi Moussaïd demonstrates a study conducted in his laboratory. Conclusion: **In an emergency situation, the crowd usually heads for the same emergency exit.**
It also shows, that virtual reality is now part of the experiment protocols, which should refresh the imagination of research laboratories!

PART 2

Crowds

Pedestrian

WHETHER IN A STATION, A METRO OR A BUSY STREET, WE ARE ALWAYS IN A CROWD SITUATION, BUT THIS TIME THE DENSITY IS LOWER: THIS IS WHAT WE WILL CALL "PEDESTRIAN CROWDS". SO WHY DO PEDESTRIANS BUMP INTO EACH OTHER SO RARELY AND ALMOST ALWAYS AVOID EACH OTHER? AN ANALYSIS OF THE COLLECTIVE BEHAVIOURS THAT EMERGE DURING OUR INTERACTIONS AND OUR MOVEMENTS.

Amongst animals

Amongst animals, the phenomenon is obvious: here we can see it in a mesmerising film by the artist Søren Solkær, that shows the unpredictable coordination of a huge flock of starlings.
We see **collective behaviours among many species of animals, without any leader intervening**.
Which species? Bees? Ants? Visitors can try to find the answers with the collective quiz *Questions for sheep*.
A little further on, it becomes clear that it is very easy to mathematically simulate a flight of starlings, a shoal of fish or a cloud of insects.
The multimedia game called *Boids, boids, boids* allows you to take control of a swarm and attempt to adjust its parameters faster than your opponent. This gives a better understanding of the complexity of virtual crowd software used in movies and video games.
The exploits achieved in this area are the subject of the film *The Crowd Factory* shown next door.

Pedestrian movements

Also in this area, a large interactive table invites you to try your hand at being a "crowdologist". The collective game consists of identifying, in video animations of crowds, certain characteristic behaviours of pedestrians: avoidance by the right, V-shaped movements, etc. **Without knowing it, we use these behaviours almost systematically in our daily lives and thus make traffic much smoother.**

Proximal distances

Several times a day, **we unconsciously adjust the distance we put between ourselves and others. Not too close, not too far. It all depends on the nature of the interaction and many other parameters.** This is demonstrated by a large projection on the floor in which visitors are invited to take part. Like an animated dance floor, they move around following the indications and re-enact various situations: travelling in the metro, in a lift, hanging out at the beach, etc. **These are all opportunities to explain the concept of proxemics*.**

DEFINITION

*** Proxemics**: a field of study, founded in the 1960s-1970s by the American anthropologist Edward T. Hall, which focuses on the adjustment of physical distances between individuals in everyday life.

PART 3

COLLECTIVE PHENOMENA ALSO OCCUR WHEN WE COMMUNICATE AT A DISTANCE: BY WORD OF MOUTH, ON SOCIAL NETWORKS, OR EVEN BY SINGING. THIS THIRD PART DISCUSSES THE PARTICULAR MECHANISMS AT WORK IN 'VIRTUAL CROWDS'.

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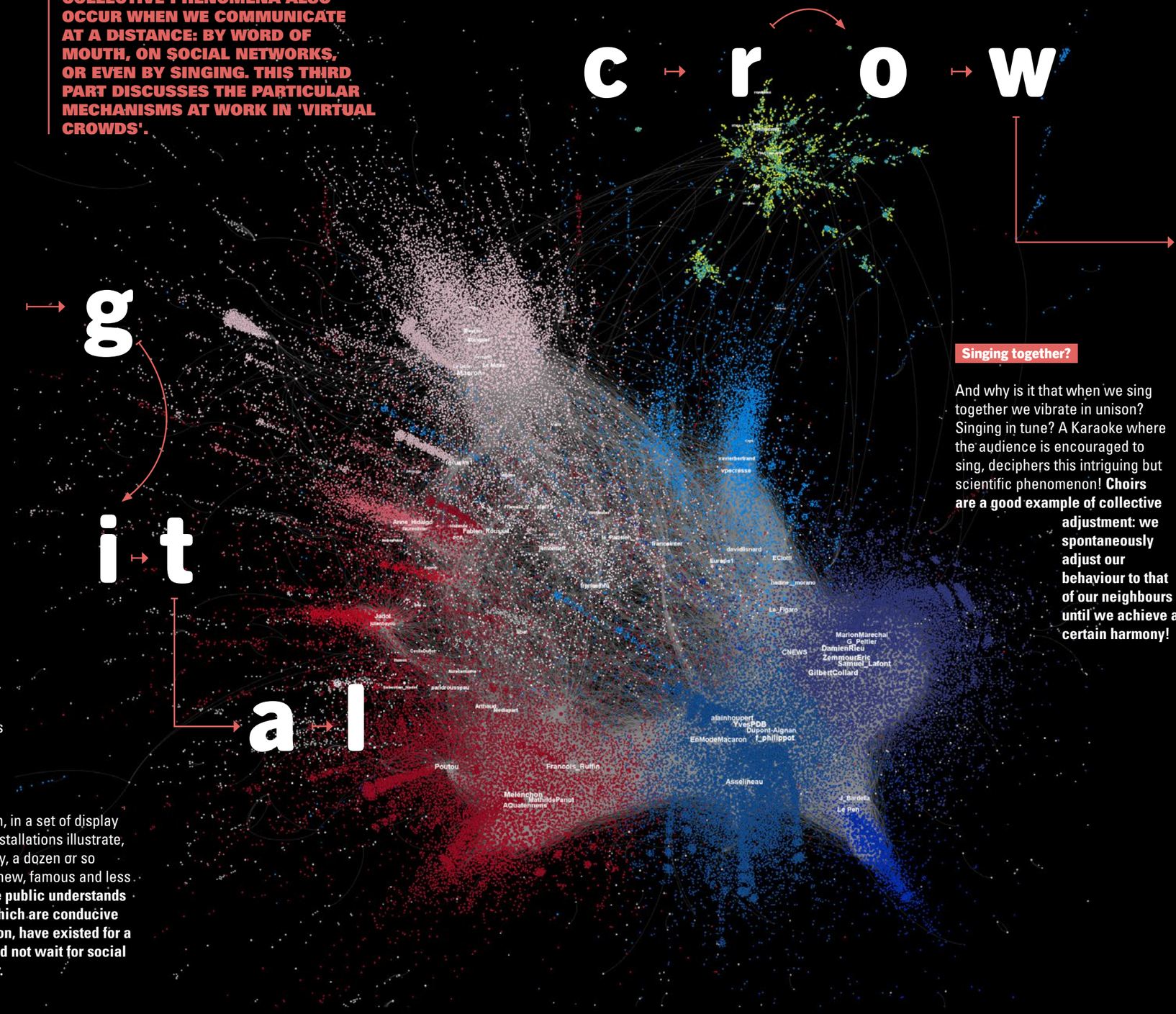


Networks

To represent the content of the exchanges within these virtual crowds, the public is welcomed by a large data visualisation wall projection: *The Politoscope*. Researcher David Chavalarias presents a dynamic panorama of the messages exchanged on Twitter on a range of subjects, revealing communities and a strong polarisation of certain debates. **Because even from a distance, we are in contact and form networks.** A short documentary explains this particularly effective architecture for communicating, called "small world". It shows "hubs", which are real points of intersection towards which a number of links converge.

A little further on, in a set of display cases, plastic installations illustrate, in an offbeat way, a dozen or so rumours, old or new, famous and less well-known. **The public understands that rumours, which are conducive to group cohesion, have existed for a long time and did not wait for social media to appear.**

Singing together?

And why is it that when we sing together we vibrate in unison? Singing in tune? A Karaoke where the audience is encouraged to sing, deciphers this intriguing but scientific phenomenon! **Choirs are a good example of collective adjustment: we spontaneously adjust our behaviour to that of our neighbours until we achieve a certain harmony!**

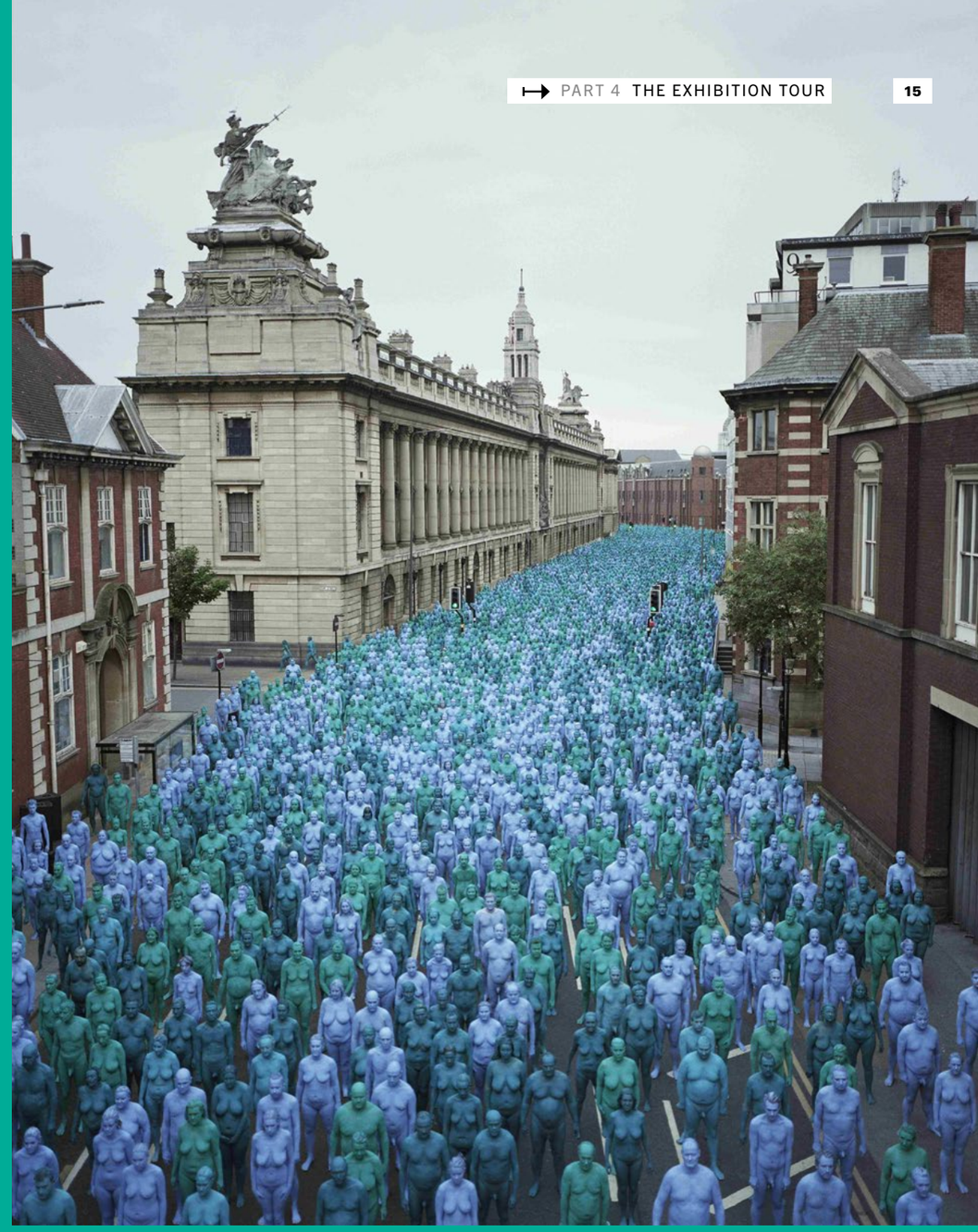
PART 4

Between crowds and groups

WHAT IS THE DIFFERENCE BETWEEN A CROWD AND A GROUP? HOW IS AN OPINION MOVEMENT BORN? WHAT IS A CONTAGIOUS BEHAVIOUR? HOW ARE RUMOURS DISTORTED? SEVERAL ANSWERS ARE PROVIDED IN THIS GALLERY OF GRAPHIC FRESCOES.

Tipping point

We see a display of images of the #Metoo and #BlackLivesMatter movements. American journalist Malcolm Gladwell, a specialist in psychology and sociology, calls this "tipping point" **the precise moment when a situation, a piece of information or a fact expands from the stage of confidential dissemination to that of a social phenomenon**. The crowd then becomes a political movement, a social cause... always driven by common interests.



Belonging to a group

Sea of Hull is a photograph by the artist Spencer Tunick taken during a performance: a crowd of 3,200 people, stripped naked and covered in green or blue paint, in the middle of a street in England. Do we see two separate groups? This crowd of coloured bodies seems to expose our tendency to attach too much importance to trivial differences.

And yet, on the basis of these small differences, it is very easy to feel that we belong to one group and to reject members of the other group. A parallel is drawn with the American social psychologist Muzafer Serif's well-known experiment with children in a holiday camp in the 1960s.

PART **5**

Bad reputation

Representations of the crowd

The revolutions and popular movements of the late 19th century gave rise to **the idea that the crowd was not just a sum of individuals but had its own psychology and mechanisms**. Very quickly, it was considered to be animal-like, uncontrollable, even dangerous.
But while it is true that collective movements can be the stage of the worst scene, they more often than not generate solidarity and a form of collective intelligence: as shown in the film *Bad Reputation*, at the crossroads of historical, sociological, political, psychological and anthropological approaches. Comfortably seated, the audience immerses itself in this fifteen-minute show, which includes images of mass crime or solidarity events, jubilation or violence, and interventions by experts*. **A rich panorama of historical representations of the crowd.**

THE EXPERTS

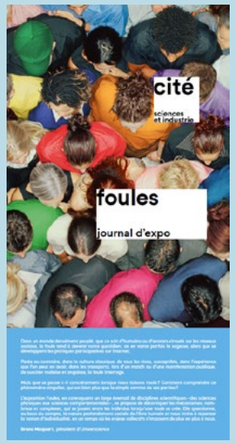
*** Matthijs Gardenier**, sociologist; **Guillaume Dezecache**, researcher in cognitive sciences, Université de Clermont Auvergne; **Jacques Sémelin**, historian, Centre d'Études et de Recherches Internationales, CNRS, and author of *Purifier et détruire, usages politiques des massacres et génocides*; and **Vincent Rubio**, social anthropologist, Université de Nanterre

PART **6**

the other side of the mirror

And what if the visitor were to become, for a moment, a real "crowdologist"?
This is what happens in this last secret room. Surprises await... !

EXHIBITION
SIDE EVENTS



The exhibition journal

Intended as an extension of the visit, this journal highlights the multidisciplinary nature of the researchers who study crowds and reports on the current applications of their research.
By focusing on the notions of collective intelligence and the virtual crowd, it also provides the keys to understanding the nature of crowds today.

Author of the texts and interviewer:
Clara Delpas, scientific journalist.
Scientists interviewed: Mehdi Moussaïd, scientific curator of the exhibition, researcher in cognitive sciences at the Max Planck Institute for Human Development (Berlin), author of the book *Fouloscopie* and Audrey Dussutour, member of the exhibition's scientific committee, ethologist and director of research at the CNRS at the Animal Cognition Research Centre (Toulouse).
Price €5.95.
For sale: in the shop and ticket office, on site and online from 18 October 2022.

Card game
“Cartzzle Foules”

"Cartzzle Foules" is a puzzle with 50 cards to be stacked. It involves putting together two images, a human crowd and an animal crowd, and taking on a number of challenges to create new puzzles. Attention to detail, observation skills and care are required!

Ages 8 and up. A joint publication by Jeux Opla / Cité des Sciences et de l'Industrie.
Available from October 2022. On sale at the Cité des Sciences, at toy shops and in our online shop. Retail price: €11.

Demonstration
“Does a crowd speak with one voice?”

There are many ways to allow a crowd to make a decision. There are many different voting systems and methods, each with different effects on the outcome. Find out how the voting system affects the final result.

From 22 October 2022, duration 45 min.

Online escape game
"Trapped in the crowd”

Professor Solo has locked the players in his laboratory and trapped their avatars in his crowd simulator! In this collaborative online escape game, the countdown timer takes the form of an increasingly dense crowd. To escape, the players must, together, pass a series of tests. They will experiment with the mechanisms of collective intelligence at the origin of complex systems such as shoals of fish or ant colonies. How will the team organise itself? The crowd, sometimes a little frightening, can be a formidable source of innovation. Beware, time is limited!

Ages 11 and up. Duration 45 to 90 minutes. For 2 to 6 players.

Online

Find all the online content for the exhibition on its page:
cite-sciences.fr/fr/au-programme/expos-temporaires/foules

PARTNERS

↦ In partnership with

MAX PLANCK INSTITUTE
FOR HUMAN DEVELOPMENT

The Max Planck Institute for Human Development is a research centre dedicated to the study of individual and collective behaviour, educational systems and human-machine interaction. Located in the German capital, the institute attracts researchers from various disciplines: psychology, sociology, medicine, history, economics, computer science and mathematics. The research carried out there includes, for example, the mechanisms of decision-making, the functioning of the brain, collective intelligence and the behaviour of crowds, cognitive development over the course of a lifetime, the role of emotions in a historical context and the role of social and digital innovations.

↦ With the support of

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The analysis of flows and the management of crowds and their behaviour thus supports the practices of Transilien agents, particularly during major events or disruptions.

↦ With the cooperation of

cnrs

Fonds Afnor pour la Normalisation

THE TEAM

↦ Exhibition curator (Universcience)

Astrid Aron and **Dorothée Vatinel**
co-curators

↦ Scientific curators

Mehdi Moussaïd, a researcher in cognitive sciences at the Max Planck Institute for Human Development (Berlin), specialist in crowd behaviour, author of the book *Fouloscopie* published by humenSciences in 2019, host of the virtual laboratory "fouloscopie.com and the YouTube channel "Fouloscopie".

↦ Scientific and cultural committee of the exhibition

Denis Bartolo, university professor at the ENS Lyon.

Marion Carrel, Professor of Sociology at the University of Lille, co-director of the GIS Démocratie et Participation.

David Chavalarias, CNRS research director at the Centre for Social Analysis and Mathematics (CAMS) of the École des hautes études en sciences sociales (EHESS), director of the Institut des systèmes complexes de Paris Île-de-France.

Coralie Chevallier, researcher at the Cognitive and Computational Neurosciences laboratory (INSERM) and the Department of Cognitive Studies (ENS-PSL).

Maxime Derex, CNRS researcher at the Institute of Advanced Studies of Toulouse (IAST) and at the Toulouse 1 Capitole University.

Guillaume Dezecache, lecturer at the University of Clermont Auvergne, laboratory of Social and Cognitive Psychology.

Audrey Dussutour, Director of Research at the CNRS at the Centre de recherche sur la cognition animale de Toulouse.

Nicolas Fieulaine, researcher in social psychology, University of Lyon, scientific director of the Nudge Unit of SNCF Transilien.

Pablo Jensen, CNRS researcher at the physics laboratory at ENS Lyon, author of the book *Pourquoi la société ne se laisse pas mettre en équations* (Seuil, 2018).

Stéphane Laurens, university professor at Rennes 2 in social psychology.

Juliette Venel, lecturer at the CERAMATHS laboratory (Polytechnic University, Hauts-de-France, CNRS).

NOTES

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