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Edited by Rima-Maria Rahal

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Open Social Psychology

Open Social Psychology

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Social psychology is built on a strong set of classical research paradigms and findings, featured in many of the textbooks, syllabi, online courses and teaching guides that aspiring psychologists study with and established psychologists use as teaching resources. However, the common body of knowledge that social psychology relies on is undergoing change. Modern research methods and changing attitudes towards permissible research practices bring about social psychological research that looks different today than it used to. This book is dedicated to tracing some of these changes, and to offering a version of record of the changing perceptions and interpretations of classic social psychology in the light of its contemporary counterpart. As such, this study book is a snapshot of how we see social psychology today.

Because it tends to be difficult to keep teaching and study materials up to date with emerging trends and debates, we see this study book as an addition to traditional educational resources in social psychology. It is published as an Open Educational Resource to aid the accessibility of this knowledge for all, and to be adapted to teachers' and learners' needs as they dive into what social psychology has to offer.

How this Book Came to Be

Flávio Azevedo, Mahmoud Elsherif, Jens Fünderich, Hooman Habibnia, Savannah C. Lewis, Ilse L. Pit, Aleksandra Tołopiło and Rima-Maria Rahal

Social psychology is devoted to studying how individuals behave, think, and feel within their social contexts. The field is therefore, by its very nature, set up for collaborative work. Leveraging the social context in which knowledge is generated is built into the assumptions and interests that social psychology pursues. This fundamental attitude towards the social embeddedness of knowledge is mirrored in the process by which this study book came to be.

It started by bringing together the work of students at Heidelberg University during the winter term of 2023. In the scope of classwork, they engaged with classical findings of social psychology, and discussed recent attempts to reengage with these classics. These works are the basis of the current book.

Researchers working on (areas related to) social psychology then revised these chapters. Through engaging the communities at the Big Team Science Conference 2024 (BTScon), the 2025 annual meeting of the Society for the Improvement of Psychological Science (SIPS), and the Framework for Open and Reproducible Research Training (FORRT), we found collaborators willing to contribute their knowledge and expertise to turning chapter drafts into an approachable and fact-checked resource. These collaborators have become coauthors of the chapters of the book. Collaborators who helped with the structural elements of the book, including the references, the online version, and the glossary, are coauthors of this chapter.

FORRT

An *International Bridge-Building Award* of the Society for Personality and Social Psychology (SPSP) to members of FORRT and ABRIR in 2026 facilitated three online hackathons with researchers from the Global South, as well as marginalized and liminal scholars. In the scope of this work, additional chapters for the book were created, following the same principle: earlier career researchers contributed the original drafts, and more experienced researchers helped them revise.

Further chapters were added to the book following a workshop at the Open Science Day Graz in 2026.

By co-creating educational content with diverse participants rather than relying solely on traditional authority figures, the process of writing this book explicitly built in diverse perspectives and lived experiences of groups who may otherwise not have access to such contribution opportunities. This process promoted cross-cultural scholarly exchange on replication and reproducibility in social psychology, and made this educational resource more inclusive by reflecting diverse perspectives.

The creation of this book was also supported by the German Reproducibility Network (GRN).

In sum, this volume offers diverse perspectives on a shared target topic: Changing perceptions of classical social psychological research.

How to Use this Book

written by Melissa Engelbart and Rima-Maria Rahal

This book contains several types of resources: narrative text, definitions and questions for reflection, as well as references.

In more than 20 chapters, we provide narrative summaries about classical research in social psychology, and its modern follow-up. Often, this means we include new attempts to show the same finding (replication attempts) or meta-analytical work that brings together a lot of evidence from different sources regarding a certain hypothesis. Each chapter contains an overview of the classic study, a summary of important work thereafter, as well as a discussion of the evidence, experiments or analyses conducted. We then attempt to draw conclusions about the tested hypotheses.

Because this volume is targeted at students, we provide definitions of key terms, preceded by #definition and displayed like this:

> #definition Replication
>
> An attempt to find the same result as a previous study in a new data set.
>
> #definition Meta-Analysis
>
> An analysis that brings together evidence from several individual studies or experiments to estimate an overall effect across the available evidence.

All definitions are also in the Glossary at the end of the book. Sometimes, you will find the same term entered twice, with slightly different definitions coming from different chapters. Sometimes, you will see that multiple chapters defined a certain term the same way.

We have aimed at providing a critical but neutral perspective to the classical and modern studies of social psychology discussed in the texts of this volume. To help you develop your own perspective and a well-reflected attitude towards this work, you will find guiding questions and suggestions that might prompt you to think more deeply about what you read throughout the book. The

guiding questions cover topics such as the research and publication process itself and its influence on research, the interpretation of data in general, as well as the experimental operationalization of theoretical questions. Moreover, to help you consider potential applications of the findings and theories discussed, these questions sometimes ask you to think of examples or consequences in real life.

You will recognize these prompts by the preceding #yourturn.. Here is an example of what these questions look like:

> #yourturn
>
> Do you think you might find such questions for reflection useful?

Finally, we have enabled the option to collaboratively annotate this work using hypothesis (note that this is how links are formatted in this book) in the online version. Your annotations will be visible to others, and others will be able to see yours, so that we can build a better learning experience using this book together.

To read up on the original research we cite in this book, such as from Vazire (2018), you can hover over or click on the references provided. You can also find the full list of references at the end of the book.

Feel free to make use of the resources in this book as you see fit. Our hope is that they will support you in building a well-reflected opinion about the existing body of knowledge in social psychology.

Introduction

written by Rima-Maria Rahal

The Role of Change for Scientific Discovery

Much of science capitalizes on change. It is the engine that drives progress and the expansion of knowledge (see Kuhn, 1962; Popper, 1959). Embracing change means taking established theories and challenging them to explore new directions. Changing perspectives, questioning the status quo, refining existing concepts, and adapting to new evidence provide the stuff that makes breakthroughs or new insights. In essence, change in science represents taking steps forward, toward greater insight and reality checks for the challenges we face. In other words, to push the boundaries of what we know, we must make change.

> #yourturn
>
> What instance of change regarding science have you recently heard about? Consider reports of breakthroughs you might have seen in the news or stories you saw on social media.

In the past decade, Open Science has made change, by transforming research practices to promote transparency, reproducibility, and collaboration in scientific endeavors. By fostering a culture of openness and collaboration, Open Science has brought about a paradigm shift in research methodologies, paving the way for more robust and reliable scientific discoveries (Munafò et al., 2017; Vazire et al., 2022). It is certainly no small feat to fundamentally reform how research is done, and yet we have seen significant change towards Open practices (Chambers, 2019; Christensen et al., 2020; Kidwell et al., 2016).

> #definition Open Science
>
> An overhead term for a number of practices to make research more transparent, such as making the data a research project is based on available to others.

Challenges of Making Change

Change can be a challenge because it disrupts established norms, habits, and power structures. This often means that individuals and groups might be hesitant to embrace change. Open Science, as a reform to refocus on good research practice, had to work with this difficulty of making change, where new methods, theories, or technologies often encounter skepticism and opposition from the scientific community. Open Science promotes transparency, data sharing, and collaborative research, which can expose flaws underlying previously held beliefs or reveal alternative interpretations. This shift can create debates about long-held ideas and established practices, which are scrutinized and potentially overturned. Established researchers may be reluctant to abandon familiar paradigms, and institutions may resist reallocating resources or altering well-known processes. Sometimes, inertia of traditional practices and fear of uncertainty can slow the adoption of innovative approaches, despite their potential to advance knowledge and solve pressing problems.

> #yourturn
>
> Consider a big change you have experienced. Was it easy to adapt to this change?

However, a questioning attitude and focus on methodological rigor and good practice also enhance the robustness and reliability of scientific conclusions by fostering an environment where continuous re-evaluation is encouraged. Thus, Open Science exemplifies how embracing change can lead to a more dynamic and resilient understanding of the world, even as it unsettles the familiar foundations of scientific consensus.

Change often implies the potential for a changed perception of what used to be, particularly in comparison to what is now. This is also the case in the scope of changes associated with Open Science. In particular, what were once considered unassailable facts can become contested or uncertain as new methodologies, data, and technologies challenge established knowledge. This is where our focus lies in this book: reporting on classical studies in social psychology and the change in how they are seen now, following a wave of additional research (often with an Open Science flavor).

> #yourturn
>
> "I was today years old when I found out …" What was the last long-held belief you had to give up?

In this spirit, when reading about the changes in perspective about classics in social psychology, there are two things to embrace:

On the one hand, revisiting classic social psychology studies is a demonstration of the profound impact they had on the field. Were they less important and less impactful, these studies would not draw continued debate, research interest and investment of resources. Therefore, reading classic studies can give readers

a sense of what matters to social psychological research, from hot topics to hot paradigms and research methods.

On the other hand, following the course of the academic debate about these claims, insights and phenomena allows us to hone our skills in accumulating insights and adjusting our perception of the currently held beliefs in this area of research. Put differently, tracing efforts to replicate, to conduct meta-analyses or to establish boundary conditions to the findings postulated in a certain study mostly reflects well-intentioned interest in assessing the validity of the claims of the original study, attempting to produce clarity about our collective knowledge about the phenomenon of interest. Reassessing classical studies might require change in opinions, calibration and reflection, but it can surely spark renewed trust in research and in its ability to refine and build our joint knowledge.

Stories of Change in this Book

This book contains more than 25 stories of change in psychological science. We have compiled these stories from across the spectrum of topics that social psychology addresses. Clustering these themes broadly, the chapters included here address three major research trajectories.

The first part of this book addresses research that is at the very core of social psychological inquiry. It addresses both classic questions of how we perceive our (social) environment and how our social perception comes into being. The research contained within asks questions such as "Can people predict the future?" (Chapter on Feeling the Future), "Can believing in someone's success make them more successful?" (Chapter on the Pygmalion Effect), or "Can humans run out of self-control?" (Chapter on Ego Depletion).

The second part of this book dives deeper into research addressing how the social context changes how humans behave. The presence of others, as well as our embeddedness in social groups exerts a strong pull on what individuals will do. The research covered in this part of the book is concerned with demonstrating this social influence on behavior. It asks questions such as "When will people blindly follow the example of others?" (Chapter on Conformity), and "Why do people obey orders?" (Chapter on Obedience to Authority). Another facet of this research focuses on the influence of social roles and norms. It asks whether stepping into a social role such as that of a prisoner or a prison guard will make us change our behavior (Chapter on the Stanford Prison Experiment) and whether we litter more when we see evidence that others do so, too (Chapter on Social Norms). This research also addresses the particular influence of the groups we belong to on our behavior. It asks whether we treat members of our team better than members of a rivaling group even if group membership is arbitrary (Chapter on the Minimal Group Effect) and how conflicts between groups can be mitigated (Chapter on Intergroup Contact Theory). Finally, this part of the book also addresses research that is focused on a particular type

of behavior in the social context: helping others (prosociality). This research investigates when humans will step in to help, and when the mere presence of others makes us hang back to wait if someone else will help (Chapter on the Bystander Effect). This research is also concerned with whether helping is an intuitive human behavior, or if it requires us to override selfish impulses (Chapter on the Social Heuristics Hypothesis).

In the third part of the book, we have compiled research that addresses how social contexts shape the way we think, the attitudes and beliefs we hold (and the consequences for behavior). For example, research covered in this part of the book addresses the question whether being exposed to warmth may lead us to perceive others as warmer and friendlier (Chapter on the Hot Coffee Effect), or whether thinking about words stereotypically related to old age will make us adopt behaviors assosciated with older age (Chapter on the Florida Priming Effect).

The chapters begin aiming to demonstrate where a certain research question came from. They then identify a classic study that addressed this research question, and assess it in detail. The chapters then outline the response in the field, including follow-up studies and replication attempts by other researchers, as well as meta-analytic evidence addressing the same research question. Finally, these chapters reflect on if and how our knowledge about the research question, and potentially our interpretation of the evidence may have changed.

Because understanding such change in scientific insight is no small feat, this book prepends a chapter dedicated to explaining how the stories of change described later on can be reconciled with the idea that science is dedicated to discovering general laws and robust insights. This chapter outlines the scientific method and explains where in the research process things can go awry, leading to findings with limited replicability and reproducibility. It also explains how responsible research practices can help strengthen the robustness of research. Most importantly, however, this chapter explains in more detail how and why change is part of the natural process of gathering scientific insight.

Scientific Research in Social Psychology

written by Monica Gonzalez-Marquez, Savannah C. Lewis, and Mahmoud Elsherif

What is science?

When we think of "science", we often imagine a textbook full of facts or a chemist in a lab coat. This assumption stems from the way that science is typically taught. Educators tend to focus on its "uniqueness", its supposed access to objective truth, and how its many discoveries have changed the world. But from the perspective of a researcher in training, science is something much more grounded. Instead of merely a collection of facts, science is a process of inquiry informed by the human problem-solving capacity. We developed this process, known as the Scientific Method, to understand natural phenomena. We later developed the IMRAD paper-writing structure (Introduction, Methods, Results, and Discussion) to document how this understanding was achieved so that others could build upon it. Hence, the three key concepts a researcher-in-training needs to understand are,

1. Science was developed to understand natural phenomena.
2. Science is informed by the human problem solving capacity.
3. Scientific knowledge builds on our understanding of how prior knowledge was created.

To better understand these concepts, and how they are not only connected but interdependent, let's begin by examining how science is a sequence of nested problems to be solved via two examples.

Imagine you are a second-year psychology student investigating how social pressure affects career choices. This is your "Meta-Problem." To solve it, you encounter a series of decision points, including:

- *The "Why" Problem:* Are you trying to understand the process of choosing,

or change the outcome?

- *The "Who" Problem:* Do you study 18-year-olds entering college or 40-year-olds changing careers?
- *The "Definitions" Problem:* Is "social pressure" parental disapproval, peer influence, or social media trends affecting career choices?
- *The "How" Problem:* Will you use qualitative interviews or an experimental survey?
- *The "Incentive" Problem:* How will you reimburse your participants? Will they volunteer, will they be paid or receive course credits?

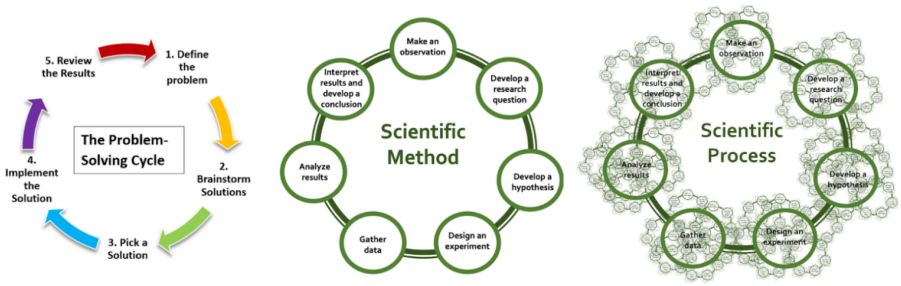
Now consider a parallel example of this decision process in a non-scientific setting. Imagine you want to build a wooden desk but have never built one before. Again, you would face a series of decision points, including:

- *The "Purpose" Problem:* Is it for dining, a patio, or a workspace? You choose a desk.
- *The "Material" Problem:* Wood, stone, or plastic? You choose wood.
- *The "Dimension" Problem:* How tall are the legs? How thick are the legs?
- *The "Stability" Problem:* Metal legs or wooden ones? How do you attach them so it does not wobble?
- *The "Specificity" Problem:* Are the planks pre-cut or are they made of timber?

At first glance, a social psychology study and a wooden desk have nothing much in common. But once you look more closely, you see that both are descriptions of a process related to *iterative problem-solving*. This hierarchy reveals a fundamental truth: science is a chain of dependencies. In both cases, the 'lower' problems are foundational - they provide the constraints for everything that follows. You cannot choose the teeth of your saw for the desk until you have selected the density of your wood. Similarly, you cannot choose a statistical test (the study) until you have defined the boundaries of your population. When we solve the lower problems first, the higher solutions become logical necessities as opposed to random guesses.

If you build that table and it is the most stable, beautiful desk in the world, your "finding" is great. But if you did not write down the type of wood, the specific measurements, or the tools used, no one else can build a better version of it. They might get "close," but they would not be building on your work—they will be guessing.

Now, compare the steps above to the problem-solving cycle in Figure 1.



Science is a Human Process

The examples and figure above highlights the difference between two terms that are often confused, Scientific Method and Scientific Process.

The *scientific method* is simply the formal name we give to the general human problem-solving mechanism applied to the process of knowledge generation and documentation. In contrast, a *scientific process* is an instantiation of the scientific method. The development of the polio vaccine and development of our knowledge of gravity are very different scientific processes. The polio vaccine involved addressing problems and making decisions about cows and viruses, and gravity about the mass of objects and their velocity upon falling, yet both followed the same generalized problem solving mechanisms formalized as the scientific method. They each involved several layers of nested problem solving and decision-making by human minds, thus exemplifying how science is a deeply human way of understanding the world (Bechtel & Richardson, 1993).

> #definition Scientific Method
>
> The universal, step-by-step logical framework that underlies all scientific inquiry. The scientific method is a defined, step-by-step process for investigating phenomena. It is a formalization of a generalized human problem solving process (see below).
>
> #definition Scientific Process
>
> The specific methods and approaches (e.g., saw for the table or surveys) that scientists use based on their specific field and matter. various methods and approaches scientists use to investigate phenomena in their pursuit of knowledge.

You will note that the steps to determine how you build the table comprise a rather mundane example of problem-solving. The schema describes the steps we typically undertake when we are solving any problem in everyday life, ranging from how to roast a chicken to how to solve a math problem. Regardless of the intended outcome, we engage in the same generalized sequence of actions. Now look at the schema for the scientific method next to it. What similarities and differences do you see? The language may be a bit more formal, but the processes are very similar, so much so that they are essentially variations of each other.

You observe something, notice there is something you do not know, figure out a way to understand that unknown, execute your plan and evaluate the results. Regardless of the intended outcome, we engage in the same generalized sequence of actions. This makes science and teaching it a deeply human process (Bechtel & Richardson, 1993).

The final schema in Figure 1 shows a scientific process. The distinction between the scientific method and a scientific process is key to understanding how subjectivity is not strictly an inherent characteristic of qualitative science, but is actually constitutive of all science, and is an expression of the problem-solving process from which it is derived (Bechtel & Richardson, 1993; Gopnik et al., 1999). In our table example, we presented several levels of problem solving embedded as part of the main steps. These sub-steps are represented in the iterated scientific method schemas found overlapping the steps of the main scientific method. If you considered that you might have approached addressing those sub-steps differently than how we described them, you probably also realized that there is no "one" correct way to conduct these sub-steps. Different people will do things differently according to their training and experience. An architect would likely approach the process differently than a do-it-yourselfer (DIY). It is no different in science. The vagaries of training and experience will create differences between how different problem-solvers deal with a problem, even as the generalized problem-solving process itself will be virtually the same. These differences mark the distinction between the scientific method and a scientific process. The scientific method is the idealized, schematized form, and the scientific process is how a specific research question was actually addressed. This messiness is reflected in the third schema in Figure 1, thus underlining that no two scientific processes will or can be exactly the same.

A scientific process, no matter how productive, means little if it is not well documented. This documentation is what scientific knowledge builds upon. A finding alone, without an understanding of how it came about, is anecdote. We cannot develop reliable and usable scientific knowledge on anecdote. We need structured information of how problems were formulated, the decisions that were made, and what was actually done. The IMRAD structure mentioned above was developed to provide the needed information. That said, as a guide to documentation, it lacks the structure needed to take into account the nested nature of problem-solving in science. Methods is not a monolith but involves a set of nested, interconnected and interdependent problems/tasks that must be carried out to obtain the needed data. For example, we must choose an experimental method, obtain the physical apparatus, design a protocol, determine types of participants, develop a plan to recruit them, etc. Each of these is nested beneath the Methods umbrella, and each requires reliable documentation of its development process, and justification of accompanying decisions/choices.

In science, anything that interferes with the accurate documentation of these problem-solving steps is a danger to the reliability of the scientific record. This includes:

- *Closed Access:* Hiding the "instructions to build a table" behind a paywall.
- *Lack of Training:* Not teaching students how to document and justify their problem-solving processes, including decisions made as part of those processes.
- *Questionable Research Practices (QRPs):* Practices that researchers sometimes engage in that unintentionally or intentionally increase the chance of false or misleading results (see Nagy et al., 2025).

  #definition Questionable Research Practices (QRPs)

  Questionable research practices are actions that fall into a "grey area" between honest errors and outright fraud. They are often described as "p-hacking" or "data dredging" methods used to make a study's results look more significant or consistent than they actually are.

All of this matters deeply because our ultimate goal as researchers is to create reliable and usable knowledge for our peers and for posterity. This is our societal role and our responsibility. It means that our aim should be to document our work so well that someone else can understand and use that knowledge, and potentially reproduce it, 20 years after our death.

When we acknowledge that science is a human product of problem-solving, we realize that *good documentation is the foundation of science as a collective activity.* It is the only way to ensure that the scientific record is a usable human endowment rather than a collection of "anecdotes" that can neither be well-understood nor reproduced.

> #yourturn
> What is the idea behind psychological research?

What can go wrong in the scientific process?

> " 'Objective knowledge' is an oxymoron."
>
> — Patricia Gowaty, Feminism and Evolutionary Biology (as cited in Cooke, 2022).

Historically, the Victorian academic establishment understood that science was not always a neutral or purely rational endeavor; rather, it was, and remains, shaped by the social, cultural, and political context in which it is embedded. Scientific bias is notoriously difficult to address because it is often unseen by the very researcher it affects. We are all conditioned to see the world through our own lenses, shaped by experiences, identities, and societal influences (Elsherif, 2025; Pownall & Rogers, 2021). Acknowledging the limitations of objectivity requires courage, reflection, and humility.

Science is often idealized as the pursuit of objective, unbiased knowledge, understood to be derived purely from empirical methods and rigorous testing.

However, science being perceived as an objective truth has led to more issues arising where studies are found not to replicate (Pennington, 2023). Science is also a human pursuit. Like any profession, it has a culture, where a set of social pressures, incentives and unwritten rules influences what gets studied and what gets ignored. For a long time, this research culture prioritized convenience and "flashy" results. If a scientist wanted to get a permanent position or a promotion, they needed to publish "exciting" new discoveries in famous journals. This created a "Publish or Perish" culture where boring but accurate work was often suppressed or ignored in favour of results that made headlines. For instance, across nine experiments, Daryl Bem (2011) investigated the phenomenon of precognition, exploring whether future events can retroactively influence present behaviour. Through diverse methodologies, including predicting the location of erotic images, avoiding unforeseen negative stimuli, and "retroactive priming" where future words affect current reaction times. Bem, consistently, observed that participants performed above chance. The authors suggested that future exposure to images or practicing word lists could influence a participant's preferences and memory recall (see chapter on feeling the future). Bem concluded that individuals may implicitly anticipate upcoming events in ways to shape their current actions and processes. This paper was published in a peer-reviewed journal well respected in social psychology - the *Journal of Personality and Social Psychology*.

The publication caused an uproar within the scientific community and rightfully so! Precognition is outside of current scientific explanations and laws of physics, thus conflicting our understanding of how the universe, reality and world works! If we assume science is an objective process, then these findings should be accepted as true. But this created a crisis in logic: it suggested that humans could see the future but the problem might not be the future, but the rules of the game themselves. The findings were questioned, re-analyzed (Wagenmakers et al., 2011) and replicated (Galak et al., 2012; Ritchie et al., 2012). You can read more details about this study and its echo in psychological research in a chapter of this book (see Feeling the Future).

This back-and-forth sparked a crisis within the field. Where were there null findings? Why did the math seem to work for something that defied reality? Most importantly, what did it mean for our field? In this system, science risked serving the careers of individuals as opposed to the needs of the public. But ultimately, science should be in the service of people. This means recognizing humanity in scientific work, acknowledging bias, embracing replication and transparency, and striving for a research culture that prioritizes credibility over convenience. Here, collaboration and discussion were happening to challenge our biases. By recognizing that science is fundamentally a human pursuit and prioritizing integrity, we transform science from a rigid, infallible machine into a collaborative, self-correcting community.

Psychology, in particular, has undergone a period of self-reflection and reevaluation. The replication crisis, now referred to as the credibility revolution, where

many prominent findings failed to replicate, has sparked changes in how research is conducted. For example, the once-famous theory of "Power Posing (the idea that body posture changes your confidence and hormones) was a staple of introductory textbooks until massive replication efforts showed the effect was likely a statistical fluke. A defining moment in the emergence of the"replication crisis" or credibility revolution was the 2015 Reproducibility Project conducted by the Open Science Collaboration (2015). This massive undertaking involved 270 researchers attempting to replicate 100 psychological studies. To maximize rigor, the team used larger sample sizes for increased statistical power, collaborated with the original authors and newcomers, and used pre-registration to mitigate researcher bias. Despite these safeguards, only 36% of the studies yielded significant results ($p < .05$), with social psychology showing a particularly low success rate of 25%. These figures stand in stark contrast to the expected 89% replication rate if the original effects were robust (Field et al., 2019). Furthermore, the observed effect sizes in the replications were roughly half the magnitude of the original findings, sparking widespread concern across the scientific community. As Smaldino & McElreath (2016) noted that the industry had accidentally created a system that rewarded "flashy" results over reproducible ones. This served as a vital "wake-up call" for the industry, showing that even the most popular theories need to be tested multiple times. Researchers began to question why this was the case.

However, many scholars and scientists (e.g., Bishop, 2020; Sulik et al., 2025) have pointed out that the foundations of science itself are not immune to personal and societal biases. One particular bias was confirmation bias. As humans, we look for arguments that support our hypotheses and theories (i.e., confirmation bias, Bishop, 2020). This is not a flaw but it is a part of being human. Science can only work if we accept the fact that science is not a neutral and apolitical process. Humans have biases and we need to be aware of them and consider ways to address them. One approach to challenge confirmation bias was pre-registration, where you plan to date and time-stamp your analysis plan and hypotheses before the study is conducted (Nosek & Errington, 2017). Here you include your confirmatory or hypothesis driven research and can also include exploratory or data-driven research in order to ensure findings are replicable and robust in order to challenge these biases. Although this was perceived as a panacea at first to cure the researcher biases, there were issues that arose to challenge these biases. First, the lack of analytical discussion, theoretical discussion or constructs within pre-registration (e.g., Sarafoglou et al., 2022; Szollosi & Donkin, 2021). Second, registrations were too vague or too specific that they did not leave room for discussion (e.g., Bakker et al., 2020; Binney et al., 2025) and finally, the documentation and pre-registration did not match (Van Den Akker et al., 2023; Van Den Akker et al., 2024). This highlights even when we have remedies, we are still biased to try and find evidence in favour of our theories and hypotheses.

In addition, this is not limited to just conceptualisation but also data analysis. Silberzahn et al. (2018) asked 29 independent teams to analyze the same

hypothesis whether referees would give dark skin-toned players more red cards than light-skin-toned players. The authors observed that 20 teams out of 29 found evidence supporting the hypothesis, while 9 teams did not observe this pattern (see also linguistics: Coretta et al., 2023; ecology and evolutionary biology: Gould et al., 2025). As a result, scientists should use a reflexive approach. This means they do not study others but they constantly should check their own analyses, assumptions and theories (Jamieson et al., 2023). During this time, scientists should ask how we get to the result. How do they arise, what was the design, what was the design based on? Was it their training, research culture and social interaction (Sulik et al., 2025)? By questioning these established norms, researchers can ensure they are not accidentally trying to confirm their own assumptions, similar to confirmation bias, but also to challenge their stereotypes. Put simply, there will always be a reason for why this question is interesting, whether it is how you tested participants, how you collected the data and the analyses done. What seems objective, detached and apolitical, is actually more subjective than it should be. Data analysis is more of an art than a science, as these decisions are made actively and purposely by our values and by human beings not robots. Put simply, Patricia Gowaty's assertion that "objective knowledge" is an oxymoron challenges the notion that science can ever be fully detached from the people who practice it. While it may seem counterintuitive to suggest that subjectivity improves science, the advantage lies in transparency and honesty (Frank et al., 2024). By acknowledging that humans, not robots, analyze data, we move away from 'hidden biases' and toward a system of radical transparency, where every decision is documented and debated. Science is not the same as a collection of static facts. Instead, science is a method, a process of refining our understanding of the world through systematic inquiry. As such, science is not a sprint to definitive answers but a marathon of continuous questioning and testing (e.g., Owens, 2013).

> #yourturn
> Let's think back to the scientific process! What are some of the things a researcher might do in this process to introduce bias?

Looking back at Figure 1, scientific studies almost never give a straightforward "yes" or "no" answer. Instead, research helps us estimate how likely a conclusion is to be true based on the evidence collected. In other words, science does not claim absolute certainty; it tells us the probability that a finding reflects something real rather than random chance. This is why results are reported using statistics because they help us judge the strength and reliability of the evidence. However, researchers sometimes engage in practices that unintentionally increase the chance of false or misleading results. These are known as questionable research practices (QRPs), and they can occur at multiple stages of the research process. Some of the common QRPs in psychology include:

- *P-hacking*, which involves analyzing data in multiple ways and selectively reporting only those that yield statistically significant - results. This can involve trying different combinations of variables, excluding certain partic-

ipants, or stopping data collection - once a desired result appears (Hardwicke et al., 2014). We do this to clean data until it matches our expectations.

- *HARKing (Hypothesizing After Results are Known)*, in which researchers present their findings as though they confirmed a - pre-existing hypothesis, when in fact the hypothesis was developed after looking at the data. This gives a false impression of - theoretical support (Nosek & Lakens, 2014).
- *Publication bias*, the tendency for journals to publish only studies with statistically significant or novel findings, leaving null - or contradictory results unpublished and distorting the scientific literature (Franco et al., 2014).
- *Using small samples*, which reduces statistical power and increases the likelihood that findings are due to chance or are not - replicable (Button et al., 2013).
- *Relying on WEIRD samples* (Western, Educated, Industrialized, Rich, and Democratic populations), which limits the generalizability - of findings to broader or more diverse populations (Henrich et al., 2010).
- *Formulating vague theories*, which are difficult to falsify or test rigorously, reducing the scientific value of research (Dienes, 2008).

#definition P-Hacking

P-Hacking is the practice of manipulating data analysis until non-significant results ($p > .05$) become statistically significant ($p < .05$).

#definition HARKing

HARKing is Hypothesizing After the Results are Known and where a lucky guess looks like a solid scientific theory. It violates the principle that a theory should be able to *predict* behavior, not just describe it after the fact.

#definition Statistical Power

Statistical power is the probability that a study will detect an effect (a real relationship) if that effect actually exists.

#definition Publication Bias

Publication Bias is the tendency for journals to publish only "positive" results (studies where something happened) while ignoring "null" results (studies where nothing happened).

#definition WEIRD

An acronym for people from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) backgrounds. When relying on samples of WEIRD participants, scientists are looking at a unique subgroup that does not represent the general population. This makes it difficult to claim that these findings are universal truths about human nature.

> #definition Replication
>
> Replication involves repeating a study using the same methods and sample size to see whether the results hold up. Replications help identify which findings are reliable and support the self-correcting nature of science.

Now let's consider where each of these QRPs may be introduced in the scientific cycle.

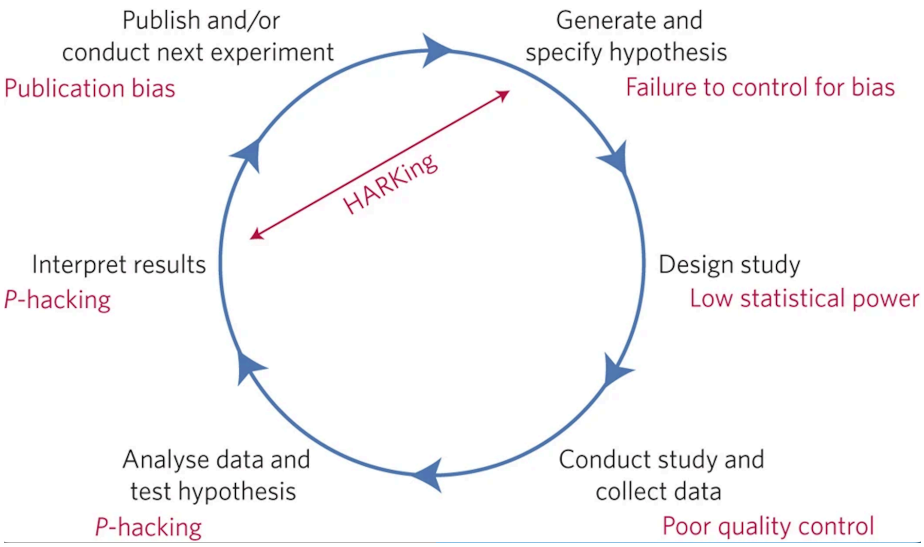


Figure 1: Figure 2. Visualization of the Scientific Method with QRPs. Taken from Munafò et al. (2017).

The journey begins with coming up with a hypothesis, which is a testable explanation or an educated guess about something that works. Researchers may use or create a vague theory that is susceptible to confirmation and reinterpret after the data is collected to formulate this hypothesis (see Figure 2, Munafò et al., 2017). In the next stage, researchers will be in the study design phase, where they will create the design of the study, here depending on their research question, researchers will need to consider the type of participants being recruited. If researchers are testing a specific population, then they can consider that specific population. However, even when they are making comments about the human population, researchers tend to rely only on WEIRD samples. These groups do not represent the whole world, and consequently, the findings might not apply to the other 95% of the global population (Arnett, 2008). If a study uses a group that is too small, it has low statistical power. Think of this like trying to take a photo in a pitch-black room; the "image" (the result) will be so grainy and blurry that you might miss the truth or mistake a random shadow for a real object (a false positive). A sample that is too small will yield similar noisy results,

making it difficult to say what is a true or a false positive. After gathering data, researchers use math to see if their results are meaningful. However, researchers sometimes fiddle with their math or try different shortcuts until they find a result that looks statistically significant, even if it is a lucky coincidence. After seeing the results, it is time to explain what they mean. Researchers may engage in HARKing (Hypothesizing After the Results are Known). HARKing means looking at the results and then pretending the observed outcome was expected from the start, before the results were known. This is like shooting an arrow at a blank wall and then drawing a bullseye around where it landed, pretending that was the target you were aiming for all along. Finally, the research is shared with the world. However, scientific journals often prefer "exciting" new discoveries over "boring" results where no significant effect was found. This creates publication bias, a systemic filter that skews our library of knowledge by hiding the "misses" and only showing the "hits" – or the effects we think might be "hits". This bias creates a lack of transparency in the scientific record, when journals only show the successes, the underlying questionable research practices such as selective reporting become invisible. Each of these practices, while sometimes unintentional, undermines scientific transparency. By recognizing these stages, and their traps, we can build a more trustworthy bridge between our questions and the truth.

One of the most important tools to combat these problems is replication. Replication involves repeating a study using the same methods and samples to see whether the results hold up. When a study replicates under the same conditions, it increases our confidence that the original findings were not due to chance. However, a "perfect" 100% replication is an impossible ideal. Research is always situated and conducted at a specific point in time, within an unique cultural climate and with specific participants, the study can never be perfectly recreated or frozen. Recognizing this situatedness is important. It suggests that when a study fails, we should not automatically assume there is a flaw in the original work or it was fabricated but that the finding may be sensitive to environmental or temporal changes.

When replications introduce small but deliberate variations, they can help evaluate how robust a finding is across different populations or contexts. In this way, replication serves as a safeguard against QRPs and helps strengthen the foundation of scientific knowledge. In recent years, social psychology has undergone a "Replication Crisis" after several high-profile findings failed to hold up when tested again by independent labs. This led to a movement to restore credibility through the Credibility Revolution. The most significant of these new standards is preregistration. This is the practice of a researcher publishing their hypotheses, experimental design, and data analysis plan in a public registry before they ever collect a single data point. By "locking in" their plan ahead of time, researchers cannot later engage in p-hacking or HARKing, because any changes to their plan would be visible to the public. By combining replication with open data (sharing raw files) and full reporting, the field is moving away from a "trust me" model toward a "show me" model, effectively strengthening

the foundation of scientific knowledge and rebuilding public trust.

Transparency is not just a methodological concern, it is an ethical one. Without transparency, questionable research practices go unnoticed, undermining public trust and the credibility of science itself. When scientists are not open about their data, methods, or limitations, it becomes difficult for other researchers, or the public, to evaluate the validity of their findings. As Wingen et al. (2020) argue, trust in science requires openness and integrity.

> #yourturn
> What are reasons why researchers might engage in QRPs?

You might find it difficult to imagine why researchers engage in QRPs. After all, researchers are committed to finding out things about the world, and QRPs make it harder to generate robust and reliable insights. To understand why QRPs may nevertheless take place, you could consider that they sometimes occur unintentionally. Perhaps a researcher simply did not know better. That is one reason why the Credibility Revolution has emphasized the need for high-quality training in avoiding QRPs (and in practicing more responsible research practices instead).

In addition, consider the context in which researchers work. We already touched on the issue of publication bias, making it more difficult to publish research that is not considered "exciting" or that does not show significant results. This also means that researchers may invest a lot of time and other resources into a research project that does not end up being published. In such cases, these resources are wasted, both because the public or other researchers can never access the research (because it remains unpublished) and because researchers need publications for progressing with their careers and for starting (new or follow-up) research projects. As you recall from above, this system of incentives is often referred to as "Publish or Perish". Because researchers need publications, they may use QRPs strategically to turn what they may consider a failed project, or a project that just falls short of being a shooting star, into a success story (Yong, 2016). By glossing over inconsistent findings (cherry picking, see above), for instance, they might increase their chances of getting their research published. In an academic system where hiring decisions, decisions about promotions, and decisions about research funding in large parts depend on how many publications a researcher has (Abele-Brehm & Bühner, 2016), you might see why it is tempting to use QRPs to get to publish: Researchers who do so play by the rules of the game in academia. As a consequence, to maintain the integrity of scientific research and guard against QRPs, more and more voices have called for changing academic incentive systems into conditions supporting collaboration, transparency, and responsible research practices (Rahal et al., 2023; Tiokhin et al., 2024).

How can we improve our scientific process in psychology?

Scientific research should be accessible to everyone. This means that both researchers and the general public should be able to easily access, understand, and evaluate scientific findings (e.g., Nosek et al., 2022). Responsible research practices (RRPs) are designed to increase the credibility, transparency, and reproducibility of scientific findings. These practices address many of the problems introduced by questionable research practices and help create a more trustworthy and inclusive research culture. In social psychology, researchers are increasingly adopting a number of responsible practices that improve how studies are designed, conducted, and shared.

> #definition Responsible Research Practices (RRPs)
>
> Practices that researchers or journals can do to increase the credibility, transparency, and reproducibility of scientific findings.

Some of the common RRPs in psychology include:

- *Preregistration*, which involves documenting hypotheses, methods, and analysis plans in advance of data collection. This reduces - researcher flexibility and helps prevent QRPs like p-hacking and HARKing by creating a public record of the study's original - intent.
- *Open data*, where researchers make their raw datasets publicly available so that others can verify results, conduct new analyses, or - replicate findings. This increases transparency and allows for greater scrutiny.
- *Open materials*, which refers to sharing all the tools used in a study—such as surveys, instructions, tasks, or stimuli—so other - researchers can accurately replicate the study or adapt it for different contexts.
- *Open code*, where the analysis scripts or software used to process and interpret data are shared publicly. This allows others to - reproduce statistical results exactly and learn from the analytical approach.
- *Open access*, which means that research articles are published in ways that make them freely available to everyone, not just those - affiliated with universities or institutions. This increases public engagement and makes research more equitable.
- *Registered reports*, a publishing format where study plans are peer-reviewed and accepted before data collection begins. This - reduces publication bias and helps ensure that studies are valued for their design and theoretical contribution, not just their - results.
- *Big team science*, a collaborative approach where large, multi-site teams of researchers conduct studies together. This leads to - larger, more diverse samples and helps ensure findings are more robust and generalizable.

Social psychologists can learn from other scientific disciplines, such as neuroscience and genetics, which have embraced large-scale collaborative projects and open repositories to pool data and improve generalizability. Likewise, other

fields could adopt social psychology's strengths in understanding how context, motivation, and identity shape human behavior, enriching how we interpret individual and group differences.

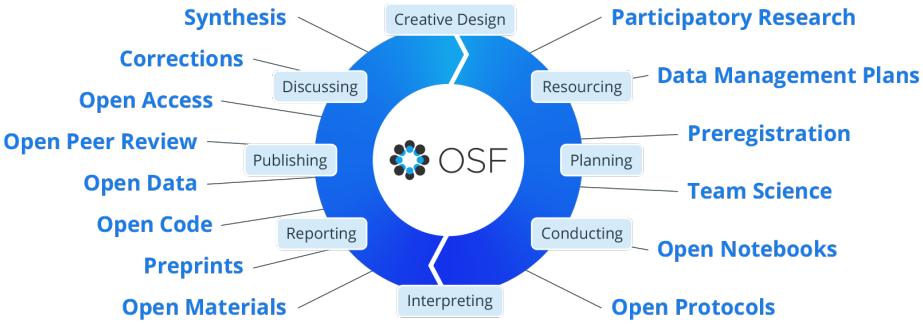


Figure 2: Figure 3. Mapping Open Science principles such as preregistration, open data, and preprints across the various stages of the scientific research process. Taken from the Center for Open Science (n.d.).

When we think about the scientific process, we can integrate open science practices into each stage of the scientific research cycle to promote transparency, reproducibility, and accessibility (Figure 3, Center for Open Science, n.d.). At the beginning of the process, researchers can pre-register their hypotheses and study designs, which helps prevent questionable practices like p-hacking and hypothesizing after results are known (HARKing). During the study design and data collection phases, sharing open code and materials ensures that others can understand and replicate the methodology. Once data are collected, using open source software allows for reproducible analyses, and sharing open data allows others to verify results or conduct new analyses. When interpreting and reporting results, making them available through preprints and open access publications ensures that findings are accessible to the public and scientific community, regardless of institutional access. Finally, this cycle continues as researchers use these openly shared resources to publish and build on existing knowledge, improving the overall robustness and equity of scientific research.

Scientific methods and results should also be clearly reported so that other researchers can replicate studies and build on existing knowledge (Munafò et al., 2017). Social psychology, in particular, has experienced a shift toward preregistration, registered reports, and increased emphasis on replication, which are practices other areas of science might also benefit from adopting. Making methodology transparent not only improves reproducibility but also allows for greater critical engagement with findings.

Science should also be inclusive and collaborative. Scientists from all backgrounds should have equal opportunities to contribute to the research process (Merton, 1968, 1988). Inclusive science values diverse perspectives, leading to

more creative and relevant research questions and reducing the likelihood of bias or blind spots. Social psychology has much to gain from cross-cultural research and incorporating intersectional frameworks that consider how overlapping identities shape psychological experiences, approaches that could also inform behavioral sciences (Blasi et al., 2022; Puthillam et al., 2024; Wang, 2016).

Finally, science is self-correcting. Errors and mistakes are a natural part of the scientific process, and when identified, they should be acknowledged and addressed. This ensures that the body of scientific knowledge remains based on accurate and up-to-date evidence (Ioannidis, 2022). Social psychology's willingness to look in the mirror and admit lack of replication did not weaken the field but modernized it, allowing others to see it as a more scientific endeavour. By leading the Open Science movement, it provided a blueprint for how all scientific disciplines can move from a culture of 'getting published' to a culture of getting it 'right'. At the same time, social psychology can benefit from adopting more robust statistical practices, theoretical specification, and computational modeling used in disciplines like economics and epidemiology. Empirical science also benefits from recognizing both individual differences, such as genetic predispositions, and the malleable aspects of human nature shaped by culture, experience, and environment. Together, these perspectives foster a more complete understanding of human behavior.

> #yourturn
> What are social psychologists doing to improve research practices in social psychology?

Summary

Science, at its core, is a human endeavor, imperfect, evolving, and deeply rooted in our limitations as well as our capacity for insight. Scientists must embrace the reality that much of what we believe today may be refined, corrected, or forgotten in the future. This is not a weakness but a fundamental strength of the scientific process. Especially in social psychology, a field concerned with the foundations of human behavior, acknowledging our fallibility is key to meaningful progress.

Contrary to how it is often portrayed in textbooks (R. Gross, 2015; Hewstone & Stroebe, 2020; see review by Blachowicz, 2009), science is not a rigid set of steps or an infallible machine. It is a dynamic, iterative process shaped by context, values, and uncertainty. Findings once treated as foundational can be overturned by new evidence and perspectives. This can feel chaotic, but it reflects how knowledge truly grows, through critique, debate, and discovery.

We must also cultivate cultural conditions that support responsible research practices: open data, preregistration, replication, and collaborative science. These practices help improve transparency and trust, making the process not

just more rigorous, but also more humane.

To conclude: Is science messy? Absolutely. But so is reality. Accepting this complexity does not diminish science, it reveals its beauty. By remaining open to new evidence and showing kindness to one another in our disagreements, we make space for better questions, better answers, and a better understanding of the world.

Part 1: Foundations of Social Psychology

This part of the book concerns research that is at the core of social psychological inquiry. It addresses both classic questions of how we perceive our (social) environment and how our social perception comes into being. The research contained within asks questions such as "Can people predict the future?" (Chapter on Feeling the Future), "Can believing in someone's success make them more successful?" (Chapter on the Pygmalion Effect), or "Can humans run out of self-control?" (Chapter on Ego Depletion).

Part 1 contains six chapters:

- Pygmalion Effect
- Cognitive Dissonance
- Implicit Association Test and Attitudes
- Framing Effect
- Ego Depletion
- Feeling the Future

Chapter 1

Pygmalion Effect

written by Maja Düsenberg (original draft), and Jana Berkessel (revision)

1.1 The Classic

The Pygmalion Effect is a social psychological phenomenon that highlights how expectations can influence performance. It was first demonstrated by Robert Rosenthal and Lenore Jacobson in their seminal study, *Pygmalion in the Classroom* (Rosenthal & Jacobson, 1968). The study investigated how teachers' expectations about their students' potential could shape the students' academic performance.

> #definition Pygmalion Effect
>
> The phenomenon in which higher expectations from others lead to improved performance.

In their experiment, Rosenthal and Jacobson (1968) told teachers that certain students were likely to be "growth spurters" who were expected to achieve significant academic improvement over the school year based on a fabricated test. The students were randomly selected and had no actual differences in ability compared to their peers.

The results were striking. The so-called "spurters" showed significantly higher gains in IQ scores from the pre-test to the post-test compared to their control peers. These changes could not be explained by retesting effects, familiarity with the test, or natural cognitive development due to aging. Instead, the findings highlighted the powerful role of teacher expectations in shaping student outcomes.

The study also explored moderating factors. Younger children demonstrated greater improvements, potentially due to their higher malleability to external

influences. Gender differences were observed, with girls showing greater increases in reasoning IQ and boys improving more in verbal IQ, aligning with their respective pretest strengths. Additionally, while not statistically significant, minority students appeared to benefit more from positive expectations, with "more Mexican-looking" boys (e.g., darker skin tones) showing particularly pronounced IQ gains. These results suggest that preconceived notions based on race and ethnicity may interact with expectation effects.

> #yourturn
>
> In which other situations could the Pygmalion effect play a role? Think about situations where your assumptions or expectations about others may influence their behavior—positively or negatively.

The implications of the Pygmalion effect extend far beyond the classroom. In organizational settings, for instance, research has shown that managers' high expectations for their employees can lead to improved performance through changes in behavior and increased self-efficacy (Eden, 1990). Similar dynamics have been observed in therapeutic relationships, where therapists' beliefs about their clients' potential for progress influence treatment outcomes (Jenner, 1990), and in healthcare, where nurses' confidence in their patients' recovery can affect health results (Learman et al., 1990). These examples illustrate how expectations have the power to shape behavior and performance in diverse domains.

> #yourturn
>
> Which other social psychological constructs are related to the Pygmalion effect?

The Pygmalion effect is closely related to two other psychological concepts: the self-fulfilling prophecy and self-efficacy. A self-fulfilling prophecy occurs when an initially false belief or expectation leads to behaviors that ultimately make the false belief come true. This concept aligns with the Pygmalion effect, as individuals may unconsciously alter their actions to align with the expectations placed upon them. Additionally, self-efficacy, or one's belief in their ability to succeed in specific situations, plays a key role in mediating the impact of expectations. When high expectations are communicated, they can enhance an individual's self-efficacy, reinforcing their motivation and performance. These interconnected mechanisms help explain how expectations shape outcomes across various domains.

1.2 The Aftermath

Thorndike (1968) and Snow (1969) offered early critiques of Rosenthal and Jacobson's (1968) Pygmalion study, challenging its methodology, data analysis, and conclusions. Thorndike (1968) focused on issues with data quality, pointing out inconsistencies such as the implausibly low IQ scores of some participants, which he described as rendering the testing meaningless. He argued that the

effects of the intervention were limited primarily to a small group of first- and second-grade students, raising concerns about the generalizability of the findings. Thorndike (1968) concluded that any observed effects might have been coincidental rather than genuinely linked to the intervention.

> #yourturn
>
> The Pygmalion effect often involves subconscious biases. How do you think societal stereotypes (e.g., gender, race) might influence the expectations we hold for others? Can you think of ways to address or mitigate these biases?

Snow (1969), similarly skeptical, critiqued the study's complex experimental design, highlighting incomplete data and methodological flaws, such as inadequate norms for the youngest children and those from lower socioeconomic backgrounds. He noted that 20% of the participants were not retested, an omission unaddressed in the analysis. Snow (1969) also questioned the mechanism of teacher influence, pointing out that teachers reportedly could not recall which students were identified as "bloomers," undermining the study's foundational premise. Snow (1969) concluded that the study's premature dissemination in popular media had harmed teachers, parents, and students by raising unrealistic expectations without robust evidence to support them.

> #definition Special Issue
>
> A collection of articles on a specific topic, typically published together in a single issue of an academic journal. Special issues are often edited by guest editors and aim to provide a comprehensive exploration of the chosen theme or field of study.

In 2018, the journal *Educational Research and Evaluation* published a special issue on the Pygmalion effect, just in time for its 50th birthday. In the Editorial, they summarize that despite warranted criticism of the early studies, research conducted over the past five decades has refined our understanding of the Pygmalion effect. Specifically, empirical studies have shown that teachers generally show a degree of accuracy in their expectations (Jussim & Harber, 2005) but tend to favour students from affluent backgrounds over those from less privileged ones, while often holding lower expectations for special needs students (Cameron & Cook, 2013; De Boer et al., 2010). Evidence on expectations related to student ethnicity and gender is more inconsistent, with some studies finding biases—such as lower expectations for ethnic minority students, boys in reading, and girls in mathematics—while others do not. Teacher expectations influence teaching behaviours, such as offering greater opportunities to learn, asking richer questions, and providing more targeted feedback for students with higher expectations (J. E. Brophy & Good, 1970; Rubie-Davies, 2007). These expectations can function as self-fulfilling prophecies, impacting student outcomes like performance, intelligence, and motivation. However, the magnitude of these effects varies significantly across studies (e.g., effect sizes ranging from d = .11, Raudenbush (1984); to d = .70, Rosenthal & Rubin (1978)). Notably,

students who are low achievers, from low-income families, or belong to ethnic minority groups appear more vulnerable to these effects, and some teachers are more likely than others to amplify these disparities (Madon et al., 1997; Rubie-Davies et al., 2015).

> #definition Editorial
>
> An introductory article written by the editors of a special issue in an academic journal. It outlines the purpose, scope, and significance of the special issue, provides an overview of the included articles, and often highlights key themes, trends, or gaps in the research field.

Finally, the Editors underscore the need to view teacher expectations ecologically, considering the individuality of teachers and students, as well as the broader contexts of classrooms, schools, families, and communities. Teacher expectation effects are not universal; they vary by teacher practices, student vulnerability, and contextual factors like classroom composition. They also emphasize the importance of integrating teacher expectation findings into teacher education. Teaching future educators to avoid the negative effects of low expectations and to provide appropriately challenging learning opportunities could foster greater equity in student outcomes.

> #yourturn
>
> Can the Pygmalion effect apply to self-expectations? How might your own beliefs about your abilities influence your performance in a given task or goal?

1.3 Conclusion

The Pygmalion Effect is a social psychological phenomenon in which higher expectations from others lead to improved performance. This effect was first demonstrated by Robert Rosenthal and Lenore Jacobson in their seminal 1968 study, *Pygmalion in the Classroom* (Rosenthal & Jacobson, 1968), which showed that teachers' beliefs about students' potential could significantly influence academic outcomes. While the original study laid the groundwork for understanding this phenomenon, the decades of subsequent research have added nuance to our understanding. Teacher expectations can indeed enhance or hinder students' academic achievements, but these effects are not uniform; they depend on various factors, including teacher practices, student background, and the context within which they operate.

Chapter 2

Cognitive Dissonance

The Effect of Choice on Attitude Change within the Induced Compliance Paradigm

written by Maria Solovjeva (original draft), Benjamin Buttlar (revision), Adira Daniel (revision), and David C. Vaidis (revision)

2.1 The Classic

Paul had a big heart and a passion for life. He called himself a "foodie" and loved planning long dinners with friends, filled with laughter and lively political debates. One of his favorite topics was animal suffering. He spoke passionately about animal welfare and felt a deep connection with animals. He strongly believed in ethical animal farming and often said that respecting animals was part of what makes us human. I'll never forget seeing him stand at the dinner table, glass in hand, speaking out against animal cruelty—while enjoying one of his favorite meals: a medium-rare steak. That was Paul—driven, sincere, and full of beautiful contradictions.

Cognitive dissonance theory is a foundational framework in social psychology and psychological science (Devine & Brodish, 2003; Haggbloom et al., 2002). It explains a powerful mental process that helps us understand how people make sense of their thoughts, beliefs, and behaviors. This theory has established dissonance processes as a fundamental psychological mechanism and a key theoretical construct. Beyond demonstrating a basic psychological effect, the theory provides a comprehensive model for understanding how individuals construct and reshape their perceptions of reality.

The model proposed by Leon Festinger (1957) states people feel uncomfortable when they have two thoughts (or cognitions) that don't fit together. These thoughts can be about the world, themselves, or their behavior. When two

related thoughts contradict each other, we experience cognitive dissonance. For example, Paul who cares deeply about animals but eats meat may feel discomfort because their beliefs and actions don't align. The thought "I care about animals" conflicts with "I eat meat, which causes animals to suffer" (Bastian & Loughnan, 2017; Gradidge et al., 2021; Loughnan et al., 2010).

> #definition Cognition
>
> Cognitions can be thought of as bits of knowledge, such as opinions, attitudes, or beliefs about the world, about oneself or one's behavior. If two cognitions are relevant to each other, but the opposite of one follows from the other, these cognitions are said to be inconsistent.
>
> #definition Cognitive Dissonance
>
> Cognitive dissonance describes the discomforting state that people experience when they hold cognitions that are relevant to each other but inconsistent with each other—meaning that one bit of knowledge suggests the opposite of another bit of knowledge.
>
> #yourturn
>
> Can you think of other real-world examples in which someone might experience dissonance?

People generally prefer consistency between their thoughts and actions as they navigate through life. When one holds inconsistent cognitions, this can lead to cognitive dissonance—a discomforting state that people try to reduce by using various strategies. Research, however, has mostly focused on one strategy to get rid of this uncomfortable feeling: modifying inconsistent cognitions, especially through attitude shifts that align people's attitudes with a discrepant behavior (for recent reviews, see Buttlar et al., 2025; McGrath, A., 2017). In Paul's case, he might reduce dissonance by convincing himself that "ethical meat" doesn't really harm animals (e.g., Rothgerber, H., 2015). This shift in belief helps him feel better about eating meat, even though it conflicts with his values. A change in attitudes may thereby allow people to resolve the inconsistency between conflicting cognitions and the discomfort after engaging in counterattitudinal behavior.

> #yourturn
>
> Take one of your own real-world examples: How might people modify a discrepant cognition to resolve the dissonance?

The History in a Nutshell

The state of cognitive dissonance was originally demonstrated using a forced-compliance paradigm. In a classic experiment by Leon Festinger and James Carlsmith in 1959, participants were asked to perform a boring task. After the task, some participants were asked to lie to the next participant by saying that the task was interesting, while others were asked to tell the truth about the

boring task. Some were paid $1 to lie, others $20. The idea was that lying creates dissonance—especially when the reward is small. Festinger & Carlsmith (1959) expected that participants should experience cognitive dissonance when they lie, because one cognition ("I said the task was interesting") is inconsistent with another cognition ("The task was boring"). If you're paid only $1, you don't have a good reason to lie, so you might change your opinion to believe the task was more interesting than it really was. That way, your actions and beliefs match. The results showed that people paid just $1 were more likely to say the task was interesting, while those paid $20 did not change their attitudes. This surprising result challenged earlier theories like reinforcement theory (Skinner, 1958), which said people change their behavior when they get bigger rewards.

> #definition Forced-Compliance Paradigm
>
> A very early paradigm of cognitive dissonance initially stemming from the persuasion field where participants are asked to perform a discrepant behavior (mainly a speech or essay), being more or less incentivized for doing it. Classic studies (e.g., Festinger & Carlsmith, 1959) report counter-intuitive results showing more attitude change when paid a small amount of money in comparison to a bigger amount. This contradicted predominant theoretical frameworks at the time, such as the reinforcement theory (Skinner, 1958), which would have predicted that people adjust their attitudes especially when they receive a high reward.

Festinger's (1957) original formulation of cognitive dissonance was broad in scope. Researchers rapidly narrowed their focus to attitude change after cognition inconsistency in behavioral contexts, ultimately leading to a focus on developing experimental procedures (Vaidis & Gosling, 2011; for more insights on the rich and evolving history of the dissonance theory see Aronson, 1992; Harmon-Jones, E. and Harmon-Jones, C., 2007; Vaidis & Bran, 2020). Early in the theory development, researchers such as Jack Brehm, Arthur Cohen, and Joel Cooper emphasized choice as a necessary condition for observing dissonance-induced attitude change. From Brehm and Cohen's (1962) foundational theoretical revision to key experiments, choice emerged as a central moderator of dissonance effects, and a necessary point to distinguishing the dissonance effect from other theories. After that, the theory was challenged by competing explanations (e.g., self-perception theory, Bem, 1967). This led to multiple debates that prompted refinements, introducing additional boundary conditions for dissonance. As a result, the paradigm evolved to highlight the individual responsibility for the counterattitudinal behavior, that was summarized in choice but also took various forms with similar constructs like volition, freedom, aversive consequences, and perceived responsibility as critical variables for producing attitude change (Cooper & Fazio, 1984; e.g., Linder et al., 1967). According to these perspectives, Paul would experience dissonance about eating meat only if (a) he feels like he had a choice, (b) he believes that meat consumption harms animals, and (c) he feels responsible for his action (e.g., not blaming others for the harm inflicted on

animals). The recognition of these additional boundary conditions culminated in the development of the induced-compliance paradigm—a more nuanced iteration of the forced-compliance procedure. These developments represented a crucial consolidation phase for the theory.

> #definition Induced-Compliance Paradigm
>
> An evolution of the forced-compliance paradigm (Linder et al., 1967) where participants have to perform a behavior that is inconsistent with their attitudes—typically writing or delivering a counter-attitudinal essay. In this version, all participants engage in the discrepant task, but they differ in the justification provided. Half are explicitly told they have a free choice in performing the task (freedom condition), while the other half are simply asked to do it, as in the original forced-compliance paradigm. The key difference lies in the source of justification: an external incentive in the traditional condition, versus perceived freedom of choice in the revised one. The classic results show a greater change in the attitude in the choice condition (high choice) compared to the control condition (low choice).

Although the induced-compliance paradigm led to several refinements of Festinger's original theory (1957), most of these refinements were reconsidered later on. For example, Harmon-Jones, E. and Brehm, J. W. and Greenberg, J. and Simon, L. and Nelson, D. E. (1996) found that people can still change their attitudes even if they don't feel responsible or don't see negative outcomes. However, choice retained its central role in the induced-compliance paradigm as the key moderator variable for attitude change and this paradigm remains widely used today when people engage in dissonance studies (e.g., Cooper & Feldman, 2019; Forstmann & Sagioglou, 2020; Randles et al., 2015).

> #yourturn
>
> Take one of your own real-world examples: Imagine how the different refinements in regard to choice, aversive consequences, and responsibility of dissonance theory would apply to your example?

2.2 The Aftermath

In recent years, psychologists have started re-examining classic theories using more rigorous methods, partly in response to the replication crisis in psychology. One method used to systematically test key findings in psychology is the Registered Replication Reports (RRR), which use pre-registered, standardized methodologies to systematically test key findings, reducing biases and ensuring that results are replicable across diverse samples. Specifically, researchers in multiple labs decide in advance how to run and analyze a study, using the same script and materials. By having multiple independent labs follow the same

procedure to test whether research findings hold up, RRRs reduce systematic error and human tendencies that may distort results or conclusions of a study. For such a replication effort on cognitive dissonance, the induced-compliance paradigm offers a great foundation due to its pivotal role in the history of the theory.

The multi-laboratory RRR by Vaidis, Sleegers, and colleagues in 2024 (Vaidis et al., 2024) built upon a study conducted by Croyle and Cooper (1983, experiment 1) to replicate dissonance-induced attitude change in the induced-compliance paradigm. In the replication study, relying on 19 countries and almost 5,000 participants, students were informed about potential policy changes and then asked to write an essay contradicting their supporting opinion, with the potential to be applied under different conditions. They were then divided into three groups. The first group (high-choice inconsistency) wrote essays to support tuition fee increases while they had the opportunity to refuse to do it—they were reminded to participate voluntarily and consciously agreed to do so. The second group (low-choice inconsistency) was put in a situation where they were not explicitly free to refuse—they were simply told to write an essay to support an increase in fees. Thus, the first two comparisons served to assess the effect of choice. A third control group received all the similar information (potential change in the policies) but wrote an essay on a neutral topic with high freedom of choice (high-choice neutral). The control serves as a way to assess the effect of the inconsistent content of the essay.

According to cognitive dissonance theory, participants in the high-choice condition should have experienced more psychological discomfort and, consequently, a greater shift in their attitudes toward the position they argued for. However, Vaidis et al. (2024) found that both high- and low-choice participants in the inconsistency conditions changed their attitudes in line with their behavior (a within shift about 1 point on a 9 point scale), but the difference between these two groups was similar (all Cohen's ds < 0.05, all ps $> .15$, with an overall power of 95% for the four primary analyses). These findings challenge that perceived freedom of choice is necessary for cognitive dissonance to occur—which is considered a central tenet of the theory.

Crucially, the effect of inconsistency on attitude change in the RRR was found across labs, consistently showing that writing a counterattitudinal essay produces more change than the neutral essay. This raises concern about the exact process behind these effects and opens the door for alternative explanations, like self-persuasion. Thus, the authors performed a limited number of exploratory analyses to disambiguate these results. Based on two specific items assessing the cognitive dissonance state—discomfort and conflict—that were collected during the study, they compared the reported affect of participants in the counterattitudinal essay conditions to the ones in the neutral essay condition. The results showed more discomfort and more conflict in the inconsistent conditions than in the neutral one (respectively ds $> .22$ and ds > 0.58, with all ps $< .001$). While having to keep in mind their exploratory purpose, these results light that

cognitive dissonance may be a relevant process to take account of the attitude change results.

> #definition Paradigm
>
> Within Kuhn's (1962) tradition, a paradigm transcends mere methodological procedure, constituting instead a foundational scientific framework that combines theoretical principles, methodological standards, and empirical expectations. This comprehensive system guides scientific practice by providing explanatory models and predicting experimental outcomes. The paradigm's coherence depends on the alignment of these elements—when empirical results contradict theoretical predictions or methodological applications fail to produce expected findings, the entire paradigm faces fundamental challenges.

The results from the RRR suggest that the induced-compliance paradigm can still produce attitude change, but a central boundary condition for these effects that has been considered necessary for decades does not seem to hold up to scrutiny in a current replication. Which thus raises concerns about the induced-compliance paradigm: If freedom of choice were not a necessary precondition, then the paradigm would be based on flawed assumptions. This raises concerns that previous studies may have overestimated the role of choice, possibly due to false positives from small samples or selective reporting.

> #yourturn
>
> Why might Kuhn's definition of paradigm lead scientists to reconsider the induced-compliance paradigm in light of these RRR findings? And if a paradigm fails, do you think that automatically means the underlying theory is also wrong? Why or why not?

Reaction to the Failed RRR of Choice as a Boundary Condition for Attitude Change

Recent comments on this replication have argued that choice may nonetheless be a central boundary condition (Harmon-Jones, E. and Harmon-Jones, C., 2024; Pauer et al., 2024). For instance, a re-examination of the RRR by Vaidis et al. (2024) shows that the effect of counterattitudinal behavior on attitudes was moderated by the perceived freedom of choice on self-reported manipulation checks. That is, across the inconsistent high- and low-choice conditions, especially people who perceived higher (vs. lower) choice adapted their attitudes in line with their counterattitudinal behavior (Pauer et al., 2024). This might suggest that the subjective perception of choice, rather than actual experimental manipulation, may be a critical driver of dissonance effects. Another explanation for this replication failure might be that the induced-compliance paradigm may not be appropriate in a modern world, in which people, for instance, have to regularly "choose" to accept cookies to avoid effort (Harmon-Jones, E. and Harmon-Jones, C., 2024; Pauer et al., 2024). In a response to these commen-

taries, Sleegers et al. (2024) emphasized that the offered explanations were only post hoc analyses or explanations, not firm expectations stemming from the theory. They reminded the field that, regardless of the theoretical discomfort, the results remain what they are—emerging from a more structured and robust study, with more participants in a single experiment than combined totals of studies over several decades—the induced-compliance paradigm as defined has not been able to generate the predicted attitude changes in the RRR.

2.3 Conclusion

What Do These Findings Mean for Future Research?

Ultimately, this replication effort does not invalidate cognitive dissonance theory but rather highlights the need for refinement in its procedures. The induced-compliance paradigm in particular has long been a cornerstone of dissonance research, yet these findings suggest it may be flawed or at least in need of revision. If the expected effect of choice on dissonance is not as reliable as previously assumed, this casts doubt on the paradigm's ability to isolate cognitive dissonance effects from other psychological mechanisms. Many of the classic studies using this paradigm may need re-evaluation, and researchers must consider which of the refinements to Festinger's original theory (1957) are really required and whether alternative explanations, such as the self-perception (Bem, 1967) may account for the observed effects. The RRR provided some potential explanations through their exploratory data, but there is a clear need for further research. Moving forward, cognitive dissonance research must embrace more rigorous methodologies to determine when and how dissonance processes truly operate (Vaidis & Bran, 2019).

Moving forward, we propose three key considerations for future research. First, as a main lesson from these replication efforts, prioritizing pre-registered, large-scale replications is essential to distinguish robust findings from false positives (Sleegers et al., 2024). Second, echoing other calls (Gradidge et al., 2021; Vaidis & Bran, 2019), researchers should incorporate direct measures of the subjective experience of dissonance, such as self-reported tension, arousal, or neural activity, to investigate the process of cognitive dissonance beyond its effects on attitudes. Third, regarding the induction of cognitive dissonance specifically, future research should explore, evaluate, and refine alternative paradigms that do not depend exclusively on choice-induced dissonance. Promising examples include newer approaches like induced hypocrisy (for a meta-analysis, see Priolo et al., 2019), and the meat paradox framework (Bastian & Loughnan, 2017; Gradidge et al., 2021) — the latter of which has even recently received empirical validation through registered replication (Jacobs et al., 2024). Alternatively, maintaining the plausibility of the induced-compliance paradigm will require both substantial adaptation to contemporary contexts (e.g., Schwarz & Strack, 2014) and, more crucially, rigorous validation through preregistered studies to evaluate these adaptations. These steps will lead to a better understanding of

cognitive dissonance and its underlying processes.

Chapter 3

Implicit Association Test and Attitudes

written by Karolin Kessel (original draft), Bradley Baker (revision), Savannah C. Lewis (revision)

3.1 1. The Classic

How can we know what people truly think about a certain topic? This question is difficult to answer, given that people are sometimes motivated to misreport their true attitudes.

> #definition Attitude
>
> The cognition, affect and behavioral tendencies towards a certain object.

For example, if a friend was very excited about a new band they discovered, you might feel like you don't want to burst their bubble of joy by telling them you don't enjoy the music as much as your friend. Because it is socially desirable to respond positively, to mirror your friends' liking of the band, you might misreport your true attitude to them.

> #yourturn
>
> Think back to a time you thought or felt differently from what you expressed publicly. Why did you not report the truth?

Researchers in social psychology have been working on ways to assess and measure people's attitudes towards a multitude of different topics. The Implicit Association Test (IAT), developed by Greenwald et al. (1998), is a psychological tool to measure implicit attitudes that people may not be aware of or may

not openly express.

> #definition Implicit Attitude
>
> An enduring mental disposition toward something that is not consciously identified and of which a person may lack awareness.

The test works by measuring how quickly people process and respond to pairs of words or images. It relies on the idea that people respond faster when two concepts that are closely linked – or associated – in their mind (a congruent association) are paired than when the pairing feels mismatched or unrelated (an incongruent association, Jhangiani & Tarry, 2022).

> #definition Association
>
> "A connection or relationship between two items (e.g., ideas, events, feelings) with the result that experiencing the first item activates a representation of the second" (*APA Dictionary of Psychology*, 2018).
>
> #definition Congruent Association
>
> A mental relationship between two objects or concepts characterized by agreement or harmony.
>
> #definition Incongruent Association
>
> A mental relationship between two objects or concepts characterized by lack of harmony or misalignment.

Measuring these reaction times allows researchers to understand the strength of automatic associations between concepts. Being able to measure implicit attitudes provides a different perspective on how people feel than is available from simply asking people to report their attitudes, either because people may not realize their preferences or may not be willing to share them. The IAT is designed to reveal unconscious biases and remove bias that can be introduced by people simply giving answers they think are socially acceptable, rather than what they truly believe.

> #definition Implicit Association Test
>
> A reaction-time task that measures the strength of automatic associations between concepts (e.g., flowers and positivity) by comparing how quickly people classify paired categories. Faster responses indicate stronger underlying associations.

In the classic study by Greenwald et al. (1998), participants completed a task called the Implicit Association Test (IAT) to measure automatic associations. They were asked to quickly sort words and pictures into four groups: two groups of objects (like flowers and insects) and two groups of feelings (pleasant and unpleasant words). The test had two main parts. In one part, participants pressed the same key for flowers and pleasant words, and another key for insects and unpleasant words. In the other part, the pairings were switched: flowers

with unpleasant words and insects with pleasant words. Participants had to respond as fast and accurately as possible. If someone naturally associates flowers with pleasantness, they will respond faster when those two categories are paired together.

> #yourturn
>
> Why would researchers not simply ask participants about their attitudes?

This approach is used to capture unconscious connections between concepts in memory, which in the original test format were aimed at assessing implicit stereotypes and prejudices, but have been used to identify a variety of subtle attitudes in various subject areas (Nosek & Smyth, 2007).

> #yourturn
>
> Do you think that reaction times or spontaneous reactions are an appropriate measure of implicit cognitions such as stereotypes? Why or why not?

3.2 2. The Aftermath

In his study, "The Implicit Association Test: A Method in Search of a Construct," Ulrich Schimmack (2021) examines the power of the IAT in revealing individual differences in implicit social cognition.

> #definition Implicit Social Cognition
>
> The automatic, unconscious mental processes that influence how we perceive, evaluate, and interact with others.

The results show that there is insufficient evidence for the construct validity of the test (Schimmack, 2021), in other words, that there is not enough proof that the IAT measures what it was intended to measure (implicit bias), rather than something else. This can be seen when scores from a test aren't related to other measures of the same concept in the expected ways. Based on examination of several multimethod studies, Schimmack found little or no evidence of discriminant validity compared to measures of explicit attitudes, making it unclear whether the test really captures a different type of attitude (implicit, rather than explicit). Problems with discriminant validity show up when a measure's scores are too similar to those of an established measure for a different concept, making it unclear whether the new measure is assessing something unique. That is, Schimmack (2021) raises questions regarding a lack of evidence that the IAT adequately measures individual-level differences in implicit associations and the extent to which the IAT measures something different from self-report measures of explicit associations.

> #definition Multimethod Study

> Research that employs two or more distinct methods.
>
> #definition Discriminant Validity
>
> The extent to which a test is unrelated to measures designed to assess theoretically distinct constructs.
>
> #definition Construct Validity
>
> The extent to which a test measures the theoretical construct or concept it is intended to measure.

Schimmack highlights that these deficiencies have been overlooked for many years and finds that explicit measures are more valid than the IAT in all areas. This means simply asking participants about their attitudes might indeed be the better measure of these attitudes than making them take the IAT. At the same time, Schimmack also argues that the IAT can be used as a complementary measurement tool to explicit measures for sensitive settings to reduce measurement errors by employing a multi-method measurement model. In other words, using both explicit measures and the IAT might be the best approach.

> #yourturn
>
> What are the pros and cons of using this kind of test in bias training?

3.3 3. Conclusion

The establishment of implicit association testing resulted in one of the most influential articles in personality and social psychology (Greenwald et al., 1998), and established the foundation for a variety of new (social psychological) theories (Schimmack, 2021). At the same time, the difficulties identified by Schimmack illustrate the extent to which social psychological theory formation is highly complex. Particularly when investigating the discrepancy between human thinking and socially desirable conformity, as well as its (uncertain) influence on behavior, precise (construct) differentiation and validity testing are essential in research. Extensive research has used and built on the IAT (Greenwald et al., 2003; Greenwald et al., 2009) and related approaches to measuring the strength of automatic associations or using implicit measures to bypass bias in research data due to socially desirable responding by study participants.

> #definition Social Desirability
>
> The tendency to want to be viewed positively by others, often by aligning with socially approved behaviors and attitudes.
>
> #definition Socially Desirable Responding
>
> The act of providing inauthentic responses to better present oneself favorably according to current social norms.

However, Schimmack (2021) highlighted weaknesses of the IAT regarding construct and discriminant validity as a measure of implicit constructs. He emphasizes the significance of being cautious when making claims about subtle ideas based on the IAT and highlights the variation in the IAT's validity depending on the construct being measured. If the IAT is not measuring implicit attitudes (unconscious biases) or does not provide additional information beyond simply asking people about their attitudes, as suggested by Schimmack, then the test offers limited utility to researchers and calls into question findings that rely on the IAT.

> #yourturn
>
> The IAT was designed to assess automatic associations people may hold unconsciously. However, if implicit and explicit attitudes are highly correlated, what are the implications for how we understand the relationship between conscious and unconscious mental processes?

Chapter 4

Framing Effect

written by Hilmar Brohmer (original draft), and Sarah von Götz (revision)

4.1 The Classic

How we communicate information matters, because the *frame* senders choose influences how receivers will understand the message. The same factual information can be relayed through different frames, with consequences for receivers' understanding, and potential subsequent behavior.

For instance, a campaign to mobilize voters could communicate its core message as "Vote to secure your future" or as "Vote to stop disaster". Signage on fines for riding public transport without a ticket might read "Riding without a ticket costs 60€" or "Buy a ticket to avoid a 60€ fine". And would you rather buy milk that is presented as 96.5% fat free or as containing 3.5% fat? In short, framed messages lead to differences in perceptions and behavior, although the facts are the same.

> #definition Framing Effect
>
> People sometimes make different judgments or decisions depending on *the way relevant information* is presented, even though the underlying facts remain unchanged.

This so-called *Framing Effect* (Levin et al., 1998) occurs because people interpret information through psychological, emotional, and contextual cues rather than purely objective reasoning. Framing influences perceptions of risk, value, fairness, and responsibility, affecting decisions in all areas of everyday life. Understanding these effects helps explain why logically equivalent messages can lead to different attitudes, choices, and behaviors despite conveying identical essential information, and why it is sometimes vital to re-asses how a message is being communicated.

The essence of framing lies in the bigger theoretical framework of *Prospect Theory* by Amos Tversky and Daniel Kahneman (1981).

> #definition Prospect Theory
>
> Prospect Theory is a framework of assumptions about how people perceive subjective value and probability, deviating from objective numerical values/probabilities. It assumes that losses unfold a more negative effect than gains do a comparably positive effect: Finding € 20 on the streets likely feels good, but would not weigh as heavily as the negative feeling of losing € 20 by accident. It also assumes that small probabilities are overestimated.

Tversky and Kahneman translated this principle into the *Gain-vs.-Loss Framing Effect* - the mother of all framing effects. When decisions have to be made for future outcomes, people may process potential gains and losses differently, depending on how relevant information is presented (e.g., by third parties). Let's look at a famous scenario (Tversky & Kahneman, 1981) which predated a worldwide pandemic forty years later:

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

- *If Program A is adopted, 200 people will be saved.*
- *If Program B is adopted, there is 33% (one third) probability that 600 people will be saved, and 67% (two third) probability that no people will be saved.*

> #yourturn
>
> Think for a moment about which program you would choose, if you were a political decision maker in such a situation.

If you decided to adopt Program A, you would be with the majority of people, who were asked by Kahneman and Tversky to make this hypothetical decision (72% out of N = 152 participants), who indicated the same, seemingly secure option. The remaining 28% chose Program B, which seems to be the less certain and more risky option.

However, now consider if Program A and B read in an alternative version (now called Program C and D, respectively, to avoid confusion):

- *If Program C is adopted, 400 people will die.*
- *If Program D is adopted, there is 33% (one third) probability that nobody will die, and 67% (two third) probability that 600 people will die.*

> #yourturn
>
> Think again, which program, C or D, you would choose now.

It is noteworthy that program A and C are equivalent in their results, as are Program B and D. Yet, when another sample N = 155 participants were presented with these new options instead, 22% chose Program C and 78% chose Program D. This was interpreted as evidence for a framing effect: even though the choices are logically equivalent, the way the information is presented or "framed" affects what choices people make. In light of the certain loss of 400 lives, people overwhelmingly opted now for the small, but not unrealistic, chance of saving everyone - they went with the riskier, less secure option.

4.2 The Aftermath

Following the seminal paper by Tversky & Kahneman (1981), generations of researchers became interested in all kinds framing effects, their emotional underpinnings, (e.g., Nabi et al., 2020; Slovic et al., 2007), as well as differences in contexts, such as in health behavior (O'Keefe & Jensen, 2007), political attitudes (Bizer & Petty, 2005), or marketing (Simonson, 1989).

Particularly in marketing research, it could be shown how easily choices by consumers can be influenced. Imagine you would like to drink a new kind of beer in a pub, which offers two options of IPA that you have never heard of before:

- *Beer A: € 5.00*
- *Beer B: € 6.50*

Certainly, it would be a better deal for the pub if you bought the more expensive beer. The pub may achieve this goal, when it presents you with a more expensive third option:

- *Beer A: € 5.00*
- *Beer B: € 6.50*
- *Beer C: € 9.00*

#yourturn

In which way does this scenario differ from the classic Gain-vs.-Loss Framing effect from above?

Going beyond the classic framing effect (based on same information being presented in a different light), this scenario shows how additional information may make people switch to a different alternative: As a compromise, to avoid higher costs (i.e., losses) with the most extreme option, but also avoid the impression of being a scrimper, people would more often choose the middle option now, which had been the option that the pub had wanted you to buy to begin with (Pinger et al., 2016). Hence, imagined gains and losses still play a crucial role in such altered framing situations (this one is also known as the *Decoy Effect*).

But how robust is the evidence on framing? Luckily, framing effects remain among the most replicable effects in psychology! During the onset of the Repli-

cation Crisis of the 2010s, the "Many Labs" research collaboration (Klein et al., 2014) selected the original Gain-vs.-Loss Framing Effect - that is, the Asian diseases problem - for a systematic replication study. This collaboration consisted of k = 36 participating labs from three continents (America, Europe and Asia) and more than N = 6000 participants, who participated either online or directly in the lab. As in the original study, participants read about the Asian diseases (although the experimenters replaced the word "Asian" with the word "unusual") and had to decide to choose one of two presented programs, where half of the participants were shown program A and B, while the other half saw program C and D. The researchers found that the reversal of choices was present in 31 of the participating labs (86%), while none of the remaining five labs showed an opposite effect.

For Kahneman and Tversky, who had already revolutionized psychology earlier with their research on heuristics and biases (e.g., Tversky & Kahneman, 1974), Prospect Theory made them popular beyond psychology, as it grasps fundamental motivations of how many species (not just humans) seem to behave and interact (e.g., Gintis, 2013). This work, eventually, resulted in the only "Nobel Memorial Prize in Economic Sciences" ever granted to a psychologist in 2002, namely to Kahneman (Tversky had died six years earlier in 1996. Kahneman passed away in 2024).

4.3 Conclusion

Keeping track of real and imagined gains and losses seems to be a fundamental psychological mechanism, as suggested by Kahneman and Tversky's Prospect Theory. This mechanism was originally studied in the context of Gain-vs.-Loss Framing Effects, where people seem to reverse their choices, depending on the formulation of a scenario. When making decisions people are rarely perfectly rational and framing effects are one of the cognitive biases affecting decisions.

Decades of studies on this effect suggest that it is robustly found in different societal contexts that require decisions from people. And - in regard to the classic effect - it is also replicable, as indicated by a large replication study, which took place more than 30 years after the original.

Chapter 5

Ego Depletion

written by Hannah Baumgart (original draft) and Rima-Maria Rahal (revision)

5.1 The Classic

Ego depletion is a social psychological concept that describes the depletion of individuals' self-regulatory resources. Baumeister et al. (1998) were the first to demonstrate ego depletion effects in four different experimental settings: After having to engage in an act of self-control (compared to a control task that does not require self-control), willpower is used up and cannot not be deployed as effectively in a subsequent task.

> #definition Ego Depletion
>
> A concept that describes willpower as a limited resource that can be used up (depleted).

In Experiment 1, the focus was on the act of resisting a temptation, which requires self-control. Participants were randomly assigned to different food conditions, by which the independent variables were manipulated: Chocolate chip cookies and chocolate, radishes or no food at all (control group). Participants in the radish control condition were instructed to resist the tempting chocolates and instead eat several radishes that were laid out next to the chocolate. In the chocolate condition, participants were asked to eat several cookies or chocolates, which were laid out next to the radishes – a task that was not supposed to require much self-control. The actual intention behind the experiment, to demonstrate ego depletion, was disguised with a cover story to make sure participants would not get suspicious. They were told the experiment was about taste perception.

> #yourturn

> Which other tasks in your daily life require more or less willpower?

In the no-food control condition, participants were not asked to taste any food, but worked on the rest of the experiment.

After the participants had completed the willpower task resisting the temptation of the foods presented to them, they had to complete questionnaires on mood and restraint. Then they had to work on "solving" a problem-solving task, which was actually unsolvable. Here, the time spent on trying to solve the problem before giving up was the dependent variable.

The results showed significant differences between the three conditions, with participants in the radish condition stopping earlier than those in the chocolate or no-food condition. In conclusion, it was suggested that craving chocolate but choosing to eat radishes depleted an internal resource, leaving individuals less able to persist while trying to solve the puzzles afterwards.

> #yourturn
>
> If willpower can be depleted, how can it be "refilled" or built up again?

5.2 The Aftermath

Since this study, several hundred follow-up studies, including several multi-lab studies that aimed to replicate the overall finding (Hagger et al., 2016; Vohs et al., 2021) and several meta-analyses (Blázquez et al., 2017; Carter & McCullough, 2014; Dang, 2017; Hagger et al., 2010) have been carried out.

> #definition Multi-Lab Study
>
> A research project in which researchers working at several different locations (laboratories) implement the same experimental design and then analyse the data together.

These studies yielded mixed results, with some seeming to confirm the principles of ego depletion (e.g., Hagger et al., 2010 concluding that it was highly unlikely that the ego depletion phenomenon did not exist), while others failed to establish the effect despite relying on data from more than 2000 participants (e.g., Hagger et al., 2016). Publication bias has been argued to be high in the literature on ego depletion (Inzlicht et al., 2015), casting doubt on the effect.

> #definition Publication Bias
>
> A tendency for research in line with established theories or showing significant results to be more easily publishable than deviating research.

Continued research interest on ego depletion has brought forward varying hypotheses regarding circumstances under which the effect might be demonstrable

and robust. The meta-analysis on ego depletion conducted by Dang (2017) investigated only studies with sufficient initial effort exerted in the depleting, which was hypothesized to lead to the ego depletion effect. The study ensured that the depleting task required the use of self-control and excluded manipulations that were less clearly related to self-control, such as those based on social exclusion. Eight commonly used depletion tasks were assessed in the meta-analysis: attention essay, attention video, crossing out letters, emotion video, food trial, Stroop, thought suppression, and working memory.

> #yourturn
>
> Can you imagine what participants had to do in these tasks? Think about a version of each task that would drain self-control and one that would be less exhausting.

The results showed that two of these exhausting tasks, attention video and working memory, were not associated with significant changes in subsequent self-control. Emotion videos, on the other hand, appeared to be the most effective task and reduced subsequent self-control.

The overall analysis revealed a small to medium effect size for the ego depletion effect. Correcting for publication bias, this effect was not statistically significant when using the full sample of studies identified. However, a separate analysis for reliable depletion tasks, such as attention essay, emotion video and Stroop, showed the significant effect remained when attempting to correct for publication bias. This meta-analysis suggests that in special tasks, ego depletion might occur, but that it is difficult to generalize to other circumstances.

However, even in these special tasks, there is often no direct measure of the initial depletion of willpower involved: manipulation checks on whether willpower has been used up offer only an indirect measurement (Friese et al., 2018).

> #yourturn
>
> How could you objectively measure the amount of willpower available or drained?

5.3 Conclusion

The literature suggests a differentiated view on the potentially finite nature of willpower is necessary (for a detailed overview, read more in Friese et al., 2018). In the context of social psychological theories, the ego depletion effect can be seen as an important example of contradictory findings in research, where publication bias may play a role. Although several hundred studies on ego depletion have been published, we cannot be sure whether ego depletion exists or not.

> #yourturn

Do you think ego depletion exists?

The debate about ego depletion shows that individual findings should be re-assessed in several empirical demonstrations, including replication attempts that can provide a more realistic picture of the effect or construct. In this case, the original ego depletion effect may have been initially inflated due to publication bias. Following closer examination, it is less certain whether this effect indeed exists. The example of the ego depletion literature also shows the importance of examining the evidence closely, under the microscope, in order to ensure that it meets the quality criteria that are essential for assessing cumulative evidence of the overall effect.

Chapter 6

Feeling the Future

written by Melissa Engelbart (original draft), and Katerina Michalaki (revision)

6.1 The Classic

Humans have long been interested in telling the future. Whether wanting to know if we should take an umbrella to work because it might rain in the evening or wishing one could foretell the lottery numbers on a jackpot draw, our interest in the future is pervasive.

> #yourturn
>
> What was the last time you wished you could tell the future?

Some endeavors of telling the future are relatively successful: We can, for instance, forecast the weather or make targeted predictions for stock market behavior. These approaches use historical data and up-to-date information on relevant developments (e.g., rain in a neighboring area, quarterly company reports) to predict what will happen. In other instances, forecasting is necessarily futile, because events are random. For instance, a truly fair 6-from-49 lottery draw is random. We cannot hope to accurately predict the winning numbers with a probability higher than 1 in 13,983,816. But what if we could?

Some psychological research deals with the idea that individuals may anticipate unpredictable events or stimuli. This forecasting ability for random events has been referred to as PSI (Thouless & Wiesner, 1946) or as precognition. There is even some empirical evidence demonstrating precognition performance above-chance levels – like being able to predict a lottery draw, after all (Honorton & Ferrari, 1989).

> #definition Psi

> A descriptive term used in parapsychology to describe a set of paranormal processes including telepathy, clairvoyance, psychokinesis, precognition, and premonition. Telepathy refers to the extrasensory transfer of information, and clairvoyance refers to the perception of events or stimuli that have no sensory foundations. In contrast, psychokinesis refers to the effect of intentions on physiological or physical processes.
>
> #definition Precognition or Premonition
>
> The conscious cognitive awareness or affective apprehension of a future event that could not otherwise be anticipated through any known inferential process (Bem, 2011).

Across 9 experiments, Bem (2011) investigated what he termed extrasensory perception (ESP), which refers to the idea that a future event can influence individuals' behavior in the present. Bem conducted numerous experiments on this idea and published them in one manuscript. In the first laboratory study, 100 undergraduate students completed 36 trials of a computer-based task in which they were asked to predict which of two curtains in the initial screen concealed an erotic image. Bem hypothesized that participants could precognitively detect erotic stimuli with statistically significant accuracy levels. Following the directions of previous studies (Honorton et al., 1990), Bem constructed and administered a stimulus-seeking scale to explore whether high psi performance is associated with stimulus-seeking tendencies. From the total sample, 40 participants completed 36 trials, comprising equal numbers of erotic, negative, and neutral images. The sequence of trials and the spatial positioning of the images were randomly determined. The remaining 60 participants completed 18 trials featuring erotic images and 18 trials featuring non-erotic positive images, which varied in arousal level. According to the results, participants correctly identified the future position across 53.1% of the trials containing erotic pictures. This means they seemed to be significantly better than chance (50%, $p = 0.01$). Conversely, their ability to retroactively identify the location of a non-erotic image was below chance levels. Individuals' performance when asked to locate where erotic and non-erotic images would be presented was different ($p = 0.001$): Participants could predict the future location of erotic stimuli, but could not predict the location of non-erotic stimuli on screen.

In the second experiment, Bem explored whether individuals avoided unforeseen negative outcomes at a pre-cognitive level. One hundred and fifty undergraduate students were presented with two neutral images and were asked to indicate which one they preferred. After participants completed their choice, the computer randomly selected one of the two images as the target. If the participant had chosen the target, a pleasant image was briefly flashed on the screen. If they had chosen the other image, a highly arousing, negative image was flashed instead.

> #yourturn

> What would you expect to happen if individuals could foretell which images would be followed by an unpleasant picture?

Bem hypothesized that individuals would prefer the image that would avoid exposure to a negative outcome. Results aligned with this hypothesis. Participants tended to choose the image that avoided the negative stimulus more often than would be expected by chance. This means that, again, the results seemed to suggest that participants could feel the future: They seemed to avoid negative stimuli.

In the third and fourth experiments, Bem conducted two "retroactive priming" experiments to explore whether future events influence present behavior. Across two separate studies, two hundred participants viewed emotionally evocative images and quickly judged each one as either pleasant or unpleasant. Immediately after their response, either a positive or a negative priming word was briefly flashed on the screen. In congruent trials, the word matched the emotional valence of the image, whereas incongruent trials consisted of images and words with different valence (e.g., a pleasant image followed by an unpleasant word). In Experiment 3, priming words were randomly selected after participants' response. Experiment 4 refined this approach by assigning each image a fixed pair of semantically related positive and negative words in advance, making the trial outcomes unpredictable. A standard forward priming condition was included across the two studies to ensure that congruent trials would lead to quicker reactions than incongruent ones. In the standard priming condition, pictures were presented before the judgement of the images, like it is usually done in priming experiments. Across all priming conditions, reaction time was significantly shorter on congruent trials, even when the primed word appeared after participants' judgment. Bem concluded that participants were able to - at least implicitly - foretell if the word they reacted to would be followed by a matching image or not. This means that, again, these studies seemed to show that people could feel the future.

> #definition Priming
>
> Priming refers to the effects of a subtle cue on future behavior. The primed stimulus works by activating related concepts and making them easier to access. Typical priming techniques include the very short exposure of participants to a visual, auditory, olfactory, or haptic cue. For instance, presenting the word "lion" may lead to faster categorization of the word "cat" because the two concepts represent the same "animal" category.

In three subsequent experiments, Bem built on the idea of retroactive habituation and investigated a provocative question: Do future experiences shape present preferences? These studies tested whether repeatedly showing a stimulus, after a participant made a choice, could retroactively influence their initial preference. In Experiments 5 and 6, participants were presented with pairs of images and asked to select the one they preferred. The images included neg-

ative, neutral, and erotic content. After the choice, one image was randomly selected and shown repeatedly without the participant's awareness. This means the image was flashed on the screen below the threshold of where people can actually perceive and process what they are seeing.

> #definition Subliminal
>
> Subliminal refers to the exposure of stimuli for such a short amount of time that humans are not aware of the stimuli perceived and therefore cannot actively process the information.
>
> #yourturn
>
> What do you think Bem expected to happen?
>
> #definition Habituation
>
> Habituation is a phenomenon where we get used to a stimulus, following its repeated exposure. As a consequence, the reaction to the stimuli is reduced.

Results showed that, even before participants were exposed to the repeatedly flashed image, they preferred the image that was later shown. This was the case when the pair involved negative images, suggesting that future exposure may reduce avoidance: It seemed like habituation to the stimuli repeated in the future made them less aversive in the present. However, with erotic images, they were more likely to prefer the image that was not later repeatedly shown. Bem thought this indicated a decrease in liking for erotic stimuli that would later be shown repeatedly.

Experiment 7 focused on exploring the retroactive induction of boredom with the use of neutral images and visible exposures instead of subliminal ones. Participants' overall hit rate was below 50% and not statistically significantly different from chance. However, participants with high stimulus-seeking characteristics (a "tendency to seek out stimulation," Bem, 2011; (2011), p. 410) were reported to avoid the image that would later be presented repeatedly. These findings have been attributed to a potentially higher retroactive boredom effect for those more sensitive to overstimulation.

In Studies 8 and 9, Bem conducted two "backward recognition" experiments to unravel whether memory can be influenced by future cognitive ability.

> #yourturn
>
> How would you design an experiment that tests if participants' memory now can be influenced by how much they practiced remembering certain words later?

He hypothesized that participants would recall or recognize more of those words that would be practiced after the recall than words that would not. Similarly to the other two designs, participants were expected to "feel" which words would be practiced after the recall and "recognize" the words practiced in "backwards" a

backwards process. After a short relaxation period, participants were presented with 48 words and were asked to visualize them. Following, participants were asked to recall them. Six words from each of the four categories (foods, animals, occupations, clothes) were randomly selected for participants to practice after the recall. Precognition was estimated by subtracting the "unpracticed" words that were recalled from the selected and practiced words. Bem accounted for overall memory performance by estimating the weighted Differential Recall score (DR). He multiplied the individual total number of recalled words and divided by the maximum possible score across all different trials. In Study 8, the mean DR was 2.27% ($p = 0.029$), whereas in Study 9 the estimated DR was 4.21% ($p = 0.002$). These findings suggested that practicing words after a recall test may retroactively enhance the ability to recall them in the first place.

In summary, all experiments conducted by Bem, except experiment seven, yielded statistically significant results that seemed to support the notion that people could "feel" the future: Their behavior at one point in time was apparently affected by events that were yet to occur in the future.

> #yourturn
>
> What do you think these results mean? Can people really tell the future? And what would the implications be if this was true?

6.2 The Aftermath

Many researchers in psychology expressed skepticism about the existence of precognition, based on empirical and theoretical challenges in studying humans' ability to perceive unforeseen conditions. Other researchers, however, were convinced that the theory of psi was right. Consequently, Bem's (2011) publication sparked substantial follow-up research.

One part of the debate attempted to recreate the original experiments to see if the same results could be obtained again. Several replication attempts were conducted to further test if precognition could be detected.

Across three pre-registered studies, Ritchie et al. (2012) recruited a sample of $N = 150$ participants. Before collecting the data, they conducted a power analysis to find out how many participants were required to have good chances to detect a precognition effect. The replication studies followed experimental processes highly similar to the ones by Bem (2011), with limited modifications. The design was very close to the original study in terms of procedure, participants, and so forth. Nevertheless, Ritchie et al. failed to provide statistically significant evidence for retroactive facilitation of recall.

> #definition Pre-registration
>
> The process of formally specifying the hypotheses, methods, and planned analyses of a study before any data is collected or exam-

ined. Preregistration distinguishes genuine predictions from post hoc explanations, fosters transparency, and increases the credibility and interpretability of research findings (Nosek et al., 2018; Van Den Akker et al., 2023).

#definition Power Analysis

A power analysis is used in research to estimate the probability that an effect, if it does exist, could be found in the data given. Usually, a power analysis is conducted to estimate the minimum sample size needed to detect a certain effect before running the study (a priori).

At least three other replication attempts also failed to find evidence for a precognition effect when replicating the "backward recognition" experiments (Galak et al., 2012; Muhmenthaler et al., 2022; Robinson, 2011). Muhmenthaler et al. (2022) furthermore attempted to replicate one of Bem's "retroactive priming" experiments (experiment 3). In this attempt, the difference between congruent and incongruent trials was close to zero, with a difference of 2 ms (SD = 114 ms). Therefore, again, no evidence for a precognition effect was found.

A recent multi-lab replication study (Kekecs et al., 2023) brought together researchers who thought that Bem's (2011) results supported the concept of psi, and researchers who did not. This process is sometimes also referred to as an adversarial collaboration. Together they decided on what they thought was the best way to test the theory, how to analyze the data, and how to avoid questionable research practices. They focused on replicating Bem's (2011) experiment 1, replicating it across multiple laboratories in different countries and languages. More than 2000 participants completed more than 37000 erotic trials, in which they needed to indicate where on the screen a target image would show up. The position where the image was shown was determined randomly, and only after the participant had indicated their guess. Their guesses were successful in 49.89% of the trials, which did not differ from chance.

#definition Adversarial Collaboration

A research project where researchers have different views and predictions, or support opposing theories.

#definition Questionable Research Practices

Unethical behaviors in research which produce unreliable results and reduce the validity of the findings.

#yourturn

Do you think these results prove or disprove the theory that humans can "feel the future"?

A second line of research concerned discussions on how the data should be analyzed. There were different opinions on whether the analyses originally used by Bem (2011) were appropriate to assess the effects of psi.

Along these lines, Rouder & Morey (2011)] reevaluated Bem's data. They found evidence for a slight "feeling the future-effect" for neutral and erotic stimuli, as well as some evidence for emotionally valenced stimuli. According to their analyses, Bem's data would speak in favor of a precognition effect, even when evaluated more strictly.

Wagenmakers et al. (Wagenmakers et al., 2011) on the other hand, found a small to non-existent precognition effect when they reanalyzed Bem's data. Wagenmakers et al. (2011) discussed weaknesses of the original statistical analyses and the crucial role of their correct and transparent application. In particular, they argued that confirmatory studies and conservative statistical tests are needed to provide informative evidence. Otherwise, the risk of Type I errors, and consequently of drawing false inferences, increases. Put differently, this research suggested that the way Bem's (2011) experiments were conducted, and the way the data was handled increased the chances that the findings were false positives.

> #definition Confirmatory Study
>
> A research investigation that tests (often preregistered) hypotheses derived from theory or prior empirical research.
>
> #definition Type I Error / Alpha Error / False Positives
>
> Inferring from a statistical test that a certain effect exists, although it does not exist in reality.

Similarly, Schimmack (2012) demonstrated that the results reported in Bem (2011) were unlikely to stem from only the limited number of studies reported in the original article. Rather, Schimmack's reverse-engineering of Bem's (2011) research process suggested that many studies were conducted and only significant results reported (potentially due to publication bias).

Overall, many researchers alleged that Bem's (2011) using questionable research practices led to the results (see Schimmack, 2018, for an overview).

> #definition Publication Bias
>
> Refers to distortions in which publications with significant results are more likely to be published than studies with non-significant results.

A third stream of work focused on bringing together evidence from multiple studies to assess the cumulative evidence on precognition.

Mossbridge & Radin (2018) reviewed the empirical evidence for precognition effects and they concluded that "(…) several classes of experiments have demonstrated time-reversed anomalies under tightly controlled protocols." and "it seems to us that precognition may eventually be considered just one of several forms of prediction that have evolved to enhance our survival." (p. 89). In 2016, Bem et al. (2016) conducted a meta-analysis of precognition effects as well. In

contrast to some of the replications, they concluded that the combined evidence showed decisive evidence in favor of the psi theory. However, if the evidence in the individual studies included in these meta assessments is full of false positives (see above), a combined birds' eye view would make it seem like there is a lot of evidence in favor of the psi theory, too. Put differently, researchers worried that the results of these meta assessments were biased, too (Wagenmakers, 2014).

6.3 Conclusion

In the question of a parapsychological effect, one can conclude that the empirical data is conflicting and sometimes directly contradictory. Evidence seems to accumulate that suggests a small precognition ability in humans. However, there are reasons to worry that this evidence is unreliable and the source of methodological and statistical artifacts. Research needs to be done in order to understand the potential nature and mechanisms underlying the time-reversed anomalies reported, and to address the continued skepticism and justified worries about uninformative evidence that this theory has triggered.

> #yourturn
>
> Would you bet on the psi theory?

As controversial as the area of parapsychology and Bem's study of "feeling the future" might have been, it did promote a body of research and resulted in a discussion of adequate measures of effects. The scientific discourse shed further light on the relevance of replication and meta-studies as well as pre-registration and open science, aiming to reduce data manipulation and enhance transparency of research and reproducibility of results.

Bem's (2011) study triggered considerable debate about whether research practices in psychology were appropriate for creating robust, reliable, and valid insights (see Wagenmakers et al., 2011). The publication of Bem's (2011) psi article was akin to a turning point, at which questionable research practices and misaligned incentives in the field culminated. Its publication, among other developments, sparked a larger debate about how psychological research should be conducted, published, and rewarded (Simmons et al., 2011).

Part 2: Social Influence, Groups and Prosocial Behavior

This part of the book focuses on how the presence of others or our social relationships can influence our behavior. The presence of others, as well as our embeddedness in social groups exerts a strong pull on what individuals will do. The research covered in this part of the book is concerned with demonstrating this social influence on behavior. It asks questions such as "When will people blindly follow the example of others?" (Chapter on Conformity), and "Why do people obey orders?" (Chapter on Obedience to Authority).

Part 2 contains six chapters on classic studies addressing social influence:

- Conformity
- Obedience to Authority
- Social Loafing (Ringelmann Effect)
- Social Facilitation
- Pretty Privilege: Stereotypes as Self-Fulfilling Prophecies
- Trust

Another facet of this research focuses on the influence of social roles and norms. It asks whether stepping into a social role such as that of a prisoner or a prison guard will make us change our behavior (Chapter on the Stanford Prison Experiment) and whether we litter more when we see evidence that others do so, too (Chapter on Social Norms).

In Part 2, there are four chapters that address the influence of social roles social norms and language on behavior:

- Stanford Prison Experiment
- Gender Differences in Human Mate Preferences
- Social Norms
- Social Effects of the Generic Masculine

Moreover, there are three chapters that are dedicated specifically to social influence exerted by social groups. The research covered in these chapters asks whether we treat members of our team better than members of a rivaling group even if group membership is arbitrary (Chapter on the Minimal Group Effect) and how conflicts between groups can be mitigated (Chapter on Intergroup Contact Theory).

Part 2, therefore, contains three chapters on the influence of social groups:

- Minimal Group Effect
- Stereotype Threat
- Intergroup Contact Theory

Finally, this part of the book also addresses research that is focused on a particular type of behavior in the social context: helping others (prosociality). This research investigates when humans will step in to help, and when the mere presence of others makes us hang back to wait if someone else will help (Chapter on the Bystander Effect). This research is also concerned with whether helping is an intuitive human behavior, or if it requires us to override selfish impulses (Chapter on the Social Heuristics Hypothesis).

Part 2 contains two chapters which address prosociality:

- Bystander Effect
- Social Heuristics Hypothesis

Chapter 7

Conformity

written by Adeyemi Adetula (original draft), Gabriel Agboola Adetula (original draft), Alma Jeftic (revision), and Nadia Saraí Corral-Frías (revision)

7.1 The Classic

In 1951, Solomon Asch, a Polish-American psychologist, sought to answer the question to what extent social pressure from a group can influence an individual's behavior, even when the group is objectively wrong — a psychological mechanism underlying conformity. The experiment was conducted at a time when the world was grappling with the aftermath of World War II, and there was a growing concern about the dangers of conformity and groupthink.

> #definition Conformity
>
> Conformity is changing one's behavior, judgment, or opinion to match a group, even when the group is objectively wrong (Asch, 1951, 1956). Solomon Asch measured it by how often a real participant gave the same incorrect answer as unanimous confederates on clear line-judgment tasks.
>
> #definition Groupthink
>
> Groupthink is a psychological phenomenon where a desire for group harmony or conformity results in irrational or dysfunctional decision-making. It occurs when group members suppress dissenting opinions, self-censor, and fail to critically evaluate alternatives to maintain consensus (Janis, 1972). Unlike Asch's (1951) conformity to perceptual judgments, groupthink describes flawed collective decisions in cohesive, insulated groups under stress. Some indicators of groupthink include collective rationalization and stereotyping outgroups.

Asch (1951) was inspired by earlier studies on social influence, such as the work of Sherif (1935), which demonstrated that people's judgments can be influenced by others. Asch's social influence theory proposed that conformity tends to override personal critical judgment due to informational and normative influence. In his study, he designed a "vision test" experiment involving 123 male college students. Each participant was placed in a group of 7-9 confederates — actors who were in on the experiment. They were asked to complete a simple task to identify which line (A, B, or C) was the same length as a reference line. The lines were presented on a card, and the participant had to respond aloud, along with the confederates. The participant was seated at the end of the table, and each of the confederates would give their answers first, followed by the participant. The experiment consisted of 18 trials, with the confederates giving incorrect answers on 12 of the trials. The participant's response was the focus of the study. Asch's findings were evident. Participants provided accurate responses in 99% of trials when confederates offered correct answers. Conversely, when confederates presented incorrect answers, participants conformed to the group's erroneous response in 32% of instances. A substantial proportion (75%) of participants conformed to the group's incorrect answer on at least one occasion. Notably, when a partner (a confederate providing correct answers) was introduced, conformity decreased to 5%. The findings indicated that participants exhibited increased conformity to the group's opinion when the group 1) presented a unanimous incorrect answer, 2) expressed uncertainty regarding their own judgment, and 3) consisted of individuals with "elevated" social status, in this case participants' fellow students. Asch concluded that people have the tendency to conform to group opinions, even when they contradict personal judgment. The findings suggest this behavior is driven by a desire to avoid social rejection and preserve harmony within the group. Because the task was simple and the correct answer was visually obvious, the study provided a powerful demonstration that conformity can occur even when there is little genuine uncertainty about what is correct. Moreover, the findings underscored the role of social support, showing that even one ally can be enough to weaken majority pressure and encourage independent judgment.

#definition Confederate

A confederate was an actor in on the experiment who posed as a regular participant (Asch, 1951, 1956). Asch's original line-judgment experiments used male college students from Swarthmore College as confederates; however, other variations of his paradigm have used non-college students. Confederates were physically present in the experiment room with the one real participant. Their role was to deliberately give unanimous incorrect answers on line-judgment tasks, creating group pressure to test whether the real participant would conform or maintain their own accurate judgment.

#yourturn
Let us consider the process of reforming criminal behavior or unlearn-

> ing an entrenched belief. What degree of social influence or exposure is required for an individual to conform to illegal conduct or adopt irrational beliefs? Conversely, would a single dissenting opinion be sufficient to disrupt such behavior or belief after a prolonged period of conformity?

But why did participants conform? Asch's study identified three reasons. Informational influence made them doubt their own judgment and trust the group's consensus as more accurate. Normative influence led them to avoid rejection and preserve social harmony, even when being wrong. Group cohesion created a sense of belonging that discouraged disrupting the group's unity. These mechanisms suggest that conformity is not simply passive obedience, but a response shaped by how people interpret reality and manage their place within the group. This classic study was not without criticism and its limitations. Critics identified three main issues: 1) lack of ecological validity as the study was conducted in a controlled laboratory setting, which may not reflect real-world situations, 2) limited generalizability as the study only involved male college students, which may not be representative of the broader population, and 3) methodological limitations given the study relied on a single task (line judgment), which may not be representative of other types of judgments. Other replication and extension studies have been conducted to expand the theory some of which we discussed below.

7.2 The Aftermath

How has this theory held up after seven decades? To answer this question, we considered three studies: 1) Franzen and Mader's (2023) replication and extension studies, 2) Mori and Arai's (2010) replication, and 3) Bond and Smith's (1996) meta-analysis.

Franzen & Mader (2023) conducted a close replication of the Asch's original social influence and conformity experimental studies and an extension study. Their work demonstrated how people conform to group pressure, even when they know the answer is wrong. This replication study on conformity adopted the same method as Asch's (1951) line judgment task. One part of the experiment was designed to replicate the original Asch experiment. For this purpose, 210 participants were recruited and randomly assigned to two groups. Group 1 judged line lengths without an incentive for correct answers. As in Asch (1951), each session included five confederates and one naive participant seated in a row, with the naive participant always in Seat 5. Participants completed 10 line-judgment tasks of varying difficulty, calling out the number of the correct line in order from participant 1 to 6, and then completed a short questionnaire. In Group 2, the experimental design and procedure were identical to those in Group 1, except that correct answers in the line-length judgment task were incentivized. In addition to a 20 Swiss Franc show-up fee, participants received one Swiss Francs for each correct response in the line judgment task

(see Franzen & Mader (2023); for the full procedure report). In later parts of the experiment, participants additionally responded to five general questions on political issues in Switzerland, and to items assessing their Big Five personality traits, self-esteem, intelligence, and motivation. The findings showed that conformity rates were lower than those in Asch's original work, but the social influence situation remained significant. Franzen & Mader (2023) found an error rate of 33% in the non-incentivized condition, closely replicating Asch's original findings. However, the error rate decreased to 25% when correct answers were incentivized. They found a conformity rate of 38% when expressing opinions on political statements. These findings show social influence theory still holds even half a century after their original demonstration, though less robustly than originally reported, especially when responses are incentivized. When applied practically, the theory revealed high conformity in political opinions among Swiss participants, suggesting cultural and contextual factors moderate the effect.

Mori and Arai's (2010) work was comparable experimentally to Asch's (1951, 1952, 1956). The @Mori & Arai (2010) replication aimed to resolve inconsistencies in Asch experiment replications, particularly around the use of confederates and whether participants detected them. Mori & Arai (2010) adopted a method similar to Asch's line judgment task, but used a computerized setup. The key difference here from Asch's samples was that no confederates were asked to give incorrect answers; instead, 2-4 actors gave predetermined incorrect answers via the computer, creating a majority opinion. Hence, social influence has been manipulated through pre-programmed responses and attributes given to other participants. All participants were Japanese university students (N=104; 40 men and 64 women) and told fellow participants they were responding simultaneously via computer. Consequently, although participants responded privately via computer, they believed they were part of a group. Participants were shown a standard line and three comparison lines, and asked to identify the matching line. The findings of Mori & Arai (2010) showed that conformity rates were similar to Asch's original study, despite the absence of confederates who gave incorrect answers. Participants conformed to the perceived group opinion, even when they knew the answer was incorrect. Therefore, (2010) study demonstrated that social influence can occur without direct social pressure, highlighting the power of perceived group norms. Mori & Arai (2010) discussed how personal acquaintance, age, gender, task difficulty, confederate in reality, minority and majority group, culture differences, and generational differences may influence conformity rate.

Last, we consider the meta-analysis by R. Bond & Smith (1996). This meta-analysis included 133 studies that used Asch's line judgment task, including replications and variations — studies have covered various cultures, group sizes, and participant demographics. The analysis examined the effect of sizes and moderators of conformity, such as cultural individualism-collectivism and group size. The main findings of R. Bond & Smith (1996) indicated that conformity rates varied across cultures, with higher conformity in collectivist cultures. Group size and unanimity influenced conformity, consistent with Asch's find-

ings. The meta-analysis also revealed that the effect sizes decreased over time, suggesting cultural shifts in conformity. Bond and Smith's (1996) meta-analysis highlighted the importance of cultural context in understanding conformity and social influence. These findings allow us to evaluate whether Asch's findings can be reproduced, but also how conformity changes across historical periods, research methods, and cultural contexts.

> #yourturn
> Why do you think participants in more recent studies are less likely to conform than participants in studies conducted earlier?

Taken together, studies of the aftermath of the Asch original classic studies were consistent although not as robust as the original study reported (R. Bond & Smith, 1996; Franzen & Mader, 2023). These studies identified several factors that shape conformity, alongside influences such as anonymity, group cohesion, and individual differences like self-esteem and personality. Group size matters, but its effect ceases to increase after three or four people as additional confederates contribute little to the overall level of conformity. Unanimity is also crucial as a unanimous majority exerts strong social pressure. Nevertheless, a single dissenting voice can substantially reduce conformity by disrupting the perceived consensus. Task difficulty also plays a role. When tasks are ambiguous or hard, people are more likely to rely on the group's judgment rather than their own. Cultural context plays a moderating role as well. Some studies reported that participants in collectivist cultures, which are common in many African and Asian countries, generally exhibit higher conformity rates compared to individualist cultures, which are more typical in Western countries. Incentives can affect the pattern as well. While monetary rewards may lessen conformity, they do not eliminate it entirely. Finally, social norms continue to operate even when they are not explicitly stated. People often align their behavior with what they perceive as normal or expected in a given situation. Together, these findings show conformity is not automatic but contingent on situational and social variables that either amplify or dampen the tendency to align with others.

> #yourturn
> Social media now connects us to people everywhere, and our feeds usually show us ideas we already like. Does this setup make global conformity more common?

7.3 Conclusion

Asch's conformity experiments revealed a robust demonstration of the influence of social pressure on individual behavior that was largely substantiated from subsequent extension and replication studies. The persistent effect highlights the importance of critical thinking, dissent, and diversity for reducing the likelihood of groupthink and promoting independent thought. The social influence theory has several real-world applications and implications in different domains

(Franzen & Mader, 2023). For instance, in marketing, advertisers leverage social proof—labels such as "best-seller" or "most popular"—to shape consumer choices by signaling what others prefer. In politics, campaigns invoke perceived majority opinion (e.g., "most people agree") to persuade voters. In workplaces, it can influence group decision-making and can either support cohesion or suppress innovation in various organisations. In contemporary digital/online environments, conformity may be amplified by algorithms, online activities, and visible approval metrics such as likes, shares, and trending content.

Bond & Smith's (1996.) meta-analysis/extension study reveals that conformity rates vary across cultures, with collectivist cultures showing higher rates. However, their meta-analysis included 116 (out of the 133) studies investigated in the US and Europe, which raises questions about the cultural applicability of social influence theory beyond the US and Europe. Research suggests that people from collectivist societies, common in Africa, tend to exhibit higher conformity rates compared to individualistic cultures. These studies imply that conformity should not be treated as a fixed process, but as a context-dependent variable shaped by culture and specific social situations. Hence, there is a need for further investigation in contexts of Africans and non-Western cultures considering also that collectivist cultures often prioritize group harmony over individual opinions. In Nigeria, for instance, this could mean that individuals might be more likely to conform to group decisions, even if they disagree, to avoid conflict or maintain social relationships. However, most research on social influence and group conformity in Sub-Saharan African cultures has primarily focused on undergraduate populations (Animba et al., 2023) majorly relying on Western-developed theories that may not be applicable to African contexts. Extension and replication of Asch's (1951) experiment in diverse Sub-Saharan African cultures could provide valuable insights into the dynamics of social influence in collectivist and high power distance cultures (see also Pinxteren, 2021). By understanding the factors that contribute to conformity, a society can embrace individuality and promote desirable social change.

Chapter 8

Obedience to Authority

written by Ena Uzelac (original draft), and Yu-Fang Yang (revision)

8.1 1. The Classic

In the early 1960s, psychologist Stanley Milgram conducted a series of now-famous experiments at Yale University (Milgram, 1963), inspired by the trial of Adolf Eichmann, a Nazi officer who claimed he was "just following orders" during the Holocaust (Fraser, 2016). This post-World War II zeitgeist was deeply concerned with understanding the mechanisms of genocide and the "banality of evil," a concept popularized by philosopher Hannah Arendt (Arendt, 2006). Milgram sought to answer a disturbing question: Could ordinary people commit atrocious acts simply by following orders from authority figures? To investigate this, Milgram designed an elaborate deception. Participants were told they were part of a study on learning and memory. The experimental paradigm involved three roles: 1) the experimenter (an authority figure in a gray lab coat), 2) the teacher (the actual participant), and 3) the learner (a confederate). Though the shocks were entirely fake, participants believed them to be real.

> #definition Obedience
>
> Obedience is the act of following orders or instructions from an authority figure, often without questioning the morality or consequences of those actions.
>
> #definition Confederate
>
> A confederate is a person who is secretly working with the experimenter and plays a scripted role in the study.

The teacher was seated at an imposing electric shock generator with 30 switches ranging from 15 to 450 volts, labeled from "Slight Shock" to "XXX." The learner,

strapped to a chair in an adjacent room with electrodes attached, would deliberately give wrong answers to a word-association task. With each error, the teacher was instructed to administer progressively stronger shocks. The learner's responses were scripted: at 150 volts, they would bang on the wall and demand to be released; at 300 volts, they would refuse to answer; beyond 315 volts, ominous silence. When participants hesitated, the experimenter employed four standardized prods in sequence: "Please continue," "The experiment requires that you continue," "It is absolutely essential that you continue," and finally, "You have no other choice, you must go on."

The results were disturbing: in the baseline condition, 65% of participants continued to the maximum 450-volt level, despite the learner's protests and eventual silence. Across different experimental variations, obedience rates ranged from 0% to 92.5%, depending on factors such as proximity to the victim, presence of the experimenter, and institutional setting. A meta-analysis by N. Haslam et al. (2014) later revealed that the average obedience rate across all conditions was approximately 43%, with significant variation based on experimental manipulations.

Milgram explained these results through his 'agentic state' theory (Milgram, 1963), proposing that individuals shift from an autonomous state (where they see themselves as responsible for their actions) to an agentic state (where they view themselves as instruments carrying out another's wishes). In this agentic state, participants supposedly focus solely on authority demands and become insensitive to the victim's suffering, allowing them to commit acts they would normally find morally reprehensible.

> #definition Agentic State
>
> The agentic state is a psychological condition where individuals see themselves as agents executing the wishes of an authority figure, thereby absolving themselves of responsibility for their actions.
>
> #yourturn
> Can you think of a time when you followed instructions, even if you felt uncomfortable doing so? What made you obey?

8.2 2. The Aftermath

Replications of Milgram's experiments in their original form are not possible today, but there are variations on the theme. One of the more famous partial replications is that of Jerry Burger (2009), whose primary goal was to determine if obedience rates have changed over time and to examine the influence of individual differences and modelled refusal on participants' responses, while ensuring participant well-being. He did this by modifying ethically suspect elements of the original research. First, the study replicated Milgram's Experiment 5 up to the point where the learner's verbal protest at 150 volts was heard.

This critical 150-volt point was chosen because a high percentage of Milgram's original participants who passed this point continued to the end of the shock generator's range, allowing for reasonable estimations of continued obedience without exposing participants to extreme stress. Second, a two-step screening process was implemented to exclude individuals who might have a negative reaction to the experience, including those with psychiatric disorders or extensive psychological knowledge. Third, participants were explicitly informed multiple times that they could withdraw at any point and still receive payment. Fourth, the shock level used as an example was 15 volts instead of 45 volts. Fifth, immediate debriefing occurred after the session, with the learner entering the room to reassure the participant that no shocks were actually administered. Sixth, the experimenter was a clinical psychologist instructed to end the study immediately if signs of excessive stress were observed. His key findings were that 70% of participants continued past the 150-volt point, compared to 82.5% in Milgram's comparable condition, a difference that was not statistically significant. Contrary to expectations, participants who witnessed a confederate refuse to continue (modelled refusal condition) obeyed as often as those who saw no model. Men and women did not differ significantly in their rates of obedience, nor were there any effects (or very small effects) of desire for control or empathy. In conclusion, this partial replication suggests that obedience levels remained largely consistent with Milgram's original findings, despite ethical safeguards and a more contemporary participant pool.

These persistent high obedience rates raise important questions about Milgram's original theoretical explanation. The traditional agentic state theory has faced substantial criticism based on closer examination of the original data. Milgram's own recordings and notes revealed that participants were far from emotionally detached - they displayed extreme signs of moral distress including nervous laughter, sweating, trembling, and stuttering. Crucially, many participants actively tried to help the learner by emphasizing correct answers or speaking them louder, directly contradicting the idea that they had become mere instruments of authority without concern for the victim (Gonzalez-Franco et al., 2018). The meta-analysis by N. Haslam et al. (2014) provided further evidence against the agentic state, showing that variations affecting the perceived legitimacy of the scientific enterprise had the strongest impact on obedience rates. This suggests participants were engaged with the goals of science rather than simply surrendering their autonomy to authority.

Later work of Burger et al. (2011) highlighted that a sense of personal responsibility plays a crucial role in a participant's decision to resist authority in Milgram-like scenarios. While concern for the victim's well-being may induce reluctance, it does not necessarily lead to disobedience. Furthermore, the study challenges the notion of blind obedience by demonstrating that participants were less likely to comply as the experimenter's prods became more forceful, suggesting that explicit commands may trigger resistance rather than obedience. The results suggest that Milgram's participants' behaviour might not be solely attributed to 'obeying orders,' but rather to a complex interplay of fac-

tors, including the incremental nature of the requests (foot-in-the-door effect) and psychological reactance to perceived loss of freedom.

> #definition Foot-in-the-door
>
> Foot-in-the-door is a two-step procedure for enhancing compliance in which a minor initial request is presented immediately before a more substantial target request. Agreement to the initial request makes people more likely to agree to the target request than would have been the case if the latter had been presented on its own.
>
> #definition Psychological reactance
>
> Psychological reactance states that individuals have certain freedoms with regard to their behaviour. If these behavioural freedoms are reduced or threatened with reduction, the individual will be motivationally aroused to regain them.
>
> #yourturn
> Have you ever found yourself in a situation where you didn't want to do something just because someone ordered you to?

In line with alternative interpretations of Milgram's finding, S. D. Reicher et al. (2012) showed that 'obedient' participants were motivated by "engaged followership", that is, appeals to science and identified with the experimenter's scientific goals, rather than blind obedience to authority. Identification with the experimenter positively predicts 'obedience,' while identification with the learner negatively predicts it. Further, S. A. Haslam et al. (2014) demonstrated that prods appealing to scientific goals positively predicted continuation of an objectionable task, while prods perceived as orders did not, supporting the idea of Burger et al. (2011) that participants were more inclined to disobey orders than to follow them.

Furthermore, Doliński et al. (2017) investigated the level of obedience to authority in Poland in 2015, following Burger's (2009) ethical modification of Milgram's (1963) obedience paradigm. Unlike most previous studies, this research specifically examined the influence of the 'learner's' sex on obedience, hypothesizing that participants might be less willing to shock a woman due to cultural norms. The study confirmed the persistence of high obedience levels, consistent with Milgram's original findings. While the study explored the impact of the learner's sex, the overwhelming obedience rate created a ceiling effect, making it difficult to discern the influence of this or other moderating variables conclusively. Although there was a tendency for participants to be three times more likely to withdraw when the 'learner' was a woman, this difference was not statistically significant due to the very low number of overall withdrawals (only 10% of participants failed to comply fully). The findings reinforce the idea that the situation plays a powerful role in human behaviour, as demonstrated by the consistent high levels of obedience across different eras and cultural contexts.

> #definition Ceiling Effect

> A ceiling effect is said to occur when a high proportion of subjects in a study have maximum scores on the variable.

A valuable alternative methodology for conducting empirical studies on complex social-psychological phenomena, such as obedience, is immersive virtual reality (VR). In one such VR experiment designed to replicate Milgram's studies, Slater et al. (2006) put participants in one of the two conditions, visible (VC), where participants saw and heard the virtual learner, and hidden (HC), where participants communicated with the learner only through a text interface, without seeing or hearing protests directly. Similar to Milgram's (1963) findings, the study showed that a greater 'distance' (i.e., the HC) between the participant and the learner resulted in less emotional impact and greater compliance.

Gonzalez-Franco et al. (2018) challenged the traditional 'agentic state' explanation of obedience in their virtual reality replication of Milgram's study. Their study aimed to provide systematic data on participant concern for the learner, specifically by measuring helping behaviour (e.g., emphasizing correct answers), hesitation in administering shocks, and self-assessed stress levels. A secondary aim was to explore the relationship between identification with science and concern for the Learner. The findings refute 'agentic state' explanation by demonstrating that participants exhibit significant concern for the learner, even while obeying instructions. Moreover, the study highlights that identification with science complexly influences these concerns, increasing helping and hesitation while simultaneously reducing reported stress. This supports the 'engaged followership' model, suggesting that obedience can coexist with genuine concern for the victim.

> #yourturn
> Do you have experience with immersive virtual environments? Does it sound plausible that VR can elicit realistic physiological and behavioural human responses to extreme social situations?

8.3 3. Conclusion

The current understanding of Milgram's obedience studies has evolved considerably from the initial interpretation of blind obedience through an agentic state. Meta-analytic evidence (N. Haslam et al., 2014) and modern replications consistently show that obedience rates remain high across cultures and time periods, but the mechanism appears to be 'engaged followership' rather than passive submission. Participants identify with scientific goals while maintaining genuine concern for victims, as demonstrated in virtual reality studies.

Griggs (2017) advocates, these studies should be taught with their full complexity, including both the disturbing findings about human compliance and the nuanced understanding that people often obey not because they lose their moral compass. Rather, they may obey because they believe they are contributing to a greater scientific good, with the reinterpretation that views participant

behaviour not as blind obedience but as 'engaged followership,' driven by identification with the experimenter's scientific goals. This reframing raises equally troubling questions about how legitimate-seeming authorities can leverage our prosocial motivations for harmful ends. This nuanced understanding challenges the traditional narrative perpetuated in many social psychology textbooks.

Chapter 9

Social Loafing (Ringelmann Effect)

written by Dominik Schimmel (original draft), and Adira Daniel (revision)

9.1 1. The Classic

> #yourturn
> Have you ever been in a group project where it felt like not everyone was pulling their weight?

There's a name for that feeling—and it's not just in your head. Social psychologists call it the Ringelmann Effect, or more casually, social loafing. Research on how group dynamics affect individual performance has long been a central focus of social psychology.

> #definition
> Social loafing or the Ringelmann effect refers to the decrease in individual effort that occurs when people work as part of a group rather than independently.

One of the earliest pioneers of this field was Maximilien Ringelmann, a French agricultural engineer. He was originally interested in improving the efficiency of agricultural labor and began by studying how animals like horses and oxen performed tasks in groups. Eventually, he turned his attention to human laborers. In 1913, Ringelmann conducted a groundbreaking experiment (Ringelmann, 1913). He asked participants to pull on a rope as hard as they could, both individually and in groups. Using a dynamometer (a device that measures force), he recorded the strength of each pull. What he discovered was surprising: as the size of the group increased, the total force exerted did increase—but not

proportionally. For example, if one person could pull with 100 units of force, two people together didn't pull with 200; they pulled with something closer to 180. The larger the group got, the more noticeable this decline became. This phenomenon—where the collective output of a group is less than the sum of individual efforts—is now known as the Ringelmann Effect. Initially, Ringelmann attributed this reduction in effort to coordination problems: people weren't pulling at the same time or with equal strength, so the group's performance suffered. His findings laid the groundwork for understanding group dynamics and individual motivation within collective tasks.

9.2 2. The Aftermath

In the decades following Ringelmann's study, other psychologists became curious: Was coordination the only issue? Or could something else—like motivation—also play a role?

> #definition
> Motivation encompasses internal and external factors that initiate and sustain behavior in service of a goal.

More than 60 years later, Ingham et al. (1974) replicated Ringelmann's findings and dug deeper into why this effect happens. They offered two competing theories to explain these causes. The coordination loss hypothesis indicates that performance suffers in group settings because it's hard to synchronize actions. In tasks like rope-pulling, people may struggle to match timing, rhythm, and strength. As the number of participants increases, these issues become more difficult to manage. The motivation loss hypothesis proposes that people simply don't try as hard when working in a group because they feel less accountable or assume others will pick up the slack. This psychological phenomenon is now colloquially referred to as social loafing.

To distinguish between these two theories, Ingham et al. (1974) designed a clever experimental variation. In their study, participants were blindfolded and asked to pull on a rope that was connected to a force-measuring device. All participants thought they were part of a group pull. However, some participants were actually pulling alone, while others were told they were in groups of up to five people—but those "group members" didn't exist. This setup removed any real coordination issues. Since the participants were blindfolded and had no actual teammates, they couldn't coordinate with anyone—even if they wanted to. If performance still dropped under these conditions, the cause couldn't be coordination—it had to be a loss of motivation. And that's exactly what they found.

The results revealed that participants who believed they were pulling as part of a group exerted significantly less force than those who believed they were alone, despite the absence of any real group interaction. Thus, the decrease in effort could not be attributed to coordination failures but instead reflected a

psychological disengagement from the task—a hallmark of social loafing. This finding represented a paradigm shift in the understanding of collective performance, demonstrating that group size not only complicates coordination but also systematically alters individual motivational structures.

The theoretical construct of social loafing has since been the subject of extensive empirical scrutiny and theoretical refinement. Researchers like Kravitz & Martin (1986) refined the concept further, describing it as a systematic decrease in individual effort as group size increases, driven by the perception that one's contribution is less noticeable or less necessary within a group context. This phenomenon can be explained by several motivational theories, including the expectancy-value model and the collective effort model (Karau & Williams, 1993). According to these models, individuals are more likely to reduce their effort in group settings if they believe their contributions will not be recognized or rewarded. The perception of redundancy—feeling that one's efforts are inconsequential—can lead to disengagement, even in the absence of direct coordination issues.

Furthermore, social loafing is influenced by various factors, including task significance, group cohesion, the identifiability of individual contributions (Latané et al., 1979; K. Williams et al., 1981), and cultural values related to collectivism and individualism (Earley, 1989). While the effects of social loafing are often discussed in the context of physical tasks, such as Ringelmann's rope-pulling experiment, subsequent research has shown that social loafing can occur in intellectual and collaborative tasks as well, including academic group projects, workplace collaboration, and team-based activities in sports [Liden et al. (2004); simms_social_2014].

The concept of social loafing has been extensively studied across a wide range of domains, from organizational behavior to educational settings and beyond. In modern contexts—such as remote work, digital collaboration, and large-scale institutional projects—the implications of social loafing are particularly salient. The rise of virtual teams and collaborative technologies has introduced new challenges, as individuals may feel even more detached or less accountable when working in digital environments.

> #yourturn
> Have you noticed differences in how people work together in digital groups compared to in-presence groups?

Importantly, the understanding of social loafing is not limited to simply recognizing its occurrence; it also offers insights into how to mitigate its effects. Group dynamics can be optimized by fostering strong group cohesion, emphasizing personal accountability, and ensuring that the importance of individual contributions is clear. Additionally, strategies such as clearly defining roles, setting specific goals, and providing opportunities for individual recognition can help reduce the likelihood of social loafing in group contexts.

> #definition

Group cohesion describes how connected and committed people feel to the group.

#yourturn
In what ways do you think group cohesion can influence whether or not social loafing occurs? Have you experienced the opposite—where group cohesion reduced social loafing?

9.3 3. Conclusion

The discovery of social loafing has profoundly influenced how psychologists understand collective behavior and group dynamics. Initially observed by Maximilien Ringelmann as a straightforward decline in individual effort within groups, this phenomenon has since become a foundational concept in social psychology. It has been extensively examined and refined through theoretical models and empirical studies. Core to the understanding of social loafing is the recognition that individuals often perceive their contributions as less critical or less observable when working within a group, leading to a measurable reduction in motivation and performance (Karau & Williams, 1993). This disengagement is not necessarily due to laziness or disinterest, but rather a rational—though often unconscious—response to perceived diffusion of responsibility.

However, social loafing is not a universal or inevitable outcome of group work. Rather, it is a contingent psychological tendency influenced by several moderating factors. For instance, when individuals believe that their efforts are identifiable and will be evaluated independently, the tendency to loaf is significantly reduced (Williams et al., 1981). Similarly, task characteristics play a central role: when a task is perceived as meaningful or personally relevant, individuals are more likely to remain engaged (Kerr & Bruun, 1983). The structure and cohesion of the group also matter. High group cohesion—where members feel psychologically connected and committed to the team—can foster a sense of mutual responsibility, thus counteracting the impulse to reduce effort (Stark et al., 2007).

Additionally, cultural and contextual factors can shape the likelihood of social loafing. Research comparing collectivist and individualist cultures, such as Earley's (1989) cross-cultural study of the U.S. and China, found that individuals in collectivist cultures were less prone to social loafing, likely due to stronger normative pressures to contribute to group success. This suggests that social loafing is not simply a fixed human trait but is instead shaped by social norms, group expectations, and cultural values.

In modern work and educational environments, where collaboration is often essential and increasingly mediated by technology, understanding and managing social loafing is more important than ever. Virtual teams, for example, may introduce additional challenges due to the physical and psychological distance between members, which can exacerbate perceptions of anonymity and reduce

accountability (Liden et al., 2004). Nonetheless, a variety of strategies have been identified to mitigate social loafing: clearly defining individual roles, setting transparent goals, providing regular feedback, and fostering a shared group identity can all promote more equitable contributions and enhance overall performance.

Ultimately, the study of social loafing underscores the complexity of group behavior. While groups have the potential to enhance creativity, performance, and problem-solving, these benefits are not automatic. They must be cultivated through intentional design and management of group processes. By recognizing the psychological underpinnings of social loafing and implementing evidence-based strategies to counteract it, educators, managers, and team leaders can unlock the full potential of collaborative work.

> #yourturn
> Do you think this effect happens in all group situations and with all types of people? Why or why not?

Chapter 10

Social Facilitation

written by Dearbhaile Vaughan (original draft), Kate Grady (original draft), Cillian McHugh (revision), and Siobhán M. Griffin (revision)

10.1 The Classic

Social Facilitation is a theory that posits that one will perform better on a task when it is completed in the presence of others. In 1898, Norman Triplett demonstrated that when people complete a task in competition with another person, they perform better on the task compared to completing the task alone (Triplett, 1898). This seminal experiment sparked a rich literature on the concept of "social facilitation," a term which was coined some 20 years later by Allport (1954) – the idea that the mere presence of others can lead to improvements in performance (Aronson et al., 2005; C. F. Bond & Titus, 1983).

> #definition Social Facilitation
>
> This theory proposes that the mere presence of others will positively affect performance on a task.

Triplett's seminal study (1898) was the result of perceived trends he observed in cyclists. Triplett noticed that in both paced and competitive settings, cyclists tended to cycle faster when accompanied by others. He had a multitude of theories as to why this was, including both physical and psychological hypotheses. One theory was that of the 'Encouragement Theory', where the presence of a friend would cheer on and "keep the [participant's] spirits up." Other theories included: 'Shelter Theory' – the lead cyclist creates shelter from the wind making it easier for those behind to cycle; 'Suction Theory' – a vacuum is created by "suction exertion" from the cyclist in front; and 'Theory of Hypnotic Suggestions' – that a hypnosis effect is created by the wheels of the bicycle in front, and this leads to better performance.

To test his theory, Triplett designed a lab-based study to examine if the presence of a competitor stimulates competition arousal, which he called "dynamogenic factors."

> #definition Dynamogenesis
>
> An increase in the mental or motor activity of an already functioning bodily system that accompanies any added sensory stimulation (Merriam-Webster).

For the experiment, two fishing reels were attached to a table to create a type of pulley system that moved a flag around a four-metre course. Children were invited to participate in this study. After a practice period to allow children to become accustomed to the machine, they completed six trials alternating between performing alone and performing in competition with another child. There were rest periods in between each trial to avoid the effects of fatigue. Performance was defined as the time taken to complete one trial (four laps of the course) as measured by a stopwatch. The results showed that children performed better (i.e., completed the laps faster) during the competition/together trials compared to the alone trials. However, some variation was noted where some children, described as "overstimulated," performed slower on the together trials.

> #yourturn
>
> Can you think of how the factors such as (i) age variability, (ii) potential differences in practice times, (iii) lack of clarity around the rest periods, and (iv) reporting on data from a subsample of 40 participants (out of 225) may have potentially affected the observed findings?

Triplett's findings and theory posited that competition stimulates performance (competitive coaction), but subsequent researchers focused on a broader application of this idea - that the mere presence of another person would improve performance, competitive or not.

10.2 The Aftermath

Subsequent research focused on social facilitation across a number of different social pressure contexts, including having an observer or audience present, having an evaluative observer or audience, a non-competing co-actor, and similar to Triplett's study - in the presence of a competing co-actor (Dashiell, 1930). Some research has highlighted the importance of task complexity. For instance, Zajonc (1965) examined social facilitation in a sample of cockroaches, showing that social presence enhances performance on simple tasks but hinders performance on more complex tasks (completing a runway vs completing a maze). Based on behaviour theory (C. L. Hull, 1943; Spence, 1956), Zajonc postulated that "generalized drive" is what motivates habits. According to Zajonc's theory, having other people around increases generalized drive, which makes it easier

for habitual dominant responses to occur. While for more complex tasks the dominant response may not be the correct response (C. F. Bond & Titus, 1983; Zajonc, 1965)). However, a replication of Zajonc's study did not fully replicate this effect; in simple and complex tasks, the cockroaches performed more slowly when other cockroaches were present (Halfmann et al., 2020).

> #definition Generalized Drive
>
> The presence of others leads to an increase in generalized drive, thus facilitating habitualised dominant responses.

Although Zajonc (1965) believed that the mere presence of others is the necessary ingredient in producing social facilitation effects, other researchers disagreed. Cottrell et al. (1968; 1972) argued that social facilitation occurs when a third party is perceived to be observing the performance, but that mere presence (without observation) was not sufficient to produce social facilitation effects. It is the expectation of evaluation that increases drive, and thus influences performance (C. F. Bond & Titus, 1983; Cottrell, 1972; Weiss & Miller, 1971).

There are a number of theoretical explanations to explain how, why, and when social facilitation effects occur (for reviews see C. F. Bond & Titus, 1983; Seitchik et al., 2017). Some key theories include:

- *Distraction-conflict theory:* the idea that the presence of others is distracting and takes up attention resources which may lead to cognitive overload, reducing attention on the task (Baron, 1986; Sanders et al., 1978). This may result in dominant responses facilitating performance when the task is simple and requires attention to a small number of cues, but when the task is more complex or demands attention to a larger number of cues performance may be hindered.
- Muller and Butera's (2007) *Integrated distraction-conflict theory and Social comparison theory* (Festinger, 1954); e.g., that people compare their own skills to other people's skills), and proposed that when in a co-action setting people can experience self-evaluation threat which may increase their attentional focus, in particular when a co-actor is seen to be superior, increasing drive and thus performance.

  > #definition Distraction-Conflict Theory
  >
  > This theory states that attentional conflict, a type of response conflict regarding what attentional response one should make, can arise when the social presence of others (co-actors or an audience) is distracting, at least when the task is attention demanding. The actor may then be at risk of cognitive overload as a result of this conflict, which would ultimately lead to a limitation in their ability to focus on the task.
  >
  > #definition Social Comparison Theory
  >
  > According to the social comparison theory, people are motivated to

assess their own beliefs and skills by comparing them to external images. These images can be comparisons to other people or a reference to physical reality. Individuals have a tendency to view images portrayed by others as accessible and realistic and subsequently make comparisons between themselves, other people, and these idealized images.

10.2.1 Practical Implications Arising from Triplett's Original Study

Research on social facilitation effects has highlighted its practical implications in real-world settings. For example, Anderson-Hanley et al. (2011) demonstrated that adults riding on stationary bikes with virtual reality equipment exercised more when a competitive fictional character was introduced compared to cycling alone (but only if they scored highly on self-reported competitiveness). Furthermore, people have been found to consume more food (Castro, 1994), donate more money (Izuma et al., 2010), and spend more money (Sommer et al., 1992), when with other people compared to being alone. However, sometimes the presence of another is seen to have detrimental effects. For instance, an analysis of archival data demonstrated that learner drivers who took their driving test with another individual awaiting their test present were more likely to fail than those who took the test without an observer (Rosenbloom et al., 2007).

#yourturn

Can you think of a time when you performed worse on a task because there was another individual present? And can you think of a time when you performed better on a task when there was another individual present?

10.2.2 A Reanalysis of Triplett's Data

Since 1898, more advanced statistical methods are now at researchers' disposal. Strube (2005) reanalysed Triplett's (1898) data, exploring both within-person differences in alone vs. together conditions (within-subjects tests) and differences between people across the alone vs. together trials (between-subjects tests). This re-analysis demonstrated that in general performance in the competition trials was better than the alone trials (between-subjects test); however, this was not a statistically significant difference. Likewise, looking at within-participant variation, there was only a marginally significant effect for performing better on the competition trials compared to a person's alone trials.

10.2.3 Replication of the Original Study

A recent pre-registered study directly replicated Triplett's (1898) original experiment, addressing some of the limitations mentioned earlier – namely the small (and underpowered) sample size, standardization of experimental trials

and rest periods, as well as examining if gender moderated the effects (McHugh et al., 2025). This analysis of >400 children aged 7-13 years, who were age- and gender-matched, demonstrated that participants completed the task quicker during the together trials compared to the alone trials. Gender moderated this effect, with females completing the task faster on average, and the social facilitation/competitive co-action effect was stronger for females. This replication provides support for Triplett's original findings.

10.3 Conclusion

Overall, it appears that in some settings the presence of another (whether evaluative or non-evaluative, or co-actor, competitor or observer) affects performance. Often the presence of another appears to facilitate performance or dominant response tendencies, but the conditions under which this occurs need further examination as sometimes the presence of another hinders performance. While Triplett focused on competitive coaction effects, which was later termed social facilitation (and gave rise to this literature), it is important to note that the theory of social facilitation relates to mere presence of another individual affecting performance. Triplett's (1898) experiment and the more recent replication (McHugh et al., 2025) are not able to disentangle if the effects on performance are truly due to mere presence of another person (i.e., social facilitation) or due to competition.

> #yourturn
>
> Why do you think it matters whether performance depends on mere presence of others or if others need to be co-actors and/or competitors?

More research is needed to fully understand what is driving the observed effects. Think back to the practical implications section of this chapter. If we know under what conditions mere presence affects performance (positively and negatively), or under what conditions having someone engaged in the same task as us (co-actor) or even competing against us, then this can help us design optimal environments for a range of performance-based activities, such as learning and exercise/sport.

Chapter 11

Pretty Privilege: Stereotypes as Self-Fulfilling Prophecies

written by Antonio Scholz (original draft), Alma Jeftic (revision), and Xinkai Du (revision)

11.1 1. The Classic

Did you realize that people who are perceived to be more attractive might also get treated better? What seems like it might be a nagging suspicion to some has also piqued the academic interest of social psychologists. This research deals with body privilege or pretty privilege, the idea that physical (normative) attractiveness is related to having social advantages in multiple dimensions: job success, income, friendships, educational attainment, politics, and even criminal procedure.

> #definition Privilege
>
> Privileges describe social advantages people receive because of their perceived membership to a certain group (e.g., the group of pretty people, or the group of tall people).
>
> #yourturn
> Why do you think people who are "pretty" might be treated more favorably?

This research argues in part that physical attractiveness is used as a cue for other positive attributes such as intelligence, or kindness. This is sometimes referred to as the halo effect, where the halo of attractiveness "spills over" to other

facets of person perception (Lucker et al., 1981). Some evolutionary theories argue this is the case because attractiveness is perceived to signal evolutionary fitness (Forgas & Laham, 2016).

> #definition Halo Effect
>
> A cognitive bias where a certain characteristic overshadows the overall impression formed. For instance, someone who is perceived as physically attractive may also be thought of as kind or smart.
>
> #yourturn
> How do you think conventional attractiveness is perceived?

The study by Snyder et al. (1977) on the self-fulfilling nature of social stereotypes and its replication attempt by Andersen & Bem (1981) explore gender stereotypes in interactions between two people.

In the original study, Snyder et al. (1977) investigated how social stereotypes influence interpersonal behavior, focusing on self-fulfilling prophecies, i.e. a prediction that brings about its own fulfillment.

> #definition Stereotype
>
> Stereotypes are beliefs about people held because of their membership in a social group.
>
> #definition Self-Fulfilling Prophecy
>
> A self-fulfilling prophecy suggests that the probability of an event occurring can be increased solely by the expectation of that event (Merton, 1948).

Male participants interacted with female participants via phone calls, to get to know each other. The male participants received a photograph, ostensibly showing their female interaction partners. However, these photos were experimentally manipulated and showed other women who had previously been rated to be either the most physically attractive or the least attractive.

After receiving the photos, but before interacting with their female interaction partners, the male participants who had received a photo of a highly attractive woman expected their interaction partner to be more sociable, humorous and socially capable than those who had received a photo of a less attractive woman. In other words, the male interaction partners formed a (potentially false) impression of their female interaction partners' physical attractiveness that carried over (halo effect) to forming an expectation that they would display other positive characteristics.

Female interaction partners did not know about these photos, and did not receive photos of their male interaction partners. When the pairs of participants interacted, their interactions were recorded and later rated by independent observers. These observers rated that women matched with a man who received

a photo of a physically highly attractive supposed interaction partner also behaved in line with this partners' expectation: more warmly, more socially, and so on. These findings supported the idea that social perceptions are determined by self-fulfilling prophecies. Because they were perceived to be more attractive, these participants were treated more favorably.

The results confirmed those of an earlier study by Dion et al. (1972). They, too, found that "what is beautiful is good" (ibid., p. 285). This study showed that more physically attractive people were assumed to have happier social lives and more professional success.

> #yourturn
> In reality usually both participants of such interactions have expectations and stereotypes. What would that mean for the self-fulfilling nature of these expectations?

11.2 2. The Aftermath

Andersen & Bem (1981) attempted to replicate and extend the findings by examining how individuals who differ in gender type and androgyny respond to physical attractiveness in interactions with two partners. This time, not only gender-typical but also androgynous male and female participants conducted acquaintance phone calls with supposedly attractive and unattractive members of their own and the opposite gender.

> #definition Androgyny
>
> A gender expression combining characteristics traditionally associated with masculinity and femininity, or expressing neither.

As expected, people who fit more traditional gender roles responded more positively to potential partners who had been rated by independent observers as physically attractive than to those rated as less attractive. However, this pattern was different for androgynous participants. There was no evidence that androgynous men judged potential partners based on physical attractiveness. Androgynous women showed the opposite pattern: they rated the supposedly less attractive partners as more socially appealing than the supposedly attractive partners. This finding challenged the idea that physically attractive people are always seen as more desirable.

While the study by Snyder et al. (1977) purported to provide solid evidence of the self-fulfilling nature of social stereotypes, the replication by Andersen & Bem (1981) introduced nuances in terms of individual differences. The results indicated that androgynous individuals may exhibit different patterns of response to physical attractiveness compared to individuals displaying gender-typical looks. The replication experiment demonstrates that more than one factor needs to be considered, as social perception and resulting behavior is influenced multivariately.

In the following decades, research on pretty privilege continued to demonstrate, overall, that people place a premium on physical attractiveness. For instance, Mobius & Rosenblat (2006) showed in an experiment imitating the labor market that physically more attractive workers were (wrongly) considered to be better at the experimental task by employers. Physically more attractive workers were more confident, and had better social skills, which in turn led them to earn more money after negotiating with their employers than less attractive workers. In an observational study of sentencing decisions in criminal trials (Stewart II, 1980), the defendants' physical attractiveness was correlated with the severity of the punishment: More attractive defendants received less severe sentences. Studying perceived political experience, Palmer & Peterson (2016) showed that people rated as more attractive were also perceived to be more politically knowledgeable, and more persuasive in political discussions. Physical height, a feature often considered to contribute to attractiveness, has been linked with social esteem and success in the workplace and increased income (Judge & Cable, 2004).

> #yourturn
> Is pretty privilege a cross-culturally stable phenomenon?

A large-scale replication study assessed pretty privilege interculturally (Batres & Shiramizu, 2023). Using data collected in 45 countries, this study demonstrated that male and female faces rated as more attractive were also rated to be more confident, emotionally stable, intelligent, responsible, sociable, and trustworthy. Put differently, this research demonstrated a robust halo effect of physical attractiveness, across cultures.

> #yourturn
> In the age of AI image manipulation and beauty filters, do you think pretty privilege still exists?

A recent study showed that AI-processed images to which a beauty filter was applied were rated as both more attractive, and as more intelligent and trustworthy than the same photo without the filter applied (Gulati et al., 2024). Consequently, the robust effect of pretty privilege seems to persist.

Other research, however, suggests that being perceived as physically attractive is not always associated with privilege. Physical attractiveness may also be associated with socially undesirable characteristics like being vain (Dermer & Thiel, 1975), materialistic or sexually permissive (Bassili, 1981). When physical attractiveness was related to the crime committed (swindle, but not burglary), more attractive defendants received larger hypothetical punishments (Sigall & Ostrove, 1975). For women holding a management position, being perceived as more attractive was a disadvantage in performance evaluations and for getting promoted or a pay raise (Heilman & Stopeck, 1985).

11.3 3. Conclusion

The comparison between the original study by Snyder et al. (1977) and the research that followed underscores the multifaceted nature of social perception and interpersonal behavior. Although the concept of pretty privilege appears to be robust, the role of individual differences in shaping responses to social stimuli deserves consideration. In particular, pretty privilege should be seen in the context of intersectionality: Who is perceived to be attractive, and how this attractiveness may relate to privilege, is also a matter of intersecting social categories such as race, class, or disability. Similarly, the situational circumstances under which people are being judged could even turn pretty privilege into a pretty disadvantage. Overall, the evidence on the pretty privilege phenomenon warrants a nuanced perspective that recognizes the interplay of stereotypes, individual characteristics, and situational factors to understand the complexity of social interactions.

Chapter 12

Trust

written by Camilo Ordóñez-Pinilla (original draft), and Sergio Barbosa (revision)

12.1 The Classic

Trust is an attitude toward others – other persons, groups of persons, and institutions – in which there is (a) an expression of vulnerability to that other, and (b) a belief that the other has the ability, the willingness, and will in fact act in ways that benefit us in light of that vulnerability, as opposed to taking personal advantage of it. For example, people leave their children in the care of other adults (to whom they are vulnerable) and express trust insofar as they believe those adults can, want to, and will care for their children well. The other in whom trust is placed may be an individual (interpersonal trust), a group (in-group/out-group trust), or an institution (institutional trust). In this chapter, we focus on interpersonal trust, where trusted others are individuals.

> #definition Trust
>
> An attitude toward others – other persons, groups of persons, and institutions – in which there is (a) an expression of vulnerability to that other, and (b) a belief that the other has the ability, the willingness, and will act in ways that benefit us in light of that vulnerability as opposed to taking personal advantage of it.

Deutsch (1958) was a pioneer in the experimental study of interpersonal trust. He defined trust as the expectation that something will occur—for example, that a person will behave in a certain way—such that, if this expectation is fulfilled, it results in positive and pleasant consequences for the self; whereas, if it is not fulfilled, it leads to negative and unpleasant consequences. Based on this definition, Deutsch used the Prisoner's Dilemma as the experimental task to

determine which factors motivate interpersonal trust. A Prisoner's Dilemma is a two-player game in which each player must decide whether to cooperate with another player who is making the same decision simultaneously, knowing that mutual cooperation yields the best group outcome (known as the game's Pareto optimum), mutual defection produces the worst outcome for both (known as the game's Nash equilibrium), but defecting while the other player cooperates yields the best individual outcome. Prisoner's dilemma takes its name from a relatively common situation in law enforcement where two suspects are apprehended for committing the same crime. If both suspects cooperate (i.e., do not confess to the crime) they both receive a relatively light sentence (i.e., the best "group" consequences) whereas if both defect (i.e., confess to the crime) they both get harsher sentences. Interestingly, if only one of them defects then they get the best individual outcome (i.e., no prison sentence while their accomplice gets a harsh sentence). Prisoner's dilemmas then pit against each other individual and group interests. In this game, trust can be operationalized as a choice to cooperate even when defecting could result in a best individual outcome. Figure 1 presents a schematic representation of the prisoner's dilemma.

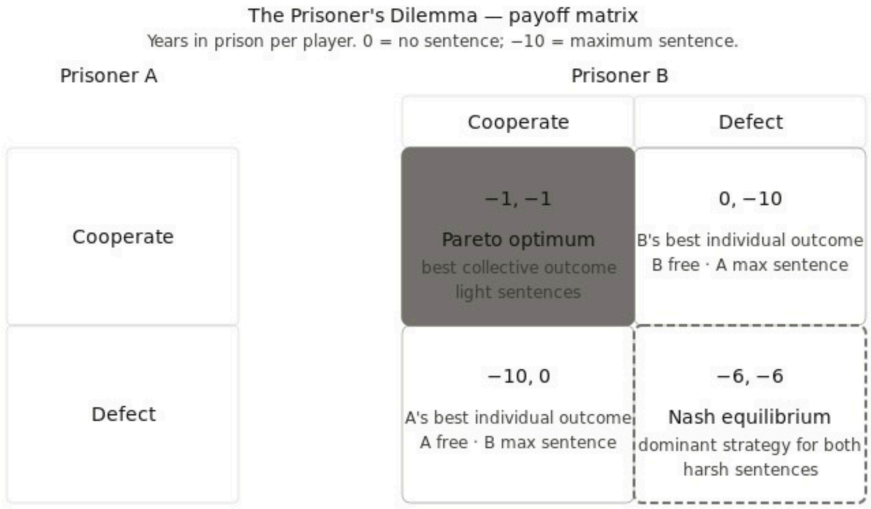


Figure 12.1: Figure 1. In this figure, to illustrate the Prisoner's Dilemma game, payoffs are represented as years of prison (less years the better), and each cell shows years for both players A and B. Options are 0 = no prison, -1 = one year in prison (light sentence), -6 = 6 years in prison, −10 = 10 years in prison (harsh sentence). The dashed box marks the game's Nash equilibrium. The filled gray cell shows the collectively best outcome, reached only through mutual cooperation (the game's Pareto optimum).

In his main experiment, Deutsch divided participants into three groups according to the type of motivation they were expected to adopt while playing the

Prisoner's Dilemma: (1) cooperative motivation, in which participants were encouraged to consider the other person's welfare as equally important as their own; (2) individualistic motivation, in which participants were motivated to care only about their own welfare; and (3) competitive motivation, in which participants were motivated both to maximize their own welfare and to obtain a greater benefit than the other person. Deutsch hypothesized that trust would arise when individuals interacted under a cooperative motivational orientation, would not arise in a competitive motivational context, and could arise among individuals with an individualistic motivation, provided that they had knowledge about how the other person was going to play.

Unfortunately, Deutsch does not clearly explain how he ensured that participants actually adopted the motivational orientation assigned to their group while interacting in the Prisoner's Dilemma. He only mentions that participants were verbally instructed to adopt the corresponding motivation. The paper does not report any manipulation checks or measures assessing whether these motivational manipulations were in fact successful.

The results of the main experiment showed that, consistent with Deutsch's hypotheses, whereas 89% of participants in the cooperative motivation condition trusted one another, trust emerged in only 12.5% of participants in the competitive motivation condition.

Following these early experimental studies exploring the conditions under which trust emerges in strategic social interactions, empirical research also began to focus on understanding the construct structure of trust in terms of individual differences. Rotter (1967) developed the Interpersonal Trust Scale based on the idea that trust involves a generalized expectancy that the verbal behavior of others (e.g., promises and statements) can be relied upon. A person who scores high on interpersonal trust is a person who tends to easily trust other people's manifest intentions or promises.

From a neurobiological perspective, Kosfeld et al. (2005) was pioneering in reporting findings suggesting that oxytocin is a key neuropeptide involved in trust. To arrive at this finding, they used a trust game (Berg et al., 1995), in which one participant decides how much money to transfer to an anonymous partner; this amount is then tripled, and the receiving participant decides how much to return (see Figure 2). Participants who received intranasal oxytocin sent significantly more money than those who did not receive it (Kosfeld et al., 2005). According to Baumgartner et al. (2008), a possible mechanism underlying this effect is that increased oxytocin is associated with reduced activation in the amygdala, midbrain regions, and the dorsal striatum, suggesting that the mechanism involves a reduction in fear, stress, and anxiety associated with the possibility of betrayal consequently making it easier to trust someone else.

> #definition Trust Game
>
> An experimental task used to measure interpersonal trust, in which one participant receives an initial endowment and decides how much

to send to another participant. The amount sent is increased by the experimenter, and the second participant then chooses how much to return if at all. The initial transfer is interpreted as reflecting trust, as it involves risking resources under uncertainty about the other's behavior, while the returned amount is interpreted as reflecting trustworthiness as the participant chose to return the endowment that they could have easily kept for themselves.

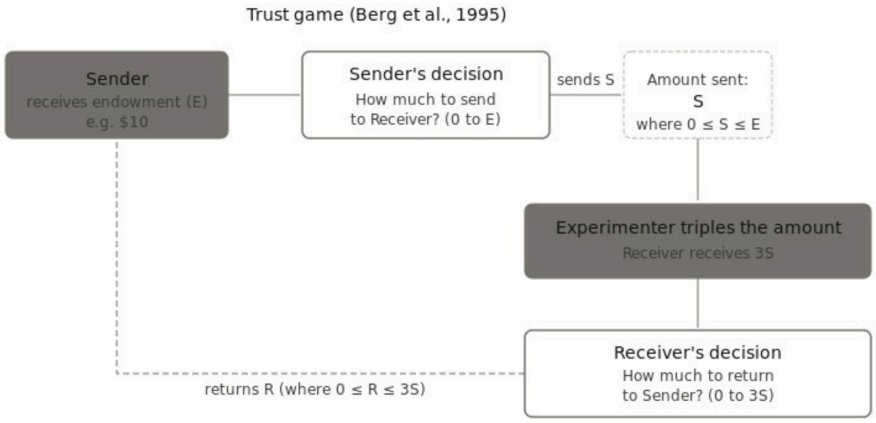


Figure 12.2: Figure 2. This figure represents the sequential logic of the trust game: Sender receives an endowment E and decides how much to send (S). S can be nothing, the total endowment or any other amount between them. The experimenter triples S and gives this amount (3S) to the receiver. The receiver decides how much to return(R), any amount between 0 and 3S.

#yourturn
How much money would you send in a trust game? Why? How did you decide how much money to send?
How much money would you expect to receive from the trustee in a trust game? Why?

12.2 The Aftermath

Rotter's definition of trust served as the main reference point in trust research until the 1980s, when important extensions were developed in the scientific literature. On the one hand, Larzelere & Huston (1980) distinguished between trust as a generalized expectancy and trust as an expectancy directed toward a specific other proposing the Dyadic Trust Scale. The difference being that one's trust towards specific others (i.e., specific trust) can be influenced by information about the considered person such as their specific prior actions, group biases and so on. On the other hand, Mayer et al. (1995), reflecting on dynamics in

organizational contexts, argued that trust should not be understood solely in terms of expectations about others, but also as involving a willingness to accept vulnerability in front of them (measured, for instance, with the Propensity to Trust Survey, Evans & Revelle, 2008). In their model, trust is explained as a function of perceived ability to act positively, benevolence (a tendency to actively do good), and integrity (the alignment between the values of the trustor and the trustee).

In addition, more recent approaches have proposed that trust should be defined as a form of behavior rather than as a belief, expectation, or attitude (Fehr, 2009). Within this framework, trust is understood as the act of voluntarily placing resources at the disposal of another person, accompanied by the expectation that this act will contribute to one's own goals. Based on this definition, Fehr argues that trust, as a behavior embedded in a context of social interaction, cannot be explained solely in terms of motivational states, but rather through the interplay between individual and social preferences. Specifically, contemporary research has examined whether trust can be explained exclusively by individual preferences toward risk (i.e., risk aversion) or whether social preferences, such as betrayal aversion, must also be considered.

In this context, the work of Bohnet & Zeckhauser (2004) and Bohnet et al. (2008) is particularly important. They compared decisions across two games with identical payoff probabilities: one involving social interaction (a trust game, in which the payoff depends on how much money the other participant returns) and another involving a random process (a lottery). In both games, participants estimated a MAP (minimum acceptance probability). In the trust game, the MAP refers to the minimum probability that the other participant will return a certain amount of money required for the participant to decide to send a given amount. In the lottery game, the MAP refers to the minimum probability of obtaining a favorable outcome necessary for the participant to choose the lottery over a guaranteed gain. The results showed that participants required significantly higher probabilities (15% higher) to trust another person than to accept an equivalent lottery. These findings suggest that betrayal aversion operates beyond simple risk aversion, which was held constant across both the trust and lottery conditions.

> #definition Betrayal Aversion
>
> The tendency for people to feel greater harm or distress from a negative outcome caused by another person's deliberate choice than from an equally bad outcome caused by chance or an impersonal source.

Furthermore, psychological models of trust have evolved from approaches that understand trust as the result of choices and evaluations to models that integrate additional types of processes. McAllister (1995) and Jones & George (1998) converge in proposing that there are two interconnected pathways for determining whether another person is trustworthy: a cognition-based route, grounded in having reasons to trust —information about aspects such as relia-

bility, competence, knowledge about the other person, and the consideration of trust as a virtue or value—and an affect-based route, which takes into account factors such as mood and emotional bonds with the trustee.

> #yourturn
> Do you expect collectivistic or individualistic societies to exhibit higher levels of general trust? Why?

Transcultural research has consistently demonstrated significant cultural variation in trust. In a landmark meta-analysis of 162 trust game studies, Johnson & Mislin (2011) found that individuals in Africa and Europe exhibit substantially lower rates of generalized trust compared to those in the United States. More recently, Kwantes et al. (2025) reported that generalized trust is significantly higher in collectivist societies — such as China and Taiwan — than in individualist ones, such as the United States and Canada. In addition, some studies have identified interesting cultural similarities. For example, Jin et al. (2025) found that self-reported trust—as measured by large-scale instruments such as the Global Preferences Survey—consistently exceeds experimentally elicited trust in both China and the United States, indicating a cross-cultural tendency to overestimate intentions to trust when no immediate behavioral demand is present. This study also showed that the introduction of monetary incentives reduces trust in both countries, although the effect is markedly stronger in China. These findings suggest either that, in the absence of incentives, individuals provide more socially desirable responses, or that the presence of incentives increases the perceived risk thereby lowering trust.

Finally, more recent evidence regarding the role of oxytocin in trust has led many researchers to abandon the idea that oxytocin alone is the key hormone explaining the neurobiology of trust. Recent research has found that the effect of intranasal oxytocin on trust has proven difficult to replicate (Nave et al., 2015). Nevertheless, neurobiological models continue to emphasize the central role of the amygdala in evaluating others as trustworthy or untrustworthy (Sladky et al., 2021), and the development of a comprehensive neurobiological model explaining trust in humans and other mammals remains an open question.

12.3 Conclusion

Trust is a multidimensional construct that operates in social interactions, involving processes of decision-making under risk, emotional responses, social preferences such as betrayal aversion, and the recognition of vulnerability toward others. Original findings on interpersonal trust appear robust, establishing that trust is a kind of decision under risk, enhanced by a mutual motivation to care about others' well-being. This approach has been broadened to recognize the role of acknowledging one's own vulnerability when trusting, as well as the role of variables such as perceived capacity to care about others' well-being and integrity—that is, the willingness to do so. In contrast to this approach, al-

ternative models of trust have been proposed that emphasize understanding trust not merely as a decision under risk, but as a decision shaped by betrayal aversion. Consequently, the extent to which trust is influenced by individual preferences—such as attitudes toward risk—or by social preferences—such as betrayal aversion—remains an open question. In addition, more specific assertions on the role of oxytocin and other biological factors and a more nuanced view of what trust is in different scales have been developed since.

As open questions, it is crucial to investigate the precise neurobiological mechanisms underlying trust evaluations. In addition, it is important to understand how trust should be explained in contexts where the dynamics of social interaction differ from the norm, such as remote interactions on social networks or interactions with artificial intelligence agents.

Chapter 13

Stanford Prison Experiment

written by Johanna Moersch (original draft), Kristine Brance (revision), Aoife O'Mahony (revision), and Shanu Sadhwani (revision)

13.1 The Classic

Understanding why ordinary people can commit acts of cruelty or oppression has been a major concern in Psychology. History provides stark reminders: from the atrocities of the Second World War to authoritarian regimes across the globe, scholars have sought to understand how seemingly normal individuals can engage in violence, discrimination, or tyranny (Adorno et al., 1950; Staub, 1989). Social Psychologists have been particularly interested in understanding the conditions that lead people to condone or participate in oppressive systems, questioning: is it the dispositions of a few pathological individuals, or can anyone become complicit given the right circumstances? One influential response to this question was the Stanford Prison Experiment (SPE).

> #definition Tyranny
>
> Tyranny refers to a system of unequal power in which one group or its representative use authority in an arbitrary or oppressive way over another group.

The SPE (Zimbardo, 1972), conducted in 1971 under the direction of Philip Zimbardo, aimed to investigate the psychological origins of violence in ordinary individuals. As Zimbardo (1983, pg. 62) later explained: "To show that normal people could behave in pathological ways even without the external pressure of an experimenter authority, my colleagues and I put college students in a simulated prison setting and observed the power of roles, rules, and expectations."

For this purpose, a simulated prison environment was created in a basement at Stanford University. Twenty-four healthy male participants were recruited and

randomly assigned as prisoners or guards. Participants who were assigned as prisoners were arrested by real police and made to wear dresses as uniforms, along with a locked chain around their ankles. Zimbardo's goal was to create an oppressive atmosphere and, in his role as an authority figure, he instructed the participants acting as guards to keep the prisoners under strict control. The prisoners had to follow strict routines and rules. Very quickly, the guards began displaying abusive behaviors, including psychological humiliation, sleep deprivation, and arbitrary punishments. Due to the escalation into extremely unethical and distressing conditions, the experiment was terminated after six days, rather than the originally intended two weeks.

> #yourturn
>
> How do you think his role of prison superintendent might have affected Zimbardo himself? Who do you think would participate in such a study? Would you have liked to participate?

Zimbardo drew several conclusions from the experiment (Zimbardo, 1972). His resulting 'situational hypothesis' argued that behavior is shaped by the specific social context in which individuals find themselves. In such circumstances, personal identity becomes less influential and people's behavior and actions are increasingly shaped by the social environment. Roles quickly become internalized: prisoners come to view themselves as criminals, whereas guards assume the position of power. As a result, individuals perform roles and established social norms may no longer apply. Zimbardo suggested that the combination of group dynamics and power imbalances can lead to a re-establishment of what constitutes appropriate behaviour, groupthink, and hence, the emergence of tyranny. This provided an alternative view to the previously common 'dispositional hypothesis', which argued that it was pathological or tyrannical people that created pathological or tyrannical systems or environments.

> #definition Groupthink
>
> A psychological phenomenon that occurs when members of a group strive for consus and harmony, often at the expense of critical thinking or considering alternative options.
>
> #yourturn
>
> Why do you think the participants identified so strongly with their roles, despite knowing it was an experiment?

13.2 The Aftermath

The SPE has been widely criticized. Soon after its publication, Erich Fromm (1997) raised several key concerns. First, he criticized the unethical treatment of participants, especially the harsh conditions on those in the prisoners' role (also see Savin, 1973). Secondly, he questioned whether the study truly demonstrated

the power of roles, or whether it reflected the personalities of the particular participants. He suggested that participants with sadistic or masochistic predispositions may not have been identified by Zimbardo's pretests. This points to a problem of selection bias, suggesting that the sample may not have represented ordinary people, but instead a particular subset more prone to certain behaviours.

> #definition Selection Bias
>
> Selection bias occurs when the participants selected for the study are not representative of the wider population, which can distort the research findings.

At the same time, because of the very small sample size, Fromm suggests that these findings may not be generalisable – not everyone in this situation necessarily would have abused power. Lastly, he highlighted that the simulated prison environment created an ambiguous experience for participants. On the one hand, participants knew they were volunteers in an experiment; on the other hand, they were arrested by real police, stripped of personal identity, and subjected to degrading treatment. The blurring of boundaries made it difficult for participants to distinguish between 'role-play' and reality, creating uncertainty about how they were expected to behave.

Another criticized aspect: The students had clearly understood what the experimenter expected to happen. Of the students tested, 81% accurately identified the experimenter's hypothesis (that guards would be aggressive and prisoners would revolt or comply), and 90% predicted that the guards would be "oppressive, hostile, aggressive, humiliating" (Banuazizi & Movahedi, 1975, pg. 158). This supports the argument that behavior in the SPE may have been shaped by demand characteristics (Banuazizi & Movahedi, 1975).

> #definition Demand Characteristics
>
> These are cues in an experiment that give away what the researcher expects, which can lead participants to change their behavior to fit those expectations.

More recently, it has been argued that the official reports of guard and participant interviews suggest that some guards were encouraged by Zimbardo and his team to act harshly, while others behaved more fairly than reported. At the same time, some prisoners admitted exaggerating their distress. These accounts raise the possibility that the dramatic narrative of the SPE was partly constructed through selective reporting and coaching rather than unbiased observation (see the article The Lifespan of a Lie, Blum, 2019).

In 2006, Reicher and Haslam conducted the BBC Prison Study, which sought to revisit the psychological effects of power dynamics (S. Reicher & Haslam, 2006). For ethical reasons, this does not represent an exact replication study, but rather a social psychological study of intergroup power relations. Contrary to the Stanford study, a prison-like system was created here that shows hierarchical

structures and thus inequality between groups. Participants were split into five guards and ten prisoners, with roles assigned after initially grouping individuals based on traits linked to authoritarian tendencies, followed by random selection. In addition, the guards received no instructions on how to behave, only the task of keeping the prison running.

The results were strikingly different. The guards did not identify with their role and showed little authority. They were eventually overwhelmed by the prisoners, who developed stronger group cohesion. Whereas in the SPEt the prisoners' submission contributed to the rise of tyranny, in the BBC study it was the guards' lack of unity that led to collapse. This led to an alternative interpretation, shifting the focus on the role of social identity. Group behavior, S. Reicher & Haslam (2006) argued, is shaped by the values and norms associated with a group identity, whether those are prosocial or antisocial. Difficulties arise when individuals fail to identify with the group they are assigned to, or when the group cohesion breaks down.

> #definition Norms
>
> These are shared rules or expectations within a group about how members should think, feel, or behave. They guide behavior by defining what is considered acceptable or unacceptable in that social context.
>
> #yourturn
>
> Based on the findings of the Stanford Prison Experiment, and the BBC Prison Experiment, which study do you think better represents how people behave in real-life institutions, and why? How do both studies help us understand power dynamics in everyday life (e.g., schools, workplaces, prisons, governments)?

13.3 Conclusion

Due to the ethical issues regarding the SPE,more reliable conclusions can be drawn more from the BBC Prison Study. This showed that group failure and a sense of powerlessness are key conditions under which tyranny can flourish. However, the BBC study also demonstrated that methodologically significant research—even on sensitive topics—can be conducted ethically, as long as proper safeguards are in place. This ensures that valuable discussions about human behavior and social structures can continue without compromising participant welfare.The issue of how social relationships vary systematically remains highly relevant, particularly for those in positions of responsibility, such as policymakers and administrators who shape the structure and procedures of institutions like prisons. The study demonstrates that social psychological elements, including group identity and perceived group power, can be linked to mental health issues and clinical symptoms. It also shows that extreme institutional settings

can foster and sustain extreme behaviors. This is also consistent with the social psychological theory that leadership is influenced by the dynamic interaction between personal characteristics and situational factors.

However: The findings were again "supporting the argument that Zimbardo's guidance and demand characteristics likely played a major role in the SPE's outcome [...] Reicher and Haslam concluded that"people do not automatically assume roles that are given to them in the manner suggested by the role account that is typically used to explain events in the SPE" (p. 30)."(Le Texier, 2019, p. pg.2).

It seems that tyranny arises from a combination of failure and promises, highlighting the importance of empowering groups in ways that promote responsible and ethical use of power. Additionally, while the Stanford Prison Experiment is well-known, it has faced significant criticism. Therefore, conclusions should be drawn cautiously and primarily based on findings from multiple replication studies that address the original study's methodological problems—such as potential demand characteristics, ethical concerns, selection bias, and experimenter effects.

> #yourturn
>
> What do we learn from the SPE and its replications? How do psychological studies have to be conducted in order to provide evidence for or against a proposed psychological effect or theory?

In sum, group failure and powerlessness are the two main components of situations where tyranny can flourish. Social factors such as group identity and group power are associated with clinical symptoms. Although extreme institutions can encourage and perpetuate extreme behavior, ordinary people are unlikely to behave in pathological ways without the external pressure of an experimenter authority, as proposed by Zimbardo. The SPE serves as a reminder of the importance of scientific discourse as well as high methodological standards and replication-studies in psychological science.

Chapter 14

Gender Differences in Human Mate Preferences

written by Hilmar Brohmer (original draft), Pelin Gül (revision) and Živa Korda (revision)

14.1 The Classic

Imagine creating a profile on an online dating app. Within hours, one user receives dozens of messages, while another waits days for a single match. Although many factors influence success in online dating (Neyt et al., 2019), this pattern may reflect a widely discussed phenomenon when it comes to human partner selection (referred to as mating, particularly from the evolutionary perspective, see below) and gender: on average, women seem to receive more romantic and sexual attention than men, whereas men apparently face stronger competition for potential partners. But are these differences backed by science?

One of the most famous demonstrations comes from a field experiment by the psychologists Russell Clark and Elaine Hatfield in the late 1970s and early 1980s (Clark & Hatfield, 1989). Heterosexual male and female research assistants approached a total of 97 opposite-sex students on a university campus and delivered one of three standardized, increasingly direct requests: "Would you go out with me tonight?", "Would you come over to my apartment tonight?", or "Would you go to bed with me tonight?" The results were striking: Men and women were similarly likely to accept a date (50% and 56%), but dramatic differences emerged for the other two questions: Men agreed to the more direct apartment and bed offers by a female stranger in 69% and 75% of these cases, respectively, whereas virtually no women did agree to an offer of a male stranger (6% and 0%). The study became one of the most widely cited demonstrations of

sex differences in short-term mating preferences, as it measured actual responses in a naturalistic setting rather than hypothetical judgments.

> #yourturn
>
> Think of reasons why women, on average, might receive more sexual attention by men than men by women.

But why should such differences exist? An influential answer came from David Buss, who examined mate preferences from an evolutionary perspective (Buss, 1989). Rather than studying one university campus, Buss coordinated one of the largest cross-cultural psychological studies conducted at the time, decades before online dating or even the internet itself became a thing. His collaborators and him manually collected data from more than 10,000 participants across 37 countries and regions on six continents. Participants completed questionnaires in which they rated what they would find important in their romantic partners — characteristics such as kindness and intelligence, but also attractiveness, age differences, or financial prospects.

The results revealed remarkable consistency: Across cultures, both men and women highly valued traits such as kindness and intelligence in their partners. However, several robust gender differences also emerged: On average, men placed significantly greater importance on physical attractiveness and signs of youth in 34 out of the 37 labs (92%), whereas women gave greater weight to financial prospects as a sign of social status (36 of 37 labs, 97%). Moreover, participants preferred an age difference to their partners, with women preferring older men and men preferring younger women, in all regions (100%).

Buss argued that these patterns reflect different evolutionary challenges faced by our great ancestors in the past — with some challenges being shared by both genders, while others diverged. A core source of divergence is argued to be the asymmetry in obligatory parental investment (Trivers, 1972): Because women historically bore the greater biological burden of reproduction through pregnancy and childrearing, selecting partners who were willing or able to provide resources would have increased reproductive success. Ridded of the biological investment of nine months of childbearing, men, in contrast, could have increased their reproductive success by attending to other women. As a result, they would have benefited from focussing on cues associated with fertility, such as youth and physical attractiveness (e.g., a symmetrical face and other markers associated with reproductive potential, see Mendelson et al., 2025). Crucially, proponents of this view argue that these evolutionary-psychological selection forces continue to shape mate preferences in the present day.

> #definition Evolutionary Psychology
>
> Evolutionary psychology is the study of how the human mind and behavior may have been shaped in our evolutionary past (in the Environment of Evolutionary Adaptedness). It suggests that many psychological traits, emotions, social behaviors, and decision-making

tendencies, are influenced by evolved adaptations (or byproducts from adaptations), while recognizing that culture, learning, and individual experiences also play important roles (Buss, 2024).

#definition Environment of Evolutionary Adaptedness

The Environment of Evolutionary Adaptedness refers to the ancestral environments in which human psychological adaptations evolved over many generations. It describes the selection pressures that shaped the human mind, rather than a specific place or time, and helps explain why some evolved traits may not always fit modern environments (Tooby & Cosmides, 1990).

#yourturn

Can you think of other everyday-life human behaviors that could also be explained in the framework of Evolutionary Psychology?

14.2 The Aftermath

The studies by Clark and Hatfield and by Buss suggested that many human mate preferences are not arbitrary but may have been shaped—at least partly—by recurrent evolutionary pressures in the past. They also led other researchers in the field to follow up on these topics. For instance; David P. Schmitt (2005) demonstrated in a similarly comprehensive cross-national study that men showed much less restricted socio-sexual attitudes than women, meaning that they fantasized more often about sex with other partners or they indicated that they did not necessarily need to feel emotional attachment to enjoy intercourse.

However, these evolutionary interpretations of gender differences also sparked academic debates in the upcoming decades: Several social psychologists such as Alice Eagly and Wendy Wood (2012) argued that many observed differences between genders reflect social roles rather than evolved psychological adaptations.

#definition Social Role Theory

Social Role Theory proposes that many differences in the behavior of women and men arise because societies assign them different social and gender roles, responsibilities, and expectations. It argues that these roles shape people's skills, attitudes, and behaviors through socialization and opportunities, rather than being primarily the result of evolved psychological and biological differences (Eagly et al., 2012).

As these roles become more equal, mate preferences should also become more similar. Although many researchers today do recognize that both biological and cultural factors likely contribute, this debate between evolutionary and social-role explanations remains one of the central discussions in the social sciences, which often goes far beyond human mating (e.g., Archer, 2019; Poeschl, 2021).

Importantly, more recent research has tested whether Buss's findings still hold today. In a large replication, Walter et al. (2020) analyzed mate preferences from a larger and more diverse international sample (N = 14,399, k = 45 countries). Despite major social changes in these three decades—including increased gender equality, globalization, and the rise of the internet—the researchers replicated the central findings. Men continued to value physical attractiveness more strongly on average, whereas women continued to place greater emphasis on earning potential (there was a significant effect in 100% of the countries in regard to the Mahalanobis Distance between the two genders), although the magnitude of some differences varied across countries and levels of gender equality. Also the preferred age difference (men older than women) remained similar across all labs.

> #definition Mahalanobis Distance D
>
> Mahalanobis Distance D is a statistical method often used to calculate the distance of a data point from a multidimensional center (centroid). That way, it is also the preferred technique to calculate the standardized difference between group means when multiple outcome variables are considered, rather than a single outcome variable, for which Cohen's d is typically used (Del Giudice, 2009).

It has to be noted that these preferred mate differences are based on what people *indicate to desire*. However, when it comes to dating and long-term partnership (i.e., *actual behavior*), people likely consider many more factors in their partners (such as humor, loyalty, similar values, etc.). This is also reflected in another recent large-scale survey by Eastwick et al. (2025), who studied to what degree the preferences match with actual behavior (i.e., attractiveness they attributed to their partner). Across 10,358 participants from 43 countries, they found only small to medium-sized correlations for desired and attributed attractiveness, as well as for desired and attributed financial prospects (along many other characteristics), while other factors emerged to be relevant when evaluating their romantic partners. Put differently, what people say they prefer in a mate differs from what their actual selection of a mate suggests they prefer. Indeed, when it comes to one's actual partners, a sole focus on looks or money seems to play only a minor role.

> #definition Correlation r
>
> Correlation r typically refers to two metric variables that co-vary (increase or decrease together), expressed in a standardized effect size Pearson correlation coefficient r. An r = 1 (-1) refers to perfect positive (negative) association between these two variables, whereas effects near zero reflect no association. Small to medium- sized correlations are typically in the range of 0.10 to 0.30 (Cohen, 1988).
>
> #yourturn
>
> Evidence for mate preferences comes from large correlational studies.

> Is it possible to achieve causal evidence and explanations in this research domain?

The findings from Clark and Hatfield have largely stood the test of time—although with some reservations, for instance due to the correlational nature of the evidence. Their original study has been replicated numerous times using different methods and larger samples. Most recently, Kunz & Greitemeyer (2025) conducted a conceptual replication, where they, again, had male and female confederates approaching people on a university campus (N = 240 across two studies in Austria): Despite changes in the dating culture, including the widespread use of dating apps, they found similar patterns in the data, although the differences in the percentages varied: men were substantially more willing than women to accept a date from a stranger of the opposite sex (40% vs. 15%), whereas in the original study the genders did not differ. Also regarding an apartment invite (38% vs. 10%) or casual sexual (28% vs. 5%), men accepted more often than women did. Although not as pronounced as in the original study, the replication demonstrates the persistence of these findings across decades.

While these studies were conducted with samples of hetersexual cis people, mating preferences of the LGBTQIA+ (Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, and Asexual, as well as other diverse sexual orientations, gender identities, and biological variations) community remain understudied and ill integrated into existing theoretical frameworks. As a notable exception, Klümper et al. (2024) surveyed a German sample of homosexual and bisexual men and women and found only small effects of sexual orientation on the importance of physical attractiveness and financial aspects. Gender differences in preferences for partner criteria were also present, e.g., women preferred a caring partner more than men. These persisting gender differences could be reconciled with the evolutionary theoretical account of partner selection: Individuals interested in same-sex partners may share gendered preferences of heterosexual people because of a shared evolutionary history. But the overall body of research addressing LGBTQIA+ people is sparse, and theoretical conclusions are difficult to reach.

> #yourturn
>
> How do you think mate preferences could be different or similar in LGBTQIA+ groups?

14.3 Conclusion

The presented research on human mate preferences provides a clear example of how psychologists combine experiments, surveys, and cross-cultural research to understand human behavior. Classic studies by Clark and Hatfield and by Buss revealed consistent differences between men and women in mating preferences, while later replications have shown that these patterns remain stable across time and cultures. At the same time, these preferences are not the only factors

when it comes to actual dating behavior or romantic partnership. Moreover, ongoing debates between evolutionary and social-role perspectives remind us that scientific explanations are continually refined as new evidence emerges. That way, theoretical and empirical progress in understanding human mate preferences is likely to come not from contrasting evolutionary and social role explanations, but from investigating how these perspectives complement and inform one another.

Chapter 15

Social Norms

written by Saihan M. Verdugo-Lauterio (original draft), Mariangel Degollado-Cohen (original draft), Martha Frías-Armenta (revision), Nadia Saraí Corral-Frías (revision), M. Yancy Lucas (revision), and Sergio Barbosa (revision)

15.1 The Classic

While we experience our daily world, we rarely question the extent to which human behavior is coordinated. Every day, we perceive social norms as natural aspects of behavior, when in fact they are collective constructions that change over time and are maintained through social mechanisms.

There are many important experiments through which we can understand how social norms affect our interactions, but in this section we will focus on one especially influential study: the Cialdini et al. (1990) experiment. As an antecedent of this experiment, Asch's (1951) experiment (see the chapter on conformity in this book) showed how group opinions can influence individuals' actions even when perceptual evidence indicates otherwise, giving evidence of how social norms may influence behaviors. Cialdini et al. (1990) take this further and distinguish between two types of social norms: descriptive norms and injunctive norms.

> #definition Social Norm
>
> A social standard that enables the evaluation of behaviors as appropriate or inappropriate within a specific context.

Cialdini et al. (1990) proposed the Focus Theory of Normative Conduct. According to this theory, social norms can be divided into two main types (Bicchieri, 2005; Cialdini et al., 1991; Kelman, 1961): descriptive norms and injunctive or prescriptive norms. Descriptive norms indicate what most people do in a given situation (it´s assumed that if many people do something, it is common

or accepted). On the other hand, injunctive or prescriptive norms, prescribe behavior given that they represent socially sanctioned rules. The Focus Theory suggests that the influence of social norms depends on which norm is most salient in individuals' attention at a given moment.

> #definition Descriptive Norms
>
> Descriptive norms refer to what people believe is the description of group behavior (decisions based on limited information may generate misperceptions; thus, perceived norms do not necessarily reflect actual group behavior), whose main influence on behavior is of informative nature.

To conduct their study, Cialdini et al. (1990) sought to identify how context influences injunctive and descriptive norms. This publication presented five studies examining whether context, quantity, and order of trash, among other variables, influenced littering. However, the first study became the most popular, whose main hypothesis proposed that behavior would depend on which norm was more salient in a given situation. To examine this, they designed several field experiments. One of the best-known experiments involved placing a flyer on the windshield of parked cars and observing whether people threw it on the ground or kept/disposed of it appropriately. Here, the participants' littering behavior was the key dependent variable. The environment was manipulated by creating either clean settings or littered settings with trash laying on the floor. From the environment, the authors argued, participants would infer a descriptive social norm: that people generally kept the area clean or that other people also engaged in littering. In short, the expectation was that participants in an environment where littering was not the descriptive social norm (clean environment) would themselves litter less than in an environment where others had visibly littered (i.e., where littering was the descriptive social norm). Indeed, results showed that when the environment was littered, people tended to litter more. In contrast, when the environment was clean, littering behavior decreased.

> #definition Injunctive Norms
>
> Injunctive norms refer to what people believe a group approves or disapproves of, -the ought-, whose influence is manifested through the group's normative pressure.

The experiment also included an actor (a confederate) who walked by and did one of two things: either littered on the ground or simply walked past. In this study, the clean or dirty space communicated the descriptive norm; that is, whether people usually littered or not. Meanwhile, the prescriptive norm (what is socially acceptable) corresponded to the idea that "one should not litter in public spaces". It is important to mention that in this study, the prescriptive norm was not directly manipulated. On the other hand, the accomplice actor intended to manipulate the normative focus, that is, to direct the participant's

attention to the environment at the moment of littering. Both environmental and actor manipulations significantly impacted participant's behavior.

The results showed that when the environment was clean and the actor walked by without littering, 14% of participants threw away the flyer. However, when the actor littered, this percentage decreased to 6%. On the other hand, in a dirty environment, 32% of participants threw away the flyer when the actor walked by without littering, whereas this percentage increased to 54% when the actor littered. This suggests that the actor fulfilled his role by directing the participant's attention to the state of the environment.

These studies demonstrated that a social norm guides behavior more effectively when it is "active" or salient for the individual within a specific context. Likewise, the distinction between descriptive and injunctive norms made it possible to understand how everyday environments and modelling shape human behavior. This laid the foundation for multiple applications in social campaigns, public health, and behavioral design. The experiment by Cialdini, Reno, and Kallgren extended the analysis of social norms to everyday settings independent of direct observation of behavior, also incorporating the role of environmental cues.

> #yourturn
> Why is it important to understand social rules within their context? What kind of social reinforcers or sanctions can you identify in the maintenance of everyday norms around you?

15.2 2 The Aftermath

Research on social norms continued to expand following Cialdini, Reno, and Kallgren's (1990) work. A recent replication study showed that the Focus Theory of Normative Conduct remains relevant, as the clean or dirty state of the environment influenced participants' littering behavior. However, the researchers observed that even a single piece of litter can lead people to violate the prescriptive norm of "not littering" (Bergquist et al., 2021).

Through the use of the concepts of descriptive and injunctive norms to understand complex social behaviors, several recent studies and meta-analyses have shown that social norms can influence multiple domains of human behavior, including consumer behavior, public health, crime, and environmental behaviors. A meta-analysis based on 572 articles from 56 countries showed that pro-environmental behavior can be influenced by descriptive and prescriptive norms with similar strength. Furthermore, the studies allowed for a comparison of this effect with internalized norms, which proved to be stronger predictors (Helferich et al., 2023).

> #definition Internalized Norms
>
> An internalized norm consists of a social expectation that a person has incorporated into their beliefs and values. Thus, when a norm is

> internalized, it influences behavior without relying on external social pressure.

Another meta-analysis of 297 studies on the influence of social norms on consumer decisions shows favorable results regarding the influence of descriptive norms on behavior and prescriptive norms on intentions to engage in certain behaviors. It also found differences based on aspects of the norm itself (origin, clarity) as well as on the individuals involved (gender and age).

Recent research in public policy has shown how social norms can significantly influence consumer behavior and tax collection, particularly when they interact with other psychological and contextual variables such as institutional trust and perceptions of legitimacy (Bevilacqua et al., 2024). Similarly, Schultz et al. (2007) found that descriptive norms can reduce domestic electricity consumption; however, they also identified a possible "boomerang effect," in which some individuals who already displayed environmentally responsible behaviors increased their consumption after learning that they were below the average consumption level of others. Likewise, a study that sought to identify protective factors against antisocial behavior found that the legitimacy of authorities and personal control functioned as protective factors, whereas social control had no effect in groups with antisocial tendencies, where group sanctions could even reinforce delinquent behaviors rather than inhibit them (Frías Armenta et al., 2022).

All in all, it appears that social norms, although a powerful motivator to change behavior, may show wide variation in their effectiveness according to attitudes and beliefs about the behavior, availability of resources around the considered behavior among others (Barbosa et al., 2023). Similarly, another important point discussed in the literature is that interventions based on social norms may normalize or even reinforce behaviors opposite to those intended, especially when the norms are descriptive and negative, e.g., "many people litter, but you should not" (Cialdini et al., 1990; Schultz et al., 2007). In addition, studies on social norms tend to be limited by methodological factors such as culturally homogeneous samples or difficulties in applying the findings across different social contexts.

> #yourturn
> How do you think social norms vary in different countries? How would you perform a sociocultural differences study to test these differences?

15.3 3 Conclusion

It is important to remember that social norms are "created", modified, and they thrive or disappear, by collective (in)action which means that they do not constitute an objective fact of reality, they are social constructions. Also, as all social constructions, they are not independent of social, political or historical

forces at play in any given moment and space. Therefore, it is necessary to critically assess the value judgments that arise from social norms and analyze their function within the group. This line of reasoning becomes relevant when we take into consideration that social norms help shape an individual´s social identity, understanding it as a self-concept that derives from the internalization of groups norms, beliefs, and values (Turner, 2010).

Cialdini et al. (1990) expanded on Asch's (1951) study understanding by identifying two types of social norms: injunctive and descriptive norms. These norms could shape behavior not only directly, but also through environmental cues, demonstrating that social norms operate both explicitly and implicitly and are embedded in everyday life. Although the study of social norms continues to advance, current research shows that their influence is not uniform and depends on various contextual, cultural, and personal factors.

Chapter 16

Social Effects of the Generic Masculine

written by Mariangel Degollado-Cohen (original draft), Saihan M. Verdugo-Lauterio (original draft), Martha Frías-Armenta (revision), and Nadia Saraí Corral-Frías (revision)

16.1 The Classic

Language is an important part of people's daily lives and is found in each of their interactions. Every chosen word actively shapes individuals' perception of their environment, transforming individual cognitive processes into shared realities (S. Gross, 2010). It allows the communication of ideas, beliefs, and thoughts in such a way that their repercussions endure in society over time. Some studies suggest that language also appears to affect the way we think and behave (Boroditsky, 2011). Likewise, the literature points out that the use of the generic masculine to refer to women exerts a significant impact on social perception and gender visibility (Braun et al., 2005; Brohmer et al., 2024; Stahlberg et al., 2001). This phenomenon manifests across several languages with formal grammatical gender systems, such as German, French, and Spanish, where masculine forms are structurally used as the default for mixed-gender groups or unspecified individuals (Sczesny et al., 2016).

> #definition Generic Masculine
>
> The generic masculine is a linguistic form that uses the masculine grammatical gender to uniformly designate men, women, mixed groups and different identities, without taking into account linguistic inclusion and visibility.

With the purpose of evaluating the impact of different generic forms of German

on the cognitive inclusion of women, Stahlberg et al. (2001) carried out two experiments with native speakers of that language. The authors expected that the use of masculine generics would facilitate the retrieval of male examples compared to alternative generics (such as neutral forms or forms that refer to women more explicitly), but would have the opposite effect when trying to retrieve female examples.

In Experiment 1, participants were asked to name their favorite heroes, musicians, etc. The participants included 50 men and 46 women who were native German speakers between 17 and 58 years old. They responded to a questionnaire that consisted of 16 questions, six of which were critical and focused on their favorite heroes in novels, real life and history and their favorite painters and musicians. It was presented in the three different generic language forms: masculine (e.g. "hero in a novel"), neutralizing (e.g. "heroic novel character") and feminine-masculine word pairs (e.g., "heroine or hero of a novel").

In Experiment 2, participants were asked to list famous figures (athletes, singers, politicians, and hosts of television shows) using different generic forms. The impact of masculine generics (e.g., "heroes", in German: "Helden") was contrasted with two alternatives: feminine-masculine word pairs (e.g., "heroines and heroes", in German: "Heldinnen und Helden") and capital "I" forms, which are words newly developed in the German language to combine feminine and masculine words within the same word (corresponds to "heroInes", in German: "HeldInnen"). The sample consisted of 90 native German speakers with an equal proportion of men and women. Following a distractor task about media habits, participants were evaluated by being asked to name three celebrities across four distinct categories. The subjects randomly completed one of three versions of the questionnaire, which differed only in the type of generic used, as introduced above: traditional masculine (e.g., "heroes"), split pairs (e.g., "heroines and heroes"), or internal capital "I" (e.g., "heroInes").

Results in both experiments showed that masculine generics reduces the cognitive inclusion of women by favoring the retrieval of men, whereas inclusive language forms effectively facilitate female visibility. Specifically, Experiment 1 proved that neutral forms are just as effective as feminized ones, while Experiment 2 confirmed that using the internal capital "I" significantly improves the retrieval of women compared to the traditional masculine. In short: Participants thought of more female exemplars when any grammatical form that was not the generic masculine was used.

> #yourturn
> If language transforms the way we think from individual perspectives into collective ideas, what are the implications for our society of employing the generic masculine as the standard form?

16.2 The Aftermath

> #definition Multi-laboratory study / Many-labs study
>
> A teamwork approach where people from different places or institutions follow the same rules to run the same experiment and see if they get the same results.

Just over 20 years later, Brohmer et al. (2024) replicated the study (Experiment 2) by Stahlberg and colleagues. The main experiment consisted of a multi-laboratory study designed to evaluate the impact of the masculine generic and its linguistic alternatives on the cognitive inclusion of women.

> #definition Gender Inclusive Language
>
> Gender inclusive language is a tool of grammatical structure to transform the way we think, eliminating gender biases and ensuring visibility, belonging, and identity of all people.

Under the false premise that they were answering a quiz to evaluate their media knowledge, participants were asked to quickly name three famous celebrities for several social categories. In the replication of the original study (Experiment 2), four categories were used (politicians, athletes, singers and TV presenters); in the extension section, two additional categories were added (writers and actors). Participants randomly completed one of several versions of the questionnaire, which differed solely in the grammatical/linguistic form in which the instruction was written (the type of generic); traditional masculine generic (e.g. "heroes"), a neutralized control, feminine-masculine split words pairs (e.g. "heroines and heroes"), the capital internal "I" form (e.g. "heroInes") and the gender star (e.g. "hero:ines" or "hero*ines", in German: Held:innen or Held*innen), which was added to this new study.

> #definition Gender Star
>
> Gender star is an inclusive typography resource (:, *, @, x, e) that breaks away from traditional linguistic structures. Its function is to simultaneously make men, women and diverse identities visible within a single word, challenging the norm of the generic masculine.

The primary dependent variable consisted of the total number of female celebrities mentioned by the participants in their responses. The researchers wanted to see if the type of language used changed the balance of men and women people thought by default. Unlike the original 2001 study (Experiment 2 which only had 90 participants from a single environment), this work was expanded to include 2,697 people across 12 different laboratories in Germany, Austria and Switzerland.

Participants were also asked what actual percentage of women they believed existed in those professions to control whether their retrieval was due to social reality or purely to language. Additionally, the study evaluated whether

contemporary ideological and demographic variables influenced the bias. The results confirmed that women, individuals with a positive attitude toward gender-inclusive language, and those with a left-leaning political orientation tended to name more female figures. Although personal variables had an effect, the type of language used remained the primary and most statistically significant factor.

The experiment confirmed and replicated the results of the original study; when participants were presented with instructions in the masculine generic or the neutral form, they retrieved significantly fewer women. In contrast, the three alternative forms of inclusive language (split pairs, internal "I" and gender-star) effectively facilitated the cognitive retrieval and visibility of female exemplars in memory.

> #yourturn
> Considering that over two decades have passed since Stahlberg's original study, does this suggest that linguistic structures are more resilient to change than contemporary social and cultural values?

Previous studies were conducted in the aforementioned countries of the European Alpine region, focusing exclusively on the German language. This study has not been replicated within a Global South population, specifically in Latin America (at least not under the same conditions and criteria as Experiments 1 and 2). However, an alternative investigation is reviewed (Experiment 2 of this study), which focuses on inclusive language and its effect on the cognitive visibility of women.

In Spanish, the generic masculine (ending in -o, as in "los médicos", in English: "the doctors") is traditionally used to refer to both men and women (Gygax et al., 2008). Nonetheless, in recent years non-binary or inclusive variants have emerged, such as using -x or -e endings or los/as articles —- for instance, "les médiques" or "los/as médicos" (Gelormini Lezama, 2023). To find out what people think of when they come across these generic forms or inclusive variants (whether they picture men, women or both), two authors designed a study with two experiments to evaluate a sample population in Argentina.

In Experiment 2 of Stetie & Zunino's (Stetie & Zunino, 2022) study, a total of 538 individuals participated: 386 were women, 131 were men and 21 identified as non-cisgender, with an overall mean age ranging between 29 and 34 years across groups. To conduct the study, the authors utilized an online, self-paced reading paradigm to measure the millisecond the brains needed to process each word, as well as the cognitive representation formed automatically. Participants read 18 experimental sentences where the grammatical subject varied across three morphological conditions (-o, -x, -e) and three levels of social stereotypicality associated with the profession (low, medium, high). For example: "Los maestros" (generic masculine, in English: "the teachers"), "Lxs hijxs" (-x form, in English: "the children"), "Les enfermeres" (-e form, in English: "the nurses"). Using specialized software, the participant read the complete sentence on the screen. Immediately afterward, the sentence disappeared, and a mandatory

multiple-choice question was presented. This question featured a unique design: proper names were used as options to identify whether the cognitive representation of the sentence's subject was a man, a woman, or a mixed group. For example, one question was, "To which of the following options can 'los maestros' refer?" (generic masculine, in English: "the teachers") and the choices were:

"Manuel"

"Carolina"

"Manuel, Marta and other people"

"Carolina, Marta and other women"

"Manuel, Federico, and other men"

The results demonstrated that the non-binary forms (-e and -x) overwhelmingly led to the selection of the "men and women" option, represented by the mixed-group choice (e.g. "Manuel, Martha and other people"). On the other hand, when faced with the generic masculine (-o), the responses for the "only men" option were the ones that predominated (e.g. "Manuel, Federico and other men").

> #yourturn
> Given that the experiments were conducted exclusively within the European Alpine regions, how critical is it for psychological science and society to test these assumptions within a Global South context?

Recent studies demonstrate how language shapes social perception turning individuals' perspectives and mindsets into shared realities (Brohmer et al., 2024; S. Gross, 2010; Keith et al., 2022). Empirical evidence from German- and Spanish-speaking contexts shows that the use of the generic masculine makes women invisible by predominantly evoking masculine representations in memory.

16.3 Conclusion

As a study that has shown strong results through several replications and across different periods, evidence is still scarce to represent data from certain regions of the world and other languages, given that previous studies only include German and within similar contexts. Spanish, French, Arabic and Italian are also within the sphere of languages that use grammatical masculine forms and they account for a large speaking population. Currently, there is an ongoing debate that the generic masculine bias might be decreasing due to the gradual incorporation of inclusive language; hence, researchers need to continue replicating these studies across different contexts and periods to gather a more representative and diverse data set (Rothermund & Strack, 2024).

> #yourturn
> If a change in the structure of the words we use can alter the visibility

of women in our minds, yet over twenties years of social progress have failed to weaken the bias of the masculine generic, what does this tell us about the relationship between language, shared beliefs and human memory?

Chapter 17

Minimal Group Effect

written by Angel Sánchez-Zavala (original draft), Nadia Saraí Corral Frías (revision), and M. Yancy Lucas (revision)

17.1 The Classic

> #definition
> Social Group
> A social group consists of two (often called a dyad) or more individuals who depend on each other and influence each other through their social interactions.

The 20th century was marked by widespread armed global conflict, including the First and Second World Wars, the Cold War, numerous civil wars and revolutions, as well as genocides and the rise of totalitarian regimes. The common denominator of these conflicts (with an estimated death rate of 200 million people) is their strong intergroup core (Böhm et al., 2020; Ponting, 1999). This historical context, alongside 21st century group-based conflicts such as political polarization or collective digital hostility (Cole et al., 2025; Levine, 2025), prompted social psychologists to investigate the scientific basis of intergroup conflict, resulting in the development of multiple lines of research. One of the most prominent intergroup theories of the second half of the 20th century is Henri Tajfel's "Minimal Group Paradigm" (Tajfel, 1970; Tajfel et al., 1971). Tajfel and colleagues were interested in studying how arbitrary (non-realistic) intergroup differences might lead to group favoritism and discrimination, this is the so-called "Minimal Group Effect".

> #definition
> Minimal Group Effect
> An inclination to favor one's own group even when group membership is weak or superficial, there is no history of intergroup conflict,

and there is a lack of member interaction or conflicting interests.

Following Brown (2020), the Minimal Group Effect has two significant historical antecedents: (1) The foundation of the European Association of Experimental Social Psychology (EAESP) as a direct answer to the descriptive and philosophical social psychology schools; (2) Compared to contemporary theories such as the frustration-aggression theories (Berkowitz, 1962; Sherif et al., 1961) or Adorno's et al (1950) psychoanalytic-based authoritarian personality theory, the minimal group paradigm proved to be a fruitful research program, capable of testing new hypothesis in different settings.

> #yourturn
> Which social groups do you belong to? Do you treat members of your group differently than people who don't belong to the group?

Henri Tajfel believed that it was possible to conduct socially relevant experimental research with external validity within social psychology (Brown, 2019), which lead him to test a research question similar to the proposed by Rabbie and Horwitz (Rabbie & Horwitz, 1969; for an analysis on the originality of the research idea behind the minimal group paradigm, see Brown, 2019, 2020). Crucially, this paradigm aimed to strip away prior interaction, conflict, or instrumental interests, isolating mere group categorization as the key variable. Therefore, Tajfel et al. (1971) recruited participants aged 14 and 15 years old and asked them to guess how many dots were projected onto a screen or indicate their preferences for paintings by Klee or Kandinsky. Participants were then privately assigned to groups (e.g., "overestimators" vs. "underestimators", or "Klee group" vs. "Kandinsky group"), ostensibly based on their responses, although in reality the assignment was random. Importantly, group membership was anonymous, and participants did not know the group allocation of their peers. In a subsequent task, participants allocated monetary rewards to anonymous others using matrices that presented different payoff combinations. These matrices allowed participants to choose between options that maximized ingroup gain, fairness, or the difference between groups. Notably, some choices involved sacrificing absolute rewards in order to increase relative advantage for the ingroup, thereby providing a measure of intergroup bias. This design enabled researchers to test whether mere categorization was sufficient to produce discriminatory behavior.

> #yourturn
> Reconsider the question above: Based on such minimal assignments of group membership, which groups might you belong to?

Results showed that participants consistently favored their own group, even though this meant sacrificing maximum joint outcomes. Despite the complete anonymity and the minimal arbitrary nature of the group categories, this favoritism still happened. The act of classifying individuals into trivial groups was sufficient to demonstrate deliberate discriminatory behavior in favor of the ingroup, regardless of any personal gain, prior relationships, or memory of who

preferred which painter.

17.2 The Aftermath

Researchers over the last decades have increasingly focused on the factors and situational contexts that contribute to enhancing intergroup discrimination in the minimal group paradigm. A recent meta-analysis (Pechar & Kranton, 2017) reviewed over four decades of studies of the minimal group effect to identify which factors increase or decrease intergroup conflict. Based on the evidence, the minimal group ingroup bias varies based on the contextual and psychological factors that are activated. There are two variables that are consistent drivers of intergroup discrimination:

Identity salience is the most consistent enhancer. Studies showed that framing the group assignment as chosen rather than random or inducing a sense of common fate among ingroup members enhanced discriminatory behaviors. Norm priming is also a strong moderator, with studies priming loyalty, competitiveness, or a perception of the outgroup as immoral increasing intergroup bias, while emphasizing egalitarian values decreased it.

Pechar and Kranton's (Pechar & Kranton, 2017) meta-analysis also identified variables with inconsistent findings. For instance, Studies examining group status have produced conflicting results. While some studies indicate that high-status groups discriminate more than low-status groups, other studies report the opposite pattern (high-status groups discriminating less), null effects, or mixed evidence. On the other hand, several studies have tested whether the Positive-Negative Asymmetry Effect (PNAE) increases intergroup conflict. With few studies confirming the PNAE, while others find no such pattern.

> #definition
> Positive-Negative Asymmetry Effect
> Individuals tend to discriminate more when given positive outcomes (e.g., money or points) than when given negative outcomes (e.g., fines).

Several additional variables have received less empirical attention (Pechar & Kranton, 2017). There is little evidence showing that males and younger children exhibit higher levels of discrimination in minimal group contexts. Research on mood suggests that both positive affective states and high uncertainty can amplify bias. Group size has yielded mixed evidence, where studies show that in the absence of enhanced group salience, only minority groups discriminate more, whereas after salience was primed, both minority and majority groups displayed similar levels. Personality traits are relatively weak enhancers of minimal group discrimination, with social dominance orientation consistently linked to increased discrimination.

> #definition

> Social Dominance Orientation
> The belief that society should be organized hierarchically, which endorses hierarchy and legitimizes myths such as sexism, racism, classism, etc.

Beyond these findings, a major limitation on the minimal group effect studies is that most research relies on samples drawn from the Global North, predominantly white, middle-class university students (Pechar & Kranton, 2017). This raises concerns about generalizability, for instance, Falk et al. (2014) tested the minimal group effect in participants from the United States and Japan, where United States participants displayed higher ingroup bias compared to Japanese participants. Rahal & Schulze Spüntrup (2025) conducted a 20-country study on ingroup favoritism using the minimal group paradigm. Moving beyond the traditional Global North samples, they found that while ingroup favoritism was present in every country studied, its magnitude varied across societies, providing evidence that cultural context does shape minimal group responses. Notably, societal-level uncertainty (e.g., government effectiveness) and individualism predicted the degree of discrimination, sometimes in directions that challenge earlier theoretical predictions. Their work thus exemplifies how the field is beginning to address generalizability concerns by incorporating diverse cultural samples. Therefore, cultural norms around equality, interdependence, and institutional trust may shape minimal group responses across different cultures, but these require further cross-cultural empirical testing.

17.3 Conclusion

As one of the most prominent social psychology theories, substantial progress has been made in understanding the minimal group effect. Overall, this research demonstrates the minimal group effect relatively reliably. However, research continues to demonstrate an overreliance on samples from the Global North. This sample bias limits the external validity of findings, highlighting the need to assess the paradigm's generalizability. For instance, Yang and colleagues' preregistered report (Yang et al., 2024) aims to assess the cross-cultural prevalence of the minimal group effect, while also investigating the contextual and individual level-moderators.

> #yourturn
> Which cultural contexts do you think might shape or alter responses in minimal group effect experiments? What other variables do you think could moderate the effect?

Chapter 18

Stereotype Threat

written by David Ehrhardt (original draft), Amélie Gourdon-Kanhukamwe (revision), and Milica Ninković (revision)

We often have certain expectations about what people will behave like, look like or think like based on the social groups they belong to. We call these thoughts about others based on their group membership stereotypes. Sometimes, these generalized expectations based on group membership even affect how we think or feel about ourselves, and what we do (self-stereotyping).

> #yourturn
> Which social groups do you belong to? How might they affect how others think about you, or how you think about yourself?

> #definition Stereotype
> Stereotypes are beliefs about people held because of their membership in a social group.

> #definition Social Group
> A social group consists of two (often called a dyad) or more individuals who depend on each other and influence each other through their social interactions.

When individuals feel that their behavior would confirm negative stereotypes about their social group, we say that they feel a stereotype threat (Spencer et al., 1999). For example, women who perform math can be afraid that their non-exceptional results might confirm the stereotype that women are generally bad in mathematics. This may interfere with performance and would not be felt by individuals unaffected by this stereotype. In other words, it can result in women's underachievement in math, without their skills being really lower than men's. Besides potentially affecting test scores, general math achievement may also be affected and a feeling of not belonging in related classes may be induced.

> #definition Stereotype Threat
> Stereotype threat refers to an individual's fear that their own characteristics or behaviors could confirm negative stereotypes about their group.

In Study 1 of the original research by Spencer et al. (1999), researchers selected an equal number of men and women whose math ability was above average. Then, they asked them to take a math test containing simpler and more advanced mathematical problems. As expected, men and women had similar average scores on simpler problems; however, men had a significantly better performance on more advanced tasks. Two potential explanations emerged: either there are real differences in math ability that result in men performing better than women, or women are afraid that they would underperform because they are expected to.

To test which of the two explanations is more appropriate, the researchers conducted another experiment (Study 2). It was similar to Study 1, but with an additional explanation for participants: prior to taking the test, half of the participants was informed that the test is insensitive to gender differences (i.e., that men and women score equally high). Another half was told that the test is sensitive to gender differences. In the group that learned that the test was insensitive to gender, women and men had very similar average scores, i.e., the difference in their scores was not statistically significant. On the other hand, women scored significantly lower in the group that learned about gender-sensitivity of the test. Researchers interpreted this as evidence of stereotype threat: if women knew that there was no danger of confirming negative stereotypes, they would perform as high as men. This means that women's general underperformance should not be attributed to lower math skills, but to social expectations. In Study 3, they replicated these findings and also found that women who learned that the test was gender sensitive were more anxious than those who did not - indicating that fear or anxiety might underlie the differences between men and women in math performance.

> #yourturn
> Can you think of other examples where stereotype threat makes a difference in individuals' performance?

After almost two decades of research on stereotype threat, Flore et al. (2018) tried to replicate the initial findings in a large-scale registered report. To motivate their replication study, they find that despite stereotype threat being supported by a number of meta-analyses, some methodological flaws may put their results in doubt. For example, the effects of stereotype threat were more often found in published studies compared to the unpublished ones - even though all of them were methodologically sound. This phenomenon is called publication bias and it often occurs when meta-analytic studies take into account only those experiments that have been published in professional journals. Furthermore, generalizability of the published studies was questionable, given that the conclusions were often made based on the convenient samples of undergraduate

students.

> #definition Publication Bias
> The phenomenon that research findings are more likely to be published when the results are statistically significant.

In fact, the experiment conducted by Flore et al. (2018) showed no evidence of stereotype threat among Dutch children. However, as authors discuss, these results could have occurred due to some cultural specificities. Perhaps Dutch children do not hold the stereotype that women are worse at math, or perhaps Dutch girls do not feel anxious about conforming with this stereotype. Consequently, this null finding does not necessarily mean that stereotype threat does not exist in the domain of math performance.

Meta-analyses on stereotype threat regarding women's math performance highlight the differences (heterogeneity) in effect sizes. This means that whether the effect is shown and how strong it is depends …

> #definition Effect Size
> In statistics, the effect size refers to a value that indicates the magnitude of the relation between independent and dependent variable. In factorial designs (experiments), the effect size gives us information on how large the difference between groups is.

> #definition Registered Report
> A publishing format where peer review comes before researchers conduct the study. Research first submit Introduction and Method sections, alongside the detailed hypotheses and plan of data analysis to test them. Only after this phase (Stage 1 Registered report) is reviewed and accepted, researchers start collecting the data and write the full report (Stage 2). This ensures that theoretically valuable and methodologically sound research is published regardless of the results.

These criticisms of the literature may encourage further research, but do not negate their results. They note mixed results when it comes to moderators, specifically domain identification, gender identification, math anxiety, and test difficulty. A gender gap in reported math anxiety could offer an alternative explanation. Easier tests could be more motivating, thereby reducing the effect of stereotype threat, more physical arousal during difficult tests has been observed, and stereotype threat taking up parts of working memory could interfere more with challenging tasks.

> #definition Working Memory
> Working memory refers to a part of human cognitive functioning that temporarily stores information and holds available to be "worked with".

The original study was split up into three different lab experiments, with small samples of a rather specific population. This was changed in the replication,

which was done on a large sample of Dutch high schoolers with a wider range of backgrounds. Despite adding to potential generalizability, there was a lack of diversity in the sample, which by the author's account should increase the effect. However, this reduces generalizability. Previous research on school aged children is inconclusive. Methodologically the replication study introduced pre-registration to counter publication bias, a priori analysis to reduce the risk of being underpowered and efforts to ensure the independence of observations which can be difficult when working with classroom settings.

> #yourturn
> When are observations independent, when dependent? Can you think of examples?

> #definition Pre-registration
> Pre-registrations are documents outlining the research plan (materials, analyses) and hypotheses prior to the research being conducted.

> #definition A priori power analysis
> Before a study is conducted ("a priori"), researchers use a statistical method to estimate the minimum sample size needed to reliably detect a specified effect size. Often, researchers aim for tests that have at least 80% power, that means that the tests can correctly reject a null hypothesis when it is false in at least 80% of cases. This analysis guides the determination of the planned sample size.

The original study (Spencer et al., 1999) differs in that it first checks whether women indeed underperform on the more difficult test, then compares a treatment that has been told about gender differences on the test with one that has been told there are no differences, and finally compares a treatment that has been told there are no differences with a control group that received no mentioning of gender differences. Methodologically, the replication study (Flore et al., 2018) appears more rigorous.

The original study (Spencer et al., 1999) supports the effects of stereotype threat on women's math performance, while the replication study (Flore et al., 2018) does not find an effect.

> #yourturn
> What could be the reason for this differing result? What factors could have played a role?

There were about two decades between the studies. Differences in results could be due to cultural change (perhaps the stereotype that women are worse at math was simply not as strong anymore at the time of replication) or differences in the studied population (Dutch high schoolers compared to US college students).

18.1 3. Conclusion

Since most of the literature seems to support the original results, the replication study may cast some doubt on those results, but is so far insufficient to reconsider the effects of stereotype threat on women's math performance. Contemporary literature suggests that the relation between stereotypes and performance is not simple. Whilst stereotype threat has been widely studied, there is a less known complementary phenomenon — stereotype lift or stereotype boost. It refers to a boost in performance among members of nonstereotyped groups (Priest et al., 2024).

> #yourturn
> Which stereotypes have you used in everyday conversations? How might they affect how others think about themselves?

Finally, it seems that individual sensitivity to stereotype threat / lift is intertwined with the level of implicit belief that the particular stereotype is true (Franceschini et al., 2014). Thus, the literature undoubtedly suggests that stereotypes — held by ourselves or by others — can largely impact how we behave.

> #yourturn
> Can you think of other examples of stereotype threat beyond gender differences in math performance? What would be the real-life consequences of stereotype threat?

Chapter 19

Intergroup Contact Theory

written by Vanessa Müller (original draft), Milica Ninković (revision), Raul Szekely (revision), and Lukas Wallrich (revision)

19.1 The Classic

In the mid-20th century, after the horrors of World War II and during fights against official racial segregation, social scientists began asking a deceptively simple question: If you bring members of conflicting groups into contact, will they start to get along? Opinions were divided. Some warned that interracial contact would only breed "suspicion, fear, resentment, disturbance, and at times open conflict" (Baker, 1934, pg. 120; I. N. Brophy, 1945; cited in Pettigrew & Tropp, 2006). Others were more optimistic, suggesting that isolation allowed prejudice to "grow like a disease" (Brameld, 1946, pg. 245; cited in Pettigrew & Tropp, 2006) and that, under the right circumstances, interaction could lead to "mutual understanding and regard" (Lett, 1945, pg. 35; cited in Pettigrew & Tropp, 2006). This debate set the stage for one of social psychology's most influential ideas: intergroup contact theory.

One of the first real-world tests of these ideas came in the United States Merchant Marine shortly after World War II. In 1946, sociologist Norman Brophy surveyed white sailors now serving in newly desegregated ship crews (I. N. Brophy, 1945). He created a "prejudice index" from interview questions and looked for patterns. Expected predictors of racial attitudes – such as where a sailor was born or how much education he had – turned out not to matter much. Instead, direct personal contact was the standout factor. Brophy found that white seamen who had never shipped with a Black crewmate scored highest in prejudice, whereas those who had taken four or more voyages with Black crewmates scored the lowest. In the cramped, cooperative environment of a ship – an "artificial society" where survival depended on teamwork – many sailors discov-

ered they could no longer "afford the luxury" of prejudice. And Brophy wasn't alone in this observation. Similar studies, mostly in the United States, showed more positive attitudes among White police officers who worked with Black colleagues (Kephart, 1957), and White residents who lived in mixed buildings where they had the opportunity to interact with Black neighbours (Deutsch & Collins, 1951). These early findings suggested that prejudice was not immutable, but could change with contact.

> #definition Prejudice
>
> A negative attitude toward a group and its members, often based on stereotypes rather than direct experience.

These patterns spurred social scientists to theorise why and when contact might reduce prejudice. In his landmark book *The Nature of Prejudice* (1954), the psychologist Gordon Allport proposed what has become known as the contact hypothesis: the idea that under appropriate conditions, interpersonal contact between members of different groups can be one of the most effective ways to reduce intergroup prejudice. Crucially, Allport (1954) did not claim that contact always works. Instead, he specified four optimal conditions that, in his view, were needed for contact to reduce prejudice:

1. **Equal Status:** The groups should have equal status within the contact situation.
2. **Common Goals:** The groups should strive towards a mutually beneficial outcome.
3. **Cooperation (Not Competition):** The interaction should require cooperative effort from members of different groups.
4. **Support of Authorities or Norms:** The contact experience should have the explicit or implicit support of authorities, law, or social norms (e.g., teachers who encourage intergroup exchange explicitly).

Allport (1954) hypothesised that when these conditions are met, contact encourages people to view one another as individuals and teammates, and thus perceive members of the "other" group as part of a shared "us" rather than a separate "them." Interpersonal contact could then reduce ignorance and anxiety, increase empathy and understanding, and ultimately chip away at prejudice (Allport, 1954). On the other hand, Allport (1954) warned that contact in unfavourable circumstances could backfire.

> #yourturn
>
> Think about a common intergroup contact situation in your community (for example, students from different backgrounds meeting at university, or neighbours from different ethnic groups interacting). Does that situation meet Allport's four optimal conditions (equal status, common goals, cooperation, and supportive norms)? How might the presence or absence of these conditions be influencing how well the groups get along?

19.2 The Aftermath

Allport's (1954) formulation of the contact hypothesis was hugely influential. It inspired a wave of research from the 1950s onward as psychologists, sociologists, and others researched the power of contact in a variety of groups and settings, mostly in observational research. By the turn of the 21st century, the evidence base had become enormous – though somewhat scattered. Hundreds of studies across dozens of countries and intergroup contexts had examined intergroup contact in one form or another, and the contact hypothesis had become a cornerstone of social psychology. The overarching question remained: Does contact typically work to reduce prejudice, and under what conditions?

> #definition Observational Research
>
> A study design where researchers measure variables as they naturally occur, without manipulating them. Observational studies can reveal associations between variables but cannot, on their own, establish that one causes the other.

19.2.1 The Classic Meta-Analysis

By the early 2000s, it was challenging to see the big picture in contact research. To address this, psychologists Thomas Pettigrew and Linda Tropp (2006) conducted a landmark quantitative review. In 2006, they published a meta-analysis synthesising findings from 515 studies (covering 713 independent samples and over 250,000 participants) that had studied intergroup contact. Across this vast body of work, they found a consistent pattern: people who reported more positive contact with members of an outgroup also tended to report lower levels of prejudice toward that group.

> #definition Meta-Analysis
>
> A statistical technique that combines the results of multiple independent studies to estimate an overall effect. Meta-analyses can reveal patterns across a large body of research, but the quality of their conclusions depends on the quality and comparability of the included studies.

Pettigrew & Tropp (2006) concluded that "intergroup contact can promote reductions in prejudice" (p. 751) and that "there is little need to demonstrate further contact's general ability to lessen prejudice" (p. 766), even in situations when not all optimal conditions are met. The average effect size was substantial by social science standards (Cohen's d 0.43). With this uplifting message, their meta-analysis has become one of the most-cited papers in social psychology, with over 13,000 citations to date.

However, most of the studies they synthesised were observational rather than experimental, meaning they measured naturally occurring contact rather than

manipulating it. While observational studies are valuable for spotting consistent relationships, they cannot, on their own, establish that contact caused the reduction in prejudice. For that, experiments are usually needed, and only 5% of the studies in the meta-analysis are true experiments. Pettigrew & Tropp (2006) acknowledged this limitation but advanced various arguments why their results still indicate causal effects. Most importantly, studies that used more rigorous methods (for example, longitudinal designs or experiments) tended to find larger effects of contact than weaker, correlational studies did.

Pettigrew & Tropp (2006) also aimed to assess whether the benefits of contact generalise – that is, does having a positive experience with, say, one Black teammate make a white person feel more positively toward Black people in general? Encouragingly, many studies did find evidence of generalisation: improved attitudes often extended beyond the specific individuals involved to the outgroup as a whole. For example, if a white student befriended a Latino roommate, not only might their attitude toward that roommate improve, but their overall attitude toward Latinos could become more favourable as well. This kind of generalisation is crucial if contact is to have a broad social impact, and the meta-analysis indicated that it often occurs.

For a time, Pettigrew and Tropp's (2006) comprehensive review seemed to settle the debate: Intergroup contact works. With so many studies and an authoritative meta-analysis affirming that contact typically reduces prejudice (even outside of perfect conditions), the contact hypothesis gained even more prominence. Textbooks began to state confidently that positive contact is a proven method to improve intergroup relations. However, the story didn't end there. Sceptics and careful scientists raised important questions and cautions that would spark the next wave of investigations. Most importantly: is the evidence causal? If we observe that people who have more friends from other groups also show lower prejudice, it's not always clear which way the arrow of causality points – does contact reduce prejudice, or do less-prejudiced people simply seek out more contact? Pettigrew and Tropp's (2006) analysis went a long way toward addressing this by showing that the best studies (including experiments) found stronger effects, but still, the bulk of studies in their database were not true experiments. Additionally, critics wondered about unpublished null findings: were there "file drawer" studies where contact had no effect that were never known, potentially making the published literature look overly rosy? These cautions set the stage for a new generation of research that aimed to more robustly test when and how contact works – and to probe its limits.

> #yourturn
>
> Why is it important to go beyond correlational evidence (where we simply observe relationships) when evaluating whether intergroup contact truly reduces prejudice? What kinds of studies or methods would give more convincing evidence of causation?

19.2.2 New Insights and Challenges: Refining the Theory

By the 2010s, researchers began responding to these methodological concerns, bringing fresh scrutiny to the study of intergroup contact. For instance, a review by Elizabeth Paluck, Seth Green, and Donald Green (2019) specifically re-evaluated the contact hypothesis from a rigorous causal perspective. They exclusively focused on studies that met a high bar for evidence: field experiments with random assignment to a contact condition versus a control condition, and outcome measures assessed after the contact experience was concluded. Out of the thousands of contact studies conducted over the decades, Paluck et al. (2019) found only 27 experiments that fit these strict criteria up to that point. (Notably, almost two-thirds of those 27 had been published after Pettigrew and Tropp's (2006) meta-analysis, reflecting the field's recent push for experimental work.)

> #definition Experiment
>
> A study where researchers deliberately manipulate one or more variables and randomly assign participants to different conditions. Random assignment helps ensure the groups are similar before the intervention, so differences in outcomes are more likely to be caused by the manipulation rather than by pre-existing differences.

The good news was that, overall, the evidence from these rigorously controlled studies still supported Pettigrew and Tropp's (2006) basic conclusion: intergroup contact "typically reduces prejudice." In their meta-analysis of the 27 experiments, Paluck et al. (2019) found that the average effect of being randomly assigned to a positive contact experience was a reduction in prejudice levels compared to the control groups, with Cohen's d 0.39, very similar to Pettigrew and Tropp's (2006) result. This helps rebut the idea that the contact-prejudice link was merely a selection effect; even when people were assigned to have contact, prejudice tended to go down, on average. However, the experimental evidence also revealed some important caveats. One striking finding was that contact's effectiveness varied considerably by context and target group. In particular, interventions aimed at reducing ethnic or racial prejudices (for example, between Israelis and Palestinians, or between white and Black Americans) tended to show weaker effects than interventions aimed at reducing prejudice toward other stigmatised groups (such as people with disabilities or members of an opposing political party). In other words, contact worked least well for some of the most historically entrenched divides like race and ethnicity. On the flip side, contact interventions addressing prejudices that might be less emotionally charged or less tied to deep-rooted group identities (for example, toward the disabled, or between fans of rival sports teams) produced relatively larger improvements on average.

Paluck and colleagues (2019) also highlighted critical gaps in the evidence. For example, they found an almost complete lack of field experiments focused on adult populations dealing with racial or ethnic prejudice – the context the con-

tact hypothesis had originally been about and arguably still one of the most important areas for policy. Additionally, very few studies had systematically tested Allport's (1954) optimal conditions by manipulating those factors to see which mattered most. The authors concluded that these gaps need to be filled before we can confidently advise policymakers to rely on contact to remedy societal prejudice. In short, their message was not "contact doesn't work" but rather "contact can work, but we need better evidence, especially on the toughest cases and the crucial conditions, to understand how to use it most effectively."

> #yourturn
>
> Intergroup contact seems to yield larger prejudice reductions for some kinds of group differences (for instance, attitudes toward people with disabilities) than for others (like attitudes between ethnic groups). Why do you think this might be? Consider the nature of prejudice or anxiety in each case. What factors could make prejudice based on race/ethnicity harder to change through contact compared to prejudice toward people with disabilities, and vice versa?

19.2.3 An Outstanding Modern Study: Contact on the Soccer Field in Post-ISIS Iraq

To illustrate both the strengths and limitations of intergroup contact in action, consider a modern field experiment that put Allport's (1954) hypothesis to a challenging test. Political Scientist Salma Mousa conducted a remarkable study in post-conflict Iraq, published in 2020, to see if positive contact could help heal rifts between deeply divided religious communities (Mousa, 2020). The setting was Northern Iraq in the aftermath of the ISIS terror reign. In 2014, ISIS had overrun the region, committing atrocities including the displacement of almost the entire Christian population from certain towns. By 2016, after ISIS was defeated, many displaced Christian families began returning to their hometown of Qaraqosh, a historically Christian town that had been scarred by violence. These returning Christians carried intense distrust and resentment toward the local Muslims. The Christians feared that some Muslim neighbours had been complicit with ISIS, or at least did not suffer as they had, and rumours and grievances ran rampant. In turn, Muslim residents felt unwelcome and resented the suspicions. In this tense post-ISIS context, the two groups lived segregated lives, with social contact minimal and fraught. Prejudice and fear were high on both sides.

Mousa (2020) wondered if a carefully designed contact intervention could begin to rebuild trust and coexistence in this environment. She chose a grassroots approach: recreational soccer teams. Why soccer? Importantly, soccer in this context naturally met many of Allport's (1954) optimal conditions for positive contact. For one, players on a team share a common goal – to win matches – and must cooperate closely to do so (passing the ball, strategising, etc.). Team sports also tend to equalise status; when everyone puts on the same jersey, they

have equal status as teammates on the field. Additionally, Mousa (2020) worked with local organisations and community leaders (including church officials) to support and endorse the league, lending authority approval to this intergroup activity. In short, the intervention was deliberately structured to tick all of Allport's (1954) boxes.

Here's how the experiment worked. Mousa (2020) invited young Christian men in Qaraqosh who were interested in playing soccer to form teams in a new reconciliation soccer league. These men formed teams mostly with friends or neighbours, so initially, all-Christian teams. The twist was that Mousa (2020) then randomly assigned half of the league's teams to receive several Muslim players as additions to their roster (the other half of the teams remained all-Christian and served as a control group). The Muslim players were recruited from outside the town (from camps of displaced Muslims nearby) and chosen to be of similar skill level to the Christian players, so that they could genuinely contribute on the field without dominating or being token outsiders. In total, each "mixed" team got three Muslim teammates added. All teams – mixed and all-Christian alike – then played in the same 8-week amateur league, facing each other in matches. Importantly, every other aspect of the league was the same for everyone: all teams had the same equipment, schedule, and participated under the same community-endorsed conditions, with the only difference being whether your teammates included Muslims or not. This experimental setup meant that if differences emerged between players on mixed teams versus all-Christian teams, the only systematic explanation would be the experience of having (or not having) Muslim teammates.

At first, the intervention faced friction. Some Christian players were unhappy about Muslims joining their teams. In the early weeks, there were incidents of mistrust and even hostility – for example, a few Christian team members openly told the organisers "We don't want Muslims; they will ruin the league." Such remarks underscored just how deep the suspicion ran in this community; it wasn't an easy start. But as the season progressed and these young men practised and competed side-by-side, the tone began to shift. By about the mid-point of the season, signs of camaraderie had emerged. One small episode stood out: when some Christian players learned that their new Muslim teammates were struggling to afford taxi fare to the games (travelling from a distant displacement camp), the Christian players pooled money to help cover the cost so their teammates could make it to matches. On the field, teammates started to celebrate goals together and encourage one another. Over time, a shared team identity – we are the Lions, we are teammates – began to form, overlaying the previous religious divide. A Christian player, asked later about his experience, reflected that "I learned that Muslims could be friends of ours, even like brothers." The transformation was not instant or universal, but by the end of the league, many of the initial anxieties had given way to friendly competition and mutual respect on these mixed teams.

So, did this Allportian (Allport, 1954) contact experience actually change at-

titudes or behaviors? Mousa's (2020) results were revealing. They showed both encouraging positive outcomes and clear limits. First, consider the effects within the context of the league itself – that is, how the Christian players felt and acted toward their Muslim teammates (and other Muslims in the league): The Christian players who had Muslim teammates ended up displaying significantly more positive behaviours toward Muslim peers compared to players on all-Christian teams. For example, at the end of the season, each team voted for a member of an opposing team to receive a sportsmanship award. Christians on mixed teams were more than 15 percentage points more likely to vote for a Muslim player (from another team) for this award than were Christians on all-Christian teams. This indicated greater esteem and fairness toward Muslim peers. Moreover, when sign-ups opened for a new season, the mixed-team Christians were much more willing to play on a mixed team again – they registered at higher rates for a subsequent mixed league – whereas many all-Christian team players declined to sign up once they heard teams might be mixed. Perhaps most impressively, about six months after the experiment, Mousa (2020) found that many of the mixed-team players were still regularly meeting up with their former Muslim teammates to practice together and maintain their friendship. In fact, roughly one-third of the mixed teams continued to meet socially for pick-up soccer games long after the official league ended, whereas almost none of the all-Christian teams chose to continue gatherings that included outgroup members. These findings show that meaningful friendships and trust did form through the contact intervention. By all accounts, prejudice had decreased, at least with respect to those specific Muslim teammates and other known Muslim players.

However, now consider what happened outside the context of the league – in the broader community and in attitudes toward Muslims in general. Here, the findings were more sobering: The positive effects of contact did not substantially generalise to Muslims beyond those directly encountered. In surveys and behavioural measures after the season, Christian participants who had played with Muslim teammates showed no significant change in their willingness to interact with unknown Muslims or visit Muslim communities compared to the control group. For instance, having had Muslim teammates generally did not make Christian players more likely to say they would patronise a restaurant in a nearby majority-Muslim city, nor did it increase their attendance at a mixed social event in town. When asked about broader attitudes, those who experienced contact did express somewhat stronger abstract support for coexistence or the idea that Christians and Muslims could be friends, but their core beliefs about Muslims as a group (for example, levels of trust toward Muslim strangers or stereotypes about Muslims) remained essentially as negative as before. In Mousa's (2020) own words, while the Christian players found it possible to trust and befriend specific Muslim individuals they got to know, extending trust to Muslim strangers outside that circle was "too much of an ask" in the aftermath of war. In short, the contact intervention succeeded in forging new cross-group friendships and improving attitudes toward those individuals, but

it largely failed to shift the participants' generalised feelings about the outgroup as a whole or their behaviour in other contexts.

This pattern – friendships without broad reconciliation – highlights a crucial challenge for intergroup contact theory. Mousa's (2020) study offers an inspiring proof-of-concept that even in a highly fraught, post-conflict setting, a well-designed contact program, featuring Allport's (1954) optimal conditions, can produce genuine goodwill and cooperation between former adversaries. The fact that young men who initially hated the idea of playing with "the other" ended up forming lasting bonds is powerful. It shows that under the right conditions, enemies can indeed become teammates, even friends. On the other hand, the limited scope of these changes tempers the optimism. The contact in this study changed how people felt about particular outgroup members, but not necessarily about the outgroup at large. From a policy or peacebuilding standpoint, that is a big limitation: improving one-to-one relationships is wonderful for those individuals, but it may not significantly mend the overall social fabric or reduce the kind of generalised fear that fuels wider conflict. Mousa's (2020) findings align with what many other studies have found and what is now a central puzzle in contact research – the generalization problem. How can we ensure that the effects of contact spread beyond the immediate participants and influence attitudes more broadly? If positive contact only affects the small circle of people directly involved, its ability to reduce community-wide prejudice or conflict is limited.

> #yourturn
>
> In the soccer study, Christian players clearly grew more accepting of the Muslim teammates they got to know personally, yet their attitudes toward Muslim strangers remained unchanged. Why do you think a positive experience with a few individuals might fail to generalise to the entire outgroup? What psychological factors might be at play? Can you think of any additional measures or tweaks to the intervention that might help encourage broader changes in attitudes or trust (for example, activities that mix the groups in other settings, discussions that address group stereotypes, etc.) to help bridge that gap?

Mousa's (2020) soccer experiment encapsulates both the promise and the limitations of intergroup contact. It provides a vivid example that contact can work – even under pretty challenging conditions, it built trust and friendship where there was initially fear and hostility. At the same time, it underscores that a single intervention, even a well-crafted one, is no panacea for deeply rooted prejudices. Especially in contexts of recent violence and trauma, biases may run so deep that it takes much more than a brief intervention to budge generalised attitudes. These nuanced outcomes have prompted researchers to investigate strategies to amplify and extend contact effects. How might we design contact interventions that not only improve attitudes toward the people directly involved, but also shift perceptions of the broader group? This remains

an active area of research.

In fact, as the field has progressed, experts have adopted a more cautious tone about what contact can realistically achieve on its own. In 2021, Paluck et al. (2021) published an extensive review of 418 prejudice-reduction experiments conducted between 2007 and 2019, a collection that included many contact-based interventions alongside other approaches. The results of this review were mixed and somewhat concerning. On one hand, many of the experiments reported at least some positive effects on attitudes, suggesting there are reasons for optimism. On the other hand, the authors uncovered "troubling indications of publication bias," meaning that studies showing big success were likely overrepresented in the literature, while those with null or tiny effects may not have been published. When they statistically accounted for this bias, the overall picture became less rosy. Furthermore, three-quarters of interventions in that review were very "light-touch" or brief, such as a short workshop, a single encounter, or a one-time media exposure. Not surprisingly, any positive changes from such brief interventions often faded over time or were quite limited in scope. In the relatively few cases where more intensive, long-term interventions were implemented (what the authors called "landmark studies"), the effects on prejudice tended to be modest at best. This included some multi-week educational programs, extended intergroup dialogues, and other sustained efforts – many showed only small improvements, highlighting how stubborn prejudices can be. Paluck-et-al_2021 concluded that new theoretical innovation is needed to achieve larger and more lasting impacts. They suggested that perhaps contact on its own is often too limited, and that combining contact with other approaches (or addressing larger structural issues in tandem) might be necessary to produce more substantial change. In their view, simply throwing diverse people together for a short period is rarely a magic fix; researchers need to think bigger about the mechanisms of change and consider multi-pronged solutions.

Most recently, the strongest tests of the contact hypothesis have been compiled in a 2025 meta-analysis by economist Matt Lowe (Lowe, 2025). Lowe (2025) focused exclusively on the highest-quality studies: those that were pre-registered, randomised experiments on intergroup contact.

> #definition Pre-Registered Study
>
> A study in which the researchers publicly register their hypotheses, methods, and analysis plan before collecting data. Pre-registration helps increase transparency and credibility – it prevents researchers from changing their analyses or selecting results after seeing the data, which can lead to false-positive findings.

By zeroing in on these rigorously planned studies, Lowe (2025) aimed to eliminate biases introduced by practices like p-hacking or cherry-picking of data – practices that can inflate apparent effects.

> #definition p-hacking

> The practice of misusing data analysis to find patterns that can be presented as statistically significant, often by trying many variable combinations or statistical tests until something "significant" turns up. This can lead to unreliable conclusions because it capitalises on chance patterns in the data.
>
> #definition Cherry-Picking
>
> Reporting only the data, outcomes, or time frames that support one's hypothesis while ignoring or dismissing those that do not. This makes the story or articles simpler and might make them more publishable, but provides a distorted view of the evidence.

The findings are instructive. When considering only these methodologically pristine studies, the average effect of intergroup contact on prejudice outcomes was much smaller than earlier reviews had suggested, with d 0.1, a quarter of the effect size suggested by Pettigrew & Tropp (2006). In plain language, this means that the effect is statistically significant, but on average, quite modest. Lowe's (2025) meta-analysis also reinforces the now-familiar theme about specificity vs. generality: contact's benefits tend to be localised. People's attitudes and behaviours toward the particular individuals they met often improved more strongly than their attitudes toward the outgroup in general. Broad attitude change was much less common, with many studies finding little to no shift in generalised prejudice or policy views even when interpersonal warmth increased. That contact's effects often fail to generalise widely is now recognised as one of the central challenges in the field.

19.3 Conclusion

Seven decades after Allport (1954) first set out the contact hypothesis, it remains a cornerstone of prejudice-reduction research. From post-war merchant ships and integrated housing projects to modern field experiments, the idea has consistently shaped both science and policy. Its core message that prejudice is not fixed and can change through structured, positive interaction helped shift thinking away from segregation toward integration as a deliberate tool for improving relations.

The evidence, however, shows that contact is no cure-all. Gains are often local, improving attitudes toward specific individuals but failing to generalise to the wider group. Outcomes depend heavily on context, structure, and the quality of interaction. For that, Allport's (1954) optimal conditions (equal status, common goals, cooperation, and authority support) remain a useful guide, though further research is needed. Contact is also not always positive, and researchers have started taking that more seriously, as negative experiences can be as powerful, if not more so, than positive ones, though they are fortunately rare (Paolini et al., 2024). Contact also needs to be understood in context, as broader forces such as inequality, political division, and historical grievances can limit its impact.

Here, psychologists can fruitfully cooperate with other social science disciplines.

Studying the most meaningful forms of contact – deep, sustained relationships forged over years – poses particular challenges. Such relationships cannot be randomly assigned, develop slowly, and are difficult to measure without disrupting them. Creative, flexible designs are therefore needed, with interpretations that acknowledge their limitations. Current research focuses on making contact more effective and lasting. Promising approaches include pairing it with perspective-taking, cooperative learning in schools, norm-shaping media campaigns, or virtual-reality simulations of positive encounters. Some initiatives also embed contact in long-term community projects or redesign institutions, such as integrated workplaces or mentoring networks, so diverse cooperation becomes part of daily life. The challenge ahead is to move from showing that contact can work to understanding how to make it work consistently, at scale, and for the long term.

> #yourturn
>
> The IAT was designed to assess automatic associations people may hold unconsciously. However, if implicit and explicit attitudes are highly correlated, what are the implications for how we understand the relationship between conscious and unconscious mental processes?

Chapter 20

Bystander Effect

written by Liz Barleben (original draft), and Aoife O'Mahony (revision)

In the 1960s, the murder of Catherine "Kitty" Genovese went largely unnoticed by the public and by contemporary news media. The question why nobody came to help her even though she was killed right in front of her apartment building where neighbors were thought to have heard her cries for help, however, sparked vivid research interest in social psychology. Bibb Latané and John Darley analyzed whether the presence of others influences individuals' helping behavior in emergencies. With their study "Bystander Intervention in Emergencies: Diffusion of Responsibility" (1968), the two social psychologists devoted themselves to the in-depth investigation of the bystander effect, a phenomenon whereby the presence of other people reduces the likelihood of individuals offering assistance in emergency situations. The more individuals present, the less individual responsibility each person is thought to feel, therefore making them less likely to take action to help. This study was part of the broad field of prosocial behavior in social psychology, which studies the factors and influences involved in behaviors such as helping others, sharing or donating resources.

> #definition Prosocial Behavior
> Behavior where people help others, even at a cost to themselves.

> #yourturn
> In which situations or contexts do you act prosocially? When don't you? Why?

The research primarily examined the extent to which the number of people present influences the probability of actively intervening and calling for help in an emergency. The study involved 62 test participants, consisting of 59 female and 13 male American college students, who believed they were participating in a study on students' personal problems living in an urban college environment. Each participant was isolated in a separate room and connected via an intercom

system to what seemed to be other participants in the study. However, the voices participants listened to via the intercom were actually pre-recorded confederate voices.

> #definition Confederate
> In some experiments, researchers are interested in the behavior of participants given very specific social settings, and very specific behavior of others. Because it can be difficult to observe these settings in a naturally occurring environment - particularly if they also need to be varied systematically to conduct an experiment - sometimes confederates are engaged to carry out these specific behaviors. In other words, they are not real participants in the study, they are hired helpers who act in accordance with the experimental setup.

During this discussion, one of the confederates simulated an epileptic seizure. While the would-be seizure was occurring, the participants were unable to communicate with the other "discussion members" and could not determine how they were responding to the situation. Researchers assessed the time until participants reported the emergency (dependent variable), and varied how many confederates were present in the discussion group (independent variable).

> #yourturn
> What do you think are some of the ethical considerations involved in studying the bystander effect, especially when simulating emergencies?

> #yourturn
> To what extent do you think the artificial setting of Latané and Darley's laboratory experiments affects the findings' generalizability to real-life situations?

The findings demonstrated that the presence of others significantly influenced the time until the emergency was reported. Participants reacted more slowly if they believed that a larger number of people were observing the incident. This finding was then termed the "bystander effect".

The gender distribution of the "bystanders" had no significant influence on reaction times. In addition, personality and background measures showed little influence on willingness to help. Latané and Darley explained the results using the concepts of diffusion of responsibility and social inhibition. Diffusion of responsibility suggests that people in groups tend to take less individual responsibility because they assume that others will intervene. Social inhibition indicates that the presence of others influences reaction time and can lead to delayed help, especially within groups, due to uncertainty or passive behaviors among group members. According to Latané and Darley (1968), the larger the number of people present, the stronger the effects of diffusion of responsibility and social inhibition.

> #definition Bystander Effect

> When others (bystanders) are thought to be present, this delays or even fully undermines prosocial behavior.
>
> #yourturn
> Have you ever experienced (something similar to) the bystander effect yourself or have you seen others "bystanding"?
>
> #yourturn
> How might cultural norms influence the strength or presence of the bystander effect across different societies? Can you think of an example where this might vary?

20.1 The Aftermath

The results of the present study were corroborated by a meta-analysis conducted by Bibb Latané and Steve Nida in 1981 (Latané & Nida, 1981), which included 56 studies with a participant sample of at least 6,000 individuals.

> #definition Meta Analysis A meta analysis is a study that combines the results of many studies to assess the overall evidence regarding a research question.

The analysis focused on determining the prevalence of helping behavior and the influence of group size on such behavior. In 48 of 56 comparisons, it was found that people acting alone provided assistance more often than people in groups, with the overall help rate being around 75% for individuals and less than 53% for groups. The results revealed a negative correlation between group size and the likelihood of individual intervention.

> #definition Correlation Two variables are said to correlate when there is a relationship between the two, where one increases or increases as the other does, too, or one increases as the other falls. The degree to which these variables move together is expressed as the size of the correlation coefficient, which ranges from 0 (no correlation) to abs(1) (perfect correlation).
>
> #yourturn
> Do you think that a correlation is capable of explaining a causal cause and effect? Why, or why not?

Multiple other studies have attempted to replicate and critically evaluate the bystander effect since Latané and Darley's original research. These studies have supported the general idea that people are less likely to help in the presence of others but have also explored important moderators such as the social context, group membership, and the nature of the emergency (see Fischer et al., 2011 for another meta analysis).

Theoretical criticism also highlighted such considerations. For example, feminist psychologist Frances Cherry (2019) challenged and expanded the traditional

explanations by incorporating social identity and group dynamics, emphasising that helping behavior is influenced by how individuals relate to the people involved. She emphasized the importance of considering the social context and cultural influences involved in the situation such as systemic inequalities, social power, or fear of retaliation, which could also explain why people do or do not intervene. She highlights that research on the bystander effect treats non-intervention as negative and as a failure of individual responsibility, without considering legitimate reasons why someone might hesitate to act, such as fear for their own safety, distrust in police, prior trauma.Cherry also pointed out limitations of laboratory studies, stressing the need for research in more naturalistic settings where social bonds and group affiliations are clearer, arguing that these factors could either mitigate or exacerbate the bystander effect depending on the context. Although Cherry's criticisms were not based on empirical studies, her points were highly relevant to subsequent studies of the bystander effect.

A key conceptual replication of Latané and Darley's work was conducted by Levine et al. (2005). They investigated how group membership influences helping behavior in emergency situations, introducing a social identity perspective to the study of the bystander effect. The researchers were particularly interested in whether people are more likely to help others when they perceive them as part of a shared social group. To test this, they conducted a field experiment involving football fans. Participants, who were all supporters of the football team Manchester United, were primed regarding their love of this team by writing an essay and answering questions. They were then asked to walk between university buildings, where they encountered a staged emergency: a jogger falling and appearing to be injured. The jogger either wore a Manchester United shirt (signifying in-group membership), a rival team's shirt (Liverpool, signifying out-group membership), or a plain shirt (neutral condition). The study found that participants were significantly more likely to help the jogger when he was wearing a Manchester United (in-group) shirt than when he wore a Liverpool or plain shirt. This suggested that helping behavior was not inhibited only by the presence of others, but also that the perceived social identity of the victim plays a key role in determining whether someone intervenes.

> #definition Ingroup One's own social group (as opposed to other groups, called outgroups).

A subsequent study published in the same paper then extended their initial findings. They recruited Manchester United fans again but primed participants to think about themselves as football fans more generally. Participants then encountered the same staged emergency as in the earlier study. Participants were now just as likely to help the jogger in a Liverpool shirt as one in a Manchester United shirt, still being much less likely to help the jogger wearing a plain shirt. This demonstrated that by making a more inclusive identity salient (framing participants as football fans rather than just Manchester United fans), intergroup barriers were softened and helping extended to people who could formerly have been considered to have been out-group members. However, when no

shared identity could be inferred (as in the plain shirt condition), helping rates remained low, suggesting that inclusion within the perceived group boundary appeared to be key to eliciting prosocial responses.

> #definition Salience Salience describes the characteristic of a stimulus to stand out. For instance, a word printed in red is visually salient in a text otherwise printed in black and white: it stands out.

> #yourturn
> Why do you think shared group identity increases the likelihood of helping in emergency situations?

Building on this, Levine & Crowther (2008) explored how both group membership and group size affect bystander intervention. Whereas Latané and Darley had emphasised that the presence of more bystanders generally reduces the likelihood of helping due to diffusion of responsibility, Levine and Crowther proposed that this effect might be moderated by social identity. Specifically, they hypothesised that when bystanders are part of the same social group as the observer, the presence of others might promote rather than inhibit intervention. To examine this, they manipulated both the group identity of the bystanders and the number of bystanders present while watching CCTV footage of a man attacking a woman. This study challenges the traditional bystander effect by showing that the presence of others can either inhibit or enhance helping, depending on social identity and group composition. Women reported being more likely to intervene when surrounded by other women but less likely when with men. Conversely, men were most willing to help when they were the only man among women. These findings suggest that helping behavior is not solely influenced by the number of bystanders, but also by the social dynamics and identities within the group. A subsequent study by the same authors examining actual helping behaviour in a similar situation showed the same pattern of results.

> #yourturn
> How do your own group memberships or identities influence your sense of responsibility in helping others?

Together, these studies by Levine and colleagues (Levine et al., 2005; Levine & Crowther, 2008) represent conceptual replications of Latané and Darley's (1968) foundational work on the bystander effect. While they retained the core focus on helping behavior in emergency situations, they introduced a new theoretical lens—social identity theory—to reinterpret and expand upon the original findings. Rather than suggesting that helping is always inhibited by the presence of others, they showed that group dynamics can powerfully shape whether people feel responsible and motivated to help. In doing so, their work offers a more nuanced understanding of when and why the bystander effect occurs, emphasising that social context and group affiliation can either amplify or suppress intervention.

> #yourturn
> How do you think these findings might apply in online settings, like

on social media, where group identity can be fluid or anonymous?

Finally, the motivating murder case of Catherine "Kitty" Genovese, which quickly became a classic in many psychology textbooks, was also investigated further. Manning et al. (2007) outlined that the case may have been misrepresented or inaccurately reported. It is unclear whether there were actually any neighbors that heard Genovese's cries for help and failed to alert the authorities, thus demonstrating the bystander effect.

20.2 Conclusion

Overall, the bystander effect remains a robust phenomenon, with results consistently supporting the general idea that the presence of others can reduce individuals' willingness to help others in need. Latané and Darley's initial finding therefore seems valid, broadly speaking. However, subsequent research continues to refine our understanding of the conditions under which the bystander effect occurs, demonstrating the important role of social identity, number of bystanders present, and the composition of the group, in moderating this behaviour, suggesting that the effect is more nuanced and complex than initially believed.

Chapter 21

Social Heuristics Hypothesis

written by Geffen Horowitz (original draft), and Katerina Michalaki (revision)

21.1 The Classic

Are humans – by nature – good? From Aristotle and Plato to Rousseau and Hobbes, the extent to which humans are instinctively cooperative or selfish has been largely debated. Aiming to answer this question is complicated, and has occupied philosophers and researchers of different disciplines alike. A social psychological take on this fundamental question aims to translate it into a hypothesis testable in an experimental setting.

The Social Heuristics Hypothesis (SSH) proposes that individuals develop and internalize prosocial cooperative intuitions through repeated exposure to everyday social environments where cooperation typically yields rewarding outcomes. In this context, heuristics refers to a set of mental shortcuts that support decision-making under uncertainty, but may lead to inaccurate and imperfect judgments (Kahneman, 2011). These mental shortcuts are often applied automatically, reflect prior knowledge and reduce the cognitive load of information processing under conflicting and debatable conditions. In the social realm, it usually pays off to cooperate, and to help others, because one can expect them to cooperate, too. Therefore, we remember prosocial behavior and cooperation as beneficial strategies for behavior. These internalized strategies become embedded as prosocial heuristics that operate as fast and automatic responses, guiding behavior across diverse social situations: Acting prosocially and cooperatively becomes intuitive.

#definition Heuristic

> Heuristics refer to simple processes that assist individuals to identify adequate, but imperfect, answers to complex questions (Kahneman, 2011).

According to the SSH, humans extend prosocial heuristics beyond familiar contexts, applying them in novel or atypical situations where cooperation is not rewarded. In such contexts, the absence of reinforcing social cues may trigger controlled processing, a slower and effortful mode of reasoning marked by deliberative reflection and reduced emotional influence. Reflective processing may lead to suppression of intuitive prosocial decision-making, enforcing strategic and self-interested decision-making. The SSH frames social decision-making as a dual-process interplay between fast, effortless intuition and slower, deliberative reflection.

> #definition Dual Process Theories
>
> A set of theories that distinguish human thought into two subsystems: a fast, intuitive system (System 1) and a slow, deliberate system (System 2). The former appears to be independent of cognitive control, whereas the latter is effortless and relies on working memory and cognitive capacity.

Across ten studies, Rand et al. (2012) demonstrated that while reflective deliberation often unintentionally promotes selfish decision-making, prosocial cooperation tends to arise spontaneously as the intuitive human default. In 2012, Rand et al. (2012) published a paper describing a series of studies that show a counter-intuitive conclusion – human intuitive behavior tends to be prosocial. Even if the loss from that kind of behavior is clear and known.

> #definition Social Heuristic Heypothesis
>
> A dual-process theoretical framework illustrating that social decision-making lies on internalized strategies that are considered advantageous in social encounters. People employ these intuitive responses in typical and atypical contexts. Under uncertain conditions, automatic responses may be overridden by effortful and evaluative processing that yields context-appropriate responses (Rand et al., 2012).
>
> #definition Prosocial Behavior
>
> Prosocial behavior refers to the voluntary actions aimed at benefiting others, including sharing, helping, and confronting (Eisenberg & Fabes, 1998).

This conclusion arises from a cognitive-behavioral mechanism which was found in a study using the Public Goods Game (PGG). The PGG is a widely used experimental paradigm for studying cooperation and social dilemmas. In the PPG, individuals make decisions about allocating resources between themselves and others. Typically, these decisions involve money that is paid to participants

depending on their choices and the choices that others make. In the game, individuals decide whether to cooperate by contributing a portion of their resources to a public pool (think of this as a shared bank account), or to retain their resources for personal benefit. The total contributions to the public pool are shared equally among participants, regardless of individual contributions. This structure yields a conflict between collective and individual interest: although the group benefits most when all participants contribute, individual benefits may be higher by withholding contributions while still receiving a share of the group return. This experimental setup captures the tension between personal gains and joint benefits.

> #definition Paradigm
>
> The term paradigm refers to "the set of common beliefs and agreements shared between scientists about how problems should be understood and addressed" (Kuhn, 1962). Paradigms reflect the assumptions associated with the state-of-affairs. In the experimental context, these assumptions directly shape the methodological strategies employed to address a research question and influence the interpretation of empirical findings.
>
> #definition Social Dilemma
>
> Social dilemmas refers to a set of scenaria in which individual and collective interests are mutually exclusive, yielding a conflict between selecting strategies that increase personal over collective benefits. Although selfish decisions are typically rewarded, personal gains are reduced if a substantial number of individuals aim for maximum gains (*APA Dictionary of Psychology*, 2018).
>
> #definition Public Goods Game
>
> Public Goods Games (PGG) refer to multi-player experimental scenarios in which individuals are required to suppress selfish behavior and cooperate to attain a mutually beneficial outcome. In this design, individuals can choose to voluntarily contribute to a common pool that will be multiplied and equally distributed across all group members. Individuals who do not contribute may free-ride on the contribution of cooperators which imposes the risk of exploitation. Although avoiding contribution is commonly rewarded in PGG, if the number of defectors is large no collectively beneficial outcomes are achieved (Gómez-Gardeñes et al., 2011; Tomassini & Antonioni, 2020).
>
> #yourturn
>
> Can you think of a situation where you might encounter a similar decision problem in the real world?

Public good games bring real-world situations in the lab, where the conflict

between short-term incentives and long-term gains is strategized. Outside the laboratory, PGG reflects the strategic complexity of social, economic and policy-making dilemmas. For instance, in the context of sustainable energy and agriculture free-riding through underinvestment is not punished, but both cooperators and defectors will likely meet the environmental benefits. By translating these complicated situations to a simple experimental procedure, it becomes possible to study them in the lab or online. This also makes it possible to test the impact of experimental interventions on the procedure – as in the studies by Rand and colleagues.

In such a game, when one plays only a single round, it is more beneficial not to contribute to the "public pool" at all. Rand et al. (2012) examined two competing hypotheses concerning the role of intuition and reflection in cooperative decision-making. According to the first hypothesis, self-interest represents the intuitive default, with prosocial behavior emerging exclusively through effortful reflection that overrides fundamental egocentric impulses. In contrast, the second hypothesis posits that prosocial behavior is supported by intuitive processes, whereas self-interested choices result from effortful reflective processing.

> #definition Intuitive behavior
>
> Behavior that occurs through automatic, prepotent and effortless cognitive operations. Commonly referred to as "System 1", these mental operations are fast, associative and hard to control (Kahneman, 2002; Stanovich & West, 2000).
>
> #definition Reflective behavior
>
> Reflective behavior is supported by "System 2" and relies on effortful and slow mental operations that are deliberately controlled through reason (Kahneman, 2002).

Rand et al. (2012) conducted a series of studies examining whether intuitive decision-making fosters cooperation. In the first study, participants who made faster, intuitive decisions contributed more to the public pool compared to those who made slower decisions. Study 2 included re-evaluation of data collected from former published social dilemma studies. Subsequent laboratory and online studies were conducted to investigate the causal relationship between intuition and prosocial behavior. Across 8 studies Rand and colleagues (2012) manipulated decision-making conditions to promote either reflective or intuitive processing. Intuition was evoked through time pressure that encouraged rapid responses. Reflection was induced by requiring participants to delay their decisions.

> #definition Causal Relationship
>
> A causal relationship refers to the situation when an event is the direct result of a preceding event. In the research context, causal relationships occur when the manipulation of an independent variable causes and explains the observed effects in a dependent variable that would otherwise not occur. Conversely, correlation is a statistical

> measure that describes the magnitude and direction of the relationship between two or more variables. In contrast to causal relationships, correlation does not imply that changes in the independent variable will automatically lead to and explain the observed effects in the dependent variable.

Participants in these studies were randomly allocated to one of two conditions. Participants assigned in the intuition condition were asked to form a decision within 10 seconds. Participants in the time-delay condition were asked to consider their decision carefully and to wait for at least 10 seconds before deciding.

> #yourturn
>
> When do you use the reflective or the intuitive system to make decisions?

Participants in these studies were randomly allocated to one of two conditions. Participants assigned in the intuition condition were asked to form a decision within 10 seconds. Participants in the time-delay condition were asked to consider their decision carefully and to wait for at least 10 seconds before deciding.

> #yourturn
>
> What are the potential benefits and costs of deliberate decision making? And of intuitive decision making?

In an online study one of the studies Rand and colleagues (2012) et al. used an additional priming manipulation. Participants in the intuition condition were asked to write a paragraph about a situation where intuition resulted in a beneficial decision or reflective reasoning led to a negative outcome. Conversely, participants in the reflection condition were instructed to write a paragraph about a situation in which an intuition-derived decision led them in the wrong direction or a reasoning-derived decision contributed to a favorable outcome.

Across all these studies, Rand and colleagues (2012) found the same effect: Participants in the intuitive group had contributed more to the public pool compared with the participants in the reflection group. In other words, intuitive decision making promoted prosocial behavior. Deliberate decisions were more selfish.

21.2 The Aftermath

Many researchers attempted to replicate findings of the studies conducted by Rand et al. (2012), but not all of them found similar effects (Bouwmeester et al., 2017; Lohse, 2016; Tinghög et al., 2013; Verkoeijen & Bouwmeester, 2014).

In a registered replication report, Bouwmeester et al. (2017) also tested the causal effect of time pressure on prosocial cooperative behavior. They brought together 21 teams of researchers who conducted preregistered replication studies,

aiming to show the findings of Study 7 by Rand et al. (2012). To do this, they closely followed the procedure of the original study and made sure to note any deviations.

At the first glance, Bouwmeester et al. (2017) failed to replicate the findings. Including all participants who adhered to the study protocol in an intent-to-treat analysis showed no evidence that time pressure made participants more prosocial than time delay. In this analysis of the replication study, a difference in contributions of -0.37 percentage points between participants in the time pressure and the time-delay conditions was estimated. The original study had estimated a difference of 8.6 percentage points in contributions between the conditions.

However, the team noticed an important difference in how they approached the analyses and how the original research did: Rand et al. (2012) excluded all participants who did not comply with the instructions (to decide quickly or to decide only after a certain delay). When the replicators did the same and analyzed the data only from compliant participants, results yielded statistically significant differences in contributions between the time-delay and time-pressure conditions. These results showed that among the participants who complied with the manipulation, intuitive decisions supported more prosocial behavior compared to deliberate decisions. Nevertheless, the effect was smaller than in the original publication. Rand et al. (2012) reported a difference of 15.31 percentage points between the average contributions between the two conditions, the registered replication report estimated a difference of 10.37 percentage points. This deviation is not surprising and shows that the original study yielded inflated effects, whereas the replication study led to more conservative estimates. This effect is commonly referred to under the term "regression shrinkage" which may arise from sampling noise, leading to inflated estimates that diminish in subsequent replications where sample sizes are larger (Fiedler & Prager, 2018). Evaluation of reliability estimates, manipulation checks, and potential sampling noise are critical for addressing the substantial impact of regressive shrinkage in replication studies.

21.3 Conclusion

The observed deviations highlight the importance of maintaining strict adherence to experimental procedures that are empirically-informed. Specifically, these findings highlight the potential issues that arise from the lack of evidence-based exclusion criteria which may unintentionally create systematic differences between experimental conditions. These practices make it difficult to replicate previous findings. In the original study, participants who responded too slowly in the intuition condition were omitted from analysis. This decision is particularly important in light of findings showing a negative correlation between response time and cooperation ; faster decisions being more strongly associated with prosocial behavior (Rand et al., 2012). By excluding slow respondents, the

researchers may unintentionally have introduced a systematic bias that artificially inflates cooperation levels in the time-pressure condition. Simultaneously, excluding non compliant performance scores may lead to several forms of bias that undermine random assignment procedures (Evans et al., 2015; Krajbich et al., 2015).

Given these limitations, further replication studies to investigate the effects of time-pressure on prosocial behavior are required. Since alternative explanations cannot be rejected, including individual differences and personality traits, further investigation is required to map the causal effects of reflection and intuition on cooperative behavior.

Considering the methodological challenges in modifying the time-pressure condition to ensure that participants adhere to the time constraints, future studies could utilize alternative methodological approaches to evoke automatic, intuitive or effortful, deliberative processing. An interesting idea would be to design a replication study with different operationalization of the two conditions similarly to Study 7 by Rand et al. (2012). For instance, priming participants with a situation in which intuitive and reasoning-derived decisions resulted in either positive or negative outcomes could lead to effective manipulation treatments with limited non-compliant exclusions.

The Social Heuristics Hypothesis (SHH) posits that people internalize cooperative strategies from everyday interactions because of the advantage that they entail. These strategies become intuitive defaults, guiding fast, automatic prosocial decisions not only in daily life, but sometimes in less conventional settings including the laboratory settings. According to this viewpoint, individuals may suppress these intuitive tendencies and act more strategically or selfishly, when they engage in slower, reflective reasoning. Although initial evidence (Rand et al., 2012) supported this view, subsequent replications produced smaller or inconsistent effects, highlighting the role of methodological and contextual variation. Such variation may stem from differences in how experimental contexts shape the salience or strategic value of cooperation: when attention to others' outcomes is more strongly cued or socially reinforced, intuitive prosociality under time pressure is more likely to emerge (Teoh & Hutcherson, 2022). As the SHH field continues to develop, it stands to benefit greatly from the principles of open science and rigorous replication. Preregistered designs, transparent data sharing, and cumulative replication efforts can help clarify when and why intuitive prosociality emerges, strengthen the empirical foundation of the theory, and refine our understanding of how social context and cognitive processes jointly shape cooperative behavior.

Part 3: Social Cognition, Bias and Priming

This part of the book addresses how the social context influences our cognition, the way we think. These influences on our thinking, beliefs and attitudes is then often hypothesized to also manifest in behavioral changes. For example, research covered in this part of the book addresses the question whether being exposed to warmth may lead us to perceive others as warmer and friendlier (Chapter on the Hot Coffee Effect), or whether thinking about words stereotypically related to old age will make us adopt behaviors assosciated with older age (Chapter on the Florida Priming Effect).

Part 3 comprises six chapters:

- False Consensus Effect
- Facial Feedback Hypothesis
- Heat Priming-Hostile Perception Effect
- Florida Priming Effect
- Hot Coffee Effect
- Power Posing

Chapter 22

False Consensus Effect

written by Marcel Zubrod (original draft), Jana Berkessel (revision), and Márton Kolozsvári (revision)

22.1 The Classic

The false consensus effect is a cognitive bias in which individuals overestimate the extent to which their own beliefs, preferences, and behaviors are shared by others.

> #definition Bias
>
> A systematic distortion of perception or judgment.

This psychological phenomenon was first systematically studied by Ross et al. (1977), who demonstrated that individuals tend to perceive their own choices and opinions as more common than they actually are. For instance, people who express a preference for a particular option are likely to assume that others would make the same choice, even when evidence suggests otherwise. This bias occurs because individuals use their own perspective as a reference point, leading to distorted judgments about the preferences, opinions and behaviors of others.

> #definition False Consensus Effect
>
> A cognitive bias where individuals overestimate the extent to which others share their beliefs, preferences, and behaviors.

In Study 1 of the original research by Ross et al. (1977), participants were presented with one of four short stories, each describing a fictional scenario with a behavioral choice to be made. After reading the assigned story, participants were asked to estimate the percentage of their peers who would choose one behavioral option over the other within the context of the story.

> #yourturn
>
> Can you think of a time when you assumed others thought or behaved the same way you did and it turned out to not be the case?

Following these percentage estimates, participants completed a questionnaire. First, they were required to indicate which behavioral option they personally would have chosen in the scenario. Next, they rated themselves on a personality scale. As part of the assessment, participants also evaluated the typical personality characteristics of someone their age and gender who would choose either behavioral option presented in the story.

The results revealed a consistent pattern: participants who chose a particular behavioral option tended to believe that "people in general" would likely make the same choice. Conversely, participants who rejected an option perceived that behavior as less likely for others. Across all four stories, participants' own choices strongly predicted their estimates of how the general population would behave.

Additionally, significant differences emerged in personality evaluations based on participants' own choices. For three of the four stories, participants rated the typical personality traits of those choosing their preferred behavioral option as less extreme than those who selected the alternative. These effects were statistically significant in three stories, while one story showed a weaker significance, and the fourth story showed no significant results.

> #yourturn
>
> Are there certain methodological choices that could enhance or reduce the magnitude of the false consensus effect? These could include, but are not limited to, the number of choices to choose from, the social setting, the controversiality of the choices and the order of choices. Do they increase or reduce the magnitude of the false consensus effect?

22.2 The Aftermath

A meta-analysis by Mullen et al. (1985) examined 23 studies and a total of 115 hypotheses related to the false consensus effect. The analysis demonstrated that tests for the false consensus effect were highly significant and produced a moderate effect size. Importantly, it identified specific methodological factors that influenced the magnitude of the effect. For instance, the number of behavioral decisions participants were asked to make, as well as the order in which decisions and consensus estimates were presented, significantly impacted the observed false consensus effect.

> #definition Effect Size

> A quantitative measure of the magnitude of a phenomenon, used to assess the practical significance of research findings.

These findings suggested that subsequent studies should limit the number of behavioral decisions participants are required to make and prioritize consensus assessments before behavioral decisions, as those methodological peculiarities might maximize the observed extent of the false consensus effect in experimental settings.

The **self-presentation explanation** posits that individuals strategically align their behavior with perceived social norms. According to this theory, the false consensus effect should be more pronounced when individuals make their behavioral decision before estimating the consensus. Only in this sequence do participants have the chance to adjust the social norm (i.e., other people's behavior) to their own behavior. However, the meta-analysis by Mullen et al. (1985) found no statistical evidence supporting this prediction, suggesting that the false consensus effect does not vary as the self-presentation explanation would anticipate.

> #yourturn
>
> Which other mechanisms could explain the False Consensus Effect? How would you test those mechanisms?

mullen_false_1985 outlined several theoretical explanations for the false consensus effect. One explanation, **attributive projection**, suggests that individuals rely on cognitive biases to justify their belief that their own behavioral choices are rational and appropriate responses to the environment. Another perspective suggests that the false consensus effect can **protect a person's self-esteem**. It may help people feel better about themselves when they face failure or receive negative feedback about their personal characteristics. A third explanation focuses on **social environments**, noting that people tend to associate with others who share similar backgrounds, values, and interests. Using false consensus makes us associate with the others who are (often falsely) perceived to be similar, thus fulfilling the need for a sense of relatedness. This selective association reinforces the perception that their choices are widely shared. Finally, **cognitive availability** provides a more mechanistic account, proposing that the behaviors individuals have chosen—or would choose—are more easily recalled or imagined than alternative actions when theorising about the behavior of others, a phenomenon linked to the availability heuristic.

> #definition Availability Heuristic
>
> A mental shortcut where people estimate the likelihood of an event based on how easily examples come to mind, which can lead to overestimating rare but memorable occurrences.

Overall, the false consensus effect is often attributed to a psychological desire to see one's thoughts and actions as appropriate, normal, and correct. Together, these cognitive and motivational factors help explain why individuals

consistently overestimate the prevalence of their own opinions and behaviors, a phenomenon observed across numerous studies.

Recent research has refined our understanding of the false consensus effect, particularly by situating it in contemporary social and digital contexts. In a series of studies, Bunker & Varnum (2021) found that greater social media use was reliably associated with stronger false consensus effects across domains such as political attitudes, personality traits, and social motives. However, the size of these effects was consistently smaller than laypeople anticipated, suggesting a public overestimation of social media's distorting power. Luzsa & Mayr (2021) experimentally demonstrated that exposure to attitudinally congruent news feeds, especially those with high agreement and visible endorsement cues like "likes", leads individuals to overestimate public support for their own views. Interestingly, this inference was moderated by participants' interest in the topic, with highly engaged individuals showing more skepticism toward consensus cues.

Building on the political implications of false consensus, Steiner et al. (2025) found that individuals who overestimate how many others share their political preferences are more likely to express populist attitudes and to distrust political elites. Similarly, Weinschenk et al. (2021) showed that individuals' views about democratic norms, such as the peaceful transfer of power, were strongly linked to their perceptions of what others believe—indicating a false consensus bias, particularly among conservatives. Finally, Furnas & LaPira (2024) extended the scope of the false consensus effect to unelected political elites (e.g., lobbyists and journalists) demonstrating that this group's perceptions of public opinion systematically reflected their own views, suggesting egocentrism rather than ideological bias as the driving force.

Together, these studies demonstrate that the false consensus effect is a robust phenomenon with wide-ranging relevance from digital communication to political judgment and that it is shaped not only by cognitive mechanisms but also by the structural, technological, and ideological environments in which opinions are formed.

22.3 Conclusion

The body of research on the false consensus effect highlights its robustness as a psychological phenomenon while also revealing important complexities in how it comes about. Early experimental studies, such as those by Ross et al. (1977), demonstrated that individuals consistently overestimate the degree to which others share their beliefs and behaviors. Follow-up meta-analyses, like that of Mullen et al. (1985), confirmed the effect's significance and explored the methodological and contextual factors that influence its magnitude.

In the broader context of social psychology, the false consensus effect provides valuable insights into how cognitive biases and motivational factors shape human perception. Explanations for the effect, ranging from attributive projection and

ego defense to mechanisms like cognitive availability, underline the interplay between how individuals view themselves and how they perceive the social world around them.

However, as with many constructs in psychology, it is crucial to approach findings on the false consensus effect with careful scrutiny. Methodological variations can significantly impact the observed magnitude of the effect, and further research is needed to disentangle its underlying mechanisms. The enduring study of the false consensus effect is an example of the importance of revisiting and refining theoretical constructs to build a more comprehensive understanding of human cognition and behavior.

Chapter 23

Facial Feedback Hypothesis

written by Sophia Reitmayer (original draft), Patrícia Arriaga (revision), and Effy Zachou (revision).

23.1 The Classic

Does what your body does influence how you feel? This is a central question that the Facial Feedback hypothesis addresses. The idea is simple, and quite old. In fact, it echoes one of the earliest theories of emotions in modern psychology: the James-Lange theory of emotion (James, 1884). This theory proposes that bodily changes precede and give rise to emotional experiences. In other words, perhaps what our body does informs what we feel.

> #yourturn
>
> Have you ever felt your heart beat faster when giving a presentation or walking into a room full of people, and then noticed yourself feeling nervous or fearful? These are examples of how bodily responses, such as a racing heart or sweating, might shape emotional experience, as suggested by James-Lange theory (James, 1884).

Now think more specifically: have you ever noticed that frowning while concentrating made you feel more tense? Or that you felt more positive when you smiled, even without a clear reason? These are everyday examples of how facial expressions, as specific bodily reactions, might affect your emotional state, as proposed by the Facial Feedback Hypothesis.

The Facial Feedback Hypothesis can also be related to the work of Darwin (1872) and, later, Ekman (1992), as both suggested that facial expressions play a role in emotion. Ekman, for example, emphasized that certain facial expressions are universal and biologically innate. However, these theories are distinct, since unlike the Facial Feedback Hypothesis, neither Darwin nor Ekman proposed

that facial expressions causally influence the emotional experience itself. In contrast, the Facial Feedback Hypothesis suggests that the activation of facial muscles involved in an expression can modulate the subjective experience of emotion. This theory posits that the act of forming a facial expression, such as smiling, frowning, or furrowing the brow, can intensify, initiate, or modulate the corresponding emotional state, thereby establishing a bidirectional relationship between expression and affect. Thus, the act of smiling may actually make people feel happier.

> #yourturn
>
> Can you think of everyday situations where the Facial Feedback Hypothesis might apply? Try to go beyond smiling, by considering how other facial expressions might also shape your emotional experience, such as sadness, anger, fear, disgust.

The publication by Strack et al. (1988) investigated this hypothesis in two studies. The authors tested whether adopting a facial expression typically associated with a specific emotion could influence people's emotional experience and their evaluation of external stimuli. More specifically, they investigated whether producing a smiling facial expression could lead to a more positive evaluation of cartoons and a more positive emotional state.

Strack et al. (1988) conducted two studies using a new methodology designed to prevent a cognitive interpretation of facial action. In other words, the aim was to avoid participants consciously recognising their facial movements as expressions of specific emotions. This was important because one of the main concerns is the risk of demand characteristics, that is, the possibility that participants' awareness of the study's true purpose might influence their responses. To address this, they introduced a cover story, telling participants that the study focused on psychomotor coordination. This procedure became known as the "pen-in-the-mouth" paradigm, allowing for a more subtle manipulation of facial muscle activity.

In both studies, participants (N = 92, Study 1; N = 83, Study 2) used the same pen-in-the-mouth paradigm. In study 1, participants were assigned to three conditions. In one condition, participants were asked to hold a pen between their teeth in a way that would facilitate a facial configuration associated with smiling ("teeth" condition). In this condition, the way participants held the pen would activate the facial zygomaticus major muscles, which are typically involved in smiling.

> #definition Zygomaticus Major Muscles
>
> These bilateral facial muscles, when activated, raise the corners of the mouth in an upward and lateral direction, facilitating expressions such as smiling.

In a second condition, they were asked to hold the pen between their pursed lips ("lips" condition). In contrast to the "teeth" condition, this position engages

the orbicularis oris muscles, which may inhibit the activation of the zygomaticus major, making smiling more difficult.

> #definition Orbicularis Oris Muscles
>
> These are circular muscles around the mouth that close the lips and produce puckering, as in kissing or whistling.

The third condition included in study 1 served as a control group, as it did not involve any direct manipulation of the facial muscles. Instead, participants were asked to hold the pen with their non-dominant hand.

In study 1, the aim was to test whether facial manipulation influenced the evaluation of humorous stimuli (perceived funniness) and study 2 aimed at replicating the procedure but also differentiating the effects on cognitive and affective components of this response. Thus, after being assigned to one of the conditions, participants were presented with cartoons on various topics, ranging from neutral to humorous situations, and asked to rate how funny each cartoon was on a scale of 0 to 9 ("not at all funny" to "very funny"). Additionally, in study 2, the affective experience of amusement was measured by asking participants to indicate how amused they felt while viewing the cartoons, also using a 10-point scale (from 0 = "I felt not at all amused" to 9 = "I felt very much amused").

The results in study 1 showed differences in the ratings of the cartoons between the "teeth" and "lips" conditions. In the "teeth" condition, participants rated the cartoons as significantly funnier than in the "lips" condition, and the results of the control group fell between these two conditions. This suggests that activating the facial muscles involved in smiling can lead to a more positive perception of humorous stimuli, while inhibiting those muscles reduces this positive perception. In study 2, by introducing separate measures for cognitive and affective components, the authors showed that facial manipulation affected only the amusement experience without affecting the cognitive evaluation of funniness. This highlights the need to distinguish between these two components explicitly. According to the authors, the effects obtained in the perceived funniness of the cartoons in study 1 likely reflected a combination of affective and cognitive influences within a single global evaluation.

> #yourturn
>
> Why do you think Strack et al.'s (1988) publication was so influential? Are you fully convinced? Are there exceptions to the rule? How could facial-feedback be criticized?

Over the years, several questions have been raised, and both conceptual and direct replications of Strack et al.'s (1988) study have been conducted. For example: Are facial feedback effects stronger when people produce genuine, spontaneous smiles, compared to subtle and artificial manipulations like holding a pen in the mouth? Does facial feedback initiate emotional experiences, or does it merely amplify emotions that are already present? Also, although Strack et al. (1988) focused specifically on smiling, the Facial Feedback Hypothesis

suggests that other facial expressions may also contribute to shaping emotional experience.

23.2 The Aftermath

Strack et al.'s (1988) influential study has been the subject of debate in recent years, as several researchers have had difficulties replicating the original results. One of the attempts was the Registered Replication Report (RRR) by Wagenmakers et al. (2016). Despite coordination across 17 independent laboratories, the replication failed to reproduce original findings: participants did not rate cartoons as funnier when their facial muscles were configured into a smile. This null result raised doubts about how reliable the facial feedback hypothesis is. In response, Strack (2016) argued that small differences in the setting, especially the use of video cameras, may have affected the participants' responses. He suggested that being watched could make people more self-aware and stop the natural reactions needed for facial feedback to work. Later, Noah et al. (2018) investigated this concern by examining whether the presence of video cameras could alter participants' behavior. In two experiments, they compared conditions with and without video monitoring. The results showed that the pen-in-mouth task influenced results only when participants were not being observed. This suggests that the facial feedback effect is influenced by whether people feel they are being monitored, and that subtle changes in the study design can affect the results.

More recently, Coles et al. (2022) contributed to this debate with the Many Smiles Collaboration, designed as a large-scale, pre-registered multi-lab project to test the facial feedback hypothesis through both direct and conceptual replications.

> #definition Conceptual Replication
>
> A study that aims to recreate the gist of a prior study without using an identical procedure. These studies often aim to explore boundary conditions, the influence of specific variables, or aim to broaden and extend a certain finding.

Conducted across 19 countries with data from 3,878 participants, their study used various methods to examine the reliability of facial feedback effects. Participants were asked to imitate prototypical or less prototypical facial expressions of happiness (facial mimicry paradigm) or to perform voluntary facial movements (voluntary facial action). In addition, the pen-in-the-mouth paradigm from Strack et al. (1988) was used, in which participants held the pen either between their teeth or between their lips.

The results showed that, when present, the effects were small, supporting the idea that facial feedback contributes to emotion but is not its primary determinant. There was consistent evidence of emotional amplification in voluntary

smiling and mimicry tasks, while results for the pen-in-mouth task were less clear, even when avoiding video recording. It is worth noting that Strack was directly involved in this project, highlighting the project's collaborative effort to test the facial feedback hypothesis. The results suggest that different mechanisms may underlie the effects of each task. Rather than refuting the facial feedback hypothesis, Coles et al.'s (2022) findings frame it as a conditional and modest phenomenon, dependent on how facial expressions are elicited and on contextual factors such as participant awareness.

23.3 Conclusion

Attempts to replicate Strack et al.'s (1988) original findings have produced inconsistent results. Importantly, the Many Smiles Collaboration (Coles et al., 2022) did not provide clear evidence regarding the emotional amplification effect of the pen-in-mouth task used in Strack et al.'s (1988) study. However, this recent project broadened the scope of investigation by including additional paradigms, such as voluntary smiling and facial mimicry, which yielded small but consistent facial feedback effects.

Overall, the evidence suggests that facial feedback can influence emotional experience, but its effects are small, sensitive to context, and not consistent across all types of manipulations. These studies also highlight the importance of identifying the conditions under which facial feedback operates.

From the perspective of James-Lange theory, the findings remain consistent with the idea that bodily changes contribute to affective experience, though in a more limited and conditional way than originally assumed.

> #yourturn
>
> In light of these results, would you say that smiling more will make people feel happier?

In short, the relationship between facial expressions and emotions is complex. Such effects may occur, but they are usually small, context-dependent, and further research is still needed to determine when and how they emerge. Smiling alone is unlikely to serve as a simple route to happiness.

Chapter 24

Heat Priming-Hostile Perception Effect

written by Hannes Dieterle (original draft), and Patrícia Arriaga (revision)

24.1 The Classic

Does what you have recently seen, heard or read affect how you think, even if you do not realise it? This is a central question behind the concept of priming, which has been used to describe how subtle cues, like words related to temperature, might influence our thoughts, feelings, and behaviours.

The verb "to prime" means "to activate". In psychology, "priming" refers to the idea that exposure to a stimulus can activate mental representations, making it easier or faster to respond to that same stimulus later (direct priming), or to something related to it (indirect priming).

> #definition Priming
>
> "Priming refers to facilitative effects of an encounter with a stimulus on subsequent processing of the same stimulus (direct priming) or a related stimulus (indirect priming)" (Tulving et al., 1982, p. 336).

To test how such subtle verbal cues might affect person perception, Nathan DeWall & Bushman (2009) conducted an experiment (Study 2) in which they investigated the relationship between exposure to words associated with hot and cold temperatures and the subsequent evaluation of a fictitious person. The 72 undergraduate students who participated in this experiment were first randomly assigned to one of three groups, in which they were primed with temperature-related or neutral words.

Their task consisted of creating grammatically correct sentences from five scrambled words. In the "heat prime" and "cold-prime" groups, six of the 13 sentences contained words associated with heat or cold, respectively. The "neutral prime" group's task did not include any temperature-associated words; therefore, it served as the "control group".

A "control" group is often used as a baseline in experiments, allowing researchers to see whether the changes observed in the experimental groups are due to the manipulation, and not to other factors. In this study, the control group was created to test whether exposure to "hot" or "cold" words influenced how participants judged the fictitious person, compared to a group with no temperature cues.

Thus, the priming condition, with the three levels (heat, cold, and neutral), was the independent variable (IV) in this experiment. Subsequently, all participants read a text about a fictitious man named Donald, whose behaviour was described in an ambiguous but potentially hostile manner. Participants were asked to rate Donald's personality in four questions related to hostility traits. The responses to these four questions were combined into an index of hostile perception, which served as the dependent variable (DV).

> #yourturn
>
> Why did the researchers measure the perception of Donald's personality after participants were primed with the concepts of heat or cold, compared to the neutral control group?

The underlying assumption is that priming can increase the accessibility of specific personality-related concepts or trait descriptions in memory, which in turn may shape how ambiguous information about others is interpreted (Srull & Wyer, 1979). Additionally, theoretical models such as the General Aggression Model (Anderson & Anderson, 1998) integrate the temperature–aggression hypothesis, proposing that hot temperatures can serve as situational inputs that activate aggression-related thoughts and feelings. In Study 2, Nathan DeWall & Bushman (2009) tested the more specific hypothesis that exposure to heat-related words would increase hostile perceptions of an ambiguously described person, compared to both neutral and cold-related words.

To compare the groups, the authors adopted the null hypothesis significance testing approach (NHST, Brandt et al., 2014; Cumming, 2014; Wasserstein & Lazar, 2016), by comparing the mean scores on the hostility index across the three priming conditions. In this approach, a result is considered statistically significant when the probability of observing a difference is sufficiently low, typically less than 5% ($p < .05$), assuming that there is actually no real difference between groups (the null hypothesis). As is typical in psychological research, the authors used this threshold to determine whether the differences between group means were statistically significant.

Nathan DeWall & Bushman (2009) results showed that the "heat prime" group

rated Donald as significantly more hostile than both the "neutral" and the "cold" groups (heat vs. cold: $d = .67$, $p < .03$; heat vs. neutral: $d = .63$, $p < .05$). Moreover, no significant differences were found between the "cold" and the "neutral" groups ($p = .85$).

These findings suggest that exposure to heat-related words increased participants' tendency to perceive ambiguous behavior as more hostile, supporting the hypothesis that temperature-related concepts can activate hostility-related trait perception. The absence of a statistical difference between the "cold" and "neutral" groups ($p > .05$) further indicates that this effect was specific to heat-related priming, rather than a general effect of temperature-related concepts.

24.2 The Aftermath

In 2014, McCarthy conducted two replication studies of this experiment (McCarthy, 2014).

> #yourturn
>
> What criteria should a replication meet in order to be relevant and helpful for examining the effect?

There are different types of replication studies, each with different criteria and goals, although both aim to test the same theoretical claims. Close replications aim to verify whether the original effect can be found again under the same conditions as the original study, using the same method. In contrast, conceptual replications test the generalisability of an effect across contexts and may rely on different operational definitions or use a different method (Brandt et al., 2014).

By following Brandt et al.'s (2014) definition and guidelines for close replication, McCarthy (2014) designed two studies aiming to reproduce the original procedures but using larger samples. He justified these attempts to replicate with three arguments. First, a single study is not sufficient to establish the reliability of an effect, and further testing is necessary. Second, the original study had a relatively small sample size, which can lead to unstable effect size estimates; and larger samples are required. Third, the original findings had already been widely cited, so it is important to verify whether they could be replicated before treating them as reliable knowledge.

In McCarthy's (2014) first replication study, involving 182 participants, participants were randomly assigned to one of three priming conditions (heat, cold, or neutral) and completed the same scrambled sentence task as in the original. After the priming task, they read the same ambiguous story about a fictitious man and rated his hostility using the same four items to measure hostile perceptions. The second replication, conducted online with 507 participants, used the same critical heat- and cold-related words as in the original experiment, but the scrambled sentences in which these words appeared were slightly different from

the original materials. Otherwise, the procedure closely followed the original study.

The results of these two replication studies did not support the original hypotheses. Donald's rated hostility did not differ significantly between the heat and the cold prime groups. Thus, the findings reported by Nathan DeWall & Bushman (2009) could not be replicated. Additionally, McCarthy (2014) conducted a meta-analysis combining the original study with the two replications. This analysis also indicated a non-significant effect of heat priming on hostile perceptions ($d = 0.18$, $p > .05$). Based on these results, McCarthy (2014) concluded that priming individuals with heat-related concepts does not reliably affect hostile perceptions of others, and that the original effect is likely non-existent or too weak to be considered meaningful.

24.3 Conclusion

McCarthy (2014) tried to replicate DeWall and Bushman's (2009) study twice and found no evidence that heat-related words increase hostile perceptions. Their meta-analysis combining the original and replication studies also showed a non-significant effect, suggesting the original finding is likely non-existent or too weak to be relevant.

This replication failure reflects a broader debate in psychology that social priming effects may be fragile and difficult to reproduce, particularly when it comes to temperature-related words and their relation to hostility. Moreover, these studies evaluated hostile perceptions rather than aggressive behaviour. Therefore, the findings do not directly challenge broader theoretical models such as the General Aggression Model (Anderson & Anderson, 1998), which integrates the temperature–aggression hypothesis through a variety of situational, cognitive, and affective mechanisms. What the replications do suggest is that simple word-based priming of hot and cold temperature is unlikely to be a reliable predictor of person perception in terms of hostility.

Chapter 25

Florida Priming Effect

written by Lillie Schupp (original draft), Vaitsa Giannouli (revision) and Aswathi Surendran (revision)

The Florida Priming Study, published in 1996 by Bargh, Chen, and Burrows (Bargh et al., 1996), examined how stereotype activation could affect physical behavior. This experiment — the second in a set of three related studies — involved 30 participants and tested whether priming with words associated with elderly people could influence walking speed.

> #definition Stereotype
>
> A belief about characteristics of people belonging to a certain social group, attributed to them because of their group membership.
>
> #definition Priming
>
> A psychological phenomenon where exposure to one stimulus (e.g., a word, image, or idea) influences how you respond to a later stimulus, often without conscious awareness.

Participants in the study were randomly allocated to one of two groups. One group, the experimental group, was asked to construct short sentences using words associated with older people, such as old, gray, and wrinkle. These words also included the term Florida, which in the US-context is also related to old age as many people choose to move to Florida when they retire. This gave the study the name by which it was later often referred to. Note that participants were not explicitly made aware that all words had something to do with old age. They were simply instructed to construct sentences with the available words. This was also the case for participants in the other group, the control group. They were asked to construct sentences from a different set of words, however. The control group was presented with neutral words, such as "private" or "thirsty". This sentence construction task therefore primed participants with the concept

of old age (in the experimental condition, compared to no priming in the control condition).

After the priming task, researchers measured the time it took participants to walk 9.75 metres from the study room to the elevator as they left the laboratory. The idea was that participants' behavior, their walking speed, would be affected when the stereotype of old age was activated. Stereotypically, elderly people are thought to walk more slowly. If the stereotype of old age was activated due to the priming task, this would mean that participants in the experimental group should walk more slowly to the elevator.

This is also what the results of the original study indicated: Participants in the experimental group took an average of 8.23 seconds, which was statistically significantly longer than the control group's average of 7.3 seconds.

> #yourturn
>
> Think about the potential impact of this study. If small interventions like priming can impact observable behavior like walking speed, what implications does this have?

This study aimed to show that stereotype-related words (e.g. 'Florida', 'Bingo', 'old') activate not only the category "elderly". The priming task was also expected to activate another concept related to the category "elderly" which did not come up in the task itself: walking slowly. This activation was further assumed to not only what participants were thinking about, but to influence observable behavior: their own walking speed.

Although the original study showed strong effect sizes and found a connection between priming with stereotypes and subsequent behavior, there are several points of criticism regarding this study.

One major concern is that the sample size of N = 30 was quite small, and that the sample was not representative, as it consisted only of a specific group that is undergraduate students only from New York University.

> #definition Representativity or Representativeness
>
> The extent to which a study sample reflects a well-defined target population, such that the estimates or the interpretation of results can be generalized to that population (Rudolph et al., 2023).

Methodologically in this experiment we have to keep in mind that the experiment involved two very different types of behavior. The participants first completed a writing task. Then experimenters measured their walking speed, which is quite a different type of behavior than writing. Often, when tasks involve different types of behaviors, effect sizes are smaller, because the influence has to "carry over" to a different type of behavior. If the researchers had measured how fast participants were writing, for instance, this would be comparing two relatively closely related behaviors and a larger effect might have been expected.

Nevertheless, the effect reported in this study was relatively large - which is surprising given the contrast between the two tasks.

The large difference in walking speeds was also surprising because the intervention - the priming task where participants formed sentences - itself was relatively small. To observe large changes in behavior, usually, one needs a large intervention.

> #yourturn
>
> Think of the last time you drastically changed your behavior. Did this require only a tiny intervention, or did something big happen that led to the change?

Additionally, the materials were not fully reported. For example, study listed the elderly-stereotype words included in the priming condition (e.g., Florida, grey, wrinkle, bingo), they did not provide the full set of neutral replacement words used in the control condition, only stating that the stereotype-related items were substituted the words unrelated to the elderly stereotype (e.g., thirsty, clean, private). This omission left later researchers without a complete specification of the control stimuli, which complicated replication efforts. Subsequent work, such as Doyen et al. (2012), addressed this limitation by publishing full stimulus lists, thereby ensuring greater transparency. Finally, another point of criticism is the potential influence of experimenter effects (Doyen et al., 2012). We will see why this criticism was warranted below.

25.1 The Aftermath

The publication of the Florida priming study had a considerable impact within social psychology, sparking both enthusiasm and scrutiny. Subsequent research has produced mixed findings, with some studies attempting to replicate the original result and others questioning its validity.

Some studies sought to build on the results of the Florida priming study. They thought that differences in what people think about the elderly, or whether they like elderly people could influence whether they would walk more slowly if primed with the concept of old age.

A study by J. G. Hull et al. (2002) found that self-consciousness might change how strongly priming works. In psychology, self-consciousness refers to how much people tend to pay attention to themselves, especially their own thoughts and feelings. J. G. Hull et al. (2002) focused on private self-consciousness, meaning the habit of reflecting inwardly and thinking about what one is doing or feeling. They discovered that people high in private self-consciousness were more likely to walk slowly after being exposed to elderly primes. In this case, self-consciousness acted as a moderator. A moderator does not cause an effect by itself, but it influences when and for whom an effect shows up. To summarize,

the priming effect was stronger in people who were more self-reflective, but weaker or absent in those who were less so.

Cesario et al. (2006) explored a related idea: that participants' motivations and attitudes toward the elderly might influence the direction of the behavioral effect.In psychology, an attitude refers to a person's overall evaluation of something or someone—whether they feel positively, negatively, or neutrally about it. In this study, participants exposed to images of elderly people (rather than words) walked more slowly if they liked the elderly, but more quickly if they held negative attitudes. This highlights that priming does not operate in isolation; personal motivation plays a role.

In a relevant study not only replicating, but extending on the original research (J. G. Hull et al., 2002), findings support that high levels of self-consciousness in individuals influence the slower walking speed after exposure to implicit elderly primes. Another study with the same research aim, but using pictures instead of words (@ Cesario et al., 2006), found a similar pattern. Participants shown pictures of elderly men, compared with pictures of teenage boys, walked more slowly if they liked the elderly, similar to slowing down to keep pace with a slow friend. However, if they disliked the elderly, they walked more quickly, like speeding up to move away from a slow person you would rather avoid (you speed up to get away from a slow enemy).

In a well-known replication effort, Doyen et al. (2012) attempted to replicate the Florida Priming Effect while controlling for experimenter bias. They found that the effect only appeared when experimenters knew the hypothesis. When timing was done manually, experimenters' expectations seemed to influence when they started or stopped the stopwatch. Experimenters who expected the participants to walk more slowly pressed the stopwatch later, whereas those who expected faster walking pressed the stopwatch earlier. This finding may be explained by the social-psychological theory of the self-fulfilling prophecy. Because experimenters believed a hypothesis to be true, they (probably unintentionally) behaved in a way that made it appear true: They stopped the time accordingly.

> #definition Self-Fulfilling Prophecy
>
> A self-fullfilling prophecy suggests that the probability of an event occurring can be increased solely by the expectation of that event (Merton, 1948).

To eliminate the influence of experimenter bias, Doyen et al. (2012) replaced the stopwatch with a light barrier. This allowed the time to be measured objectively, independently of the experimenters' biases and expectations. Under these conditions, the effect of the original study could not be replicated. These results show that the time difference between the experimental group with stereotypical priming and the control group with neutral priming was not statistically significant. This suggests that the original findings may have been partially or entirely due to experimenters' expectation.

25.2 Conclusion

These studies showed that the effects of priming are not simple, automatic responses that happen in the same way for everyone. Instead, they depend on individual differences, such as personality traits, motivations, and attitudes. In other words, priming interacts with who the person is and how they feel, which means its impact can vary widely across situations and individuals.

Although these findings can not be generalized in other cultures and populations and follow similar, but at the same time different experimental conditions (different words-pictures used as primes and different parameters included/measured apart from the assessment of walking speed), they do open a discussion over the experimental support on ageism in the form of discrimination regarding physical performance of older adults.

This chapter is a reminder that in science, no single study settles a question. Claims must be tested, scrutinized, and replicated under diverse conditions to build reliable knowledge.

Chapter 26

Hot Coffee Effect

written by Aslı Ay Arat (original draft), and Aswathi Surendran (revision)

26.1 The Classic

Our environment often exerts strong influences on us. For instance, seasonal changes in sunlight hours can seriously affect mood and wellbeing (e.g., seasonal affective disorder), and people tend to be more willing to make donations in December (also referred to as the Christmas effect).

> #yourturn
>
> How does your current environment affect you? Take a moment to reflect!

Much psychological research is interested in how environments shape human behavior, our thinking and what we feel (often also considered in interaction with person-specific variables). One subfield has dedicated research on embodied cognition – the idea that bodily states influence what and how we think and feel (Chabris et al., 2019). The assumption is that the environment acts on the mind, via the body.

> #yourturn
>
> Based on the principles of embodied cognition, how might working in a cluttered or messy room affect someone's ability to concentrate or study?

In a 2008 study, researchers L. E. Williams & Bargh (2008) worked on a related question. They wanted to know if temperature – a salient feature of the environment if you think about how often conversations are centered on the weather – affected how people are perceived. They hypothesized that "physical warmth

should activate concepts or feelings of interpersonal warmth" (L. E. Williams & Bargh, 2008, pg. 3).

> #definition Psychological Warmth
>
> The sense that another person is friendly, kind, and has good intentions. It is one of the two central dimensions we rely on when forming first impressions, the other being competence. People tend to notice warmth quickly and often use it as a basis for deciding whether someone is trustworthy. Importantly, research suggests that experiences of physical warmth can subtly shape these social judgements (Fiske et al., 2007; L. E. Williams & Bargh, 2008).

The researchers asked undergraduate subjects to hold either a warm cup of coffee or iced coffee in their hands while writing down information. The expectation was that the concepts of warmth (or coldness) would be primed due to the physical experience of the temperature of the coffee, making it more likely that a person was correspondingly perceived as warm (or cold).

> #definition Priming
>
> A psychological phenomenon where exposure to one stimulus (e.g., a word, image, or idea) influences how you respond to a later stimulus, often without conscious awareness.

In the first part of the study, participants were undergraduate students at Yale University. They were asked to hold either a warm cup of coffee or an iced coffee while evaluating a fictional individual described in a personality profile. Those who held the warm beverage rated the individual as significantly more "interpersonally warm" compared to those who held the cold beverage (L. E. Williams & Bargh, 2008). This result was interpreted as evidence that the feeling of physical warmth can unconsciously bring to mind the idea of social warmth. In other words, holding something warm made people more likely to see the person in the profile as kind and friendly.

In a follow-up study, participants were asked to hold either a heated or a cold therapeutic pad, under the impression that they were simply evaluating the product. Afterwards, they were given a choice of reward for taking part in the study. They could either select a gift for themselves (such as a drink voucher or an ice cream certificate) or choose the same type of gift for a friend. The results showed a clear pattern. Those who had held the warm pad were more likely to pick the gift for a friend, while those who had held the cold pad tended to choose the gift for themselves. This finding suggests that physical warmth does not just influence how we see other people, but can also affect our own behaviour, making us act in a more generous or prosocial way.

> #yourturn
>
> What do you think: How are physical warmth and prosocial giving related?

The researchers expected that physical warmth would lead to more generous behavior because our early life experiences often connect warmth with comfort, safety, and care from others. For example, being held close by a caregiver usually involves both physical warmth and feelings of trust and affection. Over time, these experiences create an unconscious link between physical warmth and social warmth.

In the study, participants who were in the warm condition were more likely to make the generous, prosocial choice of giving a gift to a friend, rather than keeping it for themselves. Together, these findings suggest that physical warmth can unconsciously activate ideas of social closeness and trust. This supports the broader idea that common expressions like calling someone "cold" or "warm" are not just figures of speech but may reflect real psychological processes.

From this we could conclude that physical warmth can lead to perceiving others as "warmer" people and it also makes us "warmer" and more generous.

26.2 The Aftermath

Given the striking and intuitive appeal of the original findings, they received significant media attention and were cited widely. However, as concerns about replicability in social psychology grew, so did scrutiny of the hot coffee study. Scientists emphasized that the hypothesis that hot coffee makes you generous is worth testing again, as the original had several methodological flaws. A major limitation of the original research was the small sample size. The two studies included only 41 and 53 participants, respectively. Small samples increase the risk that results reflect random variation rather than a genuine effect, which reduces the reliability of the conclusions. In other words, findings based on so few participants may not hold up when tested with larger groups.

A second issue was that the participants were not representative of the wider population. They were all undergraduate students from one university in New York State. College students often share similar age, education level, and cultural background, which means the findings might not apply to older adults, children, or people from other places and backgrounds.

> #definition Representativity or Representativeness
>
> The extent to which a study sample reflects a well-defined target population, such that the estimates or the interpretation of results can be generalized to that population (Rudolph et al., 2023).

Replication studies attempted to address these limitations by recruiting larger samples, with more than three times the original number of participants, and by selecting more diverse populations. These methodological improvements provided stronger statistical power and greater external validity, allowing researchers to test whether the effect was robust beyond the narrow conditions of the original experiments.

Multiple high-powered replication attempts have since failed to reproduce the original effects. In 2014, Lynott and colleagues conducted a multi-lab replication of the first Williams and Bargh experiment. A multi-lab replication is when several independent research groups carry out the same study using a common protocol. This approach reduces the likelihood that the outcome is due to local conditions or the influence of a single research team. Across a larger and more diverse sample, Lynott et al. (2014) found no evidence that holding a warm object influenced social judgments.

In 2018, Chabris et al. (2019) attempted to replicate the findings of L. E. Williams & Bargh (2008) using more rigorous methodology. Their studies addressed several shortcomings of the original. The first studies used very small samples (41 and 53 people), which makes results unstable and prone to influences of chance. Chabris et al. tested much larger groups, giving their findings more statistical power. The original participants were all college students, limiting generalisability; the replication recruited a more diverse public sample. The original studies also took place in a lab with experimenters aware of conditions, raising concerns about artificiality and bias. Chabris et al. tested participants in a natural field setting and used double-blind procedures. Despite these improvements, and contrary to the original claims, they found no evidence that holding a hot or cold object influenced participants' judgments or generosity. In other words, the replication showed no evidence that physical warmth affected behaviour or perceptions (Chabris et al., 2019).

> #yourturn
>
> What could be the cause for a differing result?

The replication researchers, however, do not conclude that hot coffee does not make people generous. Instead, because they found null effects, they concluded that there was no evidence for such an effect. Using a different statistical approach, they found that the evidence actually favored the interpretation that there was no effect, and not the interpretation that they might have missed detecting the original effect.

Some later research has suggested that warmth effects might still exist, but only under specific conditions. A study by Citron & Goldberg (2014) found that physical warmth increased perceptions of interpersonal kindness only in neutral social contexts. When participants read about someone behaving negatively, the warmth manipulation had no effect. This suggests that the influence of physical warmth on social judgment is not universal, but shaped by the surrounding social context.

26.3 Conclusion

The Hot Coffee study (L. E. Williams & Bargh, 2008) sparked fascination with the idea that physical sensations shape social judgments. However, over a decade

of follow-up research has largely failed to replicate these findings reliably. While the metaphor of warmth remains powerful in language and intuition, its psychological effects appear to be fragile, context-sensitive, and not easily reproduced under stricter experimental controls.

This case illustrates an important lesson in psychological science: even intuitively satisfying findings must be rigorously tested, replicated, and interpreted within a broader theoretical and methodological context. The story of this study also reflects a broader shift in psychology: moving away from surprising, single-study findings toward replication, cumulative evidence, and methodological transparency.

> #yourturn
>
> Which study seems more convincing to you? Why?

More broadly, this debate encourages us to reflect on the role of the environment in shaping human behaviour. Findings like the Hot Coffee study suggest that seemingly minor physical cues might influence judgments and actions, but the difficulty in replicating these effects shows that such influences are neither simple nor uniform. Environmental factors may interact with individual differences, situational contexts, and cultural expectations in ways that make their effects less predictable than early studies implied. Our thoughts and actions could be shaped in subtle ways by the contexts we are in. The challenge for psychology is to determine which of these effects are robust, meaningful, and practically relevant, and which are not.

Chapter 27

Power Posing

written by Sarah von Götz (original draft), and Hilmar Brohmer (revision)

27.1 The Classic

Imagine you are nervous before a presentation or job interview. Wouldn't it be great if there was a quick and simple solution to make yourself feel confident and powerful, potentially even on a hormonal level, and it only takes a couple of minutes of your time? Wouldn't that be great? This is the promise of the effects of *power posing*, which is the practice of standing in a "powerful pose" (imagine Wonder Woman) for a couple of minutes to change how powerful you feel.

> #yourturn
>
> If you feel up to it, try it yourself! Set a timer for one minute and stand up straight and take up as much space with your body as you can. After the minute is over, take a second to notice how you feel. Do you feel more confident or powerful than before? Maybe even less stressed?
>
> #definition Power Posing
>
> Behavioral technique where a person assumes and holds an open pose that is associated with being powerful through taking up space in a room. This is intended to make you feel more confident and powerful.

This practice was first suggested in a 2010 paper by Dana Carney, Amy Cuddy and Andy Yap (Carney et al., 2010). The claim of this paper was that humans, like other animals, express power and dominance through their posture, with high power being expressed by open and expansive postures and low power (or

obedience) being expressed by closed, contractive postures, where they make themselves small. Following the idea of embodiment, the authors expected that such poses would have effects on participants' feelings, behavior and their physiology.

> #definition Embodiment
>
> The idea that the mind and body influence each other, so that the body plays a significant role in shaping how we think and feel.

In their original experiment the authors had 42 participants, who either assumed two "high-power" poses, such as sitting stretched out with their hands behind their head and their feet on a desk, or two "low-power" poses such as standing with both arms wrapped around themselves. Each pose was held for a minute. Afterwards, participants were first presented with a risk assessment task, where they could either keep 2$ or gamble them on a higher reward. The authors also asked participants how powerful they felt on a rating scale from 1 (not at all) to 4 (a lot). Additionally, they measured participants' cortisol (a hormone associated with stress levels) and testosterone (a hormone assumed to be connected to dominant behaviors) before and after assuming their poses.

> #definition Cortisol
>
> Cortisol is often called the "stress hormone", since it regulates your body's response to stress. During stressful events it spikes and activates the body's fight or flight response, meaning that you are on high alert to deal with a potential threat.
>
> #definition Testosterone
>
> Testosterone is a hormone mainly associated with reproduction and physical development. It might be associated with certain behaviors such as competitive behavior, dominance, or aggression, although this depends on the situation and the individual. For a more recent article on the influence of hormones on psychology see Botzet et al. (2024).

As the authors hypothesized, the high-power poses seemed to cause an increase in testosterone and a decrease in cortisol, while the low-power poses showed a decrease in testosterone and an increase in cortisol. Participants in the high-power group were also more likely to take the gambling risk and subjectively felt more powerful and "in charge". The authors concluded that this could have substantial implications for everyday life, since assuming certain poses seemed to significantly change people's physiology, mental state, and feelings. This means that if you can change how powerful you feel, your behavior, and even your hormones through your body position, you may be able to use this to your advantage. The hormonal changes would mean that, because of the lowered cortisol, you feel less stressed, and that the higher testosterone levels make you behave more dominantly. The authors therefore concluded that their results imply that people can use power posing to "fake it till you make it"

in situations that require power, such as job interviews, disagreeing with their bosses, public speaking, or taking profitable risks.

27.2 The Aftermath

Power posing very quickly entered the public sphere following a 2012 TED Talk by the original study author Amy Cuddy titled Your Body Language May Shape Who You Are, which to this date is one of the most watched TED-talks of all time (Cuddy, 2012). Power posing was also widely reported in popular media, and Cuddy later published a self-help book based on the idea that adopting confident body language could improve performance and well-being (Cuddy, 2015).

However, an independent replication study in 2015 (Ranehill et al., 2015) that had a larger sample of N = 200 and a more controlled research design, where the researchers were blind to the conditions they assigned their participants to, could only replicate the finding that participants subjectively reported higher feelings of power in the power posing condition, but no statistically significant hormonal changes or behavioral differences were found.

Following this, methodologists took note of the original study and started criticizing the growing power posing literature as suffering from small sample sizes, low statistical power, and likely selective reporting (Simmons & Simonsohn, 2017). Moreover, one of the original study authors, Dana Carney, released a statement regarding the original study that she did not believe the effects of power posing were real (Carney, 2016).

> #definition Statistical Power
>
> Statistical power is the probability that a study will detect an effect (a real relationship) if that effect actually exists.

A more recent meta-analysis based on 88 studies involving 9,779 participants (Körner et al., 2022) found effects of body position on self-report measures (such as "feeling powerful") but no reliable effects on physiological outcomes. There was some evidence for behavioral effects, but the authors also found that these findings were likely influenced by publication bias. To this day, it is also still unclear whether high power poses or low power poses drive the effect, since most studies did not have a neutral pose control group.

> #definition Publication Bias
>
> The phenomenon that research findings are more likely to be published when the results are statistically significant.

27.3 Conclusion

The original claim that power posing changes people's physiology, mood and behavior has become somewhat of an example of the replication crisis in social psychology, where findings that initially appeared compelling sometimes are "too good to be true". The original claim of hormonal changes and risk-taking behavior did not hold up to replication (Ranehill et al., 2015) and even one of the original study authors, Dana Carney, stated that she no longer believes in the effects of power posing (Carney, 2016). There is, however, some evidence that adopting expansive body postures increases people's self-reported feelings of power (Körner et al., 2022). However, because these findings rely on self-report measures, they may be susceptible to demand effects, which is the subject of an ongoing scientific debate.

> #definition Demand Effects
>
> Sometimes people participating in an experiment interpret what the experiment is supposed to measure and what the researcher expects. This can lead to them consciously or subconsciously changing their behavior to what they think is expected of them.

Overall, the best available evidence suggests that power posing may influence how powerful people report to feel, but there is little convincing evidence that it reliably changes hormones or produces broad changes in behavior.

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Glossary

Adversarial Collaboration

A research project where researchers have different views and predictions, or support opposing theories.

Agentic State

The agentic state is a psychological condition where individuals see themselves as agents executing the wishes of an authority figure, thereby absolving themselves of responsibility for their actions.

A priori power analysis

Before a study is conducted ("a priori"), researchers use a statistical method to estimate the minimum sample size needed to reliably detect a specified effect size. Often, researchers aim for tests that have at least 80% power, that means that the tests can correctly reject a null hypothesis when it is false in at least 80% of cases. This analysis guides the determination of the planned sample size.

Attitude

The cognition, affect and behavioral tendencies towards a certain object.

Availability Heuristic

A mental shortcut where people estimate the likelihood of an event based on how easily examples come to mind, which can lead to overestimating rare but memorable occurrences.

Betrayal Aversion

The tendency for people to feel greater harm or distress from a negative outcome caused by another person's deliberate choice than from an equally bad outcome caused by chance or an impersonal source.

Bias

A systematic distortion of perception or judgment.

Bystander Effect

When others (bystanders) are thought to be present, this delays or even fully undermines prosocial behavior.

Causal Relationship

A causal relationship refers to the situation when an event is the direct result of a preceding event. In the research context, causal relationships occur when the manipulation of an independent variable causes and explains the observed effects in a dependent variable that would otherwise not occur. Conversely, correlation is a statistical measure that describes the magnitude and direction of the relationship between two or more variables. In contrast to causal relationships, correlation does not imply that changes in the independent variable will automatically lead to and explain the observed effects in the dependent variable.

Ceiling Effect

A ceiling effect is said to occur when a high proportion of subjects in a study have maximum scores on the variable.

Cherry-Picking

Reporting only the data, outcomes, or time frames that support one's hypothesis while ignoring or dismissing those that do not. This makes the story or articles simpler and might make them more publishable, but provides a distorted view of the evidence.

Cognition

Cognitions can be thought of as bits of knowledge, such as opinions, attitudes, or beliefs about the world, about oneself or one's behavior. If two cognitions are relevant to each other, but the opposite of one follows from the other, these cognitions are said to be inconsistent.

Cognitive Dissonance

Cognitive dissonance describes the discomforting state that people experience when they hold cognitions that are relevant to each other but inconsistent with each other—meaning that one bit of knowledge suggests the opposite of another bit of knowledge.

Conceptual Replication

A study that aims to recreate the gist of a prior study without using an identical procedure. These studies often aim to explore boundary conditions, the influence of specific variables, or aim to broaden and extend a certain finding.

Confederate

A confederate is a person who is secretly working with the experimenter and plays a scripted role in the study.

Confederate

In some experiments, researchers are interested in the behavior of participants given very specific social settings, and very specific behavior of others. Because it can be difficult to observe these settings in a naturally occurring environment - particularly if they also need to be varied systematically to conduct an experiment - sometimes confederates are engaged to carry out these specific behaviors. In other words, they are not real participants in the study, they are hired helpers who act in accordance with the experimental setup.

Confirmatory Study

A research investigation that tests (often preregistered) hypotheses derived from theory or prior empirical research.

Contact Interventions,

Carefully tailored interventions that apply intergroup contact in real-world settings to try and reduce prejudice among social groups.

Construct Validity

The extent to which a test measures the theoretical construct or concept it is intended to measure.

Correlation

Two variables are said to correlate when there is a relationship between the two, where one increases or increases as the other does, too, or one increases as the other falls. The degree to which these variables move together is expressed as the size of the correlation coefficient, which ranges from 0 (no correlation) to abs(1) (perfect correlation).

Correlation r

Correlation r typically refers to two metric variables that co-vary (increase or decrease together), expressed in a standardized effect size Pearson correlation

coefficient r. An r = 1 (-1) refers to perfect positive (negative) association between these two variables, whereas effects near zero reflect no association. Small to medium- sized correlations are typically in the range of 0.10 to 0.30 (Cohen, 1988).

Cortisol

Cortisol is often called the "stress hormone", since it regulates your body's response to stress. During stressful events it spikes and activates the body's fight or flight response, meaning that you are on high alert to deal with a potential threat.

Demand Characteristics

These are cues in an experiment that give away what the researcher expects, which can lead participants to change their behavior to fit those expectations.

Demand Effects

Sometimes people participating in an experiment interpret what the experiment is supposed to measure and what the researcher expects. This can lead to them consciously or subconsciously changing their behavior to what they think is expected of them.

Descriptive Norms

Descriptive norms refer to what people believe is the description of group behavior (decisions based on limited information may generate misperceptions; thus, perceived norms do not necessarily reflect actual group behavior), whose main influence on behavior is of informative nature.

Discriminant Validity

The extent to which a test is unrelated to measures designed to assess theoretically distinct constructs.

Dual Process Theories

A set of theories that distinguish human thought into two sub-systems: a fast, intuitive system (System 1) and a slow, deliberate system (System 2). The former appears to be independent of cognitive control, whereas the latter is effortless and relies on working memory and cognitive capacity.

Dynamogenesis

An increase in the mental or motor activity of an already functioning bodily system that accompanies any added sensory stimulation.

Effect Size

In statistics, the effect size refers to a value that indicates the magnitude of the relation between independent and dependent variable. In factorial designs (experiments), the effect size gives us information on how large the difference between groups is.

Effect Size

A quantitative measure of the magnitude of a phenomenon, used to assess the practical significance of research findings.

Editorial

An introductory article written by the editors of a special issue in an academic journal. It outlines the purpose, scope, and significance of the special issue, provides an overview of the included articles, and often highlights key themes, trends, or gaps in the research field.

Ego Depletion

A concept that describes willpower as a limited resource that can be used up (depleted).

Embodiment

The idea that the mind and body influence each other, so that the body plays a significant role in shaping how we think and feel.

Environment of Evolutionary Adaptedness

The Environment of Evolutionary Adaptedness refers to the ancestral environments in which human psychological adaptations evolved over many generations. It describes the selection pressures that shaped the human mind, rather than a specific place or time, and helps explain why some evolved traits may not always fit modern environments (Tooby & Cosmides, 1990).

Evolutionary Psychology

Evolutionary psychology is the study of how the human mind and behavior may have been shaped in our evolutionary past (in the Environment of Evolutionary Adaptedness). It suggests that many psychological traits, emotions, social behaviors, and decision-making tendencies, are influenced by evolved adaptations (or byproducts from adaptations), while recognizing that culture, learning, and individual experiences also play important roles (Buss, 2024).

Experiment (Intergroup Contact Theory, Hot Coffee Effect)

A study where researchers deliberately manipulate one or more variables and randomly assign participants to different conditions. Random assignment helps ensure the groups are similar before the intervention, so differences in outcomes are more likely to be caused by the manipulation rather than by pre-existing differences.

False Consensus Effect

A cognitive bias where individuals overestimate the extent to which others share their beliefs, preferences, and behaviors.

Foot-in-the-door

Foot-in-the-door is a two-step procedure for enhancing compliance in which a minor initial request is presented immediately before a more substantial target request. Agreement to the initial request makes people more likely to agree to the target request than would have been the case if the latter had been presented on its own.

Forced-Compliance Paradigm

A very early paradigm of cognitive dissonance initially stemming from the persuasion field where participants are asked to perform a discrepant behavior (mainly a speech or essay), being more or less incentivized for doing it. Classic studies (e.g., Festinger & Carlsmith, 1959) report counter-intuitive results showing more attitude change when paid a small amount of money in comparison to a bigger amount. This contradicted predominant theoretical frameworks at the time, such as the reinforcement theory (Skinner, 1958), which would have predicted that people adjust their attitudes especially when they receive a high reward.

Framing Effect

People sometimes make different judgments or decisions depending on *the way relevant information* is presented, even though the underlying facts remain unchanged.

Gender Inclusive Language

Gender inclusive language is a tool of grammatical structure to transform the way we think, eliminating gender biases and ensuring visibility, belonging, and identity of all people.

Gender Star

Gender star is an inclusive typography resource (:, *, @, x, e) that breaks away from traditional linguistic structures. Its function is to simultaneously make men, women and diverse identities visible within a single word, challenging the norm of the generic masculine.

Generalized Drive

The presence of others leads to an increase in generalized drive, thus facilitating habitualized dominant responses.

Generic Masculine

The generic masculine is a linguistic form that uses the masculine grammatical gender to designate men, women, mixed groups, and unspecified individuals, often reducing visibility and inclusion of women and non-masculine identities.

Group Cohesion

Group cohesion describes how connected and committed people feel to the group.

Groupthink

A psychological phenomenon that occurs when members of a group strive for consensus and harmony, often at the expense of critical thinking or considering alternative options.

Habituation

Habituation is a phenomenon where we get used to a stimulus, following its repeated exposure. As a consequence, the reaction to the stimuli is reduced.

HARKing

HARKing is Hypothesizing After the Results are Known and where a lucky guess looks like a solid scientific theory. It violates the principle that a theory should be able to *predict* behavior, not just describe it after the fact.

Heuristic

Heuristics refer to simple processes that assist individuals to identify adequate, but imperfect, answers to complex questions (Kahneman, 2011).

Implicit Association Test

A reaction-time task that measures the strength of automatic associations between concepts (e.g., flowers and positivity) by comparing how quickly people

classify paired categories. Faster responses indicate stronger underlying associations.

Implicit Attitude

An enduring mental disposition toward something that is not consciously identified and of which a person may lack awareness.

Implicit Social Cognition

The automatic, unconscious mental processes that influence how we perceive, evaluate, and interact with others.

Incongruent Association

A mental relationship between two objects or concepts characterized by lack of harmony or misalignment.

Induced-Compliance Paradigm

An evolution of the forced-compliance paradigm (Linder et al., 1967) where participants have to perform a behavior that is inconsistent with their attitudes—typically writing or delivering a counter-attitudinal essay. In this version, all participants engage in the discrepant task, but they differ in the justification provided. Half are explicitly told they have a free choice in performing the task (freedom condition), while the other half are simply asked to do it, as in the original forced-compliance paradigm. The key difference lies in the source of justification: an external incentive in the traditional condition, versus perceived freedom of choice in the revised one. The classic results show a greater change in the attitude in the choice condition (high choice) compared to the control condition (low choice).

Ingroup

One's own social group (as opposed to other groups, called outgroups).

Injunctive Norms

Injunctive norms refer to what people believe a group approves or disapproves of, -the ought-, whose influence is manifested through the group's normative pressure.

Intergroup Bias (Intergroup Contact Theory, Hot Coffee Effect)

Tendency to favour one's own social group (ingroup) over other groups (outgroups), which often leads to negative attitudes or behaviours toward outgroup members.

Internalized Norms

An internalized norm consists of a social expectation that a person has incorporated into their beliefs and values. Thus, when a norm is internalized, it influences behavior without relying on external social pressure.

Intuitive Behavior

Behavior that occurs through automatic, prepotent and effortless cognitive operations. Commonly referred to as "System 1", these mental operations are fast, associative and hard to control (Kahneman, 2002; Stanovich & West, 2000).

Mahalanobis Distance D

Mahalanobis Distance D is a statistical method often used to calculate the distance of a data point from a multidimensional center (centroid). That way, it is also the preferred technique to calculate the standardized difference between group means when multiple outcome variables are considered, rather than a single outcome variable, for which Cohen's d is typically used (Del Giudice, 2009).

Meta-Analysis

An analysis that brings together evidence from several individual studies or experiments to estimate an overall effect across the available evidence.

Meta-analysis (Intergroup Contact Theory, Hot Coffee Effect)

A statistical technique that combines the results of multiple independent studies to estimate an overall effect. Meta-analyses can reveal patterns across a large body of research, but the quality of their conclusions depends on the quality and comparability of the included studies.

Meta Analysis

A meta analysis is a study that combines the results of many studies to assess the overall evidence regarding a research question.

Minimal Group Effect

An inclination to favor one's own group even when group membership is weak or superficial, there is no history of intergroup conflict, and there is a lack of member interaction or conflicting interests.

Moderator

A variable that modifies the relationship between independent and dependent variables.

Motivation

Motivation encompasses internal and external factors that initiate and sustain behavior in service of a goal.

Multi-Lab Study

A research project in which researchers working at several different locations (laboratories) implement the same experimental design and then analyse the data together.

Multi-laboratory Study / Many-labs Study

A teamwork approach where researchers from different institutions follow the same protocol to run the same experiment and assess whether results replicate across sites.

Multimethod Study

Research that employs two or more distinct methods.

Norms

These are shared rules or expectations within a group about how members should think, feel, or behave. They guide behavior by defining what is considered acceptable or unacceptable in that social context.

Obedience

Obedience is the act of following orders or instructions from an authority figure, often without questioning the morality or consequences of those actions.

Observational Research

A study design where researchers measure variables as they naturally occur, without manipulating them. Observational studies can reveal associations between variables but cannot, on their own, establish that one causes the other.

Open Science

An overhead term for a number of practices to make research more transparent, such as making the data a research project is based on available to others.

Orbicularis Oris Muscles

These are circular muscles around the mouth that close the lips and produce puckering, as in kissing or whistling.

Paradigm

Within Kuhn's (1962) tradition, a paradigm transcends mere methodological procedure, constituting instead a foundational scientific framework that combines theoretical principles, methodological standards, and empirical expectations. This comprehensive system guides scientific practice by providing explanatory models and predicting experimental outcomes. The paradigm's coherence depends on the alignment of these elements—when empirical results contradict theoretical predictions or methodological applications fail to produce expected findings, the entire paradigm faces fundamental challenges.

Paradigm

The term paradigm refers to "the set of common beliefs and agreements shared between scientists about how problems should be understood and addressed" (Kuhn, 1962). Paradigms reflect the assumptions associated with the state-of-affairs. In the experimental context, these assumptions directly shape the methodological strategies employed to address a research question and influence the interpretation of empirical findings.

P-Hacking

P-Hacking is the practice of manipulating data analysis until non-significant results ($p > .05$) become statistically significant ($p < .05$).

Positive-Negative Asymmetry Effect

Individuals tend to discriminate more when given positive outcomes (e.g., money or points) than when given negative outcomes (e.g., fines).

Power Analysis

A power analysis is used in research to estimate the probability that an effect, if it does exist, could be found in the data given. Usually, a power analysis is conducted to estimate the minimum sample size needed to detect a certain effect before running the study (a priori).

Power Posing

Behavioral technique where a person assumes and holds an open pose that is associated with being powerful through taking up space in a room. This is intended to make you feel more confident and powerful.

Precognition or Premonition

The conscious cognitive awareness or affective apprehension of a future event that could not otherwise be anticipated through any known inferential process (Bem, 2011).

Prejudice

A negative attitude toward a group and its members, often based on stereotypes rather than direct experience.

Pre-registration

The process of formally specifying the hypotheses, methods, and planned analyses of a study before any data is collected or examined. Preregistration distinguishes genuine predictions from post hoc explanations, fosters transparency, and increases the credibility and interpretability of research findings (Nosek et al., 2018; Van Den Akker et al., 2023).

Pre-registration

Pre-registrations are documents outlining the research plan (materials, analyses) and hypotheses prior to the research being conducted.

Priming (Florida Priming Effect, Hot Coffee Effect)

A psychological phenomenon where exposure to one stimulus (e.g., a word, image, or idea) influences how you respond to a later stimulus, often without conscious awareness.

Priming

Priming refers to the effects of a subtle cue on future behavior. The primed stimulus works by activating related concepts and making them easier to access. Typical priming techniques include the very short exposure of participants to a visual, auditory, olfactory, or haptic cue. For instance, presenting the word "lion" may lead to faster categorization of the word "cat" because the two concepts represent the same "animal" category.

Priming

"Priming refers to facilitative effects of an encounter with a stimulus on subsequent processing of the same stimulus (direct priming) or a related stimulus (indirect priming)" (Tulving et al., 1982, p. 336).

Prosocial Behavior

Behavior where people help others, even at a cost to themselves.

Prosocial Behavior

Prosocial behavior refers to the voluntary actions aimed at benefiting others, including sharing, helping, and confronting (Eisenberg & Fabes, 1998).

Prospect Theory

Prospect Theory is a framework of assumptions about how people perceive subjective value and probability, deviating from objective numerical values/probabilities. It assumes that losses unfold a more negative effect than gains do a comparably positive effect: Finding € 20 on the streets likely feels good, but would not weigh as heavily as the negative feeling of losing € 20 by accident. It also assumes that small probabilities are overestimated.

Psychological Reactance

Psychological reactance states that individuals have certain freedoms with regard to their behaviour. If these behavioural freedoms are reduced or threatened with reduction, the individual will be motivationally aroused to regain them.

Psychological Warmth

The sense that another person is friendly, kind, and has good intentions. It is one of the two central dimensions we rely on when forming first impressions, the other being competence. People tend to notice warmth quickly and often use it as a basis for deciding whether someone is trustworthy. Importantly, research suggests that experiences of physical warmth can subtly shape these social judgements (Fiske et al., 2007; L. E. Williams & Bargh, 2008).

Publication Bias (Scientific Research in Social Psychology, Power Posing)

Publication Bias is the tendency for journals to publish only "positive" results (studies where something happened) while ignoring "null" results (studies where nothing happened).

Publication Bias

Refers to distortions in which publications with significant results are more likely to be published than studies with non-significant results.

Publication Bias

The phenomenon that research findings are more likely to be published when the results are statistically significant.

Public Goods Game

Public Goods Games (PGG) refer to multi-player experimental scenarios in which individuals are required to suppress selfish behavior and cooperate to attain a mutually beneficial outcome. In this design, individuals can choose to voluntarily contribute to a common pool that will be multiplied and equally distributed across all group members. Individuals who do not contribute may

free-ride on the contribution of cooperators which imposes the risk of exploitation. Although avoiding contribution is commonly rewarded in PGG, if the number of defectors is large no collectively beneficial outcomes are achieved (Gómez-Gardeñes et al., 2011; Tomassini & Antonioni, 2020).

Pygmalion Effect

The phenomenon in which higher expectations from others lead to improved performance.

Questionable Research Practices (QRPs)

Questionable research practices are actions that fall into a "grey area" between honest errors and outright fraud. They are often described as "p-hacking" or "data dredging" methods used to make a study's results look more significant or consistent than they actually are.

Questionable Research Practices (QRPs)

Unethical behaviors in research which produce unreliable results and reduce the validity of the findings.

Reflective Behavior

Reflective behavior is supported by "System 2" and relies on effortful and slow mental operations that are deliberately controlled through reason (Kahneman, 2002).

Registered Report

A publishing format where peer review comes before researchers conduct the study. Research first submit Introduction and Method sections, alongside the detailed hypotheses and plan of data analysis to test them. Only after this phase (Stage 1 Registered report) is reviewed and accepted, researchers start collecting the data and write the full report (Stage 2). This ensures that theoretically valuable and methodologically sound research is published regardless of the results.

Replication

An attempt to find the same result as a previous study in a new data set.

Replication

Replication involves repeating a study using the same methods and sample size to see whether the results hold up. Replications help identify which findings are reliable and support the self-correcting nature of science.

Representativity or Representativeness (Florida Priming Effect, Hot Coffee Effect)

The extent to which a study sample reflects a well-defined target population, such that the estimates or the interpretation of results can be generalized to that population (Rudolph et al., 2023).

Responsible Research Practices (RRPs)

Practices that researchers or journals can do to increase the credibility, transparency, and reproducibility of scientific findings.

Salience

Salience describes the characteristic of a stimulus to stand out. For instance, a word printed in red is visually salient in a text otherwise printed in black and white: it stands out.

Selection Bias

Selection bias occurs when the participants selected for the study are not representative of the wider population, which can distort the research findings.

Self-Fulfilling Prophecy

A self-fulfilling prophecy suggests that the probability of an event occurring can be increased solely by the expectation of that event (Merton, 1948).

Scientific Method

The universal, step-by-step logical framework that underlies all scientific inquiry. The scientific method is a defined, step-by-step process for investigating phenomena. It is a formalization of a generalized human problem solving process.

Scientific Process

The specific methods and approaches (e.g., saw for the table or surveys) that scientists use based on their specific field and matter. Various methods and approaches scientists use to investigate phenomena in their pursuit of knowledge.

Social Comparison Theory

According to the social comparison theory, people are motivated to assess their own beliefs and skills by comparing them to external images. These images can be comparisons to other people or a reference to physical reality. Individuals have a tendency to view images portrayed by others as accessible and realistic and subsequently make comparisons between themselves, other people, and these idealized images.

Social Desirability

The tendency to want to be viewed positively by others, often by aligning with socially approved behaviors and attitudes.

Socially Desirable Responding

The act of providing inauthentic responses to better present oneself favorably according to current social norms.

Social Dilemma

Social dilemmas refer to a set of scenarios in which individual and collective interests are mutually exclusive, yielding a conflict between selecting strategies that increase personal over collective benefits. Although selfish decisions are typically rewarded, personal gains are reduced if a substantial number of individuals aim for maximum gains (*APA Dictionary of Psychology*, 2018).

Social Dominance Orientation

The belief that society should be organized hierarchically, which endorses hierarchy and legitimizes myths such as sexism, racism, classism, etc.

Social Group (Minimal Group Effect, Stereotype Threat)

A social group consists of two (often called a dyad) or more individuals who depend on each other and influence each other through their social interactions.

Social Heuristics Hypothesis

A dual-process theoretical framework illustrating that social decision-making lies on internalized strategies that are considered advantageous in social encounters. People employ these intuitive responses in typical and atypical contexts. Under uncertain conditions, automatic responses may be overridden by effortful and evaluative processing that yields context-appropriate responses (Rand et al., 2012).

Social Loafing

Social loafing or the Ringelmann effect refers to the decrease in individual effort that occurs when people work as part of a group rather than independently.

Social Norm

A social standard that enables the evaluation of behaviors as appropriate or inappropriate within a specific context.

Social Role Theory

Social Role Theory proposes that many differences in the behavior of women and men arise because societies assign them different social and gender roles, responsibilities, and expectations. It argues that these roles shape people's skills, attitudes, and behaviors through socialization and opportunities, rather than being primarily the result of evolved psychological and biological differences (Eagly et al., 2012).

Special Issue

A collection of articles on a specific topic, typically published together in a single issue of an academic journal. Special issues are often edited by guest editors and aim to provide a comprehensive exploration of the chosen theme or field of study.

Statistical Power (Scientific Research in Social Psychology, Power Posing)

Statistical power is the probability that a study will detect an effect (a real relationship) if that effect actually exists.

Stereotype

Stereotypes are beliefs about people held because of their membership in a social group.

Stereotype

A belief about characteristics of people belonging to a certain social group, attributed to them because of their group membership.

Stereotype Threat

Stereotype threat refers to an individual's fear that their own characteristics or behaviors could confirm negative stereotypes about their group.

Subliminal

Subliminal refers to the exposure of stimuli for such a short amount of time that humans are not aware of the stimuli perceived and therefore cannot actively process the information.

Testosterone

Testosterone is a hormone mainly associated with reproduction and physical development. It might be associated with certain behaviors such as competitive behavior, dominance, or aggression, although this depends on the situation

and the individual. For a more recent article on the influence of hormones on psychology see Botzet et al. (2024).

Treatment and Control Conditions (Stereotype Threat, Hot Coffee Effect)

In experimental design, treatment condition refers to the participants who are randomly chosen to undergo the intervention (e.g., to play in the mixed soccer team). Control condition refers to the participants who are subject to intervention-like treatment that lacks the critical aspect of the intervention (e.g., those allocated to play in the all-Christian soccer team). Here, the critical aspect is intergroup contact within the team.

Trust

An attitude toward others – other persons, groups of persons, and institutions – in which there is (a) an expression of vulnerability to that other, and (b) a belief that the other has the ability, the willingness, and will act in ways that benefit us in light of that vulnerability as opposed to taking personal advantage of it.

Trust Game

An experimental task used to measure interpersonal trust, in which one participant receives an initial endowment and decides how much to send to another participant. The amount sent is increased by the experimenter, and the second participant then chooses how much to return if at all. The initial transfer is interpreted as reflecting trust, as it involves risking resources under uncertainty about the other's behavior, while the returned amount is interpreted as reflecting trustworthiness as the participant chose to return the endowment that they could have easily kept for themselves.

Type I Error / Alpha Error / False Positives

Inferring from a statistical test that a certain effect exists, although it does not exist in reality.

Tyranny

Tyranny refers to a system of unequal power in which one group or its representative use authority in an arbitrary or oppressive way over another group.

WEIRD

An acronym for people from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) backgrounds. When relying on samples of WEIRD participants, scientists are looking at a unique subgroup that does not represent the general

population. This makes it difficult to claim that these findings are universal truths about human nature.

Working Memory

Working memory refers to a part of human cognitive functioning that temporarily stores information and holds available to be "worked with".

Zygomaticus Major Muscles

These bilateral facial muscles, when activated, raise the corners of the mouth in an upward and lateral direction, facilitating expressions such as smiling.

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