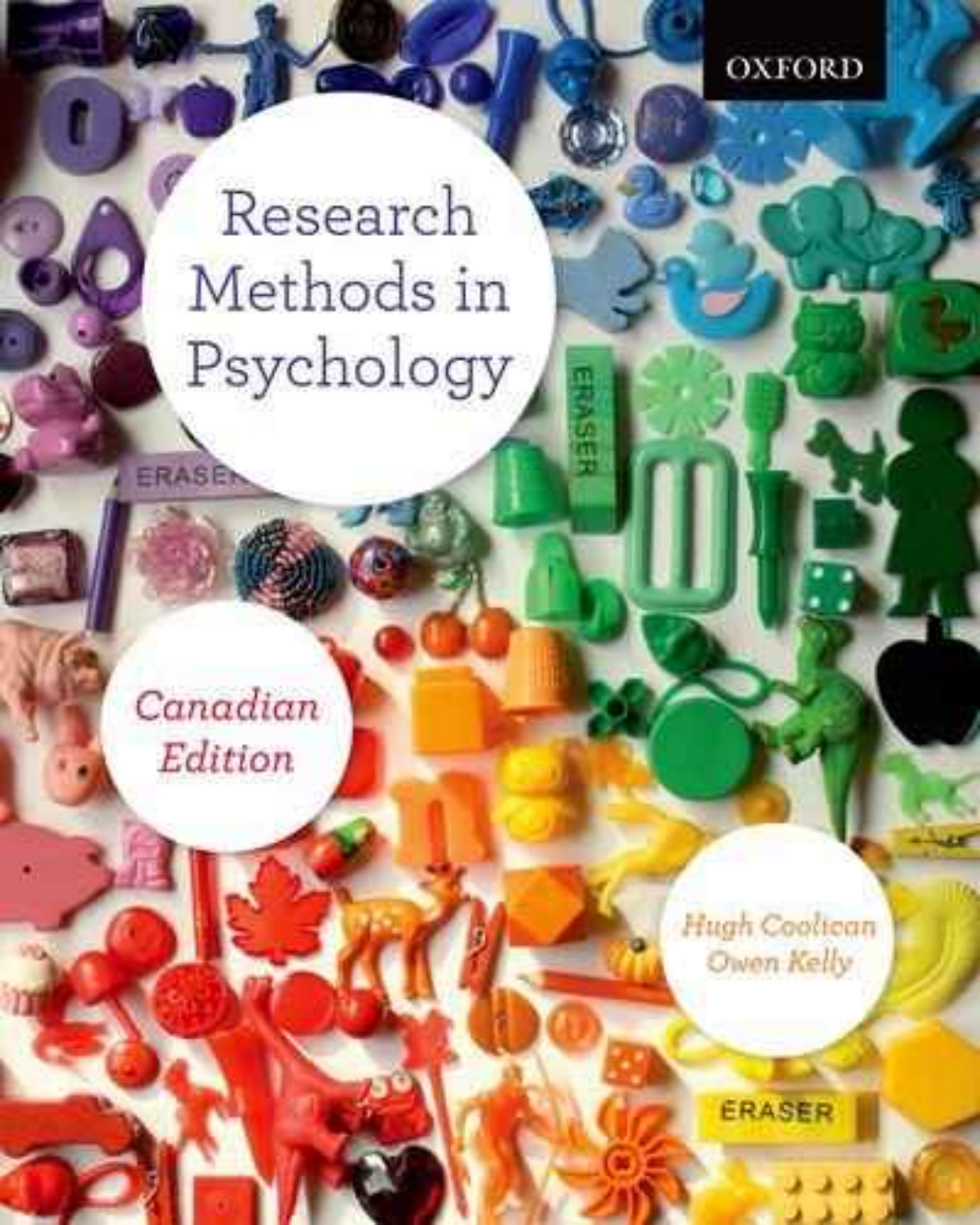
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Research Methods in Psychology
Canadian Edition
Hugh Coolican
Owen Kelly
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Brief Contents

Detailed Contents

Edition Highlights

Research Methods in Psychology, Canadian edition, presents a comprehensive examination of research methods that guides students through each stage of a research project. The text includes the following features:

Proven student-friendly approach: Coolican's bestselling text has been extensively tested by thousands of students. This Canadian edition maintains the original's engaging narrative style and its links between research methods and everyday knowledge, providing an accessible primer to behavioural studies.

Extensive Canadian coverage: To ensure that students are prepared to conduct research in a Canadian context, the text discusses this country's funding agencies, peer-review process, research guidelines, and ethics codes (including the *Canadian Code of Ethics for Psychologists* and the *Tri-Council Policy Statement*).

Practical examples: Like its predecessor, *Research Methods in Psychology* directly integrates interesting and relevant scientific examples with explanations of research methodology. This approach involves students, de-emphasizes rote learning, and illustrates how research methods skills and concepts can be applied to psychology's various subdisciplines.

Supportive pedagogy: Chapter overviews, key terms, a running glossary, Pause for Thought and Info boxes, exercises, and an answer key help students interact with the material and learn the processes required for successful research. Online ancillaries include an instructor's manual, PowerPoint slides, a Test Generator, and a student study guide.

Expert advice: Throughout, the authors guide students on how to plan and conduct studies, analyze data, use SPSS®, and report results. The text's final chapter is an invaluable resource for planning an honours thesis and writing the report.

Preface

Based on Hugh Coolican's *Research Methods and Statistics in Psychology*—a bestseller in the UK for over two decades—this Canadian edition is for psychology students undertaking practical research and writing psychological reports. Focusing on the research methods aspect of psychology, the text explores such areas as qualitative and quantitative methods, variables, samples, experimental designs, bias, observational methods, interview and survey methods, significance testing, non-experiments, comparison studies, and correlation. The subject of statistics, as well as the use of IBM® SPSS Statistics software (SPSS®) to organize and evaluate data, has certainly not been abandoned but is discussed at several points in the text, especially in Chapter 14 and in two of the appendices. Throughout the book, Pause for Thought and Info boxes provide activities and further explanations and/or examples of concepts, respectively. A running glossary, end-of-chapter exercises, and a list of key terms are featured in each chapter, with an answer key and full glossary in the back of the book.

Psychology research within a Canadian context is a major part of this adaptation. Chapters 2 and 3 thoroughly discuss funding opportunities, best practices, peer-review procedures, and ethical guidelines for conducting research in this country. Canadian examples are also used throughout the book. Finally, Chapter 15 examines the honours thesis project and report, a common requirement in Canadian psychology programs.

Like its predecessor, this edition also emphasizes the need to understand how researchers gather data in a fair and unbiased manner and how they analyze and interpret such data. To help with this understanding, the text maintains Coolican's friendly, commonsense approach and clear, concrete examples to explain otherwise abstract and sometimes complex notions.

A main premise of this book is that people have learned many of the basic principles of research methods from their everyday life. For example, you probably already know what an experiment is, what an average is, what it means when people deviate from an average, and even what the fundamentals of statistical significance are—you can probably tell intuitively when samples of girls' and boys' reading scores differ by an amount that cannot be explained by chance. Hence, you are not really starting something you know little about, even if you are wary of numbers and science. To some extent, the purpose of *Research Methods in Psychology* is to harness, formalize, and elaborate on the concepts that you already know. Further, it will enable you to spot errors in psychological studies and in the arguments of advertisers, politicians, and others who try to use numbers or "findings" to deceive you. There are several examples of such poor methods or data massaging in the text.

Another assertion is that, although many people fear the mathematical side of psychological research, the statistics involved rely on the most basic math. Even better, you can use calculators and software programs for any required calculations. Psychology is not about (re)learning addition; it's about using statistical tools to summarize data and to

show that a relationship between the data supports a particular view or theory about how people behave.

As you read this book, remember that none of the truly fascinating ideas or insights about human behaviour and experience that can be gained from a psychology course are possible without someone (many committed people, in fact) doing exactly what you are doing.

Acknowledgements

I am indebted to my early research methods and statistics professors, Chris Herdman, Brian Tansley, Jo Wood, and the late Dick Dillon, for launching my interest in research and for giving me a sound understanding of basic research principles that I continue to employ to this day.

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Along with the publisher, I thank the following reviewers, as well as those who provided anonymous suggestions, for their invaluable comments: Carolyn Ensley, Wilfrid Laurier University; Aaron Johnson, Concordia University; Joanne Wood, University of Waterloo; and Cara Zaskow, Capilano University.

As well, my sincere thanks to Heather Clark for her expertise and assistance in the adaptation for this text for a Canadian audience as well as for putting together much of the SPSS Appendix. I would also like to thank those at Oxford University Press with whom I've had the pleasure of working closely on this project with including Suzanne Clark, Sarah Francis, Janna Green, Steven Hall and Jodi Lewchuk. I have learned so much from each of you and your patience was greatly appreciated.

I would like to acknowledge my friends and family, particularly my parents, whose support has been instrumental to my personal and professional development.

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Psychology, Science, and Research

1

This chapter introduces research in psychology. We'll examine the following ideas:

- Although scientific thinking is a careful extension of common-sense thinking, using only the latter can lead to false assumptions.
- Theories in science and in psychology are not proven true but are supported or challenged by research evidence. A great deal of research attempts to eliminate variables as possible explanations and to broaden the scope of a previously demonstrated effect or to find instances where the effect does not occur.
- Most people frequently use the logic of scientific theory testing in their everyday lives.
- Psychological researchers generally follow a scientific approach that developed from the empirical method into the hypothetico-deductive method. This approach involves careful definition and measurement and the logic of testing hypotheses produced from falsifiable theories.
- Scientific research is a continual and social activity, involving promotion and collaboration among colleagues.
- Good research is replicable; theories are clearly explained and falsifiable.

Why Psychology and Science?

If you have just begun studying psychology, you may have been surprised, if not daunted, to find your professors referring to the field as a science. You probably discovered that you must conduct practical research exercises, make measurements, deal with statistics, and write up your findings as a scientific report. Many people cannot move away from their concept of science as a collection of Bunsen burners, white coats, complicated mathematical formulae, and unpleasant smells. Rest assured that the psychological "laboratory" contains none of these things and shouldn't involve difficult mathematics. Statistics are used (see Chapter 14), but they can be figured out on a standard calculator. Besides, computers and software programs can do any serious number crunching.

The main point here is that science is not about Bunsen burners and white coats. It is a system of thought that leads us to a rational explanation of how things work in the world and a process of getting closer to truths and further from myths, fables, and unquestioned or intuitive ideas about people. A further point, which is central to this book's approach, is that you already think scientifically, even if you don't realize it. We will return to this topic in a moment.

This book is primarily about the ways that psychologists establish evidence for their theories about people. It examines how they do research and the advantages and disadvantages involved in the use of alternative methods. In this chapter, we will discuss the reasons that psychology uses the scientific method and ask, "What is science and what is scientific thinking?"

Isn't a Lot of Psychology Just Simple Intuition?

Let's first address readers who think that psychology is not a physical science. After all, you might say, "We know so much about people already; surely a lot of psychology is plain common sense or pure intuition." Intuition is commonly seen as a handy short cut to truth. Figure 1.1 illustrates the intuitive thinker and the critical thinker considering the proposition that heat makes people aggressive.

Now let's look at something else that is "intuitively" known: men are more aggressive than their female partners. Plenty of psychological and criminological studies back up this statement, but it can seem that we don't really need the research because the finding is so obvious. However, we need to be careful with the detail. For instance, we might also assume, as a consequence, that males hit their female partners more often than the other way around. According to a large study by Archer (2000)—an **analysis** of many studies conducted across Canada, the United States, the United Kingdom, Israel, South Korea, and New Zealand—females in heterosexual partnerships are slightly more likely than men to use acts of physical aggression and to use them more often than men do. Males, however, are much more likely to cause injury through physical aggression.

analysis investigation of data for patterns or evidence of an effect

This result does not dispute many women's dreadful experiences with violent partners. It could mean that, in relationships that sometimes involve physical aggression, women use mild aggression but men perhaps hold back, knowing their strength. However, one of the important things about science is that you are able to check the findings and perhaps carry out your own research if you are suspicious of what they seem to show.

Why Can't We Trust Intuition?

We can't trust intuition because it depends too much on myth, stereotype, prejudice, and received but unchecked wisdom. In addition, when confronted with a new problem,

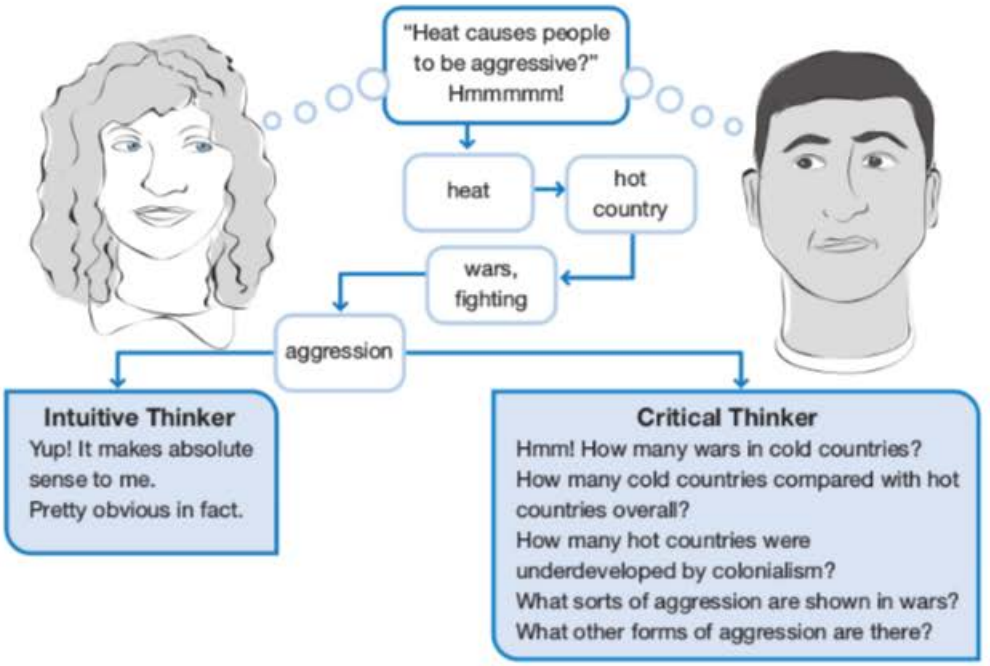

FIGURE 1.1 The intuitive thinker and the critical thinker

intuition tends to make us stick with what we know. Think about the two problems in the Pause for Thought box. Don't read any further until you answer both questions.

Pause *for* thought

1. Imagine a rope placed around the circumference of Earth (ignore hills, mountains, and lakes). Suppose we want to lift the rope so that it is a metre above Earth all the way around. About how much more rope would we need?
2. Take a piece of paper and fold it in half. The paper is now a bit thicker than it was before. We can't physically fold a piece of paper more than about 7 times, but imagine that the sheet was folded 50 times. How thick would the paper be?

The answer to the first problem is just over six metres.[1] How can that be, you might ask, when Earth is so huge? The trouble here is that, because part of the problem involves a massive size, we think the answer must also be massive. But it isn't.

Exactly the same process happens with the second problem but in the opposite direction. We know paper is very thin, so we assume that the answer will be a relatively small amount. In fact, the paper would be thick enough to stretch from Earth to the sun and back and back again, with a bit left over. How did we get this answer? If we take a piece of paper to be 0.1 millimetres thick, double this thickness 50 times (using Excel, for instance), and divide the figure by a million to convert it into kilometres, we get a result of 113 billion.

What do these exercises have to do with psychology? The problem we're dealing with here is that intuition and common sense give us "obvious" answers that are incorrect. Therefore, we can't rely on them for developing a system of psychological knowledge.

participant person who takes part in a psychological investigation as a member of a sample or individual case

Intuition is even less helpful when issues are much more personal. Ritov and Baron (1990) gave **participants** a hypothetical situation: imagine there is a flu epidemic during which your child has a 10 in 10,000 chance of dying. There is a vaccine that will certainly prevent the disease, but it can be fatal. The researchers asked participants to decide the maximum level of risk that they would accept for their child. Participants generally would not accept a risk higher than 5 in 10,000. In other words, they were willing to submit their child to a 1 in 1,000 chance of dying from the flu rather than take the lower (0.5 in 1,000) risk of death from the vaccine. This is "magical thinking." Perhaps people would rather that chance took their child than have any positive decision they made be linked to the child's death, even though *not* acting carried double the chance of fatality. Something similar has actually happened in many Western countries recently, where flimsy and discredited evidence (e.g., Honda, Shimizu, & Rutter, 2005) that the MMR vaccine might cause autism led parents to avoid it and probably contributed to a serious rise in cases of measles, mumps, and rubella (Jansen et al., 2003; see Info Box 3.2).

Many people are convinced that their intuition tells them reliable truths about the world and about people. Psychologists aren't.

Science: Not a Subject but a Way of Thinking

Many students who choose psychology are put off by the idea of science being applied to the study of people. People who are interested in people are not usually interested in laboratory equipment or procedures. However, what we need to be clear about here is that science is not a body of technical knowledge or a boring subject but simply a way of thinking that leads us towards testable explanations of what we observe in the world around us. It doesn't deliver the "truth," but it does provide us with reasonable accounts of what might be going on. What's more, it is a thought system that we all use in our everyday lives. It is no different from the logic used in the example in the next box.

Pause *for* thought

Imagine that you have a younger brother who gets a rash every Monday. You take him to the doctor, who sees the rash and asks, "Does he eat broccoli?" "Yes," you answer, "He doesn't like it so he just has to eat it on Sundays when we have dinner with our grandmother." The doctor is fairly sure that the rash is an allergy. The obvious move is to banish broccoli from your brother's diet (your brother is ecstatic) and watch for the rash. Four weeks later, the rash has not reappeared. The broccoli theory looks good.

theory idea used to explain something, such as research findings, and that can be subjected to further tests

Has the disappearance of the rash proved that broccoli was the problem? Well, no, and here is a point that we will return to throughout this book. Contrary to popular common sense (and this is not true just for psychology but for all sciences as well), scientific research does not prove theories true. Listen to scientific experts being interviewed in the media and you will hear them use phrases such as "all the evidence so far points towards" or "the evidence is consistent with" no matter how hard the interviewer pushes for a definitive answer to questions such as "Do power lines cause childhood leukemia?"

Research supplies evidence that might support or contradict a **theory**. If your brother's rash disappears, we have support for the broccoli allergy theory. We don't have proof

because the rash could be caused by another **variable**, such as the herbs cooked with the broccoli. There is always another possible explanation for findings. If the rash remains, we have, as we shall see, a more definite result that appears to dismiss the broccoli theory altogether, although there is the outside possibility that your brother is allergic to broccoli and to something else that is always included in the dinner. By taking out one item at a time and leaving all the others, we could eventually be pretty certain about what item or items cause the rash, if it is a food allergy at all.

variable quantity that can change; usually used to refer to a measure of phenomena

Never Use the Term *Prove*

A scientific test never proves a theory to be true. If you are tempted to write "This proves," always cross out *proves* and use *supports* instead. The word *proof* belongs in mathematics, where mathematicians prove that one side of an equation equals the other, or in detective stories, where clues such as the victim's blood being on the suspect's shoes is said to prove guilt. Of course, it doesn't. There is always a perhaps stretched yet possible innocent explanation of how the blood arrived there (e.g., "He borrowed those last week and I remember he cut himself shaving"). If theories are speculative explanations in psychology, as in detective work, evidence can only ever support—not prove—anything. We know that the suspect is guilty if we see unambiguous video of him committing the crime. However, we wouldn't refer to it as evidence supporting a theory because the suspect's guilt is now fact. (But even then it could have been his identical twin!)

finding what actually occurred in a study (the results)

conclusion what the researcher may conclude after considering findings in the context of background theory

INFO BOX 1.1
FINDINGS AND CONCLUSIONS

Always be careful to distinguish between **findings** and **conclusions**. *Findings* are what actually occurred in a study—what the results were. *Conclusions* are what the researcher may conclude after considering findings in the context of background theory. For instance, the fact that identical twins' IQs correlate highly is a finding. From this finding, a researcher might conclude that heredity plays a big part in the development of intelligence. However, since identical twins also share similar surroundings, the finding could be taken as evidence for the environment's role in the development of intelligence. In the previously mentioned Archer (2000) study, the finding was a small but significant difference, with females using physical aggression slightly more than their male partners do. What we conclude from this result is perhaps that most males, knowing their strength, restrain their impulses. However, we won't know until we conduct further research. To return to another example, the lack of a rash is a finding; the assumption that broccoli caused the rash is a conclusion. Findings should always be clear and subject to little if any argument. Conclusions, on the other hand, are regularly contentious and disputed.

Thinking Scientifically: We Can All Do It

We claimed earlier that people use the logic of scientific thinking in their daily lives. The difference between ordinary and professional scientific thinking is just a matter of practice and the acquisition of some extra formal concepts and procedures. The study of psychology will tell you that almost all children begin to seriously question the world, and to test hypotheses about it, from the age of around six or seven. The logic that you will need to cope with science and with all the concepts of methods and statistics in this book are in place by age 11. Everything else is just a more complicated use of the same tools that we use every day of our lives. We used the brother's rash example to demonstrate this idea. Here is another example: you suspect that your cellphone isn't working because you recently

dropped it down the stairs and haven't received an e-mail on it for some time. How would you test your theory? You could check your e-mail from a computer. If you have received e-mails that have not shown up on your phone, you may be right. Of course, as in science, the result is not conclusive. There are other possible explanations; for example, the issue could be with your cellphone provider. Both theories can be tested to find where the problem really lies, which is also how the scientific method works.

Pause *for* thought

Most people frequently use the basic logical principles that underlie all scientific thinking, such as the logic of **hypothesis testing** (which we will explore in more detail shortly). They are usually quite capable of generating several basic research **designs** used in psychology without having received any formal training.

To practise generating basic research designs, think of ways to test the proposal depicted in Figure 1.1: heat makes people aggressive. With your classmates or on your own, think of how you would gather evidence for this idea. Some suggestions appear in Table 1.1. (Students' answers to this question often predict most of the lecture topics in a first-year course in research methods!)

hypothesis testing research that analyzes data for a predicted effect

design structure and strategy of a piece of research

TABLE 1.1 Possible ways to test the hypothesis that heat makes people aggressive

Suggested Designs for Testing the Theory That Heat Makes People Aggressive	Methods (which we will learn more about in Chapters 4–8 and 12)
Have people solve difficult problems in a hot room and then in a cold room; measure their blood pressure.	Repeated measures experiment; indirect measure of aggression.
Have one group of people solve problems in a hot room and a different group solve them in a cool room. Have them tear up cardboard afterwards and assess aggression from observation.	Between groups (independent samples) experiment; aggression assessed from direct observation of behaviour, but coding will be required.
Observe the number of times urban drivers honk their horns on a hot day and a cold day.	Naturalistic observation.
Put people in either a hot or cold room for a while, then interview them using a scale to measure aggression.	Between groups (independent samples) experiment; dependent variable is a measurement by psychological scale.
Approach people on hot and cold days and administer (if they agree) an aggression scale.	Between groups quasi-experiment; aggression is defined as measured on a psychological scale.
Check public records for the number of crimes involving aggression committed in hot and cold seasons in the same city.	Use of archival data; a kind of indirect observation.

Beyond Common Sense: The Formal Scientific Method

It's now time to look at the approach used in psychology and psychological science. Allport argued that psychological science should have the aim of "enhancing—above the levels achieved by common sense—our powers of predicting, understanding and controlling human action" (1940, p. 23).

If we can predict, we have observed enough to know that what we are witnessing does not just happen randomly; we have noted a pattern of regularities. For instance, we observe that broccoli leads to a rash, but we may not understand why. Controlling human action