



university of  
 groningen

campus fryslân

# SUCCESSFUL STRATEGY AND INDIVIDUALS

Gjalt de Jong

---

**CENTRE FOR SUSTAINABLE ENTREPRENEURSHIP  
 MONOGRAPH SERIES, NO. 1**

# **SUCCESSFUL STRATEGY AND INDIVIDUALS**

**Gjalt de Jong**

**ISBN: 978-90-367-8854-0**

Copyright © 2016 Gjalt de Jong

No part of this publication may be reproduced and/or published by print, photocopy, microfilm, audio tape, electronically or in any other manner, or stored in a database without the prior written permission of the author.

## **Colofon**

### **Edition**

UG/Campus Fryslân  
Centre for Sustainable Entrepreneurship

### **Text**

Gjalt de Jong

### **Editing**

Frank Schröer  
Inge Nummerdor

### **Design**

Inge Nummerdor

### **Visitors address**

University of Groningen/Campus Fryslân  
Sophialaan 1  
8911 AE Leeuwarden  
E-mail: [campusfryslan@rug.nl](mailto:campusfryslan@rug.nl)  
Telephone: 058 288 2132  
[www.rug.nl/cf/cse](http://www.rug.nl/cf/cse)

# ABOUT THE CSE MONOGRAPHS

Since its foundation in 1614, the University of Groningen has enjoyed an international reputation as a dynamic and innovative university of higher education offering high-quality teaching and research. Balanced study and career paths in a wide variety of disciplines encourage the 30,000 students and researchers to develop their own individual talents. Belonging to the best research universities in Europe and joining forces with prestigious partner universities and networks, the University of Groningen is an international place of knowledge.

Campus Fryslân is a Faculty in the making and is a part of the University of Groningen. Campus Fryslân focuses on the grand challenges of our society. Rather than teaching one particular discipline, the Faculty is aimed at the multidisciplinary study of academic questions connected with the social and economic themes. The Faculty's core philosophy is to connect regional themes with interdisciplinary global issues.

Within Campus Fryslân, the Centre for Sustainable Entrepreneurship is dedicated to one of the main challenges in the modern world economy: the transformation from an oil- and gas-based economy into a circular society. Sustainable entrepreneurship offers the creative potential needed to develop a circular society in which economic, social, and ecological systems are simultaneously balanced and preserved. The Centre will offer a master of science in sustainable entrepreneurship for students, master classes for business leaders and sustainability labs for academic scholars.

The monograph series of the Centre for Sustainable Entrepreneurship offer state-of-the-art academic research related to understanding the causes and consequences of sustainable entrepreneurship. The monographs offer a unique opportunity for new thought leadership and new path-breaking research guiding students, junior and senior academic scholars, business leaders and policymakers in their efforts to design, implement and preserve successful sustainable entrepreneurship. Each monograph comprises several chapters which introduce theories, methods, evidence and implications relevant to think about sustainable entrepreneurship in the modern world economy.

Research in the field of sustainable entrepreneurship is in its infancy. Research aims, questions, theoretical concepts, models, research methods and empirical evidence are being developed. This process benefits greatly from essential progress made thus far in all fields of science. The monograph series will focus on providing a robust and comprehensive forum for the growing scholarship on sustainable entrepreneurship. The volumes in the series will cover interdisciplinary and multi-method approaches dealing with the challenges of making the new business models of sustainable entrepreneurship successful.

The monograph series from the Centre for Sustainable Entrepreneurship aim to offer inspiration to all who are or soon will be designing and implementing sustainable options for their organizations, be they directors, managers, employees, academic scholars, students, politicians or policymakers. Through the ongoing release of focused topical titles, this monograph series will enable all representatives to contribute to a rigorous and comprehensive understanding of the causes and consequences of sustainable entrepreneurship in the modern world economy.

Gjalt de Jong, PhD  
University of Groningen/Campus Fryslân

Series Editor  
Centre for Sustainable Entrepreneurship

# CONTENTS

<b>About the CSE monograph series</b>	<b>4</b>
<b>Acknowledgements</b>	<b>7</b>
<b>Biography</b>	<b>8</b>
<b>Chapter 1. Introduction</b>	<b>9</b>
<b>Chapter 2. Nature and nurture</b>	<b>19</b>
<b>Chapter 3. Education and personality traits</b>	<b>42</b>
<b>Chapter 4. Speed of learning</b>	<b>62</b>
<b>Bibliography</b>	<b>82</b>
<b>Index CSE Monographs</b>	<b>96</b>

# ACKNOWLEDGEMENTS

Permission to reprint selections from the following sources is gratefully acknowledged:

Chapter 2 was published as De Jong, G. (2015). The impact of social and human capital on individual cooperative behavior. Theory, evidence and implications for international strategic alliances. *Critical Perspectives on International Business*, 11(1), 4-29.

Chapter 3 was published as De Jong, G., and J. Veijer (2014). Cooperative behavior in strategic decision-making: Human capital and personality traits, in T.K. Das (ed.) *Behavioral Strategy: Emerging Perspectives*, 55-78, Charlotte, NC: Information Age Publishing.

Chapter 4 was published as Boone, C., B. de Brabander, M. Carree, G. de Jong, W. van Olfen, and A. van Witteloostuijn (2002). Locus of control and learning to cooperate in a Prisoner's Dilemma game. *Personality and Individual Differences*, 32, 929-946.

# BIOGRAPHY

Gjalt de Jong, PhD (Oentsjerk, 1968) is Director of the Centre for Sustainable Entrepreneurship at Campus Fryslân at the University of Groningen. He also is Associate Professor of Strategy at the Faculty of Economics and Business at the University of Groningen. He received his Master's degree in Economics and a PhD degree in Business Administration from the same university. He is a senior member of the Faculty's research institute. Prior to his current appointment, he served as a senior advisor at PricewaterhouseCoopers and KPMG.

De Jong has extensive experience in research into strategic issues. He publishes on key strategic issues related to leadership, organizational structures, inter-firm collaboration, globalization and public policy. His research is interdisciplinary, multi-level and multi-method.

De Jong has extensive experience in university education. He has developed and supervised virtually every conceivable form of educational activity for students of Bachelor's and Master's programmes and postgraduate studies. He has coordinated educational programmes for economics, business and management. He has managed both large international programmes and small national groups. He has coordinated thesis programmes for various departments and has supervised hundreds of research projects on strategy themes.

De Jong has extensive experience as a senior advisor in consultancy for the private and public sectors. He developed his consulting skills throughout his career with leading consultancy firms and their international clients. He provides strategy advice to leaders of international companies, but also to managers from small and medium-sized enterprises, universities, government and network organizations.

De Jong plays an active role in public debates. He combines his knowledge with research, education and advice in developing and challenging opinions on contemporary regional and national strategic issues. He regularly gives guest lectures and public presentations.



# CHAPTER 1. INTRODUCTION

## 1.1 Introduction

People have a strange habit: we all want to do something unique. This manifests itself in different ways: ornate jewellery, a scarf or a pair of trendy shoes. However we do it, we all want to ensure that we are different than the rest.

This is no different in the animal world. A good example is the blue satin bowerbird (*Ptilonorhynchus violaceus*). In the mating season the male builds a bower – a nest shaped like a gazebo – which he decorates with blue, preferably shiny stones. A successful male lures many females into his bower, and then mates with them. His competitors view his efforts with suspicion and do everything they can to mate as well. This creates competition and a survival of the fittest.

These examples illustrate what strategy is all about: making choices and taking action to successfully differentiate ourselves from our peers. This applies to people and animals, but also to teams, private companies, public organizations, countries and even regions. We are constantly working to distinguish ourselves as effectively as possible. Some of us are very good at it; others barely ever succeed however hard they try.

The theme of this book is to gain a better understanding of the differences in strategic success at the level of individuals. Many entrepreneurs, for example, live with the issues of the day, but the issues of the day are irrelevant. What counts are the right strategic decisions leading to sustainable success. Successful strategy is not just a product which can be purchased on the market. Individuals need to learn how to make successful strategic decisions and need to develop this skill itself. Given the large number of bankruptcies in times of crisis and the many companies which struggle just to keep their heads above water, this is obviously a challenge.

This book intends to offer guidance for developing successful strategies in general and for sustainable entrepreneurs in particular. The book studies whether and how individual characteristics such as his or her education, religion, personality traits or learning abilities matter for the success of decisions by individuals. This allows the reader to fundamentally think about individuals and how variations in their characteristics matter for variations in individual strategic success. In line with the unit of analysis (that is, the individual), the book presents the results of large-scale experiments with university students. Based on the experimental findings, the book shows whether and how personal characteristics matter for personal success.

The remainder of this chapter offers foundations to think about successful strategy. I first position strategy as a new field in the arena of modern sciences. Subsequently, I review the added value of scientific research and its limitations. Finally, this chapter offers the outline of the book.

## **1.2 Strategy as a scientific discipline**

This book is about strategy. The word strategy is derived from the Greek word *strategos*: the art of the general leading an army to victory. It is only recently that strategy as an independent discipline usurped its place on the scientific map. A brief review of its roots and evolution is helpful to assess the added value of strategy as a modern scientific discipline.

It is helpful to sketch its root disciplines in order to understand the contemporaneous position and development of strategy as a scientific discipline. The root disciplines of strategy can be stereotyped on the degree to which reality is included in the scientific thinking of the respective roots. As indicated earlier, the goal of much scientific research is to provide an analysis of reality. Reality is infinitely complex and, given the limitations of the human brain, not amenable to all-encompassing study. A company, for example, can be analysed from too many different perspectives, requiring choices to be made. Within the social sciences, the degree to which reality is simplified varies greatly by discipline. At one end of the spectrum are 'the economists'. At the other end of the spectrum are 'the business administrators'.

For convenience, I will use these disciplines as polar extremes on a spectrum of reality in scientific research. It will serve to show that strategy is a new scientific discipline in the modern academic world. Between the aforementioned black and white polar extremes of the academic spectrum lie numerous grey disciplines. The next sections will argue that strategy acts as a bridge between economics, business and International Business. Strategy is a generic way of thinking and of working, which allows complex issues to be reduced to manageable proportions and for which its interdisciplinary and multi-method approaches are essential.

### *Economics, Business Administration and International Business*

Economists are experts in many areas, including in the area of the simplification of reality. Companies, for example, are sometimes presented as profit-maximizing machines. Many economic models disregard elements such as organizational culture, organizational structure or strategy. There are several legitimate reasons for doing this: firstly, because economists tend to disregard theoretical concepts that cannot be measured with existing databases, and partly because some business aspects are difficult to model. This is reinforced by the fact that economists have a preference for

Ockham's razor: simplicity above all else.

This simplification of reality in economic models sometimes results in odd situations. The predictions of the Central Planning Bureau (CPB) are a good example. Its former director Coen Teulings freely admitted that CPB models are unable to correctly predict the Dutch economy precisely because the CPB models may not include the complexity of the Dutch economy. CPB predictions are therefore, according to Mr Teulings, systematically incorrect, yet CPB forecasts form a major pillar of Dutch government policy.

The power of economic models lies mainly in the fact that they are often explicit about the assumptions on which their models are supposed to be based. Economists, for example, explicitly state that they assume full competition between companies or that those companies will always maximize profits. The other strength of economists is that they have developed an econometric toolbox (with associated statistical packages) which allows the disentangling of very complex causal relationships.

There is one concern with quantitative studies in economics worth mentioning (see also van Witteloostuijn (2015) for similar conclusions). Academic journals generally only accept studies reporting statistically significant findings. Academic journals do not or incidentally publish non-significant findings. However, the added value of statistically significant findings only appears if the potentially non-significant findings are also reported. It is well known that quantitative research comes with an overwhelming large number of non-significant findings. Non-significant findings in themselves may offer valuable information as, for example, is the case in testing new drugs. Here, it is obvious that the non-significant effects of new drugs need to be reported if only because this enables understanding of why new drugs are ineffective and how other possibilities can gain from this. This is rarely the case in economics. Researchers envisage large numbers of models and only submit those which are significant given that journals are biased towards publishing significant findings.

At the other end of the science-reality spectrum is business administration. Business administration has – partly as a reaction to economics – focused on very detailed descriptions of reality. This inductive approach has led to the development of conceptual and theoretical frameworks with which the actual strategic behaviour of firms can be described, albeit that it cannot be explained statistically. Business administration has undoubtedly driven the state of the art of doing case studies from its infancy. It has developed rules which link the conceptual content of their previous studies to one another, and this has lifted the quality of the field.

An advantage of case studies is that we have obtained a large number of photographs of many different companies and of many different aspects of business – including structure, culture and strategy. This makes sense because case studies are descriptively very well able to answer ‘why’ questions. The ‘why’ questions offer insight into the fundamental processes of a managerial phenomenon, which is not always addressed well using the econometric toolbox. A disadvantage of case studies is that they are always about a single case – or at most a few cases. Conclusions based on case studies do not generalize to the letter and spirit of scientific rules. They provide at most a set of statements which could be assessed in another academic setting – for example, using data obtained from a survey of many companies.

Between these two extremes, an entirely new discipline emerged around the turn of the century which we term International Business (IB). IB is more than the English translation of business administration. The majority of IB studies are ‘economic’ in nature and follow the pattern of empirical research.

Comparing economics and IB studies provides two insights relevant to the development of strategy as a modern scientific discipline. First, IB research often has to work with primary data, especially since IB issues cannot really be answered using existing data. Working with primary data is also necessary because the unit of analysis in IB research is often the company. Country studies are numerous and existing files (secondary data) for country studies are often present. Company data, however, are often so confidential that they cannot be obtained from existing files. Secondly, both groups support constant debate on all elements of the empirical research cycle – from the theoretical concept to its measurement and the method – although there is often more consensus among economists. Using primary data, which is typical of IB research, also contributes to its heterogeneity because the questions, concepts, samples, standards and methods are often just as diverse.

### *Strategy as a new scientific discipline*

Strategy has evolved as an independent discipline over the past five to ten years. For example, until 2010 the word ‘strategy’ appeared only eighty times in the titles of articles in a leading IB journal, the Journal of International Business Studies. This shows at that time we still had little fundamental knowledge of strategy, despite the age-old tradition of warfare.

Strategy as a theme has a long history, but as an independent discipline it is relatively young (Porter, 1998). Just like companies, a new discipline also needs to fight for its legitimacy. New disciplines are viewed with suspicion by the established order. A new player in the scientific community will be opposed explicitly or implicitly in many

ways. This challenging environment has perhaps had exactly the opposite result to what the established order (if you can call it that) intended: strategy as a discipline has encountered many challenges, has achieved many successes and has thereby increased in scope and importance.

There are various definitions of strategy as a discipline. Virtually all definitions include elements such as choices or actions and relate almost without exception to company performance. Strategy, however, should not be focused on sustainably superior business performance per se. Performance is a result – it is a logical consequence of the distinctiveness of a successful business. That is where strategy focuses – on the successful distinctiveness of businesses. That is also the reason for my definition of strategy as a scientific discipline. Strategy as a scientific discipline is the study of the fundamental causes and consequences of the choices which businesses make and the activities they undertake to successfully become distinguishable from their peers. Strategy, in short, is all about successfully making a difference.

Successful business is strategy and vice versa. When a company fails, discussion will be of its lack of strategy or its inability to implement good strategy. The reverse is also true: success is often directly linked to strategy. There is a well-known debate about whether, and if so how, disciplines should uncover applicable insights. Strategy scholars do not shy away from this debate. Modern strategy scholars choose for fundamental research which can also be applied to practice.

Much prior strategy research has been conceptual. Using, for example, a 'strength-weaknesses-opportunities-threats' analysis or Porter's five forces framework, a company's strategy was analysed and compared with those of other companies. The supposedly successful generic strategies of Michael Porter are based on this approach. They fit into the 'ready-made' approach of strategy research. Much of this research has little theoretical foundation and many conceptual research methods are therefore debatable. Nevertheless, the descriptive and conceptual strategy studies have proven their usefulness, if only because they have demonstrated the need for further professionalization of the field.

The goal of the modern discipline is to lift the field of strategy to another level. The empirical cycle of research – despite its acknowledged shortcomings – provides a solid framework for a reliable analysis of the strategic reality, which is one of the objectives of this book. In so doing I will accord slightly different weight to criteria such as repeatability and verifiability. Such research criteria are de facto only viable in controlled laboratory conditions, as in biology or chemistry. Modern strategy research is deductive by nature, and theory, however young, is the basis for empirical choices.

Strategy research will also often be conducted in situations where controlled laboratory conditions are virtually impossible. This is partly because of the ex post character of many contemporary strategy studies. Modern strategy studies – and much social science research – include the construction and analysis of events which have already occurred and therefore by definition cannot be encapsulated in real time in a controlled laboratory environment as in biology or chemistry. This means that the criteria of verification and repeatability in this context are largely redundant in a methodological sense, as they would require biological or chemical laboratories. This makes strategy research no less scientific, provided it is valid and reliable. The reliability of a strategic ex post study is checked in different ways, especially when the research is conducted within the structure of the empirical cycle.

### **1.3 Philosophy of science**

This book presents a scientific endeavour of strategic decision-making. The added value of science is its opportunity to systematically define and review definitions and concepts, causal structures and offer tests of propositions or hypotheses often using advanced econometric and statistical methods. In so doing, the aim of science is to offer answers to questions in the best and most valid way. The debate about the usefulness of science versus religion or other dogma's is often advocated in advance of the science. Science is considered to offer superior answers given its opportunities to work with "reality". It is worthwhile, however, to briefly consider some of the limitations of scientific thinking and doing.

First, scientists must be constantly aware of their own limitations. Every person – and therefore every scientist – is a prisoner of his or her own time and brain (Damasio, 2003; Hammerstein, 2002). Science is cognition developed from human evolution (Dawkins, 2006; 2009; Denet, 1996; Davies, 2001; Wilson, 2002). Science is a dynamic debate: it is subject to continuous change – although not every change represents progress by definition. Changes in science have accelerated through the impact of information technology (IT), in part because we can gather more information, store it better and analyse and share it faster. The results of particle accelerators around the world have revealed the complex interplay between theory and practice, though not

what was theoretically plausible (which seemed to be the case for a long time in the quest to find the 'non-existent' Higgs boson).

The shelf-life of scientific knowledge is becoming increasingly shorter. It is therefore not inconceivable that the thinking power of human brains themselves, as part of our ongoing evolution, will also be getting bigger and faster. With this in mind it is very likely that all scientific products and insights will be obsolete within the foreseeable future. That does not mean that current science is pointless, if only because it makes an important contribution to new insights into the human brain. Science is a continuous flow of information of which a large part, but not all (such as the discovery of the structure of our solar system or of the human genome), will soon be obsolete. Researchers must account for this.

Secondly, science should exercise modesty, especially when it comes to predicting the future. Science is about uncertainty and probability: within certain limits we can make scientifically founded statements, nothing more. Predictions in social disciplines are subject to an entirely different order of uncertainty than, say, Newton's laws of gravity. Making a correct weather forecast is almost impossible, let alone predicting the economic situation in a country in a year. Scientific models are intended to explain parts of our history as reliably as possible, no more than that.

Every scientific model and the insights it yields are unmistakably the product of human brains (in interaction with the environment: this is the central foundation of social constructivism). This also applies to mathematics, which is often presented as a super-science. Scientists are essentially no different from 'non-scientists': we are all the result of evolution (Churchland, 1986; Gould, 1990). This fact places the supposed superiority of the disciplines within the branches of science (such as economics versus business in the social sciences) or between disciplines (such as physics versus psychology) in perspective. Science is nothing more than a debate. For meaningful scientific debate, disagreement is essential. If we were all of the same opinion or all had the same knowledge, there would never be new insights. Science is supposed to have democratic values. In that respect, sceptics in particular should have the space to disagree and not be denigrated as being morally inferior. By definition, science is not fixed or finished. The essence of science is that the existing consensus (the dominant logic) is continuously under challenge.

A scientific debate should occur on the basis of fundamental insights. In many of the current debates – certainly in the public debates on the financial crisis – the personalities of some scientists play too big a role. This sometimes leads to statements which go beyond what is scientifically acceptable. A scientist is no more than the

proverbial shoemaker who should stick to his last.

Thirdly, science – like any other religion – is the product of other people’s work. Science is a language in which individual human brains construct reality indivisibly (Chomsky, 1993; Jack Dorff, 2007). We cannot descend from our brains and observe the ‘real’ reality. We also cannot connect directly to each other’s brains, so we have language in the broad sense of the word to share our individual construction of reality with others. Language shapes how we think. Language also determines what we can think.

In mathematics, this language is abstract but remains a man-made, mutually agreed language. In almost all other sciences, language is an institution in the literal sense of the word: an enabling constraint. A scientist’s native language also heavily influences his scientific insights. The English, for example, have at least two different concepts for our understanding of trust: confidence and faith. For someone who was not born and raised in England these differences are hard to interpret. An English native understands without any explanation what the subtle differences between these concepts are. Science is largely a technical language game. This requires precise and internationally understandable definitions of concepts and theoretical logic.

Fourthly, scientists must embrace scientific heterogeneity rather than reject it (Nooteboom, 2012). Without heterogeneity of knowledge or experience, there can be no scientific evolution. Heterogeneity in scientific frameworks, in addition to selecting and transmitting knowledge, is the basic requirement for scientific progress. Science as a unified entity does not exist. An outsider may be inclined to view a scientific discipline such as physics, biology or business as a homogeneous field in which there is broad consensus about, for example, the structure and behaviour of companies or countries. Nothing could be further from the truth: every scientific discipline – or even every field within a discipline – is inherently heterogeneous. That is because science is humanity’s brainwork. Heterogeneity is the hallmark of all scientific disciplines and the field of strategy is no exception.

The social sciences in general, and strategy in particular, are especially ‘language’-bound sciences (Delantray & Strydom, 2003). These disciplines are also highly susceptible to technical and especially econometric changes. The result of these dynamic forces is an explosion of theoretical concepts, theoretical logic, models, empirical measures and findings. Every endeavour to achieve uniformity seems doomed to fail because language is a technical debate between human brains. From the perspective of the evolution of science, heterogeneity rather than uniformity should be embraced.



Fifthly, scientists essentially aim to offer a reliable picture of the reality in which their debates about 'reliability' themselves are a part. The primary purpose of science is not necessarily only to create repeatable and verifiable models of reality. These criteria narrow the academic space to almost unattainable proportions: this is certainly the case for a large part of strategy research. It is often impossible to meet the methodological criteria of repeatability and verification for strategy research – controlled research environments for this discipline are often not available.

Of course, empirical results should be presented transparent such that the research can be repeated *ex post* and its findings can be verified. The inherent heterogeneity of disciplines thus relieve scientists of their obligation to communicate openly and transparently about every part of their thinking. Accordingly, logics at least temporarily attain dominance to create direction or focus among scientists. Clock time, the decimal system, the 26 letters in our alphabet or our solar system demonstrate the social benefits of dominant logics. Dominant logics stand until the contrary is proved.

This kind of dominant logic can even be found within the social sciences – such as transaction cost theory. The owners of this dominant logic often recognize the limitations of their own logic. Williamson (1985), for example, acknowledges that transaction thinking is completely static, and that it therefore has no explanatory value for the analysis of dynamic aspects such as innovation or learning (although this is precisely the most important issue in today's business; see Nooteboom, 2000). Because of their relative monopoly within a discipline, dominant logics form self-reinforcing but also self-destructive systems. Scientists are almost forced to use dominant logics, either as additional confirmation of the dominant logic (reinforcing mechanisms), or to demonstrate that there are imperfections in the dominant logic and a need for alternative perspectives (destructive mechanisms). This is the creative destruction of scientific insights. The appearance and disappearance of dominant logics seems to me to be one of the most fascinating and unexplained phenomena in science. Each scientist strives for this monopoly, but few are able to achieve it other than by chance or luck.

In summary, science is like opening Pandora's box. With all the good also the evils escape. This is to be remembered when scientifically thinking about strategy thinking.

#### **1.4 The structure of the book**

The quest for successful strategy begins with the person behind the strategy. Every organization has leaders. Examples of both successful and failed leadership are legion. The central question this book answers is why some leaders are so successful at making and implementing strategic decisions and others are not. To that end, this

book presents three chapters which answer this question from different perspectives. The three chapters share a similar quantitative method: they all work with student experiments which enable us to understand why some people collaborate in Prisoner's Dilemma situations and others do not. Each chapter includes all details of a full empirical cycle of research enabling the reader to study all chapters or each of them independently.

Chapter 2 focuses on the nature versus nurture discussion. Can leaders learn how to become strategically successful or is it a given? This chapter analyses the impact of social and human capital on strategic success, which is defined here as the willingness to cooperate with others. An important thread running through this book is that each individual has his or her own background and that these personal backgrounds variously determine the success of the strategic choices made by individuals. Chapter 2 studies the effects of the social conditions – religion, family and the local community – in which leaders are born and raised, and the education they received.

Chapter 3 focuses on the interaction between leaders' human capital and their personality traits. For example, psychology defines people with large appetites for risk as Type A people and the risk-averse as Type B people. Chapter 3 shows that these personality characteristics, along with the leaders' human capital, determine their strategic success.

Chapter 4 zooms in on one particular personality trait, namely locus of control and the extent to which variations in locus of control determine variations in the speed of learning new strategies. Repetition and learning breed cooperation because people learn to understand that cooperation is instrumental in obtaining long-term profits in social dilemma situations (which often resemble the context in which leaders need to make strategy). Locus of control helps identify those who believe that they are the masters of their own fates from those who consider their path in life as the outcome of luck and fate.

# CHAPTER 2. NATURE AND NURTURE

## Summary

Prior work has established the importance of cooperation for the behaviour and performance of firms in particular for international strategic alliances. Despite all efforts, however, the determinants of successful international cooperation are still the subject of ongoing debate following inconclusive findings. We suggest that the international business literature has largely overlooked social and human capital as individual-level drivers of individual cooperation. This study reviews research about these various forms of capital and hypothesizes the effects of each of them on cooperative behaviour of individuals. Data from experiments with 182 university students are used to test the theoretical model. The empirical findings suggest that different capital theories should be integrated for future research of cooperation between individuals and between firms in international strategic alliances.

Key words: Social capital, human capital, cooperation, Prisoner's Dilemma

## 2.1 Introduction

Cooperative behaviour has long been a topic of research in international business (IB) studies (Bachmann, 2001; Dörrenbächer and Gammelgaard, 2010; Porter and Kramer, 2011). Research on international strategic alliances, for example, extensively studies the impact of trust or contracts on the performance of inter-firm cooperation (De Jong and Nooteboom, 2000; Klein Woolthuis et al., 2005). IB research shows an increase in the number of international strategic alliances between firms but also that few of them are truly successful (Nooteboom, 2004). This implies that the determinants of successful international collaboration between firms are in need of more research. Notwithstanding substantial progress, we suggest that IB research may benefit from a different set of lenses to understand cooperative behaviour. We argue that international cooperation is an inherent individual level phenomenon. The individual should therefore be the unit of analysis. In this study we explore whether, and if so how, individual characteristics determine cooperative behaviour of individuals. Few IB studies explicitly analyze why, for example, some managers are more successful in collaboration with other individuals in international strategic alliances than others. Our study aims to fill this research gap.

We analyze the role of individual characteristics in cooperative behaviour in the setting of social dilemma games. Social dilemma games offer an ideal micro-level context to understand the individual-level antecedents of competitive vis-à-vis cooperative behaviour. A well-known example of a social dilemma game is the Prisoner's Dilemma (PD). We use the PD game to analyze the impact of social and human capital on cooperative behaviour. In the experimental literature, it has often been observed that people cooperate more than they would be expected to according to standard

assumptions of individual rationality (Annen, 2003; Paldam, 2000). This so-called 'excess cooperation' result has also been confirmed in various experiments, even for players who do not know each other and play only once (Burks et al., 2003; Schramm, 1998; Tan and Zizzo, 2008; Brosig, 2002). This study seeks to unlock the black box that the players in Prisoner's Dilemma games represent by considering that every individual builds social and human capital over time. These intangible forms of capital drive cooperative behaviour of individuals and could explain why people in the 'real world' – unlike the 'rational machines' in game theory – are predisposed towards cooperation.

The rationality of individual behaviour receives mixed empirical support and is therefore subject to ongoing debate (Gächter et al., 2004; Glaeser et al., 2002; Fan, 2008). It is generally accepted that when every player in a 'one-shot' game has a dominant strategy, as in the Prisoner's Dilemma, then these strategies will be the ones chosen. This hypothesis has empirical support (Rasmussen, 1990), but other findings have also been reported. Andreoni and Miller (1993), for example, show that some subjects always choose to cooperate while others choose not to cooperate or play a mixed strategy (Fehr and List, 2004). Research in game theory is far from blind to the 'excess cooperation' findings but predominantly studies the elements of the game such as the number of players, the payoff structure or the information rules. In a Prisoner's Dilemma game setting, Frey and Bohnet (1995), for example, report that pre-play communication increases the number of decisions to cooperate. For a large part, however, mainstream game theory and economics maintain the notion of homo economicus and incorporate behavioural assumptions, such as self-centred behaviour, that facilitate and enable logically rigorous theoretical models of cooperative behaviour on the one hand but, on the other hand, seem to cause the empirical anomalies of excess cooperation.

Experimental economics research has challenged the self-interest assumption and established that roughly 40-50 percent of people are completely selfish while the remainder exhibit egalitarian preferences (share profits equally among parties), surplus maximizing (maximize joint profits even to their own detriment) or altruistic preferences (Sally, 1995; Fehr et al., 2007). In other words, there is now evidence that, for example, fairness (Fehr and Schmidt, 1999), reciprocity (Falk and Fischbacher, 2006), culture (Boone and Van Witteloostuijn, 1999; Cox et al., 1991), altruism (Fehr and Gächter, 2000; Andreoni and Miller, 2002), trust (Fehr and List, 2004), credible signals (Brosig, 2002) and harmony (Tan and Zizzo, 2008) could explain why people decide to cooperate and that some of this behaviour has neurological foundations (e.g. Spitzer et al., 2007; Fehr and Camarero, 2007; Fehr and Rockenbach, 2004). This behaviour has been identified in many different game settings, such as prisoner's

dilemma, ultimatum, 'dictator', trust and public goods games (Schmid, 2004).

This study aims to contribute to the understanding of cooperation by individuals in Prisoner's Dilemma situations. More particularly, we empirically test the proposition that individuals' social and educational backgrounds explain cooperation differentials in otherwise identical situations. We make two contributions to the literature. Our first contribution concerns the notion of individual social capital. Social capital is usually broadly defined as an asset inherent to social relationships and networks (Burt, 1997): it reflects the ability of actors to secure benefits by virtue of membership in social networks and other structures (Coleman, 1990). Many studies consider social capital to be a network phenomenon but we argue that this intangible resource could also be embodied in individuals and therefore induce cooperation by individuals. We study three important sources of individual social capital, namely religion, family background and community structures. Social capital is important in studies of international strategic alliances particularly with respect to a network of international alliances (Nooteboom, 2004). We explicitly account for this in our study as well. By doing so, we also align our research with scholars arguing for studies of social capital at the level of individuals (see, for example, Crudeli, 2006). Our second contribution concerns the role of human capital. Human capital consists of all knowledge and skills acquired as a result of formal education and experience (Becker, 1975). This is important because people with superior human capital endowments are better at learning complex situations, such as repeated Prisoner's Dilemma games, and are better able to adapt their behaviour to environmental contingencies (Boone et al., 2002). Like social capital, human capital is also created through a path-dependent socialisation process and we suggest that differences in human capital explain why some people choose to cooperate whereas others do not.

The outline of this study is as follows. We will begin by reviewing research done on social and human capital and use this to ground hypotheses about the effects of each form of capital on cooperative behaviour. We focus on main effects given that we are among the first to explicitly combine particular dimensions of individual social and human capital in a model to explain individual cooperation. We aim to build foundations that can be used for more complex models in future research. We will then provide detail of the games, experimental procedure and measures, and then report the results of this study. We will conclude, finally, by discussing the wider implications of our findings for IB research with respect to international strategic alliances.

## **2.2 Social capital**

Social capital is the first source included in our model to explain individual cooperative behaviour. Scholars have broadly conceptualized social capital as the benefit that social

actors derive from their social structures (Coleman, 1990; Burt, 1997). Within this conceptualization the literature offers many definitions, measures and perspectives, i.e. researchers vary in their views regarding the concept's content, its level of analysis and its determinants and consequences, as well as the forms in which it exists (see e.g. Crudeli, 2006 for an excellent overview and discussion).

Social capital theory was originally developed by sociologists to explain the role of family in the development of neighbourhoods (Carroll and Stansfield, 2003). In the late 1960s and early 1970s, Bourdieu argued that culture was not only dynamic and creative but also a structured phenomenon. Bourdieu (1985) loosely defined social capital as the aggregate of the actual or potential socialized relationship resources between groups and classes. Coleman (1988) expanded this definition by emphasizing three separate spheres of social capital: obligations and expectations, information channels, and social norms. Social capital is useful because it provides structure to functional decision-making, i.e. like other forms of capital, social capital is productive, enabling the achievement of certain ends that in its absence would not be possible (Coleman, 1990). Hence, social capital becomes an enabling link between agents in a social setting. Putnam (1993) continued the enabling emphasis and defined social capital as comprising the features of social organization such as networks, norms and social trust, which together facilitate coordination and cooperation for mutual benefit. Over the years, the theory has been expanded to explain a variety of outcomes at different levels, including venture success (Honig, 1998; Florin et al., 2003), industry creation (Aldrich and Fiol, 1994), firm growth (Ostgaard and Birley, 1994; Kostova and Roth, 2003), and career success (Seibert et al., 2001). Many of these studies concentrate on the positive consequences of social capital, albeit it having been noted that social capital may be harmful in some cases, even if it is productive and benign in other cases (Adler and Kwon, 2002; Annen, 2003; Portes, 1998).

Social capital reflects the ability of actors to secure benefits by virtue of membership in social networks or other social structures (Durlauf, 2002). It incorporates the beliefs and attitudes that social actors hold and have toward each other. Such beliefs and attitudes may include trust and trustworthiness (Putnam, 1993), norms and sanctions (Coleman, 1990), obligations and expectations (Burt, 1992; Granovetter, 1973). These are likely to lead to cooperative behaviour, since they create a psychological environment conducive to collaboration and mutual support (Fukuyama, 1999) that is also highlighted in international strategic alliance research (Zaheer et al., 1998). Social capital refers to trust, concern for one's associates, a willingness to live by the norms of one's community and to punish those who do not (Bowles and Gintis, 2001).

In this study we consider social capital at the level of the individual. We define social

capital as an instantiated set of informal values or norms for cooperation. In terms of game theory, social capital is the propensity to play the cooperative solution even if it is not the Nash equilibrium<sup>1</sup>. The question arises of where this 'propensity to cooperate' comes from. What are the foundations underpinning individuals exhibiting such 'irrational' behaviour and how should we measure this? Social capital, as we defined it, emerges in people involved in trust-based relationships that reward them for taking on and paying back mutual obligations. Social capital is developed in a learning process within communities through democratic principles and by rewarding members for cooperatively and democratically working together (Lemmel, 2001). Hence, the social background of respondents is one of the most convenient instruments used by researchers when measuring social capital as an explanatory variable for specific issues (Ang et al., 2002). In this study, we will incorporate three features of the respondents' social background that are generally perceived as determining social capital, i.e. religion, familial background and community structures.

### *Religion*

Our study relates to the economics of religion (Heath et al., 1995; Hull and Bold, 1995; Lelkes, 2006; Brown and Taylor, 2007). A religion is a shared set of beliefs, activities and institutions premised upon faith in supernatural forces. Ever since the first publication by Weber (1905), it has generally been acknowledged that religion can affect the economic attitudes of individuals, because many religions emphasize, for example, hard work, honesty and responsibility (Iannaccone 1992, 1998; Lipfort and Tollison, 2003). Weber attributes the emergence of the spirit of capitalism to the development of a Protestant ethic that results from the interaction of the doctrine of salvation and the concept of good works. Although different religions may have different effects on people's attitudes, on average, religion is associated positively with attitudes that are conducive to cooperative behaviour (Guiso et al., 2003). Religious people trust others more, trust the government and the legal system more, are less willing to break the law, and are more likely to believe that the outcome of markets is fair (Fan, 2008). We therefore hypothesize that individuals who are from religious families and thus have been exposed to the norms and values of religion will exhibit more cooperative behaviour than those who are not. Our first hypothesis is expressed as:

Hypothesis 1a (H1a). People from religious families will demonstrate more cooperative behaviour than those who are not.

---

<sup>1</sup> In game theory, the Nash equilibrium is a solution concept of a non-cooperative game involving two or more players, in which each player is assumed to know the equilibrium strategies of the other players, and no player has anything to gain by changing only their own strategy unilaterally. If each player has chosen a strategy and no player can benefit by changing strategies while the other players keep theirs unchanged, then the current set of strategy choices and the corresponding payoffs constitute a Nash equilibrium (Rasmusen, 1990).

### *Family background*

Social capital theory implies that family and community structures are important in the creation of social capital (Morgan, 2000; Anderson and Miller, 2003; Glaeser et al., 2002). Loury (1987), for instance, posits that an individual's achievement is conditioned by the social context in which the individual matures, i.e. the family, community and/or municipality. Schiff (1992) and Coleman (1988) express a similar view, arguing that an individual's social capital results from the socially complex and historically unique configuration of human and social resources. Hence, the values and norms of young adults that lead to cooperating or not cooperating are created, strengthened and internalized in their primary-school years through close interactions with parents and other siblings, and through community networks of schools and other institutions. These socialization perspectives are incorporated in this study.

The literature contains various empirical studies that analyze the role of family size in relation to performance, such as educational attainment (e.g. Conley, 2002; Guo and Van Wey, 1999; Powel and Steelman, 1993) or labour market success (Ashenfelter and Rouse, 1998; Altonji and Dunn, 1996). These studies have found that individuals who come from larger families – that is, have more siblings – do worse in school and achieve lower labour market earnings. The results generally hold even when other factors such as the socioeconomic status of the parents, parental education, rural/urban background and family intactness are accounted for.

Family size has negative effects on child and adult achievement outcomes, mainly because of a dilution of the familial resources available to children in large families, and a concentration of such resources in small ones (Blake, 1980). As family size increases, parents have less time and fewer economic resources for each child, i.e. parents talk less to each child about school, have lower educational expectations, save less for college, and have fewer educational materials available. Hence, the dilution involves the parents' time, emotional and physical energy, attention, and the ability to interact with children as individuals (Black, 1980). It appears that being brought up in a larger family dilutes young people's sense of urgency about playing and associating outside the family group, thereby making young people from large families more parochial and limited in their understanding of a variety of social roles (de Haan, 2010). Children from small families can extract more individual attention and interaction from parents than the latter might have voluntarily provided, given what they might prefer to do. In line with the dilution hypothesis we expect that family size will have a negative effect on cooperative behaviour. We therefore hypothesize: Hypothesis 1b (H1b). People from large families will be less inclined to cooperate.



### *Community structures*

In addition to families, communities are also important in the creation of social capital (Furstenberg and Hughes, 1995; Morgan, 2000). In their early years, young adults learn values and norms through interaction in social networks with other pupils, teachers, parents and other adults who together construct the social setting (community) in which the young adult matures. Various studies have reported the norm-enforcing effects of communities with a strong social closure environment (Putnam, 1993; La Porta et al., 1997). More specifically, it has been argued that there are important differences between so-called southern and northern types of communities. Low trust among citizens, threats of repercussion in case of social defection and low levels of active public participation in civic activities among others, characterize southern types of communities. In his study of development across Italy, for instance, Putnam (1993) finds these characteristics to prevail in southern regions and to crucially explain the relatively low levels of economic regional performance in south Italy compared to north Italy. In a cross-country study, both La Porta et al. (1997) and Inglehart (1999) found evidence for this main proposition (Stulz and Williamson, 2001). In line with this, we expect that people from southern community types are socialized in environments with low trust, low civic participation and high threats of repercussions. Hence, we arrive at:

Hypothesis 1c (H1c). People from southern community types will be less inclined to cooperate.

### **2.3 Human capital**

In our study of the determinants of cooperation, we next analyze the role of human capital. It has been frequently pointed out that differences in success for an individual, group or population reflect differences in human capital endowments (Becker, 1975; Mincer, 1970). Human capital endowments are attributes such as education and experience. These attributes reflect the level of an individual's investment in formal school education and/or work experience (Becker and Murphy, 2000).

Human capital theory has been particularly applied to understanding differentials in organizational performance (Ang et al., 2002; Buchholtz et al., 2003; Watson et al., 2003). Given its intangible nature ('causal ambiguity'), human capital resources are difficult to imitate and copy. For that reason they are considered to be essential for the long-term survival and growth of organizations (Pennings et al., 1998). Organizations endowed with superior human capital are better able to effectively plan and solve problems (Florin et al., 2003), are better able to adapt to environmental contingencies (Snell and Dean, 1992; Youndt et al., 1996), and continuously find new ways to increase customer benefits (Chandler and Hanks, 1998). Therefore, a large number of empirical studies indicate that the performance of organizations is directly determined by human capital endowments.

It is a question of understanding which indicators of human capital are of interest in the analysis of cooperative behaviour within the context of Prisoner's Dilemma situations. In this study we will focus on education because education is the most indicative of the abilities and skills of young adults (Boone and Van Witteloostuijn, 1999; Gächter et al., 2004; Fan, 2008). Given their age, most young adults lack substantial experience capable of co-determining their cooperative behaviour. We allow education to have a two-fold role in our model of cooperative behaviour. This two-fold role matches the peculiarities of the subjects involved in our experiments, i.e. second-year Dutch university students majoring in management and organization. First, we must discount for differences in the type of high schools Dutch students attended prior to their enrolment in university programmes. Generally, Dutch high school students either attend 'alpha' classes with a focus on languages or 'beta' classes with a focus on mathematics and science. Language students will develop communication skills – a set of competencies difficult to use in the Prisoner's Dilemma situation, given its prerequisite of 'incomunicado'. Science students, however, are extensively trained to study, design, develop and solve complex problems. As a result, we expect beta students to be better at comprehending the Prisoner's Dilemma situation, discovering the optimal, mutual cooperation solution and adapting their behaviour accordingly. We therefore hypothesize:

Hypothesis 2a (H2a). People with prior exposure to science education will be more inclined to cooperate in Prisoner Dilemma games.

Second, the experiments of Frank et al. (1993) showed that economics students behave more self-interestedly than their colleagues studying other majors. In other words, exposure to the self-interest models commonly used in economics alters the extent to which individuals behave self-interestedly. Boone and Van Witteloostuijn (1999), however, argue that not every student is exposed to self-interest models to the same extent and that this could even vary within major programmes. Some students follow 'hard core' economics courses whereas others choose business courses with elements of sociology and/or psychology. Therefore, in line with Boone and Van Witteloostuijn (1999), we expect that the likelihood of cooperation increases with the number of courses students have followed in which cooperation is emphasized, and decreases with the number of courses in which competition is emphasized. Taking these arguments into account, we arrive at:

Hypothesis 2b (H2b). People with prior exposure to cooperative courses will be very inclined to cooperate.

Hypothesis 2c (H2c). People with prior exposure to competitive courses will be less inclined to cooperate.

## 2.4 Research methods

### *Games*

As is common in experimental research, we used undergraduate students as our study subjects (for a discussion about the use of undergraduate students in research see, for example, Boone et al., 1999a, 1999b, 2002; Frank et al., 1993; Schlenker et al., 1973; Tan and Zizzo, 2008). The experiment was conducted during a four-week course on statistical methods for second-year students of management and organization at the Dutch University of Groningen. The four-week course was part of a new curriculum, and only those students who had passed the first-year programme were allowed to participate. At the outset of the experiment students filled out a digital questionnaire, revealing background and personality information. The experiment was conducted during the first week of the course, and saw 182 management and organization students play five different PD games in a row. The average age of the subjects was 19.65 and 66% of the participants were male. We only told the students that the experiment was designed to deepen their and our understanding of behaviour in a game theory setting. The students were promised feedback on the main findings of the research project after completion of the four-week course. We also guaranteed strict confidentiality of the questionnaire information. The five PDs were presented to the subjects in a fixed order for the sake of simplicity. The order of presentation and the main characteristics of the games are summarized in Table 1.

Each game consists of twelve rounds of choosing, except for Game III that has an unknown horizon, ending at random after 13 rounds. In the first two games, subjects played against a fictitious party, receiving no information about the choices made by that party in each round. Therefore, these games were essentially 'one-shot' or non-interactive games. In the last three games, dyads were randomly formed and the subjects played interactive repeated games. Here, choices were made simultaneously and independently in each round, after which the subjects were informed of the choice made by the other party. Game III has a so-called infinite horizon as the subjects were not informed about the game's end round (i.e. Game III ended at random). The fourth game was similar to Game III, except for our announcing in advance that the game would end in round 12. In the last game, we changed the values of the payoff matrix used in all the other games so that the incentive to cooperate might increase in the eyes of the players. The horizon of game V was, again, finite and known to be 12 rounds. The instructions and game payoff matrices can be found in the Appendix.

The first two non-interactive games can be considered as baseline measures of cooperative behaviour. Both measures give an impression of the subjects' basic

inclination to pursue a competitive or a cooperative strategy. In the second game, we manipulated the reputation of the other fictitious party by suggesting that this party was trustworthy because he or she had made cooperative choices in each of the twelve rounds in the previous encounter (i.e. cooperative feedback). We expected baseline cooperation to drop because opportunism is rooted in Western societies (Boone and van Witteloostuijn, 1999). Subsequently, in the last three repeated games, we expected cooperation on average to gradually gain importance. When players are engaged in repeated interaction with another party, they quickly learn

*Table 2.1 Main characteristics of experimental games.*

Game #	Type of game	Main characteristics of game
I	"One-shot"	12 choices (low or high price) against fictitious party No information on past behavior of other party Baseline game
II	"One-shot"	12 choices (low or high price) against fictitious party Information on past behavior of other party
III	Repeated	Subjects make independent and simultaneous choices in each round Exchange of choices made by other parties after each round Unknown horizon ("infinite" game) Final payoff equals sum of payoff in each round
IV	Repeated	Same as game III, except horizon which is finite and known (12 rounds)
V	Repeated	Same as game IV, except payoff matrix which is changed to elicit cooperation

to cooperate, and often enter into tacit collusion, irrespective of whether the game's horizon is known or not.

### *Experimental procedure*

The experiments were conducted in a large room. In the room there were three groups and each group had three rows of paired tables. The pairs of tables were separated by the space of one table. When entering the room, the students were randomly distributed across the three groups and within the three groups using the seats available. Pairs of subjects were formed to play the repeated PD games (i.e. the last three games in Experiments I and II). These dyads consisted of students sitting

side-by-side.

One experimenter and two assistants, identifiable by their similar shirts, guided each of the three groups. The assistants handed out the various information forms while the experimenter remained in front of the group for the entire experiment. All the groups started the experiment at the same clock time.

The PD was presented as an oligopoly-pricing problem. The experimenter first announced that five games were to be played, and that detailed information about each game would be provided just before that game started. He then presented and explained the general payoff structure of the first game (see the Appendix). The subjects could make two choices: setting a low price (corresponding to a competitive choice) or setting a high price (corresponding to a cooperative choice). The instructional phase fully and redundantly explained the interdependent nature of the payoffs, so that the consequences of different combinations of choices were clearly understood. We avoided the use of terms like 'compete', 'cooperate', 'defect' and 'sucker', so as to ensure a neutral instructional setting.

The experimenter, who gave instructions as to when and how to make choices in each game, strictly controlled the pace of the experiment. The subjects received a booklet with the instructions for each game and a corresponding response sheet. With the use of slides, the experimenter clarified each instruction at the beginning of each game. As mentioned above, Games I and II involved making twelve choices in a row against a fictitious party. At the beginning of Game III, the experimenter announced each subject's opponent/partner for the three repeated games. The subjects each received a booklet with small blank sheets of notepaper and were instructed in each round to choose independently and simultaneously. Next, the subjects had to write down their choice on the aforementioned blank paper. Once each subject had written down his or her choice, the experimenter instructed the parties to exchange notes. Following this exchange, the subjects noted their own choice, their opponent's choice and their payoff on a response sheet. This procedure was repeated for each round in the three interactive games. Of course, apart from the exchange of notes, no communication was allowed.

Following standard experimental gaming (e.g. Boone et al., 1999a; Schlenker et al., 1973; Pruitt and Kimmel, 1977; Gächter et al., 2004), the subjects were instructed to maximize their payoff during the experiment. Additionally, although experimental psychology has repeatedly revealed that subjects take experiments very seriously in any event, we introduced an extra motivational incentive by announcing that the top five players in accumulated payoff terms would receive a music voucher. We also appealed to a social prestige motive by telling the subjects that the ranking of

payoffs, including the players' names, would be announced in public in a final plenary session at the end of the four-week course, both on a bulletin board and on the Faculty's student Internet homepages.

### *Measures*

**Independent variable.** Following other researchers (Boone et al., 1999a, 1999b; Uejio and Wrightsman, 1967; Cox et al., 1991), we computed the total number of cooperative choices in each game as the measure of our independent variable: cooperative behaviour. Recall that 13 rounds were played in Game III. In order to standardize measures over the five games, we multiplied the total number of cooperative choices in Game III by the ratio 12/13.

**Social capital.** We constructed three measures for each of our three social capital dimensions. First, we asked the student to indicate the religion of his or her family, choosing from one of the five main religious categories in the Netherlands. From this, we constructed a binary variable measuring whether or not the respondent had been exposed to religion (coded as 1, 0 otherwise). Second, large family size was measured by a binary variable determining whether or not the respondent came from a family with one or more siblings (coded as 1, 0 otherwise). Third, membership of a southern community type was measured using the province where the respondent received kindergarten and elementary education. The Netherlands has twelve provinces and we decided that the southern three (i.e. South Limburg, North Brabant and Gelderland) represented southern type communities (coded as 1, 0 otherwise). These provinces are known for their Catholic heritage, reflected in many aspects of their society (churches, sports, music and other social groups). Where more than one province was provided, we asked the respondent to indicate the province in which he or she had lived the longest.

**Human capital.** Three binary indicators were created to capture the respondents' human capital. The first indicator measured whether the respondent attended a science-type high school prior to enrolment at University on a single binary variable (coded as 1, 0 otherwise). Prior knowledge and exposure to competition or cooperation was measured with two variables. The students received a list of nine courses and they were asked to mark the courses they had already followed. Our assessment of the course content revealed that three courses (i.e. economic principles, law principles and transactions) emphasized the self-interest economic model (i.e. competition) whereas three other courses (i.e. organizational behaviour, international transformation processes and communication) also stressed the importance of cooperation in economic life. We used two ordinal measures (ranging from 0 to 3) to measure exposure to competitive or cooperative courses.

### *Control variables*

We included two sets of control variables. The first set of control variables includes two subject characteristics that are widely recognized as having influence on cooperative behaviour, i.e. age and gender. Based on cognitive-developmental theories, we expected that cooperation increases with age (Cook and Sloane, 1985): the older people are, the more likely they are to believe that others try to be fair or helpful (Gächter et al., 2004). With respect to gender differences, the majority of the findings supported the widely held belief that females are more cooperative than males (e.g. Mason et al., 1991; for contradictory findings, see Cook and Sloane, 1985). In the present study, males were coded as 0 and females 1.

The second set of control variables includes four types of personality traits: locus of control, self-monitoring, Type-A behaviour and sensation seeking. Boone et al. (1999b) have shown that these four personality traits are stable human characteristics that have a relevant effect on cooperative behaviour. First, locus of control refers to the individual's generalized belief in internal versus external control of reinforcements (Rotter, 1966). Those who believe in external control ('externals') see themselves as relatively passive agents and believe that the events in their lives are due to uncontrollable forces. Those who believe in internal control ('internals') see themselves as active agents; they feel that they are masters of their fates and they trust their capacity to influence their environment. Empirical results suggest that internals are more cooperative than externals (Boone and Van Witteloostuijn, 1999; Boone et al., 2002). We measured locus of control with an adapted version of Rotter's original scale that contains 37 forced items (23 of those items being designed to measure locus of control expectancies and 14 being filler items that conceal the purpose of the test). Each item consists of a pair of statements where the respondent has to choose between an 'internal' and an 'external' alternative. A total locus of control score is obtained by counting the number of external alternatives chosen (with minimum 0 and maximum 23). The Cronbach's alpha of 0.65 is well above the lower limits of acceptability in experimental research, generally considered to be in the 0.50 to 0.60 range (Rotter, 1966; Robinson and Shaver, 1973; Nunnally, 1978).

The next control variable considers that people may differ in the extent to which they observe and control their expressive behaviour and self-presentation (Snyder 1974, 1987). Individuals high in self-monitoring are thought to regulate their expressive self-presentation for the sake of desired public appearances. They are therefore highly responsive to social and interpersonal situationally appropriate performance cues (Snyder and Gangestad, 1986). Individuals low in self-monitoring are thought to lack either the ability or the motivation to regulate their expressive self-presentations. Research suggests that high self-monitors are more cooperative

than low self-monitors, given their sensitivity to others' goals (Baron, 1989). We used Snyder and Gangestad's (1986) 18-item scale to measure self-monitoring. For each of the 18 items, respondents are asked to indicate whether the statement is true, mostly true, rarely true or false as applied to their lives. The items are keyed towards high self-monitoring. A total score is obtained by counting the number of high self-monitoring answers (with minimum 0 and maximum 18). The Cronbach's alpha of 0.63 is satisfactory.

The following control variable accounts for the fact that the degree of cooperative behaviour is higher for Type-B than for Type-A individuals. Type-A behaviour is referred to as the behaviour of an individual who is involved in an aggressive and incessant struggle to achieve more and more in less and less time (Friedman and Rosenman, 1974; Friedman and Booth-Kewly, 1987; Appels et al., 1985; Glass, 1983). Those who have not developed such a behavioural pattern are called Type-B persons. Due to their impatience and competitiveness, Type-A persons are less likely to show cooperative behaviour than Type-B individuals (Kabanoff, 1987). We used the 24-items Jenkins Activity Survey (Jenkins et al., 1979) to measure Type-A behaviour. The Cronbach's alpha of 0.73 is acceptable.

Sensation seeking is the final control variable and refers to the seeking of novel and intensive experiences, including the willingness to take risks for the sake of such experience (Zuckerman, 1979a, 1979b; Feij and Van Zuilen, 1984). Research has suggested a genetic determination basis for sensation seeking (De Brabander et al. 1992, 1995; Zuckerman, 1994) and found relationships with risk-taking behaviour such as drug use and gambling (Bratko and Butkovic, 2002; Thornquist et al., 1991; Glicksohn and Golan, 2001). Because of the risks involved in cooperating in Prisoner's Dilemma games, high sensation seekers will be more cooperative than their counterparts. We assessed sensation seeking with a Dutch version of Zuckerman's (1979a) measure (Feij and Van Zuilen, 1984). The respondents were asked to indicate on a five-point Likert scale to what extent they agreed (1 = strongly disagree and 5 = strongly agree) with 67 statements (of which 16 are filler items). The Cronbach's alpha of 0.83 for the overall sensation-seeking composite is satisfactory.

## **2.5 Empirical results**

The dependent variable is the discrete choice of each individual in each of the 37 attempts of the last three games (0 = competitive choice and 1 = cooperative choice). In line with other studies, hierarchical logistic regressions were performed to predict the likelihood of individual cooperation in each attempt (Boone et al., 2002; Boone et al., 1999a, 1999b). That is, we interpreted the data of the three repeated games as a pooled cross-section/time-series sample (Mason et al., 1991). This procedure allowed



us to investigate the dynamics of game behaviour and the unique contribution of each individual capital variable to the explanation of cooperative behaviour. We included two variables to account for the dynamics of game behaviour: a trial number and the other party's choice in the previous round. A trial number was incorporated to account for the finding that cooperation increases steadily over Games III to V due to differences in the games' nature. The second variable was included to account for the history of the game. That is, although individuals make independent choices in each round, these choices are not independent of the choices made by the other party in previous rounds. By incorporating the game's history – that is, the other party's choice in the previous round – we were able to assess whether human and social capital matters, irrespective of the other party's strategy. The summary statistics and correlation coefficients are in Table 2. The regressions results are in Table 3. In addition to Model 1 – which includes the control variables and the variables that account for the dynamics of game behaviour – we subsequently added social capital (Model 2) and human capital (Model 3) to the first model in order to assess the unique contribution of each form of capital in predicting cooperative choices.

Table 2.2 Summary of statistics and correlations (a)

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Cooperation	5.48	2.24	1.00												
2. Religion	0.67	0.47	0.01	1.00											
3. Family	0.43	0.50	-0.08	0.19	1.00										
4. Southern community	0.26	0.44	-0.06	0.13	-0.05	1.00									
5. Science education exposure	0.30	0.46	0.09	0.02	0.06	0.11	1.00								
6. Cooperative exposure	2.20	0.96	-0.02	0.01	0.05	-0.02	0.10	1.00							
7. Competitive exposure	2.18	0.92	-0.09	-0.02	0.10	0.01	0.01	0.53	1.00						
8. Gender	0.34	0.37	-0.04	0.06	0.07	-0.01	0.02	0.11	0.01	1.00					
9. Age	19.65	1.04	0.05	-0.12	-0.15	-0.15	0.08	-0.10	-0.05	-0.03	1.00				
10. Locus of control	11.51	3.37	-0.04	0.03	-0.06	-0.13	0.08	0.09	-0.02	0.17	-0.07	1.00			
11. Self-monitoring	9.44	2.97	0.04	-0.09	-0.07	0.06	0.09	-0.04	0.02	-0.11	-0.08	-0.14	1.00		
12. Type-A behaviour	12.28	4.01	-0.05	0.18	0.04	-0.02	0.13	0.10	0.20	0.16	0.04	0.04	0.23	1.00	
13. Sensation seeking	11.27	1.57	-0.03	0.11	0.05	-0.09	-0.03	0.09	0.07	0.29	0.02	0.06	-0.35	0.20	1.00

a. Correlation coefficients larger than 0.02 and 0.05 are significant at  $p < 0.05$  and  $p < 0.01$ , respectively.  $N = 6734$  [182 subjects \* 37 attempts (1 trial observation lost due to the variable 'other person's choice in previous round' per subject)]. The scales of the variables are explained in detail in the text in the section on measurements

The hierarchical logistic regressions reveal that all forms of capital have an independent effect on cooperative behaviour when introduced in steps as groups. The addition of the various capital items leads to a significant improvement in the model fit (changes in Chi-square are 57.17 and 91.79 with  $p < 0.001$  for Models 2 and 3, respectively

with 8, 12 and 15 degrees of freedom, respectively). In what follows, we discuss our

*Table 2.3 The impact of social and human capital on cooperative behaviour (a, b)*

Variables	Research Model 1		Research Model 2		Research Model 3	
Constant	-3.380 (0.602)	***	-2.576 (0.632)	***	-1.808 (0.648)	**
Trail	0.015 (0.003)	***	0.015 (0.003)	***	0.016 (0.003)	***
Other person's choice lagged	1.531 (0.054)	***	1.527 (0.054)	***	1.520 (0.055)	***
Gender	-0.057 (0.061)		-0.028 (0.061)		-0.049 (0.062)	
Age	0.116 (0.026)	***	0.093 (0.027)	***	0.066 (0.027)	**
Locus of control	-0.001 (0.008)	**	-0.012 (-0.008)	**	-0.023 (0.009)	**
Self-monitoring	0.040 (0.010)	***	0.042 (0.010)	***	0.037 (0.010)	***
Type AB	-0.035 (0.007)	***	-0.042 (0.007)	***	-0.041 (0.007)	***
Sensation seeking	0.004 (0.019)		-0.009 (0.019)		-0.003 (0.019)	
Religion			0.282 (0.062)	***	0.274 (0.062)	***
Large family			-0.240 (0.057)	***	-0.269 (0.058)	***
Southern community type			-0.367 (0.064)	***	-0.435 (0.066)	***
Exposure to science education					0.474 (0.062)	***
Exposure to cooperative courses					0.081 (0.034)	**
Exposure to competitive courses					-0.188 (0.036)	***
-2 log likelihood	8,054.57		7,997.40		7,905.61	
model chi-square	1,015.59	***	1,072.76	***	1,164.55	***
change chi-square	1,015.59	***	57.17	***	91.79	***

a.  $N = 6734$  [182 subjects \* 37 attempts (1 trial observation lost due to the variable 'other person's choice in previous round' per subject)]. Standard error in parenthesis.

b. \*, \*\* and \*\*\* indicate statistical significance at the 0.05, 0.01 and 0.001 level, respectively.

findings for social and human capital with respect to the results for the final Model 3. The results confirm the fostering effect of exposure to religion on cooperative behaviour ( $B = 0.274, p < 0.001$ ). Hence, Hypothesis 1a is confirmed. Table 3 indicates that the effect of a large family size negatively impacts on cooperative behaviour ( $B = -0.269, p < 0.001$ ). Hypothesis 1b is thus confirmed. Students who have been raised in a southern community type express less cooperative behaviour ( $B = -0.435, p < 0.001$ ). This is in line with our expectations. Hypothesis 1c is therefore confirmed. In line with our prediction, students who attended a science-type high school are more cooperative than those who did not ( $B = 0.474, p < 0.001$ ).

Hypothesis 2a is thus confirmed. Table 3 shows that students who were exposed to courses that emphasize cooperation are more cooperative than those who had not ( $B = 0.081, p < 0.010$ ). Hypothesis 2b is accepted. In line with our expectations, the results show that students exposed to courses that emphasize competition are less cooperative than those who were not ( $B = -0.188, p < 0.001$ ). Hypothesis 2c is thus confirmed.

Finally, it is worth mentioning that our results hold while controlling for a substantial number of variables that could also determine cooperative behaviour. The results of Model 3 show the likelihood of cooperation increases as the game proceeds: there is a positive and significant effect of practice ( $B = 0.016, p < 0.001$ ). The parameter estimate of the other's party choice in the previous round is also positive and significant ( $B = 1.520, p < 0.001$ ). The latter result confirms previous experimental findings that cooperation is enhanced when cooperation can be expected from the other party (Pruitt and Kimmel, 1977; Boone et al., 1999). On average, the subjects opted for a tit-for-tat strategy in the repeated games. We observed that the estimate of gender parameter's sign is negative in all models (which suggests that males rather than females are somewhat more cooperative in our sample) but it is not significant in the models. The results confirm that the likelihood of cooperative behaviour increases with age ( $B = 0.066$  and  $p < 0.010$ ). The results for personality capital are also in line with our expectations, by and large. Table 3 shows that locus-of-control internality ( $B = -0.023, p < 0.010$ ) and a high self-monitoring personality trait increases the probability of cooperation ( $B = 0.037, p < 0.010$ ). Table 3 reports that Type-A individuals are more competitive than Type-B persons ( $B = -0.041, p < 0.001$ ). The results for sensation seeking are not in line with our predictions, but they are also not significant ( $B = -0.003, n.s.$ ). A possible explanation for this is that we estimated our model using the composite sensation seeking scale. Sensation seeking includes four sub-dimensions, i.e. thrill and adventure seeking, experience seeking, uninhibitedness and boredom susceptibility. We reanalyzed our model incorporating each of these four dimensions. The results from these additional tests indicate that mutually exclusive effects can be identified, although none are significant: thrill and

sensation seeking and uninhibitedness decrease cooperation, whereas experience seeking and boredom susceptibility increase the likelihood of cooperative behaviour.

## 2.6 Conclusions

Our point of departure for this study is the lack of social and human capital dimensions as essential determinants of individual cooperative behaviour in IB research. Alliance research, for example, generally uses the firm as the unit of analysis and seems to ignore the important role of managers self in interfirm collaboration (Nooteboom, 2004). This omission may have caused IB researchers to under-specify models of cooperation. The purpose of this study, therefore, is to propose and test a research model of individual cooperative behaviour that accounts for social and human capital of individuals. To really understand cooperative behaviour of individuals we must account for how earlier experience socializes individuals into certain beliefs and unconscious behavioural patterns. This directly relates to the concept of mental programming (Hofstede, 2001) that is key in studies of cross-cultural management; it refers to the glass through which people see life. Our study helps to understand why people think differently, assume differently and hence, can help to explain why people act differently in different cultures.

Hence, the key focus of this study is to understand how socialization in the past can explain cooperative behaviour of individuals in the present. In so doing, we also aim to explain the excess cooperation observed in reality that rational reasoning would deny existed. To this end, we study the effects of two forms of capital, i.e. social and human capital. Our empirical results show that these features – in combination with the gender, age and personality capital control variables, and the dynamics of game behaviour – offer a substantial explanation for cooperative behaviour in people involved in Prisoner's Dilemma situations. Clearly, the empirical results provide convincing evidence that people vary considerably in their willingness to cooperate, even under the same environmental conditions (see also Sally, 1995; Gintis, 2000; Henrich et al., 2001). By adopting our eclectic perspective, the present study belongs to an interdisciplinary research tradition that aims to account for fundamental mechanisms and processes, other than changing the game elements, that promote the emergence of cooperation (Tan and Zizzo, 2008; Hammerstein, 2003).

Cooperation is contingent on many things, and the two forms of capital are the main, overall exogenous variables that explain this. A first point of departure in our study is that socialization matter. Even within the same nation state, people behave differently because their beliefs, values, preferences and habits have been formed and reformed by continuous participation in groups with different norms and values. We argue that three key dimensions of social capital – exposure to religion, family background and community structures – influence behaviour in general, and that of an individual's

inclination to cooperate in social dilemma situations in particular. The empirical results generally support this. Exposure to religion increases cooperation, whereas being born and raised in large families or a southern community type decrease cooperation. Our empirical results also confirm that human capital matters. The type of high school education and the exposure to either competitive or cooperative courses determines cooperative behaviour in line with our expectations.

Our study has various implications for managers in particular those directly involved in international strategic alliances. An international strategic alliance is an enduring cooperative agreement in which two separate organizations share input while maintaining their own corporate identities. International strategic alliances can have different governance structures and targets but they are generally considered to be an important prerequisite for company success: net profits can grow for many years in succession if companies join forces. However, despite the potential added value of an international strategic alliance or the need to team up with other companies, approximately half of the international strategic alliances fail. We offer two explanations for the failure of international strategic alliances. First, any international strategic alliance is a collaboration between individuals that each, following our study, have their own path-dependent history making people inherently able to cooperate or not. Our study highlights the importance to review the ex ante incompatibility of any alliance partner given that a match of inherently collaborating individuals with inherently non-collaborating individuals will not be very successful. International alliance partners should therefore not only focus on firm-specific criteria such as financial or knowledge resources or market opportunities as is commonly advocated in the alliance literature. Our study shows that information about individuals (including their family, community and education background) may help to ex ante select partners that foster ex post alliance success. Second, our study offers in-depth explanations for relational features – such as a lack of trust and conflicts or dispositional alliance characteristics such as cultural differences – that are put forward for international alliance failure. It is a matter of finding and matching appropriate individuals that will result in, for instance, high trust situations needed for cross-cultural long-term relationships. Additionally, we would like to mention that in case of a “mismatch” between individuals there are opportunities to manage the resulting dynamics. Third parties may have a role to play helping such “mismatched” alliances to overcome some of the limitations that result from this. Among others, third parties may help to establish appropriate contracts, provide co-ordination or impartial and objective information needed for effective monitoring and control, or bridge cognitive distances. Of course, such third parties should meet particular criteria – for example, the third party should not be servicing the interests of one actor more than those of the other and should be trusted in his or her competences and intentions – in order to make successful interventions for the initiation and application of structural and relational governance mechanisms in

misaligned alliances. If so, third parties can help identifying behavioural repertoires and partly solve these. In doing so, they can help to 'prime' a successful collaboration or assist to manage international alliances based on appropriate incentives for both sides of the inter-firm agreement.

Hence, our study offers avenues for future IB research that aims to understand the success of cross-cultural inter-firm collaborative efforts. It is a question to what extent firm characteristics or individual features of managers determine international alliance success. Future studies may analyze whether they are complementary, mutually exclusive or interdependent and, in so doing, disentangle the underlying causal structure of cooperation at a different level than what is common in IB research. Our study shows that individual characteristics can be measured in a meaningful way. Our measurements can be included in surveys or case studies enabling IB scholars to systematically study cooperative behaviour from a multilevel perspective.

As with any experimental setting, various well-known limitations are applicable to our research. By themselves, these limitations offer challenges and opportunities that can and need to be met in future research. Although many 'real-world' situations resemble a Prisoner's Dilemma setting, other situations could align with games that have more than one (Nash) equilibrium. It could also be interesting to use such games in experiments and to explore whether the forms of capital are important in the understanding of individual behaviour. Additionally, testing the model in an international setting with non-student subjects would not only allow us to explore cross-national differences in social capital (the form within which it can be expected that international differences materialize), but would also indicate whether the behaviour of, e.g. managers or policymakers aligns with the theoretical predictions of the present research. Students are often used in experiments and their behaviour is generally considered to be representative albeit that behaviour of IB executives in naturally occurring environments may be different due to their age or their experience in international negotiations (Fehr and List, 2004). Future studies may address this explicitly by using managers in experiments. Additionally, although many of our measurements have been used in earlier research and as such offer a reliable test of our hypotheses, new research could explore whether or not our results hold for other measurements for some of our variables in particular those related to religion. Religion can have differences in depth and breath for particular persons and variations in such religiosity can be measured directly and different from what is presented in this study. Below, we will elaborate on specific limitations of this study, and explore some of the associated suggestions for further research.

First, we avoided any interaction and/or moderating effects between the independent variables in our model. Although the empirical results suggest important roles for

each form of capital in terms of direct effects on cooperative behaviour, the overall underlying causal mechanism of cooperative behaviour in Prisoner's Dilemma situations could be much more refined than the one we allowed to operate. Future research could incorporate this perspective and incorporate interaction effects among the constituent variables of cooperative behaviour into the model and, subsequently, enable its relative importance to be estimated. Second, any theoretical model is at best a biased representation of reality, and ours is no exception. There could be other forms of capital and they may have direct, indirect or moderating effects on cooperative behaviour. Such new forms of capital could be incorporated, as indicated by Zizzo's (2002) work (Fehr and Camarero, 2007; Fehr and Rockenbach, 2004). Zizzo, for example, argues that serotonin works as a form of human capital. Serotonin stabilizes information flows in the neural circuitry to produce appropriate affective and behavioural output. In relation to game-theoretic interactions, this implies that its role is related to the processing of cues relevant to social interaction because serotonin improves the social cognitive skills of agents. It would follow from this argument that pharmacologically induced changes in serotonin levels would increase social competence, and consequently produce greater social and economic success. Incorporating this form of capital calls for the design of new experimental settings (double-blind placebo studies, functional magnetic resonance imaging (fMRI) techniques, etc.) for which the present study could serve as a point of departure.

In conclusion, cooperation will remain crucially important for firms and managers that operate in the contemporary world economy, and a thorough understanding of the causes and consequences of cooperation on firm behaviour remains central to IB research. With the above limitations acknowledged, we are confident that this study makes an important contribution to IB research by explaining how the relationship between individual characteristics and individual cooperation varies.

## **2.7 Appendix – Game Settings**

Two firms operate in the same market: firms I and II. Both firms can choose between two price strategies: setting a low price and setting a high price. The profits depend on the pairs of strategies chosen. In the following payoff matrix, the four possible profit combinations (in thousands of Euros) are reported for Experiment I ( $P_i$  stands for the pricing strategy of firm  $i$ , with  $i = I, II$ ).

		Firm II	
		Low price	High price
Firm I	Low price	(-30,-30)	(600,-600)
	High price	(-600,600)	(300,300)

Each cell contains the possible profit combinations (WI, WII). WI and WII are the (negative or positive) profits of Firm I and Firm II respectively. The four profit combinations are as follows:

- (1) PI low = PII low. Both firms choose to set the same low price. The profit margins are negative. Both firms generate a loss of EUR 30,000.
- (2) PI low < PII high. Firm I offers a lower price than Firm II. The Firm II's customers prefer to buy from the 'cheaper' Firm I. The profit of Firm I is therefore EUR 600,000, and Firm II's losses amount to EUR 600,000.
- (3) PI high > PII low. Firm II undercuts Firm I. The resulting profit combination is the opposite of the second case. Firm I generates a loss of EUR 600,000 and Firm II a profit of EUR 600,000.
- (4) PI high = PII high. Both firms choose to set the same high price. The profit margins are positive. Both firms gain a profit of EUR 300,000.

### *Game I*

Imagine you are Chief Executive Officer of Firm I. You decide autonomously on the pricing strategy of your company. You have an appointment with your distributor to fix the future pricing strategy for your product. It is a custom in this industry that contracts with distributors are concluded annually, in which the price level for each month (or round) for the coming year is stipulated in advance. It is impossible to change the terms of the contract afterwards. The Chief Executive Officer of Firm II will simultaneously determine her/his pricing strategy with her/his distributor (a different one from yours) for the following twelve months. You do not know the price intentions of Firm II and vice versa. Indicate your preferred strategy below (L indicates low price; H indicates high price) for each round (month).

### *Game II*

At the end of the contract, you learn that Firm II has consistently chosen to set a high price in each month of the previous contracting period. Now, you have to agree a new contract with your distributor for the next twelve months. Indicate again which pricing strategy you prefer for each month.



### Game III

Your information on the past intentions and pricing strategy of Firm II have become irrelevant because Firm II has been taken over by another company, which installed a new Chief Executive Officer. The government has also decided that contracts in which prices are set for more than one month in advance are now illegal. Therefore, for the next year you are only allowed to fix your price level for one month, after which you have to decide again for the next round. Decisions are made simultaneously in each month.

You play the game for an unknown number of months (rounds). You do not know in advance how many times you will have to make a decision on your pricing strategy. The game can end any moment after round 8. The probability that the game ends after round 8 is 20 percent. The sequence of decisions/activities you have to perform is as follows:

- (1) at the beginning of each round, the price strategies are set simultaneously and noted on the response sheet
- (2) subsequently, swap sheets with your counterpart
- (3) finally, calculate your own profit, given the strategy of the other firm.

Indicate for each month on your response sheet: (i) the strategy you prefer, (ii) the strategy of the other firm and (iii) the profit you gained. Except for the exchange of notes after each round, no communication is allowed during the experiment.

### Game IV

Repeat Game III, but for 12 months (rounds).

### Game V

In the following period of twelve months demand has increased substantially, along with an increased profit potential. This new situation is reflected in the following profit combinations (profits are in thousands of euros).

		Firm II	
		Low price	High price
Firm I	Low price	(-20,-20)	(800,-400)
	High price	(-400,800)	(600,600)

Proceed as in Game IV.

# CHAPTER 3. EDUCATION AND PERSONALITY TRAITS

## Summary

It has often been observed that people cooperate more than they would be expected to do according to standard assumptions of individual rationality. In part, this empirical anomaly is due to the unrealistic assumptions concerning human behavior in economic models. Our study aims to offer new foundations for strategic decision-making behavior of individuals. We argue that human capital and personality traits are key in deciding whether or not to cooperate with a counterpart. Furthermore, we argue that the effect of a particular personality trait –that is, locus of control– on cooperative behavior is moderated by the level of human capital. The hypotheses are tested using Prisoner’s Dilemma games in an experiment with 182 university students. The results report significant direct effects of human capital and locus of control on cooperation and confirm the moderating relationship between the two. Internals tend to cooperate more when having high levels of human capital. For externals, the effect is opposite, that is, externals tend to cooperate more when having low levels of human capital. In so doing, we open the black box of individual decision-making behavior and contribute to a growing field of behavioral strategy research that aims to strengthen the empirical relevance and practical usefulness of management theory.

Key words: human capital, locus of control, Prisoner’s Dilemma games, cooperative behavior

## 3.1 Introduction

Decisions are the cornerstone of strategy (Powell, 2011). In strategic management, decisions concerning cooperation with counterparts are key. It has often been observed that people cooperate more than they would be expected to according to standard assumptions of individual rationality (Jones, 1999). Evidence from research in the field of psychology reveals that people do not always act as rational like the homo economicus in mainstream economic theory (Annen, 2003). This triggered a need to reconsider the foundations with regards to decision-making. Behavioral strategy applies cognitive and social psychology to management challenges in order to overcome the empirical contradictions (see, for example, Powell, Lovallo, & Fox, 2011 for a review of the recent literature). Scholars in this field aim to bring realistic assumptions about human cognition and social behavior to strategic management decision processes. This chapter contributes to this relatively new but fast growing research tradition. We study the relationship between locus of control, human capital and cooperative behavior in the setting of social dilemma games. Locus of control is among the most important personality traits of top managers. We argue that the relationship between locus of control and cooperative behavior is moderated by human capital. In so doing, we offer an explanation why people in the ‘real world’ –

unlike the 'rational machines' in many of the economic models – are predisposed towards cooperation.

Economic theory assumes that economic agents behave according two assumptions: a) they behave according to the normative rational model, and b) everyone behaves, *ceteris paribus*, in the same way. With regard to the first assumption, Mason, Philips and Redington (1991) already have shown that people do not always act as rational as predicted by the modeled behavior; a result that has been consistently confirmed in experimental economics (Pothos, Perry, Corr, Matthew, & Busemeyer, 2011). For example, game theory predicts that in finite Prisoner's Dilemma games, people will never cooperate. The reason for this is that players know at the start of the game that the other player will defect in the last period. Given this knowledge, rational players will defect in the last round of the game, because there is no reason to build a reputation of cooperation in this game (Rasmusen, 2001). The same logic can be applied by backward induction to every round of the game, including the first round. Experimental research, however, shows that cooperation does appear in finitely repeated Prisoner's Dilemma games (Pruitt & Kimmel, 1977, Raiffa, 1982). Apparently, not all players act according to the rationale of backward induction.

This chapter aims to explain differences in cooperative behavior (Boone & Van Witteloostuijn, 1999; Boone, De Brabander, & Van Witteloostuijn, 1999a, 1999b). We empirically test whether human capital and personality characteristics matter for cooperative behavior. We use the Prisoner's Dilemma to model cooperative behavior because it offers an ideal context to understand the antecedents of competitive vis-à-vis cooperative behavior (Biermand & Fernandez, 1993; Lefcourt, 1982; Raiffa, 1982). Our key contributions are twofold. First, we include human capital as an explanatory variable for cooperative behavior. Human capital is defined as the accumulation of knowledge and skills as a result of education and experience (Becker, 1975). Human capital is accumulated over time and constitutes an inclination towards particular behavior. Among others, this perspective is part of cognitive economics (Egidi & Rizzello, 2003), which studies how individual and organizational learning shapes social phenomena. Although the concept is well known and appreciated as an important factor that, for instance, predicts corporate success (Ployhart, Van Iddenkinge, & Mackenzie, 2011), little is known as to how human capital adds to the explanation of cooperative behavior. We aim to fill this research gap. We argue that based on accumulated experience people may have developed an inclination towards cooperation (or defection). Over time people can show alternated patterns of behavior due to learning modifications.

Second, we include personality traits in our study of cooperative behavior. In contrast to the concept of human capital – that can be regarded as a nurtured or learned

characteristic – personality capital reflects human nature and is relatively stable over time and situations (Brocklebank, Lewis, & Bates, 2011). In recent years, strategy scholars have used a personality capital perspective to explain deviating from predicted behavior. The Big Five trait theory, for example, reveals a positive relationship between extraversion, neuroticism, and cooperative behavior (Hirsh & Petersen, 2009). We contribute to this research by focusing on another personality trait, that is, locus of control. Locus of control is identified as one of the key characteristics differentiating so-called internal from external type of managers. Although locus of control received empirical support in the experimental literature (Cook & Chi, 1984; Cook & Sloane, 1985; Boone et al. 1999a, 1999b, 2002), the role of internals and externals in explaining cooperative behavior is to an important extent still ambiguous (Egidi & Narduzzo, 1997). We aim to address this research gap and suggest that human capital may moderate the effect of locus of control on cooperative behavior. That is, we suggest that the level of human capital serves as an important prerequisite for the effect of personality capital on cooperative behavior. To the best of our knowledge, this perspective has not been addressed in the literature.

The outline of this chapter is as follows. In Section two, we elaborate on the theoretical background of this research and present the hypotheses. Section three explains the methods used to test the hypotheses and provides details of the games, experimental procedures and measures. Subsequently, we present and discuss the results. The chapter ends with conclusions and suggestions for future research.

## **3.2 Theoretical background and hypotheses**

### *Human capital*

Human capital is defined as the accumulation of knowledge and skills as a result of formal education and experience (Becker, 1975; Becker & Murphy, 2000). In mainstream economics, the mechanism of learning is explained as the ability of individuals to make rational decisions (Perez, 2000). In that sense, learning is a mechanism to reduce errors in decision-making. Cognitive economics applies a more general view and argues that learning is a mechanism that explains any modification of individual behavior as a result of experience. These different perspectives are reflected in the experimental approaches. In the mainstream view, learning is used as a solution to reduce irrational behavior. The cognitive perspective uses learning to explain irrational behavior. When having developed a successful routine, people apply the learned principles in different contexts (Egidi & Narduzzo, 1997), but those routines not necessarily have to be the most optimal ones. Human capital can therefore be viewed as a path dependent process. In the context of this study, some people might have developed a routine of cooperation whereas others might have

developed a routine of defection or competition. We label this routine an inclination towards a particular kind of behavior, i.e. an inclination towards cooperation positively formulating in light of cooperative behavior.

Various studies attribute differences in success for an individual, group or population to differences in human capital endowments (Mincer, 1970). Human capital is relevant because persons with superior human capital endowments are more astute in learning complicated situations and are better able to adjust to environmental contingencies (Boone et al., 2002). Given its intangible nature, human capital resources are difficult to imitate and to copy. Given this nature, and given that it is updated adequately, human capital is seen as a strategic resource, leading to improved performance and effectiveness (Ployhart et al., 2011). For this reason, human capital theory has been applied to understanding differences in organizational performance (Ang, Slaughter, & Ng, 2002; Buchholtz, Ribbens, & Haule, 2003; Watson, Steward, & BarNir, 2003), where human capital is regarded as essential for the long-term survival and growth of organizations (Pennings, Lee, & Van Witteloostuijn, 1998). Organizations that possess superior human capital are more able to plan effectively and solve problems (Florin, Lubatkin, & Schultz, 2003), are better able to adapt to environmental contingencies (Snell & Dean, 1992; Youndt, Snell, Dean, & Lepak, 1996), and find innovative ways to increase customer's benefits (Chandler & Hanck, 1998).

Human capital as a learning concept has been linked to various social phenomena. Novarese (2007), for example, studied the effect of learning on individual behavior in a "Sum 10" experiment that made use of cooperation and coordination in teams. In addition, the experiment included different social contexts that served as training situations for artificial agents. The results indicated that different training situations resulted in heterogeneous behavior among participants. Furthermore, participants tended to replicate the choices that initially proved to be successful. Haselhuhn, Pope, Schweiter and Fishman (2012) studied the relationship between personal experiences and behavior in an appealing study with evidence from video rental fines. Using a field setting with longitudinal data, they unraveled the effects of learning new information from the effects of personal experience. Their results indicate that experience with a fine, and controlling for the effect of new information, has a positive effect on future compliance, whereas a large fine has a greater effect than experience with a small fine. These principles of learning are also recently empirically demonstrated in the field of behavioral finance. This literature merely illustrates the reinforcement learning heuristic, which proposes that increased weight is placed on past strategies that have proven to be successful, even if this past success logically does not imply future success. For example, Kaustia and Knüpfer (2008) illustrate that Finnish investors are inclined to subscribe to future Initial Public Offerings (IPOs) if they previously experienced high returns in their IPO subscriptions. Malmendier and Nagel (2007)

emphasize low-frequency responses to differences in return experiences across birth cohorts. Their results indicate that cohorts that have experienced relatively high stock market returns hold more stocks, whereas cohorts that have experienced high inflation prefer to hold fewer bonds.

The aforementioned empirical results are exemplary for the relevance of human capital for decision-making behavior. People tend to be biased by their experience and therefore become inclined to show particular behavior that can be related to accumulated human capital. Further, this inclination towards particular behavior does not necessarily lead to the most optimal results. People can make suboptimal decisions based on their accumulated capital. This results in a path-dependent accumulation of human capital that drives particular behavior in social phenomena. In our research setting of Prisoner's Dilemma games, this might be one of the reasons why some people have an inclination towards cooperation or defection, regardless of whether cooperation or defection is the most optimal strategy.

In studies like ours that use students as research subjects, a common applied variable to address human capital is the extent to which participants are exposed to cooperative courses. Courses from economics (such as game theory) often emphasize the self-interest model of economics, whereas business courses (such as organizational behavior) highlight the concepts from cooperation. Experimental research also reveals that economics students, compared to students from other disciplines such as sociology and psychology, tend to be more self-interested and show more free riding behavior in experiments that request for private contributions to public goods (Frank et al., 1993). Furthermore, economics students make generally less cooperative choices in PD-games than students from other disciplines. In line with Boone and Van Witteloostuijn (1999) we argue that not every student is exposed to cooperative courses to the same extent. Therefore, we distinguish between students who attended economic courses emphasizing the self-interest model, and students who attended courses that stress cooperation. We hypothesize that students exposed to cooperative courses tend to reveal more cooperative behavior than students less exposed to cooperative courses. This results in the first hypothesis:

*Hypothesis (H1):* Prior exposure to cooperative courses is positively related to cooperative behavior.

### *Personality traits*

We include personality traits to explain decisions with respect to cooperative behavior. Over the years, psychology has identified a large number of personality traits. Experimental research suggests personality traits should meet the three criteria in order to explain behavior, that is, relevant traits are (i) stable characteristics of human beings that (ii) have a relevant effect on cooperative behavior while, (iii) easily

measurable with validated instruments (Boone et al., 1999a). Further, it has also been argued that traits especially become dominant in 'weak' situations rather than 'strong' situations (Weiss & Adler, 1984). This means that personality can particularly predict behavior when the environment is uncertain or ambiguous or, in other words, weak. When there are enough cues for appropriate behavior, the situation is described as strong, personality traits will have less or even no significant influence on decisions. In this chapter, we study locus of control.

Rotter (1954) developed the locus of control perspective based on social learning theory. Locus of control refers to the individual's belief in internal or external control of reinforcements (Rotter, 1966). People who believe in external control (externals) view themselves as relatively passive agents and believe that the events in their lives are due to relatively uncontrollable external forces. Externals perceive their desired achievements dependent upon luck, chance and powerful persons or institutions. They perceive a low probability of being able to control their lives by their own decisions and efforts. Conversely, people who believe in internal control (internals), see themselves as active agents, and feel that they can master their outcomes and trust their capacity to influence their environment. Internals believe that they control events and are able to influence their lives by effort and skill. In line with this perspective, it can be hypothesized that internals are more likely to cooperate in PD situations because of their inclination to take risk.

This trait has been included in different experiments of cooperative behavior, albeit that mixed findings are reported. Cook and Chi (1984), for instance, studied the relationship between locus of control and cooperative behavior among children. Their results suggest that external children are more cooperative than internal ones. This result is supported by the study of Bialer (1961), who argued that internal children's "greater awareness of their roles in their own success and failures cause them to strive harder. This may be described as growth in competitiveness". Internals, who believe that they can control events, will adopt a more competitive style of play when they think that competitiveness will pay off. On the other hand, externals believe that they have little control over the events and therefore show a dependency on others and cooperate passively (Cook & Sloane, 1985). These findings with children are used as input for hypotheses involving adults. Boone et al. (1999b), for example, found that locus of control correlates negatively with the number of cooperative choices. Since the Rotter index that is used in their study is scored towards externals, this means that on average internal people make more cooperative choices than external people. In a multivariate analysis, the authors find a positive effect for locus of control on the probability of cooperation. This result contradicts the finding of locus of control and cooperation among children as found by Cook and Sloane (1985). However, Boone et al. (1999b) found no evidence that internals are more cooperative than externals or

vice versa. They explain this finding by suggesting that internals use both competitive and cooperative behavior to determine the valued outcome of the games. Externals, on the other hand, are less capable of using cooperative behavior as a means towards that end (Boone et al., 2002). Nevertheless, given that the arguments and evidence generally favor a fostering effect of internals on cooperative behavior, we hypothesize: *Hypothesis (H2)*: Being internal in locus of control is positively related with cooperative behavior.

### *Contingency perspective*

While the existing literature thus indicates that human capital and locus of control plays an essential role in cooperative behavior one way or another, no study has addressed human capital as a moderator to explain the locus of control – cooperative behavior relationship. It is likely that human capital and locus of control are contingent, or in other words, one of both might exclude or reinforce the effect of the other on cooperative behavior. As mentioned above, personality traits mainly have an effect on cooperation in weak situations. From that perspective, people who have accumulated much human capital in a particular area might act as in a strong situation in that particular area, compared to people that have accumulated less human capital but who have identical personality traits.

Contemporaneous experimental research focuses on antecedents of cooperative behavior in isolation. We suggest a contingency approach, combining various characteristics in one model to develop a more complete theory of cooperative behavior, following in part the mixed empirical findings reported above. Therefore, we propose that the impact of personality characteristics on cooperative behavior is conditional on other factors, i.e., human capital. Based on the theory of cognitive economics, conceptualized by human capital and the subsequent inclination towards particular strategies, we expect that previous experience and education with respect to cooperative behavior will have a strong effect on the propensity to cooperate or defect in our PD setting.

Human capital is knowledge accumulated from education and experience that shapes future decisions (either optimal or suboptimal). In that sense, people who developed a cooperative attitude through education will have a higher inclination towards cooperation than people who did not develop such attitude or, on the contrary, those who developed an inclination towards competition through competitive experiences. Using human capital as the point of departure, we can further take into account personality traits to find a more comprehensive explanation of decision-making behavior. In particular, this implies that with different levels of human capital, people with an internal or an external locus of control will show different patterns of cooperative behavior. Therefore, we expect that human capital will moderate the



relation between locus of control and cooperative behavior.

Previous research reports that overall, internals are more associated with cooperation than externals (Boone et al., 1999a). Our second hypothesis therefore suggests that, *ceteris paribus*, internals will cooperate more than externals. Boone et al. (2002) discovered a pattern of learning over different rounds of games. It appeared that internals cooperate more than externals, but externals converge to an identical level of cooperation over the course of the game. This is important because it suggests that with playing different PD games over time, human capital (knowledge) with respect to the most profitable strategy (i.e., cooperation) in PD games is developed.

Therefore, we can expect that internals who also have a background in cooperative courses, have a higher inclination towards cooperation than internals who lack a background in cooperative courses. Internals benefit from this background, which implies a default inclination towards cooperation, and take advantage of this by choosing a strategy of cooperation. In that sense, internals are able to put their background into perspective and choose for themselves how to apply these concepts that they have learned or experienced. Internals that lack exposure to cooperative courses will be less able to use their human capital as a means to support their (non) cooperative strategy.

Theoretically, we expect a different effect for externals. Externals are much more expected to rely on their environment than internals. Remember that externals perceive their desired achievements to be dependent upon luck, chance, and powerful persons or institutions. Therefore, they might be more passive in initiating cooperative behavior, fearing that the counterparty will defect (Cook & Sloane, 1985). A precise prediction concerning the moderating effect of human capital on cooperative behavior for externals is challenging. On the one hand, in case of high levels of human capital, externals might cooperate to the same extent as internals, since they both have a strong cooperative inclination, which makes a situation strong and thereby dwindles the role of locus of control. On the other hand, and still taking into account high levels of human capital, externals might be more confused of the possible downsides of cooperative behavior, i.e. the threat of opportunism. As a consequence of this fear, externals can choose to refrain from cooperation and decide to wait for their counterpart to initiate cooperation first.

In sum, we argue that the moderating effect of human capital on the relationship between locus of control and cooperative behavior will have the strongest effects for internals. If we can separate the effects of locus of control from human capital then we expect to see an enlarged effect when a person is internal and has a high level of human capital. Hence, the impact of locus of control on cooperative behavior

is contingent on cooperative inclination. Locus of control fosters cooperation for internals with high levels of cooperative education because those people are able to use their background as a means towards an end in that they believe that they can influence their desired outcomes. Therefore, based on their cognitive background, internals choose the strategy that in their judgment is the most effective. Internals with a lower level of human capital, and thus have a lower cooperative inclination, will show a smaller pattern of cooperative behavior because these internals will have less awareness of their abilities to use cooperative behavior and are therefore more prone to strategies that deviate from cooperative behavior. Consequently, our final hypothesis is stated as follows:

Hypothesis (H3): Internals with a high inclination towards cooperation will cooperate more than internals who have a lower inclination towards cooperation.

### **3.3 Methods**

#### *Games*

As is common in experimental research, we used undergraduate students as our study subjects (for a discussion about the use of undergraduate students in research see, for example, Boone et al., 1999a, 1999b, 2002; Frank, Gilovich, & Regan, 1993; Schlenker, Helm, & Tedeschi, 1973; Tan & Zizzo, 2008). The experiment was conducted during a four-week course on statistical methods for second-year students of management and organization at the Dutch University of Groningen. The four-week course was part of a new curriculum, and only those students who had passed the first-year programme were allowed to participate. At the outset of the experiment students filled out a digital questionnaire, revealing background and personality information. The experiment was conducted during the first week of the course, and saw 182 management and organization students play five different PD games in a row. The average age of the subjects was 19.65 and 66% of the participants were male. We only told the students that the experiment was designed to deepen their and our understanding of behaviour in a game theory setting. The students were promised feedback on the main findings of the research project after completion of the four-week course. We also guaranteed strict confidentiality of the questionnaire information. The five PDs were presented to the subjects in a fixed order for the sake of simplicity. The order of presentation and the main characteristics of the games are summarized in Table 1.

Each game consists of twelve rounds of choosing, except for Game III that has an unknown horizon, ending at random after 13 rounds. In the first two games, subjects played against a fictitious party, receiving no information about the choices made by that party in each round. Therefore, these games were essentially 'one-shot' or non-interactive games. In the last three games, dyads were randomly formed and the

subjects played interactive repeated games. Here, choices were made simultaneously and independently in each round, after which the subjects were informed of the choice made

*Table 3.1 Main characteristics of experimental games*

Game #	Type of game	Main characteristics of game
I	“One-shot”	12 choices (low or high price) against fictitious party No information on past behavior of other party Baseline game
II	“One-shot”	12 choices (low or high price) against fictitious party Information on past behavior of other party
III	Repeated	Subjects make independent and simultaneous choices in each round Exchange of choices made by other parties after each round Unknown horizon (“infinite” game) Final payoff equals sum of payoff in each round
IV	Repeated	Same as game III, except horizon that is finite and known (12 rounds)
V	Repeated	Same as game IV, except payoff matrix that is changed to elicit cooperation

by the other party. Game III has a so-called infinite horizon as the subjects were not informed about the game’s end round (i.e. Game III ended at random). The fourth game was similar to Game III, except for our announcing in advance that the game would end in round 12. In the last game, we changed the values of the payoff matrix used in all the other games so that the incentive to cooperate might increase in the eyes of the players. The horizon of game V was, again, finite and known to be 12 rounds. The instructions and game payoff matrices can be found in the Appendix.

The first two non-interactive games can be considered as baseline measures of cooperative behaviour. Both measures give an impression of the subjects’ basic inclination to pursue a competitive or a cooperative strategy. In the second game, we manipulated the reputation of the other fictitious party by suggesting that this

party was trustworthy because he or she had made cooperative choices in each of the twelve rounds in the previous encounter (i.e. cooperative feedback). We expected baseline cooperation to drop because opportunism is rooted in Western societies. Subsequently, in the last three repeated games, we expected cooperation on average to gradually gain importance. When players are engaged in repeated interaction with another party, they quickly learn to cooperate, and often enter into tacit collusion, irrespective of whether the game's horizon is known or not.

### *Experimental procedure*

The experiments were conducted in a large room. In the room there were three groups and each group had three rows of paired tables. The pairs of tables were separated by the space of one table. When entering the room, the students were randomly distributed across the three groups and within the three groups using the seats available. Pairs of subjects were formed to play the repeated PD games (i.e. the last three games in Experiments I and II). These dyads consisted of students sitting side-by-side. One experimenter and two assistants, identifiable by their similar shirts, guided each of the three groups. The assistants handed out the various information forms while the experimenter remained in front of the group for the entire experiment. All the groups started the experiment at the same clock time.

The PD was presented as an oligopoly-pricing problem. The experimenter first announced that five games were to be played, and that detailed information about each game would be provided just before that game started. He then presented and explained the general payoff structure of the first game (see the Appendix). The subjects could make two choices: setting a low price (corresponding to a competitive choice) or setting a high price (corresponding to a cooperative choice). The instructional phase fully and redundantly explained the interdependent nature of the payoffs, so that the consequences of different combinations of choices were clearly understood. We avoided the use of terms like 'compete', 'cooperate', 'defect' and 'sucker', so as to ensure a neutral instructional setting.

The experimenter, who gave instructions as to when and how to make choices in each game, strictly controlled the pace of the experiment. The subjects received a booklet with the instructions for each game and a corresponding response sheet. With the use of slides, the experimenter clarified each instruction at the beginning of each game. As mentioned above, Games I and II involved making twelve choices in a row against a fictitious party. At the beginning of Game III, the experimenter announced each subject's opponent/partner for the three repeated games. The subjects each received a booklet with small blank sheets of notepaper and were instructed in each round to choose independently and simultaneously. Next, the subjects had to write down their choice on the aforementioned blank paper. Once each subject had written down his

or her choice, the experimenter instructed the parties to exchange notes. Following this exchange, the subjects noted their own choice, their opponent's choice and their payoff on a response sheet. This procedure was repeated for each round in the three interactive games. Of course, apart from the exchange of notes, no communication was allowed.

Following standard experimental gaming (e.g. Boone et al., 1999a; Pruitt & Kimmel, 1977; Schlenker et al., 1973), the subjects were instructed to maximize their payoff during the experiment. Additionally, although experimental psychology has repeatedly revealed that subjects take experiments very seriously in any event, we introduced an extra motivational incentive by announcing that the top five players in accumulated payoff terms would receive a music voucher. We also appealed to a social prestige motive by telling the subjects that the ranking of payoffs, including the players' names, would be announced in public in a final plenary session at the end of the four-week course, both on a bulletin board and on the Faculty's student internet homepages.

### *Measurements*

Independent variable. Following other researchers (Boone et al., 1999a, 1999b; Uejio & Wrightsman, 1967; Cox, Lobel, & McLeod, 1991), we computed the total number of cooperative choices in each game as the measure of our independent variable: cooperative behaviour. Recall that 13 rounds were played in Game III. In order to standardize measures over the five games, we multiplied the total number of cooperative choices in Game III by the ratio 12/13.

### *Human capital*

Three binary indicators were created to capture the respondents' human capital. The first indicator measured whether the respondent attended a science-type high school prior to enrolment at University on a single binary variable (coded as 1, 0 otherwise). Prior knowledge and exposure to competition or cooperation was measured with two variables. The students received a list of nine courses and they were asked to mark the courses they had already followed. Our assessment of the course content revealed that three courses (i.e. economic principles, law principles and transactions) emphasized the self-interest economic model (i.e. competition) whereas three other courses (i.e. organizational behaviour, international transformation processes and communication) also stressed the importance of cooperation in economic life. We used two ordinal measures (ranging from 0 to 3) to measure exposure to competitive or cooperative courses.

Locus of control. We measured locus of control with an adapted version of Rotter's original scale that contains 37 forced items (23 of those items being designed to

measure locus of control expectancies and 14 being filler items that conceal the purpose of the test). Each item consists of a pair of statements where the respondent has to choose between an 'internal' and an 'external' alternative. A total locus of control score is obtained by counting the number of external alternatives chosen (with minimum 0 and maximum 23). The Cronbach's alpha of 0.65 is well above the lower limits of acceptability in experimental research, generally considered to be in the 0.50 to 0.60 range (Nunnally, 1978; Robinson & Shaver, 1973; Rotter, 1966).

Control variables. We included several control variables that are widely agreed upon as having an influence on cooperative behavior. One of the variables is age, for which it is found that cooperation increases with age (Cook & Sloane, 1985). The older people are, the more likely they believe that others try to be fair and helpful, which makes them more cooperative (Gächter et al., 2004). The other control variable included is gender, because females are generally found to be more cooperative than males (Mason et al., 1991). In this study, males are coded as 0 and females are coded as 1.

Finally, we included various proxies of social capital. Social capital is broadly conceptualized as the benefit that social actors derive from their social structures (Coleman, 1990). From that perspective, social capital refers to trust, concern for one's connections and a motivation to live according to the norms of the community (Bowles & Gintis, 2001). The literature indicates that religious background, family situations and local community types are important dimensions of social capital. We include three dummies to account for this, that is, a dummy for whether the subject is from a religious family or not, a dummy for whether the subject is from a large family or not, and a dummy for whether the subject is from a southern community type or not.

Although different religions may have different effects on people's attitudes, on average, religion is associated positively with attitudes that are conducive to cooperative behaviour. It appears that being brought up in a larger family dilutes young people's sense of urgency about playing and associating outside the family group, thereby making young people from large families more parochial and limited in their understanding of a variety of social roles. Various studies have reported the norm-enforcing effects of communities with a strong social closure environment. More specifically, it has been argued that there are important differences between southern and northern European communities. Southern community types are associated with low levels of trust and a less inclination to cooperate.

### **3.4 Results**

We interpreted the data as a pool cross-section/time series sample. This results in

6,553 observations. The dependent variable is a dummy variable, representing the choice that each individual makes during the 37 trails of the last three games (0 = competitive choice, 1 = cooperative choice). We performed a logistic regression analysis, to predict the likelihood of cooperation in each trail. To incorporate the dynamics of the game, two additional variables are included in the first model (1), the trail number (TRAIL) and a lag variable for the choice of the opponent in the previous round (LAGALT). The first variable corrects for the increase in the number of cooperative choices over the course of the experiment. The lag variable corrects for the finding that people are inclined to cooperate when the opponent has been proven cooperative (Pruitt & Kimmel, 1977). Having included these variables, we can proceed assessing whether our personality trait of interest and human capital has an effect on cooperation irrespective of learning effects and the strategy of the opponent. A summary with descriptive statistics and correlations among all variables is presented in Table 2. The regression results are in Table 3.

Table 3.2 Correlations, means, and standard deviations (a)

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Cooperation	5.48	2.24	1.00									
2. Religion	0.67	0.47	0.01	1.00								
3. Family	0.43	0.50	-0.08	0.19	1.00							
4. Southern community	0.26	0.44	-0.06	0.13	-0.05	1.00						
5. Science education exposure	0.30	0.46	0.09	0.02	0.06	0.11	1.00					
6. Cooperative exposure	2.20	0.96	-0.02	0.01	0.05	-0.02	0.10	1.00				
7. Competitive exposure	2.18	0.92	-0.09	-0.02	0.10	0.01	0.01	0.53	1.00			
8. Gender	0.34	0.37	-0.04	0.06	0.07	-0.01	0.02	0.11	0.01	1.00		
9. Age	19.65	1.04	0.05	-0.12	-0.15	-0.15	0.08	-0.10	-0.05	-0.03	1.00	
10. Locus of control	11.51	3.37	-0.04	0.03	-0.06	-0.13	0.08	0.09	-0.02	0.17	-0.07	1.00

a. Correlation coefficients larger than 0.02 and 0.05 are significant at  $p < 0.05$  and  $p < 0.01$ , respectively

In the first model, the dependent variable is regressed on the set of control variables. In the second model, the main effects are included, that is, exposition to cooperative courses (EXCOOP), exposition to competitive courses (EXCOMP) and locus of control (LOC). In the third model, the interaction term is added to investigate whether the combination of exposition to cooperative choices and locus of control has a stronger effect on the choice for cooperation. We mean-centered these variables before multiplying them.

Table 3.3 Human capital, personality traits and decision-making behavior (a, b)

Variables	Research Model 1		Research Model 2		Research Model 3	
Constant	-2.670	***	-2.114	***	-3.066	***
	(0.531)		(0.559)		(0.601)	
Trail	0.015	***	0.016	***	0.016	***
	(0.003)		(0.003)		(0.003)	
Other person's choice lagged	1.522	***	1.513	***	1.511	***
	(0.054)		(0.054)		(0.055)	
Gender	-0.117	**	-0.112	*	-0.122	**
	(0.057)		(0.059)		(0.059)	
Age	0.058	***	0.072	***	0.079	**
	(0.026)		(0.027)		(0.027)	
Religion	0.166	***	0.157	***	0.143	**
	(0.059)		(0.060)		(0.060)	
Large family	-0.265	***	-0.245	***	-0.273	***
	(0.056)		(0.057)		(0.057)	
Exposure to science education	0.461	***	0.416	***	0.403	***
	(0.060)		(0.061)		(0.061)	
Southern community type	-0.340	***	-0.329	***	-0.323	***
	(0.108)		(0.109)		(0.110)	
Exposure to cooperative courses			0.082	**	0.478	***
			(0.034)		(0.096)	
Exposure to competitive courses			-0.220	***	-0.202	***
			(0.035)		(0.036)	
Locus of control			-0.017	**	-0.059	***
			(-0.008)		(0.019)	
Cooperative courses * locus of control					-0.037	***
					(0.008)	
-2 log likelihood	-4,008		-3,987		-3,977	
model chi-square	1,055	***	1,098	***	1,118	***
change chi-square	1,055	***	43	***	120	***

a. Standard errors in parentheses with  $n = 6,553$

b. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$



The results of Model 1 confirm the importance of including the control variables in our model. For example, Model 1 shows that the likelihood of cooperation increases over the course of the game: the coefficient for TRAIL is positive and significant. Further, the variable LAGALT is also positive and significant, indicating that when the opponent cooperates, the player is inclined to cooperate as well. Model 1 shows that cooperation tends to increase with age and that females are less cooperative than males. The parameter estimates for science education also is positive and significant. All results for the control variables are in line with our expectations. The results for the control variables remain the same in all three models in terms of parameter estimates and significance levels, by and large.

In Models 2 and 3, the parameter estimates for the main effects for human capital (EXCOOP) and our personality trait locus of control (LOC) are significant. Exposure to cooperative courses is positively related to cooperation and locus of control is negatively related to cooperation. These results confirm Hypothesis 1 and Hypothesis 2. In Model 3, the interaction term is significant and negative. This implies that combining the effects of having attended cooperative courses and being internal in locus of control even further contributes to an inclination towards cooperation. A graphical interpretation of the interaction term (Ai & Norton, 2003) confirms Hypothesis 3.

Our results show that internals who are exposed to many cooperative courses have a higher probability to cooperate than internals who are less exposed to cooperative courses. For externals the reverse is true: externals with a low inclination towards cooperation have a higher probability of cooperation than externals with a high inclination towards cooperation.

### **3.5 Conclusion**

Behavioral strategy is concerned with the gap that is observed between management practice and strategy theory (Powell, Lovallo, & Fox, 2011; Elms, BRammer, Harris, & Phillips, 2010). A multidisciplinary approach cross fertilizing psychology and sociology into management and business theories has proven to be a successful path envisioned by behavioral and cognitive theories of the firm (Nooteboom, 2000) and leadership research that accounts for emotions, attribution and attention (Northouse, 2004). This paper offers new foundations for strategy research by developing realistic assumptions about human cognition and personality and how these independently as well as in combination determine strategic decision-making behavior. In so doing, we answer the call for more research in this direction (Bingham & Eisenhard, 2011; Powell, 2011).

One intention of this study was to develop hypotheses based on psychology and social research and test these with new data and proceed in further research by combining diverse relevant constituents of human capital and personality traits into a more comprehensive theory of strategic decision-making. We convincingly found that human capital in the form of exposure to cooperative courses, constituting an inclination towards cooperation, is positively linked to cooperative behavior. Further, we found strong significant results for the relationship between being external in locus of control and cooperative behavior. However, that link is only based on regression estimations based on direct effects. We revealed that it is crucial to consider the variation among observations with respect to human capital. Especially computing the interaction term between exposure to cooperation and locus of control revealed that the relationships found for the first and second hypothesis can be complemented with a more advanced perspective.

Therefore, an important aim and subsequent result of this study is the contribution to a profound understanding of the interaction between human capital and personality traits, or in other words, further unraveling the underlying causal structure of strategic decision-making behavior. The direct relationships between human capital and cooperation and between locus of control and complemented with the combined significant constituents reveal a novel framework of strategic decisions. The combination of human capital (in the form of exposure to cooperative courses), the ensuing implied inclination towards cooperation, and personality traits (represented by locus of control), established a relevant rationale to improve our comprehension of cooperative behavior. The effect of locus of control on cooperative behavior is conditional on the exposure to cooperative courses and hence, the inclination towards cooperation that follows from education with regard to cooperation. In that sense, internals tend to cooperate more when they have a high inclination towards cooperation, benefiting from their background in cooperation and utilizing that background to use it as a means towards their own ends. For externals the results are opposite.

Our study is not without limitations that offer opportunities for future research. It is particularly worthwhile mentioning that we study one personality trait, locus of control. Locus of control is among the most important personality traits but it is acknowledged that individuals differ on other ones. It is a question to what extent our model also applies to other personality traits such as Type A persons or sensation seeking. Future research might continue in our strand of research, proceeding with the role of other personality traits individually as well as the relationship of these with human capital. Additionally, new studies may also analyze the relationship between personality traits and other characteristics of individuals such as gender, age or their family background and how this matter for decision-making processes. Finally, in line with experimental research, we used students as our research subjects. New research

may also collect information from senior or junior managers and test whether our results and conclusions concerning personality traits and decision-making behavior also hold for these individuals. Such new efforts also enables to collect information for individual, team or organizational performance and as such test whether the causalities presented in this paper also explain performance.

### Appendix – Game Settings

Two firms operate in the same market: firms I and II. Both firms can choose between two price strategies: setting a low price and setting a high price. The profits depend on the pairs of strategies chosen. In the following payoff matrix, the four possible profit combinations (in thousands of Euros) are reported for Experiment I (Pi stands for the pricing strategy of firm i, with i = I, II).

		Firm II	
		Low price	High price
Firm I	Low price	(-30,-30)	(600,-600)
	High price	(-600,600)	(300,300)

Each cell contains the possible profit combinations (WI, WII). WI and WII are the (negative or positive) profits of Firm I and Firm II respectively. The four profit combinations are as follows:

- (1) PI low = PII low. Both firms choose to set the same low price. The profit margins are negative. Both firms generate a loss of EUR 30,000.
- (2) PI low < PII high. Firm I offers a lower price than Firm II. The Firm II's customers prefer to buy from the 'cheaper' Firm I. The profit of Firm I is therefore EUR 600,000, and Firm II's losses amount to EUR 600,000.
- (3) PI high > PII low. Firm II undercuts Firm I. The resulting profit combination is the opposite of the second case. Firm I generates a loss of EUR 600,000 and Firm II a profit of EUR 600,000.
- (4) PI high = PII high. Both firms choose to set the same high price. The profit margins are positive. Both firms gain a profit of EUR 300,000.

#### Game I

Imagine you are Chief Executive Officer of Firm I. You decide autonomously on the pricing strategy of your company. You have an appointment with your distributor to fix the future pricing strategy for your product. It is a custom in this industry that contracts with distributors are concluded annually, in which the price level for each

month (or round) for the coming year is stipulated in advance. It is impossible to change the terms of the contract afterwards. The Chief Executive Officer of Firm II will simultaneously determine her/his pricing strategy with her/his distributor (a different one from yours) for the following twelve months. You do not know the price intentions of Firm II and vice versa. Indicate your preferred strategy below (L indicates low price; H indicates high price) for each round (month).

### *Game II*

At the end of the contract, you learn that Firm II has consistently chosen to set a high price in each month of the previous contracting period. Now, you have to agree a new contract with your distributor for the next twelve months. Indicate again which pricing strategy you prefer for each month.

### *Game III*

Your information on the past intentions and pricing strategy of Firm II have become irrelevant because Firm II has been taken over by another company, which installed a new Chief Executive Officer. The government has also decided that contracts in which prices are set for more than one month in advance are now illegal. Therefore, for the next year you are only allowed to fix your price level for one month, after which you have to decide again for the next round. Decisions are made simultaneously in each month.

You play the game for an unknown number of months (rounds). You do not know in advance how many times you will have to make a decision on your pricing strategy. The game can end any moment after round 8. The probability that the game ends after round 8 is 20 percent. The sequence of decisions/activities you have to perform is as follows:

- (1) at the beginning of each round, the price strategies are set simultaneously and noted on the response sheet
- (2) subsequently, swap sheets with your counterpart
- (3) finally, calculate your own profit, given the strategy of the other firm.

Indicate for each month on your response sheet: (i) the strategy you prefer, (ii) the strategy of the other firm and (iii) the profit you gained. Except for the exchange of notes after each round, no communication is allowed during the experiment.

### *Game IV*

Repeat Game III, but for 12 months (rounds).

### *Game V*

In the following period of twelve months demand has increased substantially, along

with an increased profit potential. This new situation is reflected in the following profit combinations (profits are in thousands of euros).

---

		Firm II	
		Low price	High price
Firm I	Low price	(-20,-20)	(800,-400)
	High price	(-400,800)	(600,600)

---

Proceed as in Game IV.

# CHAPTER 4. SPEED OF LEARNING

## Summary

Previous studies showed that subjects with an internal locus of control were, on average, more cooperative in a prisoner's dilemma (PD) game than subjects with an external locus of control. They conjectured that this finding should not be interpreted as evidence for stable differences in cooperative behaviour between internals and externals. Specifically, they suggested that it is the capacity to adapt to different circumstances over time that distinguishes internals from externals. In the present study we want to investigate the validity of this proposition. We argue that in a PD setting individuals gradually learn to understand the subtle interplay between cooperation and self-interest. Repetition and learning breed cooperation because people learn to understand that cooperation is instrumental in obtaining long-run profit. There is, however, good reason to believe that individuals differ as to the speed of learning to cooperate. We hypothesise that internals are more astute in learning to cooperate in a PD game because they are more endowed with the cognitive faculties necessary for quick learning than externals. Our empirical findings indeed reveal that externals play less cooperatively, on average, in the first part of a series of PD games. However, this difference gradually disappears. In fact, the experiment suggests that learning and repetition reduce the impact of individual differences. By way of appraisal, implications for further research are discussed.

Keywords: Locus of control; Prisoner's dilemma; Learning; Cooperation

## 4.1 Introduction

Understanding the determinants of cooperative behaviour has been an important issue on the agenda of many social scientists for several decades. This is witnessed by the huge body of early experimental research in both economics and social psychology (Dawes, 1980; Pruitt & Kimmel, 1977; Rapoport, Guyer, & Gordon, 1976). In this research tradition, mixed-motive games, such as the prisoner's dilemma (PD), have been extensively used to model competitive versus cooperative behaviour (Raiffa, 1982). The two-party version is the most widely used class of PD games (Cox, Lobel, & McLeod, 1991; Pruitt & Kimmel, 1977). This setup will be used in the present study, too. Technical details of the PD are discussed at length elsewhere (e.g. Rasmusen, 1990). It suffices to mention here that the dilemma resides in the fact that the best possible outcome for all parties as a group results when each party refrains from trying to maximise her or his self-interest. However, no matter what the other party does, a player can always increase her or his payoff in the short run by defecting unilaterally. Thus, it is to each individual's advantage to defect, at least in the short run. Of course, when one of the parties defects, trust is undermined and cooperation generally breaks down. The final result is that when parties cannot resist the temptation to defect, both parties end up being worse off. It is this continuous tension between the long-

run gains of cooperation versus the short-term incentives to compete which makes the game a realistic simulation of real-world phenomena, and therefore interesting to study (Rasmusen, 1990).

Most experiments in the past have studied the impact of situational determinants on cooperation. In this respect, an interesting stylised fact is that subjects, at least from Western societies, tend to prefer the competitive strategy when playing one-shot PD games. However, when individuals play several games in a row against the same party, astute subjects quickly learn to cooperate and often enter into tacit collusion (Raiffa, 1982). This is the case irrespective of whether or not the repeated games have a finite (known) or infinite (unknown) horizon. Individuals gradually learn to develop long-term thinking in these games, because they recognise their mutual dependency in obtaining a reasonable payoff (Pruitt & Kimmel, 1977). So, repetition and learning breed cooperation.

Whereas previous research almost exclusively focused on identifying the circumstances triggering cooperative behaviour, the question whether and why individuals differ with respect to cooperative behaviour received only scant attention. This is somewhat surprising as Kuhlmann and Marshello (1975), already 25 years ago, demonstrated that individuals have different tendencies to compete or cooperate in mixed-motive games, where these tendencies, or orientations, are relatively stable. Because we agree with Pruitt and Kimmel (1977), we followed their plea to study the impact of individual attitudes and personality traits on cooperation in mixed-motive games. Specifically, we started a series of experiments with the purpose of investigating the behavioural implications of specific personality traits in a PD setting. We chose to focus on locus of control in the current paper because it is a fundamental personality trait, which has been shown to have important ramifications for behaviour in a social dilemma setting (Boone, De Brabander, & van Witteloostuijn, 1999a, 1999b). Before summarising the major findings of our previous work, recall that the locus of control construct refers to individual differences in a generalised belief in internal versus external control of reinforcements (Rotter, 1966). Those who believe in external control (i.e. externals) see themselves as relatively passive agents and believe that the events in their lives are due to uncontrollable forces. Externals consider what they want to achieve as dependent upon luck, chance and powerful persons or institutions. They think that the probability of being able to control their lives by their own actions and efforts is low. Conversely, those who believe in internal control (i.e. internals) see themselves as active agents, feel that they are masters of their fates and trust in their capacity to influence their environment. Internals believe that they control the events in their lives by their own effort and skill.

In a previous experiment we found that, on average, internals played significantly more

co-operatively than externals in a repeated PD game (Boone et al., 1999a, 1999b). The findings also made clear that this difference was not the result of internals being more altruistic, but rather of their tendency to use behaviour strategically in order to control their environment to obtain valued outcomes. In other words, internals play more cooperatively, on average, in a PD because it furthers their self-interest. In fact, they readily switch to a competitive strategy when this is more appropriate to obtain a higher payoff.

At a more general level, the results of the experiment made two things clear. First, it is essential to study cooperative behaviour dynamically because individuals do not necessarily make an either/or choice between cooperation and competition, as is often implied in a static analysis. As a result, static analyses of cooperative behaviour largely miss the mark. Second, we also concluded that the same comment can be made concerning the behavioural consequences of differences in locus of control. Specifically, the findings underscored the suspicion that what distinguishes internals from externals is not so much average and stable differences in behaviour, but rather the capacity to adapt to different circumstances over time. Again, searching for differences at a specific point in time might be misleading. If we do not understand the overall pattern and meaning of behaviour, analysing cross-sectional slices of that behaviour does not allow us to draw unambiguous conclusions concerning the importance of individual differences.

In the present study we want to explore and combine the consequences of both of these insights further. We argue that people from Western cultures, in which opportunism is deeply rooted (Boone & van Witteloostuijn, 1999), have to learn to cooperate in a PD game. They have to understand that in the long run cooperation is in their self-interest. There is, however, good reason to believe that individuals differ as to the speed of learning to cooperate. It is here that locus of control enters the picture. We hypothesise that internals are more astute in learning to co-operate in a PD game. This proposition follows logically from the very definition of the concept. Internals, who believe in their own potency to master their environment, are much more likely than externals to use all their faculties to understand and influence their surrounding world as this heightens the probability of successfully regulating behaviour (Boone, 1992; Lefcourt, 1982; van Olffen, 1999). Internals will question their assumptions more and will be more attentive to cues and feedback relevant to their decision making because they believe this may improve their performance. To test the validity of these general behavioural consequences of the locus of control construct, numerous experiments were conducted to relate locus of control with cognitive activities like attention and alertness, and information search and assimilation. Reviewing this literature, Phares (1976, p. 78) concludes that internals "acquire more information, make more attempts at acquiring it, are better at retaining it, are less satisfied



with the amount of information they possess, are better at utilising information and devising rules to process it and generally pay more attention to relevant cues in the situation.” All this provides strong support for the validity of the locus of control construct as it is indicative of a basic striving of internal individuals to actively engage in the seeking for relevant cues in their environment to determine and make sense out of their position and to guide or adapt their behaviour accordingly.

In the context of a PD game we expect that this eagerness of internals to learn how the world works, makes them more alert and sensitive to the subtle interdependency of payoffs and the long-run instrumentality of cooperation to obtain valued outcomes for one-self. However, we think that externals will eventually catch up and change their strategy from competition to cooperation, too. This is because (1) cooperation enhances self-interest and (2) it has been shown that externals are not less intelligent than internals (Lefcourt, 1982). We assert that externals just learn slower than internals because they are less endowed with the cognitive faculties that sustain quick learning, as described earlier. To summarise, we expect that the finding of our previous experiment—internals behave more cooperatively than externals, on average—will only show up in the first part of a series of PD games, but will subsequently disappear. In the long run, that is, when everybody learned and internalised the rules of the game, individual differences with respect to locus of control become irrelevant.

## **4.2 Method**

### *Games*

Because the experiment aims at extending insights from previous work, the games and procedures we used in the present study are very similar to those in Boone et al. (1999a, 1999b). The experiment was conducted during a 4-week course on statistical methods for second-year students of management and organisation at the Dutch University of Groningen. The 4-week course was part of a new curriculum, and only those students who had passed the first-year program were allowed to participate. At the onset of the experiment students filled out a (computerised) questionnaire, revealing background and personality information. The actual experiment consisted of two parts. In the first week of the course 182 students played five different PD games in a row (Experiment I). To evaluate whether long-run learning actually takes place, 92 of these 182 students volunteered to play the five PD games again 8 days later (Experiment II).

It is important to stress that these 92 subjects were not a random sample of the 182 who started the course and participated in Experiment I. Instead, they re-participated on a voluntary basis, provided they had fulfilled some mild, formal criteria concerning attendance in the course. Fortunately, analyses show that this group of

students does not significantly differ from the “drop-out” subjects with respect to locus of control, gender, age and average cooperative behaviour in the five games of Experiment I, suggesting that attrition did not cause a problem of sample selection bias in Experiment II. To be sure, however, that systematic sample differences do not account for our findings, we will not only analyse the data of Experiment I for the original sample of 182 subjects, but also for the subset of 92 subjects that also participated in Experiment II.

Concerning the purpose of the experiment, we only announced that it was designed to deepen their and our understanding of behaviour in a game-theoretic setting. The students were promised feedback on the major findings of the research project after completion of the 4-week course. We also guaranteed strict confidentiality of the information provided by the questionnaires.

In both experiments, five PDs were presented to the subjects in a fixed order, mainly for the sake of simplicity and comparability of findings between the experiments. The order of presentation and the main characteristics of the games are summarised in Table 1. We acknowledge that choosing this fixed-order design has also a drawback. Specifically, increases in the average level of cooperation across the games within Experiments I and II, respectively, cannot be unambiguously ascribed to learning, but could also be the result of the different game conditions. However, in this particular study, we think that the fixed-order presentation is not problematic for two reasons. First, because the games were presented in the same fixed order in both Experiments, our design eases comparison of findings between Experiments I and II. This is important because we are interested in finding out whether “true” learning takes place over longer periods of time. Note that any systematic difference in average cooperative behaviour between Experiments I and II cannot be explained away by the fixed-order presentation of the games. Second, the focus of the present study is on detecting individual differences in the dynamics of cooperation over time and across different situations. The fixed-order design in no way precludes drawing conclusions as far as this research issue is concerned.

Each game consists of 12 rounds of choices, except for game III in both experiments. In fact, game III has an unknown horizon, being ended at random after 13 rounds in Experiment I and after nine rounds in Experiment II. In the first two games, subjects played against a fictitious party, receiving no information on the choices made by that party in each round. Therefore, these games are essentially “one-shot” or non-interactive games. In the last three games, dyads were randomly formed, and the subjects played interactive repeated games.

Table 4.1 Main characteristics of experimental games

Game	Type of game	Main characteristics of game
I	“One-shot”	12 choices (low or high price) against fictitious party No information on past behaviour of other party Baseline game
II	“One-shot”	12 choices (low or high price) against fictitious party Information on past behaviour of other party
III	Repeated	Subjects make independent and simultaneous choices in each round Exchange of choices made by both parties after each round Unknown horizon (“infinite” game) Final payoff equals sum of payoff in each round
IV	Repeated	Same as game III, except horizon which is finite and known (12 rounds) Same as game IV, except payoff matrix which is changed to elicit
V	Repeated	cooperation

That is, choices were made simultaneously and independently in each round, after which subjects were informed of the choice made by the other party. Game III has a so-called infinite horizon as the subjects were not informed about the game’s end round (i.e. game III was ended at random). The fourth game is similar to game III except that we now announced in advance that the game would end in round 12. In the last game, we changed the values of the payoff matrix used in all the other games such that the incentive to cooperate might increase in the eyes of the players. The horizon of game V was, again, finite and known to be 12 rounds. The instructions and payoff matrices of the games can be found in the Appendix. The games in both experiments are close copies. Only slight differences in the payoff structure (without affecting the games’ formal Nash equilibrium outcomes) were introduced so as to trigger the students’ alertness.

Note that the first two non-interactive games can be considered as baseline measures of cooperative behaviour. Both measures give an impression of the subjects’ basic inclination to pursue a competitive or cooperative strategy. The bulk of experimental research has revealed that competitive strategies are preferred in such “one-shot”-settings, at least in nations with an individualistic cultural tradition (Boone & van Witteloostuijn, 1999). The baseline strategy, however, also depends on the players’ educational background: economics students, for instance, tend to compete much more

often than their colleagues studying other majors (Frank, Gilovich, & Regan, 1993). In the second game, we manipulated the reputation of the other (fictitious) party by suggesting that this party was trustworthy because (s)he had made cooperative choices in each of the 12 rounds in the previous encounter (i.e. cooperative feedback). We expect baseline cooperation to drop because, as we argued elsewhere, opportunism is deeply rooted in Western societies. Indeed, the individualistically oriented Dutch subjects in a previous experiment were inclined to “exploit” the “sucker” with a cooperative reputation by reducing the number of cooperative choices almost to zero (Boone & van Witteloostuijn, 1999). Subsequently, we expect cooperation to gain importance gradually, on average, in the last three repeated games. As said before, when players are engaged in repeated interaction with another party they quickly learn to cooperate, and often enter into tacit collusion, irrespective of whether the game’s horizon is known or not (Raiffa, 1982).

### *Experimental procedure*

Experiments I and II took place in one large room. The procedure used in both experiments was the same. In the room there were three groups; each group had three rows of pairs of tables. The pairs of tables were separated by the space of one table. When entering the room, the students were randomly distributed over the three groups and within the three groups over the available seats. Pairs of subjects were formed to play the repeated PD games (i.e. the last three games in Experiments I and II). These dyads consisted of students sitting side-by-side. Note that the purpose of this 2-fold randomisation procedure was to avoid the occurrence of the same random dyads in both experiments as much as possible. We deemed it important to have different dyads in both experiments in order to find out whether learning takes place irrespective of the partner with whom a subject is playing. It is, for instance, possible that a subject plays more cooperatively in a second encounter when she knows her opponent from a previous encounter. We trusted that simple randomisation concerning the second pairing would make the occurrence of the same pairs rare. Therefore, we did not randomise with the constraint that no one would have the same partner as in Experiment I. Unfortunately, the randomisation procedure without constraint resulted in the extremely unlikely outcome of 10 pairs of subjects in Experiment II who also played against each other in Experiment I. To check whether this constitutes a problem for the results reported below, we redid the analyses related to Experiment II without these 20 subjects. These findings, however, are very similar compared with those pertaining to the 92 subjects. Note also that the average level of cooperative behaviour in each of the five games of Experiment II of the subjects who played twice against the same partner ( $n=20$ ) does not significantly differ from the cooperative behaviour of the subjects who played against a new partner ( $n=72$ ). To summarise, both checks make clear that the relative “failure” with respect to making new random pairs does not influence the outcomes and interpretations of the analyses reported

below.

One experimenter and two assistants, identified by wearing similar shirts, guided each of the three groups. The assistants handed out the various forms with information while the experimenter remained in front of the group during the entire experiment. All groups started the experiment at the same clock time.

The PD was presented as an oligopoly pricing problem. The experimenter first announced that five games were to be played, and that detailed information about each game would be provided just before the game involved started. Then, he showed and explained the general payoff structure of the first game (see the Appendix). The subjects could make two choices: setting a low price (corresponding with a competitive choice) or setting a high price (corresponding with a cooperative choice). The instructional phase fully and redundantly explained the interdependent nature of the payoffs, so that the consequences of different combinations of choices were clearly understood (see also Frank et al., 1993). Following Schlenker, Helm and Tedeschi, (1973), we avoided the use of such terms as “compete”, “cooperate”, “defect” and “sucker” so as to insure a neutral instructional set. Note that in the remainder of this paper we use different terms ranging from less to more neutral to denote “the other party” in the game. We stress, however, that we only used neutral terms in addressing the participants during the experiments.

The experimenter, who gave instructions as to when and how to make choices in each game, strictly controlled the pace of the experiment. The subjects received a booklet with the instructions of each game and a corresponding response sheet. The experimenter, using slides, clarified every instruction. As mentioned earlier, games I and II involved making 12 choices in a row against a fictitious party. At the onset of game III, the experimenter announced each subject’s opponent/partner for the three repeated games. The subjects received a booklet with small blank notes and were instructed in each round to make a choice independently and simultaneously. Next, subjects had to write down their choice on such a blank note. After every subject had written down her or his choice, the experimenter instructed the parties to exchange the notes with their choice. Following this exchange, subjects marked their choice, the opponent’s choice and their payoff on a response sheet. This procedure was repeated for each round in the three interactive games. Of course, apart from the exchange of notes no communication was allowed.

Following standard experimental gaming, the subjects were instructed to maximise their payoff during the experiment (Pruitt & Kimmel, 1977; Schlenker et al., 1973). Additionally, although much experimental psychology has revealed that subjects take experiments very seriously anyway, we introduced an extra motivational incentive by

means of the announcement that the top-five players in terms of the accumulated payoff would receive a token for music records. We also appealed to the social motivation for prestige by telling the subjects that the ranking of payoffs, including the players' names, would be announced in public in a final plenary session at the end of the 4-week course, on a bulletin board and on the Faculty's students' internet homepages.

### *Subjects and measures*

The study pertains to 182 students of management and organisation of the University of Groningen for Experiment I, and a subset of 92 of these subjects for Experiment II. The information and descriptives reported in this section pertain to the sample of 182 students. The average age of the subjects is 19.65 years (S.D.=1.04), and the majority of the participants were male (66%).

Their locus of control scores were measured with the well-known and widely used Rotter scale (Rotter, 1966), translated into Dutch by the authors. The original scale contains 29 forced-choice items, 23 of those items being designed to measure the locus of control expectancies (and six being filler items). Each item consists of a pair of statements. The respondents have to choose between an "internal" and an "external" alternative. The following pair of statements is a clear example: "Many times I feel that I have little influence over the things that happen to me" (external alternative) and "It is impossible for me to believe that chance or luck plays an important role in my life" (internal alternative). A total locus of control score is obtained by counting the number of external alternatives chosen (with minimum zero and maximum 23). The number of filler items in the present study was increased to 14 in order to make the purpose of the test more obscure. The reliability of our Dutch translation was demonstrated in several studies (Boone, 1992; Boone, Gerits, & Willemse, 1990; De Brabander, Boone, Gerits, 1992). Cronbach's alpha (Cronbach, 1951) amounts to 0.65 (n=182 with 23 items) in this sample, which concurs with the internal consistencies reported by Robinson and Shaver (1973) and Rotter. The value of alpha calculated for this sample is well above the lower limits of acceptability, generally considered to be in the 0.50–0.60 range (Nunnally, 1978). The average Rotter score of the present subjects equals 11.51 (S.D.=3.37), which is in line with averages reported for other samples of similar subjects (Boone et al., 1999b).

Following other researchers (Cox et al., 1991; Uejio & Wrightsman, 1967), we measured cooperative behaviour by counting the total number of cooperative choices in each game. Recall that in game III 13 and nine rounds were played in Experiments I and II, respectively. In order to standardise measures over the five games, we multiplied the total number of cooperative choices in game III with the ratio 12/13 in Experiment I and 12/9 in Experiment II.

In the analyses presented later we treat gender as a covariate because females appear to have a more external perception of control than males [average score equals 11.10 for males (S.D.=3.41) and 12.31 for females (S.D.=3.15); F-value=5.37 and P=0.022]. This is consistent with several previous findings (McGinnies, Nordholm, Ward, & Bhanthumnavin, 1974; De Brabander and Boone, 1990). A probable cause of this difference is suggested by McGinnies et al. (p. 454) by indicating that “[t] here are, in all probability, few countries where women have achieved equality of opportunity with males and where they possess freedom of self-determination to the same extent as males. In any case, the present females probably were reporting a perception of their status which was matched, at least for them, by social reality.” Descriptives of the variables under study are presented in Table 2.

*Table 4.2 Descriptives*

Variables <sup>a</sup>	Mean	S.D.	Minimum	Maximum
Locus of control	11.51	3.37	4	21
Age	19.65	1.04	18	26
Male (0)–Female (1)	0.34	0.22	0	1
<b>Experiment I</b>				
Cooperation game I	5.74	3.61	0	12
Cooperation game II	4.50	4.09	0	12
Cooperation game III	4.91	3.14	0	12
Cooperation game IV	5.36	3.96	0	12
Cooperation game V	6.91	3.91	0	12
<b>Experiment II</b>				
Cooperation game I	6.53	4.64	0	12
Cooperation game II	5.18	4.67	0	12
Cooperation game III	8.61	4.19	0	12
Cooperation game IV	8.39	4.17	0	12
Cooperation game V	8.13	4.17	0	12

a. N = 182 except for Experiment II, where n = 92.

## Results

Before analysing the effects of locus of control on cooperative behaviour, a few general remarks with respect to the descriptives reported in Table 2 are worth making. First, the relatively high average number of cooperative choices made in baseline game I (5.74 and 6.53 in Experiments I and II, respectively) suggests that the present subjects have a more cooperative inclination than the students in a previous experiment [compare with Boone et al. (1999b), where this average equalled 2.0]. A possible reason for this difference may be that the subjects in the current sample are management and organisation students, and not economics students as before. As already mentioned above, Frank et al. (1993) showed that exposure to the self-interest model commonly used in economics alters the extent to which people behave in self-interested ways. It is very likely that management and organisation students are less exposed to this "hard core" economics paradigm and more to "softer" business courses with a psychological and/or sociological flavour (e.g. organisational behaviour) than economics majors. This is immediately clear from a comparison of the curricula of both study programs, revealing a much smaller proportion of "hard" economics courses in the management and organisation curriculum. In this respect, we showed elsewhere that even among economics students, the likelihood of cooperation increases with the number of courses students have followed in which cooperation is emphasised (Boone & van Witteloostuijn, 1999).

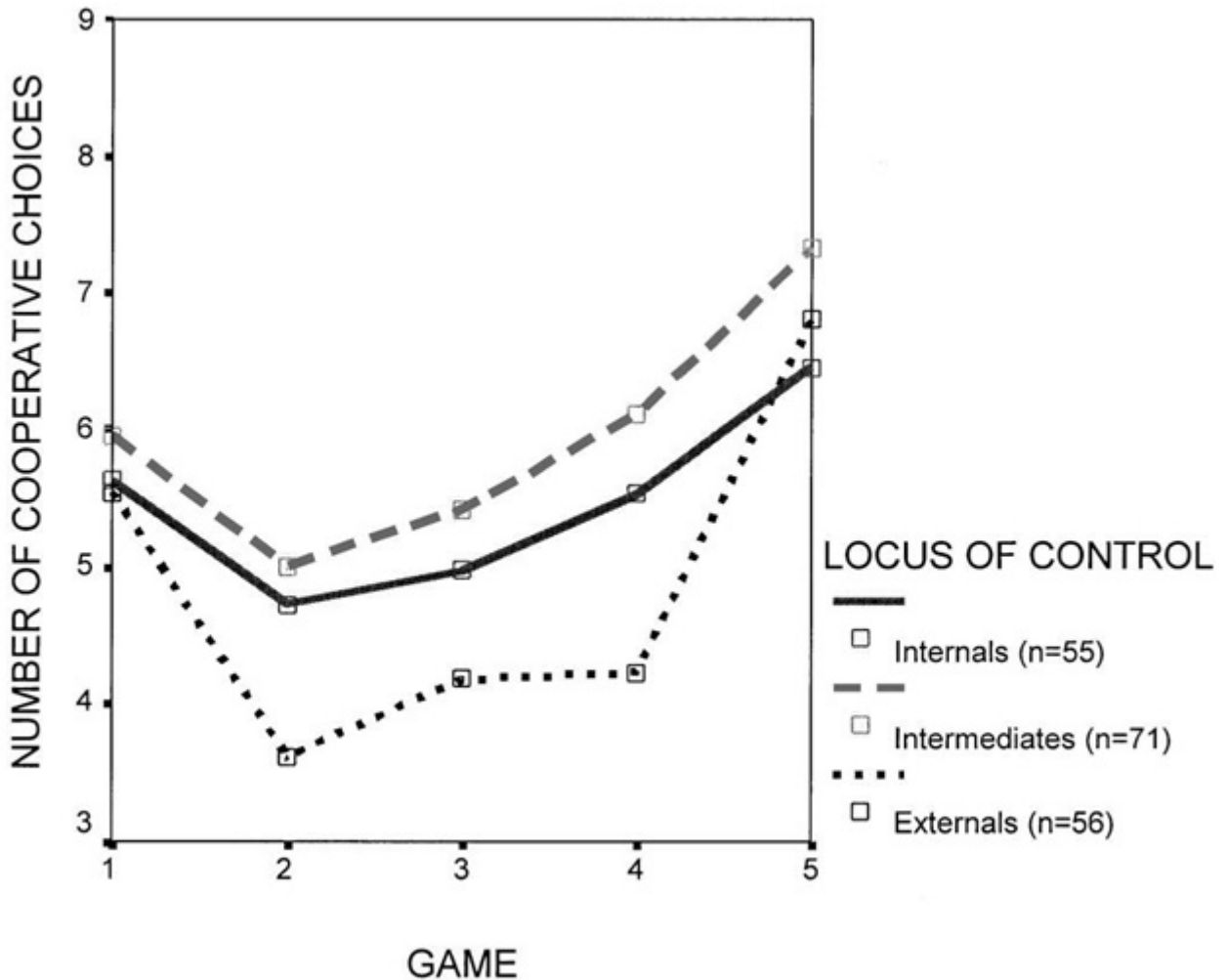
Note also that the number of cooperative choices drops in game II in Experiment I (from 5.74 to 4.50) and II (from 6.53 to 5.18), as expected. Paired t-tests show that this decrease in co-operation is significant ( $t=3.59$  and  $P=0.000$  in Experiment I, and  $t=2.85$  and  $P=0.003$  in Experiment II). Apparently, opportunism is triggered when the other party has a cooperative reputation. Subsequently, the incidence of cooperation rises gradually in the last three repeated games of Experiment I, again as expected (Table 2). Interestingly, in Experiment II cooperation continues to rise in game III over and above the level of cooperation that could be observed in game V in Experiment I. Thus, although there is an 8-day interval between both experiments, the trend of increasing average cooperation revealed in Experiment I can simply be extrapolated to Experiment II. This indicates that true learning takes place. Finally, we observe that, overall, this general pattern of average cooperation in both experiments is very similar to the one found for another sample of subjects (Boone et al., 1999b), providing confidence in the reliability of the data.

Because Rotter scores tend to be normally distributed [a Kolmogorov–Smirnov test shows that the distribution of Rotter scores in the present sample does not significantly deviate from a normal distribution either ( $z=1.05$  and  $P=0.220$ )], it is likely that the implications of behavioural differences associated with the locus of control will be most apparent at the extreme scores. For the purpose of our repeated-measures



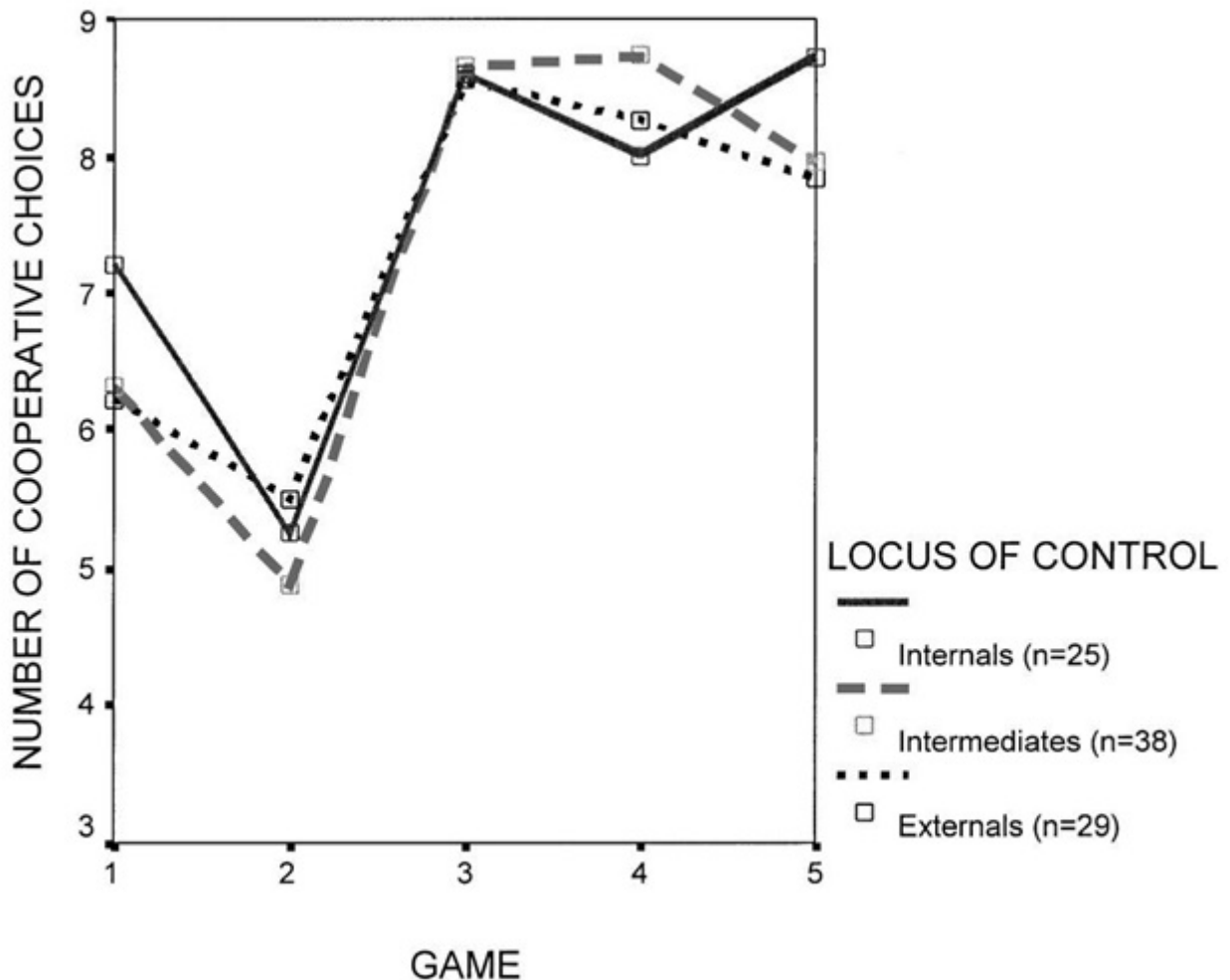
ANOVA reported below, we therefore classified the subjects in both experiments into three different phenotypic groups based on the terciles of the locus-of-control scores of the 182 subjects (instead of applying the usual two-group classification based on a median split): internals, those with an intermediate Rotter score (intermediates) and externals. This results in 55 internals, 71 intermediates and externals in Experiment I. These numbers are 25, 38 and 29 in Experiment II, respectively. Fig. 1 presents the average number of cooperative choices made in each of the five PD games in Experiment I by each locus-of-control group. The results of Experiment II are shown in Fig. 2.

Figure 1. Locus-of-control and number of cooperative choices (Experiment I; n=182)



The data were analysed with repeated-measures ANOVAs with the number of cooperative choices in each game as the dependent variable and one within-subject factor with five levels (GAME). The between-subject factor is locus of control (LOC). Note that gender was entered in the analyses as a covariate. In Experiment I, the factor GAME has a significant effect on average cooperation ( $F=2.386$ ,  $d.f.=4$  and  $P=0.050$ ). Thus, the trend towards more cooperation from game II onwards is significant. This pattern does not significantly differ over the three locus-of-control groups. That is, GAME LOC is

Figure 2. Locus-of-control and number of cooperative choices (Experiment II;  $n=92$ ).



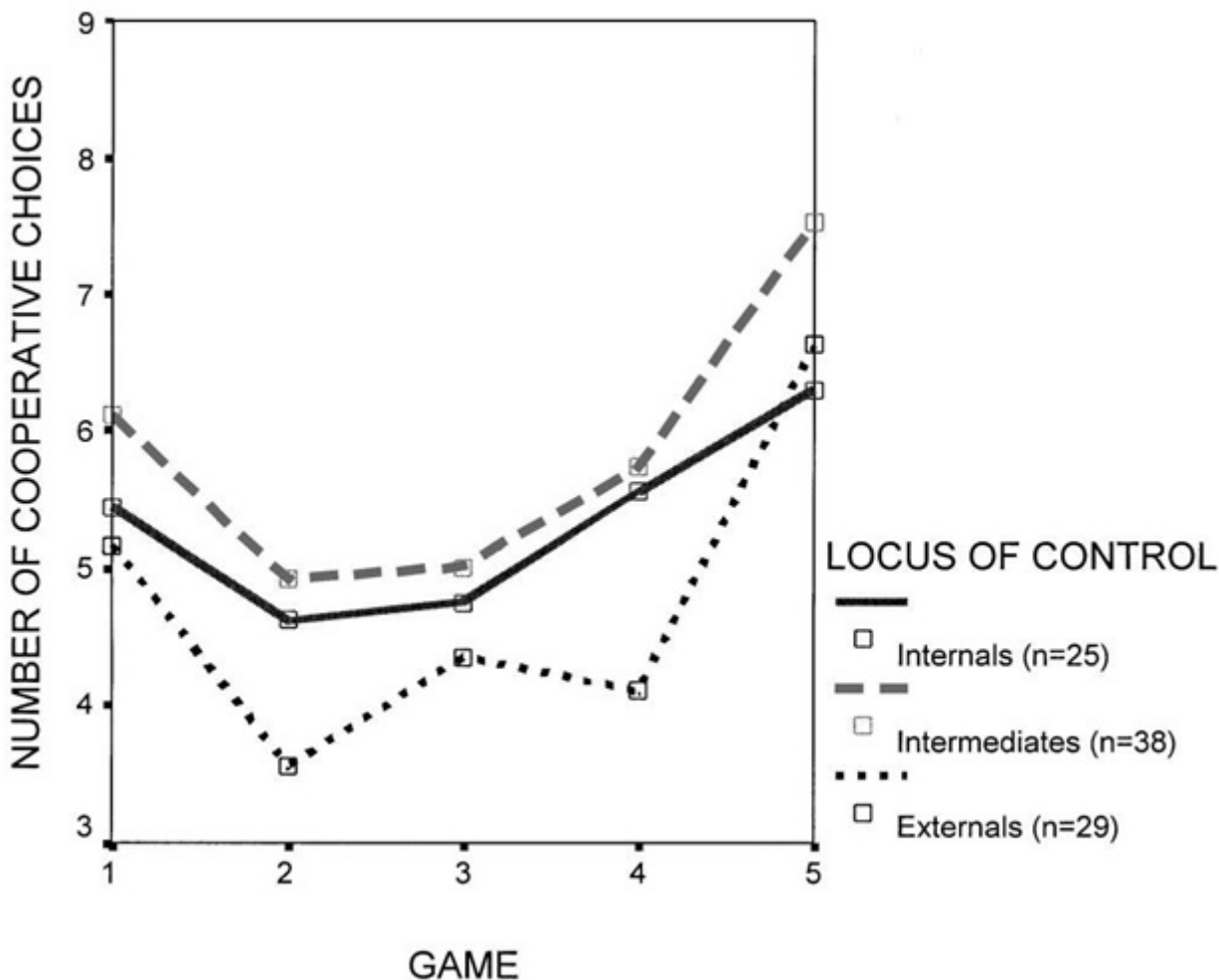
not significant ( $F=0.756$ ,  $d.f.=8$  and  $P=0.756$ ). The between-subject effect of LOC, however, is significant ( $F=3.664$ ,  $d.f.=2$  and  $P=0.028$ ). So, there are overall differences between internals, intermediates and externals concerning the extent of cooperative behaviour in Experiment I. Although GAME LOC is not significant, Fig. 1 suggests that the differences between the three locus-of-control groups can only be observed in games II, III and IV. Separate ANOVAs per game indeed reveal significant differences in game III ( $F=3.226$  and  $P=0.042$ ) and game IV ( $F=3.637$  and  $P=0.028$ ) caused by external subjects being less cooperative than their internal and intermediate counterparts (post-hoc tests reveal that the differences between internals and intermediates are small and not significant). The overall ANOVA for game II, however, is not significant, although a post-hoc test indicates a marginally significant difference between externals and intermediates (mean difference=1.41 and  $P=0.055$ ). Note that the level of cooperation of internals and intermediates rises gradually from game II onwards. This is not the case for externals. Externals only catch up with intermediates and internals in the last game when their level of cooperation increases drastically compared with game IV. As a result, there are no significant differences in game V anymore. Interestingly, in game I, the differences are not significant, suggesting that the observations mentioned above cannot be ascribed to differences in the baseline inclination to cooperate. In order to check for the robustness of these results we also performed non-parametric Kruskal–Wallis tests to detect differences between the locus-of-control groups. This test reveals a significant between-subject effect of LOC on the average level of cooperation of the five games (Chi-square=6.894,  $d.f.=2$  and  $P=0.032$ ). Game-by-game analysis again shows that the differences between the locus-of-control groups only materialise in game III and IV (Chi-square=7.001,  $d.f.=2$  and  $P=0.030$ , and Chi-square=6.668,  $d.f.=2$  and  $P=0.036$ , respectively). These findings are exactly the same as the parametric analyses reported above.

In Experiment II, none of the factors is significantly related to the incidence of cooperative behaviour, except for the factor GAME ( $F=10.558$ ,  $d.f.=4$  and  $P=0.000$ ). Apparently, the subjects average level of cooperation starts at the level where it ended in Experiment I and further increases until it reaches its equilibrium at a high average value (around 8 out of 12; see Table 2). As the subjects learned to cooperate, the effect of individual differences with respect to locus of control all vanished, as expected (this is also confirmed by Kruskal–Wallis test results). That is, from Experiment I to Experiment II, true learning has apparently taken place among all locus-of-control groups.

Recall that Experiment II only pertains to a subset (i.e. 92 volunteers) of the 182 subjects that participated in Experiment I. When comparing the results of both Experiments, it is therefore important to rule out the possibility that the observed

convergence in cooperative behaviour among the locus-of-control groups is due to (possibly arbitrary) sample differences. For this purpose we re-analysed the data of Experiment I only for those subjects who participated in Experiment II as well. Fig. 3 shows the results of this exercise. The pattern of findings is almost identical to that pertaining to the full sample (compare Figs. 1 and 3), although the between-subject effect of LOC is not significant anymore (ANOVA test:  $F=1.913$ ,  $d.f.=2$  and  $P=0.154$ ; Kruskal-Wallis test:  $\text{Chi-square}=3.573$ ,  $d.f.=2$  and  $P=0.168$ ). The reduced significance is of course due to the 50% drop in degrees of freedom. Taken together, as this sensitivity analysis essentially yields the same qualitative results, the observed convergence between the locus-of-control groups is unlikely to have been caused by subtle sample selection effects.

Figure 3. Locus-of-control and number of cooperative choices (Experiment I;  $n=92$ ).



Finally, it should be noted that one could argue that the existence of (slightly) different conditions in Experiment I vis-a`-vis Experiment II weakens the interpretation of shifts in cooperation as "pure" learning effects. Similarly, a point could be made that the evidence for externals catching up with internals and intermediates would probably be stronger if the subjects had played a number of identical procedures over time. The latter would enable one to observe learning independently of differences in experimental conditions (these issues were already touched upon when explaining our fixed-order design approach in Section 2). Notwithstanding these qualifications, we think, however, that it is very reassuring that even in the one-shot games of Experiment II all participants, irrespective of their locus of control, "pick up" cooperation at exactly the same level they ended Experiment I. As both experiments are almost identical, we think that this finding is clear evidence of all subjects learning to play cooperative over time. In addition, presenting different game conditions to subjects has also an advantage because it broadens the range of observed behaviour. This makes sense when testing for individual differences as it allows one to assess their general impact in a broad range of circumstances.

### **4.3 Appraisal**

The aim of the present study was to investigate the dynamic relationship between locus of control and cooperative behaviour. For this purpose, we conducted two experiments. In Experiment I, where subjects do not yet have any experience in playing PDs, we found that external subjects were significantly less cooperative, on average, than internal and intermediate subjects. However, this difference disappeared in the last game of Experiment I. Apparently, as expected, externals tend to lag behind as far as learning to cooperate is concerned, only catching up with the other groups after playing several PD games. The fact that we fail to observe significant differences between internals and intermediates came as a surprise. Perhaps, only relatively "extreme" externals suffer from symptoms of so-called learned helplessness (Lefcourt, 1982), which make them less alert and sensitive to the subtle interdependencies so dominant in a PD context. It should be stressed that these findings are probably to some extent sample specific. This is because the three locus-of-control groups were not determined by general population norms (which do not exist), but by using the observed locus-of-control scores of the subjects participating in the study. Although the mean locus-of-control score of the subjects in the present sample lies at the midpoint of the scale (i.e. 11), a sample of university students is clearly not representative of the "average" individual in society at large, but probably tends to lean toward the more internal part of the population. It is therefore conceivable that in more representative samples (i.e. more "external" samples compared with the present one) the slower learning to cooperate starts closer to the average locus-of-

control score of that sample, i.e. also for “intermediates”.

We argued that the underlying reason for the observed differences between the locus-of-control groups is related to differences in the capacity to learn. To be sure, only changes in actual behaviour rather than “true” learning can be observed. This is of course a major limitation of the present but also of many other studies related to learning: learning is (and in many cases can) only (be) inferred ex post. Similarly, the PD, although widely used to model competitive versus cooperative behaviour, does not, in itself, allow one to understand unambiguously the true motives or reasons of individuals to cooperate or to compete. It is a black box in which behaviour can be driven by a plethora of, not necessarily mutually exclusive, reasons and motives. Cooperation can be the result of astuteness, insight and learning, but also of interpersonal trust, the propensity to take risks, altruism, collective orientation, etc. In our view, motives such as collective orientation and altruism are unlikely candidates to explain the effect of locus of control on cooperative behaviour in Experiment I. There are two major reasons to believe that, indeed, learning to cooperate is the underlying cause.

First, and most important, is the finding that no differences between the locus-of-control groups could be observed anymore in Experiment II. In fact, cooperation was the rule rather than the exception in Experiment II. Apparently, having experience in playing the PD game is sufficient to make people cooperate, so rendering locus-of-control differences irrelevant. It is clear that if stable motives, such as altruism, would have produced the results in Experiment I, then differences in cooperative behaviour would not disappear overnight. As a result, the pattern of findings is very consistent with individuals learning that cooperation is instrumental to further their self-interest (i.e. to obtain a reasonable payoff).

Second, there is another reason why stable motives are unlikely candidates to explain the observed effect of locus-of-control on cooperative behaviour in Experiment I. If these motives were the underlying reason to cooperate, we would expect to observe significant differences in the baseline (non-interactive) game I—measuring the basic inclination of an individual to compete or cooperate. However, we fail to do so.

Finally, a few general remarks are worth making. The present study clearly underscores the value of the claim we made earlier. It shows that cross-sectional findings are at best misleading, and that it is indeed essential to study personality and cooperation dynamically (Boone et al., 1999a). It also sheds new light on the important—but frequently neglected—difference between strong and weak situations with respect to the impact of personality on behaviour (Weiss & Adler, 1984). We agree with Weiss and Adler that personality research can benefit a lot if researchers would do more

than just paying lip service to the distinction of weak versus strong situations. The point is that personality can only serve as a guide in explaining behaviour when the environment is uncertain and ambiguous (i.e. weak). However, when enough cues are provided as to the type of behaviour that is appropriate—either normative or instrumental —, then individual differences are less important in understanding that behaviour. We conjecture that experience and learning may make weak situations strong, and therefore reduce the impact of personality. The present findings are consistent with this account, at least for the case of the locus-of-control trait in a dynamic setting, as they suggest that experience indeed weakens the impact of locus-of-control. Our study is only another small step into the study of the very complex area of the impact and interplay of personality and experience. Given the promising findings, however, we believe that this issue deserves more attention in future research. Specifically, replications and/or extensions using other situations and personality traits are essential in order to test the generality of our findings and interpretations.

### Appendix – Game Settings

Two firms operate in the same market: firms I and II. Both firms can choose between two price strategies: setting a low price and setting a high price. The profits depend on the pairs of strategies chosen. In the following payoff matrix, the four possible profit combinations (in thousands of Euros) are reported for Experiment I (Pi stands for the pricing strategy of firm i, with  $i = I, II$ ).

		Firm II	
		Low price	High price
Firm I	Low price	(-30,-30)	(600,-600)
	High price	(-600,600)	(300,300)

Each cell contains the possible profit combinations ( $W_I, W_{II}$ ).  $W_I$  and  $W_{II}$  are the (negative or positive) profits of Firm I and Firm II respectively. The four profit combinations are as follows:

- (1)  $P_I \text{ low} = P_{II} \text{ low}$ . Both firms choose to set the same low price. The profit margins are negative. Both firms generate a loss of EUR 30,000.
- (2)  $P_I \text{ low} < P_{II} \text{ high}$ . Firm I offers a lower price than Firm II. The Firm II's customers prefer to buy from the 'cheaper' Firm I. The profit of Firm I is therefore EUR 600,000, and Firm II's losses amount to EUR 600,000.
- (3)  $P_I \text{ high} > P_{II} \text{ low}$ . Firm II undercuts Firm I. The resulting profit combination is

the opposite of the second case. Firm I generates a loss of EUR 600,000 and Firm II a profit of EUR 600,000.

(4) PI high = PII high. Both firms choose to set the same high price. The profit margins are positive. Both firms gain a profit of EUR 300,000.

### *Game I*

Imagine you are Chief Executive Officer of Firm I. You decide autonomously on the pricing strategy of your company. You have an appointment with your distributor to fix the future pricing strategy for your product. It is a custom in this industry that contracts with distributors are concluded annually, in which the price level for each month (or round) for the coming year is stipulated in advance. It is impossible to change the terms of the contract afterwards. The Chief Executive Officer of Firm II will simultaneously determine her/his pricing strategy with her/his distributor (a different one from yours) for the following twelve months. You do not know the price intentions of Firm II and vice versa. Indicate your preferred strategy below (L indicates low price; H indicates high price) for each round (month).

### *Game II*

At the end of the contract, you learn that Firm II has consistently chosen to set a high price in each month of the previous contracting period. Now, you have to agree a new contract with your distributor for the next twelve months. Indicate again which pricing strategy you prefer for each month.

### *Game III*

Your information on the past intentions and pricing strategy of Firm II have become irrelevant because Firm II has been taken over by another company, which installed a new Chief Executive Officer. The government has also decided that contracts in which prices are set for more than one month in advance are now illegal. Therefore, for the next year you are only allowed to fix your price level for one month, after which you have to decide again for the next round. Decisions are made simultaneously in each month.

You play the game for an unknown number of months (rounds). You do not know in advance how many times you will have to make a decision on your pricing strategy. The game can end any moment after round 8. The probability that the game ends after round 8 is 20 percent. The sequence of decisions/activities you have to perform is as follows:

- (1) at the beginning of each round, the price strategies are set simultaneously and noted on the response sheet
- (2) subsequently, swap sheets with your counterpart
- (3) finally, calculate your own profit, given the strategy of the other firm.



Indicate for each month on your response sheet: (i) the strategy you prefer, (ii) the strategy of the other firm and (iii) the profit you gained. Except for the exchange of notes after each round, no communication is allowed during the experiment.

*Game IV*

Repeat Game III, but for 12 months (rounds).

*Game V*

In the following period of twelve months demand has increased substantially, along with an increased profit potential. This new situation is reflected in the following profit combinations (profits are in thousands of euros).

		Firm II	
		Low price	High price
Firm I	Low price	(-20,-20)	(800,-400)
	High price	(-400,800)	(600,600)

Proceed as in Game IV.

*Game setting Experiment II*

The game setting in Experiment II is exactly the same except for slight differences in the payoff structure. For the first four games the following profit (loss) combinations were used: (20, 20), (500, 500), (500, 500), (200, 200). In game V these combinations are: (10, 10), (700, 700), (700, 700), (400, 400).

# BIBLIOGRAPHY

## A

- Adler, P., & Kwon, S. (2002). Social capital: Prospects for a new concept. *Academy of Management Review*, 27, 17-40.
- Ai, C., & Norton, Edward C. (2003). Interaction terms in logit and probit models. *Economic Letters*, 80, 123-129.
- Aldrich, H.E., & Fiol, C.M. (1994). Fools rush in? The institutional context of industry creation. *Academy of Management Review*, 19, 645-670.
- Altonji, J.G., & Dunn, T. (1996). The effects of family background characteristics on the return to schooling. *Review of Economics and Statistics*, 78, 665-671.
- Anderson, A.R., & Miller, C.J. (2003). "Class matters": human and social capital in the entrepreneurial process. *Journal of Socio-Economics*, 32, 17-36.
- Andreoni, J., & Miller, J. (2002). Giving according to GARP: An experimental test of the consistency of preferences for altruism. *Econometrica*, 70, 737-753.
- Andreoni, J., & Miller, J.H. (1993). Rational cooperation in the finitely repeated prisoner's dilemma: experimental evidence. *The Economic Journal*, 103, 570-585.
- Ang, S., Slaughter, S., & Ng., K. Y. (2002). Human capital and institutional determinants of information technology compensation: Modeling multilevel and cross-level interactions. *Management Science*, 48, 1427-1445.
- Annen, K. (2001). Inclusive and exclusive social capital in the small-firm sector in developing countries. *Journal of Institutional and Theoretical Economics*, 157, 319-330.
- Annen, K. (2003). Social capital, inclusive networks, and economic performance. *Journal of Economic Behavior and Organization*, 50, 449-463.
- Appels, A. (1985). *De Jenkins Activity Survey*. Lisse: Swets and Zeitlinger.
- Appels, A., Mulder, P., & Houtem, J. van (1985). De validiteit van de Jenkins Activity Survey: Een vragenlijst ter meting van het type A gedrag. *Nederlands Tijdschrift voor de Psychologie*, 40, 474-487.
- Ashenfelter, O., & Rouse, C.E. (1998). Income, schooling and ability: Evidence from a new sample of twins. *Quarterly Journal of Economics*, 113, 253-284.

## B

Bachmann, R. (2001). Trust, power and control in trans-organizational relations. *Organization Studies*, 22, 337-365.

Baron, A. (1989). Personality and organizational conflict: Effects of the type A behavior pattern and self-monitoring. *Organizational Behavior and Human Decision Processes*, 44, 281-296.

Becker, G. (1975). *Human capital*, 2nd ed. Chicago: University of Chicago Press.

Becker, G., & Murphy, K. M. (2000). *Social economics: market behavior in a social environment*. Cambridge: Harvard University Press.

Bialer, I. (1961). Conceptualization of success and failure in mentally retarded and normal children. *Journal of Psychology*, 29, 303-320.

Bierman, H. S., & Fernandez, L. (1993). *Game theory with economic applications*. Reading, MA: Addison-Wesley.

Bingham, C. B., & Eisenhard, K. M. (2011). Rational heuristics: the 'simple rules' that strategists learn from process experience. *Strategic Management Journal*, 32, 1437-1464.

Blake, J. (1980). *Family Size and Achievement*. Berkely: University of California Press.

Bó, P. D., & Fréchette, G. R. (2011). The evolution of cooperation in infinitely repeated games: experimental evidence. *American Economic Review*, 101, 411-429.

Boone, C. (1992). *Onderzoek naar het verband tussen de perceptie van controle van bedrijfsleiders en de strategie en de resultaten van ondernemingen in de meubelindustrie*. Unpublished doctoral dissertation. University of Antwerp, Antwerp.

Boone, C., & Witteloostuijn, A. van (1999). Competitive and opportunistic behavior in a Prisoner's Dilemma game: Experimental evidence on the impact of culture and education. *Scandinavian Journal of Management*, 15, 333-350.

Boone, C., De Brabander, B., & Witteloostuijn, A. van (1999a). The impact of personality on behavior in five prisoner's dilemma games. *Journal of Economic Psychology*, 20, 343-377.

Boone, C., De Brabander, B., & Witteloostuijn, A. van (1999b). Locus of control and strategic behavior in a prisoner's dilemma game. *Personality and Individual Differences*, 27, 695-706.

Boone, C., De Brabander, B., Carree, M., Jong, G. de, Olfen, W. van, Witteloostuijn, A. van (2002). Locus of control and learning to cooperate in a prisoner's dilemma

game. *Personality and Individual Differences*, 32, 929-946.

Boone, C., De Brabander, B., Gerits, P., & Willeme, P. (1990). Relation of scores on Rotter's I-E scale to short-term and long-term control expectancies and fatalism. *Psychological Reports*, 66, 1107-1111.

Bourdieu, P. (1985). The forms of capital. In: Richardson, J. (Ed.), *Handbook of Theory and Research for the Sociology of Education*. New York: Greenwood, pp 241-258.

Bowles, S., & Gintis, H. (2001). Economic Status, Inheritance of: Education, Class and Genetics. *International Encyclopedia of the Social & Behavioral Sciences*, pp 4132-4141.

de Brabander, B., & Boone, C. (1990). Sex differences in perceived locus of control. *Journal of Social Psychology*, 130, 271-272.

de Brabander, B., Boone, C., & Gerits, P. (1992). Locus of control and cerebral asymmetry. *Perceptual and Motor Skills*, 75, 131-143.

de Brabander, B., Boone, C., & Gerits, P. (1995). On the relationship between arousal and activation, and sensation seeking. *Personality and Individual Differences*, 18, 373-384.

Bratko, D., & Butkovic, A. (2002). Family study of sensation seeking. *Personality and Individual Differences*, 34, 1-12.

Brocklebank, S., Lewis, G. J., & Bates, C. T. (2011). Personality accounts for stable preferences and expectations across a range of simple games. *Personality and Individual Differences*, 51, 881-886.

Brosig, J. (2002). Identifying cooperative behavior: some experimental results in a prisoner's dilemma game. *Journal of Economic Behavior and Organization*, 47, 275-290.

Brown, S., & Taylor, K. (2007). Religion and education: Evidence from the national child development study. *Journal of Economic Behavior and Organization*, 63, 439-460.

Buchholtz, A. K., Ribbens, B. A., & Houle, I. T. (2003). The role of human capital in post acquisition CEO departure. *Academy of Management Journal*, 46, 506-514.

Burks, S.V., Carpenter, J.P., & Verhoogen, E. (2003). Playing both roles in the trust game. *Journal of Economic Behavior and Organization*, 51, 195-216.

Burt, R.S. (1992). *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.

Burt, R.S. (1997). The contingent value of social capital. *Administrative Science Quarterly*, 42, 339-365.

## C

Carroll, M.C., & Stanfield, J.R. (2003). Social capital, Karl Polanyi, and American social and institutional economics. *Journal of Economic Issues*, 37, 397-404.

Chandler, G. N., & Hanks, S. H. (1998). An examination of the substitutability of founders' human and financial capital in emerging business ventures. *Journal of Business Venturing*, 13, 353-369.

Charness, R. (2002). Understanding social preferences with simple tests. *Quarterly Journal of Economics*, 117, 817-869.

Chomsky, N. (1993). *Language and Thought*. Wakefield, RI: Moyer Bell.

Churchland, P.S. (1986). *Neuro Philosophy: Toward a Unified Science of the Mind-Brain*. Cambridge, MA: Bradford Books, MIT Press.

Coleman, J. S. (1990). *Foundation of social theory*. Cambridge, MA: Cambridge University Press.

Coleman, J.S. (1988). Social capital in the creation of human capital. *American journal of Sociology*, 94, 95-120.

Conley, D. (2002). What is the "true" effect of sibship size and birth order on education? National Bureau of Economic Research, working paper.

Cook, H., & Chi, C. (1984). Cooperative behavior and locus of control among American and Chinese-American boys. *Journal of Psychology*, 118, 197-177.

Cook, H., & Sloane, J. (1985). Locus of control and cooperative behavior in 10-year-old children. *Journal of Social Psychology*, 125, 619-630.

Cox, H., Lobel, S. A., & McLeod, P. L. (1991). Effects of ethnic group cultural differences on cooperative and competitive behavior on a group task. *Academy of Management Journal*, 34, 827-847.

Cronbach, L. J. (1951). Coefficient and the internal structure of tests. *Psychometrika*, 16, 297-335.

Crudeli, L. (2006). Social capital and economic opportunities. *The Journal of Socio-*

Economics, 35, 913-927.

## *D*

Damasio, A.R. (2003). Looking for Spinoza - Joy, Sorrow and the Feeling Brain. Amsterdam: Wereldbibliotheek.

Davies, K. (2001). Cracking the Genome. Inside the Race to Unlock Human DNA. Amsterdam: Prometheus.

Dawes, R. M. (1980). Social dilemmas. Annual Review of Psychology, 31, 169–193.

Dawkins (2006). The Selfish Gene. Oxford: Oxford University Press.

Dawkins, R. (2009). The Greatest Show on Earth. The Evidence for Evolution. London: Transworld Publishers.

Delanry, G. and Strydom, P. (eds.) (2003). Philosophies of Social Science. The Classic and Contemporary Readings. Philadelphia: Open University Press.

Dörrenbächer C., & Gammelgaard, J. (2010). Multinational Corporations, Inter-organizational Networks and Subsidiary Charter Removals. Journal of World Business, 45, 206-216.

Durlauf, S.N. (2002). On the empirics of social capital. The Economic Journal, 112, 459-479.

## *E*

Egidi, M., & Narduzzo, A. (1997). The emergence of path-dependent behaviors in cooperative contexts. Journal of Industrial Organization, 15, 677-709.

Egidi, M., & Rizzello, S. (2003). Cognitive economics, two volumes for the series the international library of critical writings in economics'. Aldershot: Edward Elgar.

Elms, H., Brammer, S., Harris, J. D., & Phillips, R. A. (2010). New directions in strategic management and business ethics. Business Ethics Quarterly, 20, 401-425.

## *F*

Falk, A., & Fischbacher, U. (2006). A theory of reciprocity. Games and Economic Behavior, 54, 268-298.

Fan, C. (2008). Religious participation and children`s education: A social capital approach. Journal of Economic Behavior and Organization, 65, 303-317.

Fehr, E., & Camarero, C.F. (2007). Social neuroeconomics: the neural circuitry of social

preferences. *Trends in Cognitive Sciences*, 11, 419-427.

Fehr, E., & Gächter, S. (2000). Fairness and retaliation: the economics of reciprocity. *Journal of Economic Perspectives*, 14, 159-181.

Fehr, E., & List, J.A. (2004). The hidden costs and returns of incentives. Trust and trustworthiness among CEOs. *Journal of European Economic Association*, 2, 743-771.

Fehr, E., & Rockenbach, B. (2004). Human altruism: Economic, neural, and evolutionary perspectives. *Current Opinion in Neurobiology*, 14, 784-790.

Fehr, E., & Schmidt, K.M. (1999). A theory of fairness, competition and cooperation. *Quarterly Journal of Economics* 114, 817-868.

Fehr, E., Klein, A., & Schmidt, K.M. (2007). Fairness and contract design. *Econometrica*, 75, 121-154.

Feij, J.A., & Zuilen, R.W. van (1984). Handleiding bij de Spanningsbehoeften lijst (SBL). Lisse: Swets and Zeitlinger.

Florin, J., Lubatkin, M., & Schultz, W. (2003). A social capital model of high-growth ventures. *Academy of Management Journal*, 46, 374-384.

Frank, R.H., Gilovich, T., & Regan, D.T. (1993). Does studying economics inhibit cooperation? *Journal of Economic Perspectives*, 7, 159-171.

Frey, B.S., & Bohnet, I. (1995). Institutions affect fairness: Experimental investigations. *Journal of Institutional and Theoretical Economics*, 151, 286-303.

Friedman, H.S., & Booth-Kewley, S. (1987). Personality, type A behavior, and coronary heart disease: The role of emotional expression. *Journal of Personality and Social Psychology*, 53, 783-792.

Friedman, M., & Rosenman, R.H. (1974). *Type A Behavior and Your Heart*. New York: Knopf.

Fukuyama, F. (1999). *The Great Disrupt*. New York: Simon and Schuster.

Furstenberg, F., & Hughes, M. (1995). Social capital and successful development among risk-taking youth. *Journal of Marriage and the Family*, 57, 580-592.

## G

Gächter, S., Herrmann, B., & Thöni, C. (2004). Trust, voluntary cooperation, and socio-economic background: survey and experimental evidence. *Journal of Economic Behavior and Organization*, 55, 505-531.

- Gintis, H. (2000). Strong reciprocity and human sociality. *Journal of Theoretical Biology*, 206, 169-179.
- Glaeser, E., Laibson, D., & Sacerdote, B. (2002). An economic approach to social capital. *Economic Journal*, 112, 437-458.
- Glass, D.C. (1983). Behavioral, cardiovascular, and neuroendocrine responses. *International Review of Applied Psychology*, 32, 137-151.
- Glicksohn, J., & Golan, H. (2001). Personality, cognitive style and assortive mating. *Personality and Individual Differences*, 30, 1199-1209.
- Gould, S.J. (1990). *The Individual in Darwin's World*. Edinburgh, Scotland: Edinburgh University Press.
- Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology*, 91, 481-510.
- Guiso, L., Sapienze, P., & Zingales, L. (2003). People's opium? Religion and economic attitudes. *Journal of Monetary Economics*, 50, 225-282.
- Guo, G., & Van Wey, L.K. (1999). Sibship size and intellectual development. *American Sociology Review*, 64, 169-187.

## H

- de Haan, M. (2010). Birth order, family size and educational achievement. *Economics of Education Review*, 29, 576-588.
- Hammerstein, P. (Ed.) (2003). *Genetic and Cultural Evolution of Cooperation*. Cambridge, MA; MIT Press.
- Haselhuhn, M. P., Pope, D. G., Schweiter, M. E., & Fishman, P. (2012). The impact of personal experience on behavior: Evidence from video-rental fines. *Management Science*, 58(1), 52-61.
- Heath, W.C., Waters, M.S., & Watson, J.K. (1995). Religion and economic welfare: An empirical analysis of state per capita income. *Journal of Economic Behavior and Organization*, 27, 129-142.
- Henrich, J., Boyd, R., & Bowles, S. (2001). In search of homo economicus: Behavioral experiments in 15 small-scale societies. *American Economic Review*, 91, 73-78.
- Hirsh, J. B., & Peterson, J. B. (2009). Extraversion, neuroticism, and the prisoner's dilemma. *Personality and Individual Differences*, 46, 254-256.



Hofstede, G. (2001). *Culture consequences: Comparing values, behaviors, institutions, and organizations across nations*. Thousand Oaks: Sage.

Honig, B. (1998). What determines success? Examining the human, financial, and social capital of Jamaican micro-entrepreneurs. *Journal of Business Venturing*, 13, 371-394.

Hull, B.B., & Bold, F. (1995). Preaching matters: Replication and extension. *Journal of Economic Behavior and Organization*, 27, 143-149.

### *I*

Iannaccone, L.R. (1998). Introduction to the economics of religion. *Journal of Economic Literature*, 36, 1465-1497.

Iannaccone, L.R. (1992). Sacrifice and stigma: Reducing free-riding in cults, communes, and other collectives. *Journal of Political Economy*, 100, 271-291.

Inglehart, R. (1999). Trust, well-being and democracy. In: Warren, M. (Ed.), *Democracy and Trust*. New York: Cambridge University Press, pp 88-120.

### *J*

Jack Dorff, R. (2007). *Language, Consciousness, Culture. Essays on Mental Structure*. Cambridge: MIT Press.

Jenkins, C.D., Zyzanski, S.J., & Rosenman, R.H. (1979). *Jenkins Activity Survey*. New York: Psychological Corporation.

Jones, B. D. (1999). Bounded rationality. *Annual Review Political Science*, 2, 297-321.

de Jong, G., & Nooteboom, B. (2000). *The Causal Structure of Long-Term Supply Relationships. An Empirical Test of a Generalized Transaction Cost Theory*. Dordrecht: Kluwer Academic Publishers.

### *K*

Kabanoff, B. (1987). Predictive validity of the MODE conflict instrument. *Journal of Applied Psychology*, 72, 160-164.

Kaustia, M, & Knüpfer, S. (2008). Do investors overweight personal experience? Evidence from IPO subscriptions, *Journal of Finance*, 63, 2679–2702.

Klein Woolthuis, R. J. A., Hillebrand, B., & Nooteboom, B. (2005). Trust, contract and relationship development. *Organization Studies*, 26, 813-840.

Kostova, T., & Roth, K. (2003). Social capital in multinational corporations and a micro-macro model of its formation. *Academy of Management Review*, 28, 297-317.

Kuhlmann, D. M., & Marshello, A. F. (1975). Individual differences in game motivation as moderators of pre-programmed strategy effects in Prisoner's Dilemma. *Journal of Personality and Social Psychology*, 32, 922-931.

## L

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R.W. (1997). Trust in large organizations. *American Economic Review*, 87, 333-338.

Lefcourt, H. M. (1982). *Locus of control: current trends in theory and research* (2nd ed.). New York: McGraw-Hill.

Lelkes, O. (2006). Tasting freedom: Happiness, religion and economic transition. *Journal of Economic Behavior and Organization*, 59, 173-194.

Lemmel, L. (2001). The dynamics of social capital: Creating trust-based relationships and trustworthy environments. *National Civic Review*, 90, 97-103.

Lipfort, J.W., & Tollison, R.D. (2003). Religious participation and income. *Journal of Economic Behavior and Organization*, 51, 249-260.

Loury, G.C. (1987). Why should we care about group inequality? *Social Philosophy and Policy*, 5, 249-271.

## M

Malmendier, U, & Nagel, S. (2007). Depression babies: do macroeconomic experiences affect risk-taking? Working paper, Stanford University.

Mason, C. F., Philips, O. R., & Redington, D. B. (1991). The role of gender in a non-cooperative game. *Journal of Economic Behavior and Organization*, 15, 215-235.

McGinnies, E., Nordholm, L. A., Ward, C. D., & Bhanthumnavin, D. L. (1974). Sex differences and cultural differences in perceived locus of control among students in five countries. *Journal of Consulting and Clinical Psychology*, 42, 451-455.

Mincer, J. (1970). The distribution of labor incomes. *Journal of Economic Literature*, 8, 1-26.

Morgan, S.L. (2000). Social capital, capital goods, and the production of learning. *Journal of Socio-Economics*, 29, 591-595.

## N

Nooteboom, B. (2000). Learning and innovation in organizations and economies. Oxford: Oxford University Press.

Nooteboom, B. (2004). Interfirm collaboration, learning and networks: an integrated approach. London: Routledge.

Nooteboom, B. (2012). Beyond Humanism: The Flourishing of Life, Self and Other. Basingstoke: Palgrave-Macmillan.

Northouse, P. G. (2004). Leadership theory and practice. Thousand Oaks: Sage Publications.

Novarese, M. (2007). Individual learning in different social contexts. *The Journal of Socio Economics*, 36, 15–35.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.

## O

van Olffen, W. (1999). Team level locus of control and competitive team behaviour: an experimental study. Unpublished doctoral dissertation, Datawyse, Maastricht.

Ostgaard, T.A., & Birley, S. (1994). Personal networks and firm competitive strategy: A strategic or coincidental match? *Journal of Business Venturing*, 9, 281-305.

## P

Paldam, M. (2000). Social capital: one or many? Definition and measurement. *Journal of Economic Surveys*, 14, 629-653.

Pennings, J.M., Lee, K., & Witteloostuijn, A. van (1998). Human capital, social capital, and firm dissolution. *Academy of Management Journal*, 41, 425-440.

Perez, F. (2000). Private experience in adaptive learning models. *Review of Economic Dynamics*, 3, 228–310.

Phares, E. J. (1976). *Locus of control in personality*. Morristown, NJ: General Learning Press.

Ployhart, R. E., Van Iddekinge, C. H., & Mackenzie, W. I. (2011). Acquiring and developing human capital in service contexts: the interconnectedness of human capital resources. *Academy of Management Journal*, 54, 353-368.

Porter, M.E. (1998). *The Competitive Advantages of Firms*. New York: Free Press.

- Porter, M. E., & Kramer, M. R. 2011. Creating Shared Value. *Harvard Business Review*, 89, 62-77.
- Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, 24, 1-24.
- Pothos, E. M., Perry, G., Corr, P. J., Matthew, M. R., & Busemeyer, J. R. (2011). Understanding cooperation in the Prisoner's Dilemma game. *Personality and Individual Differences*, 51, 210-215.
- Powel, B., & Steelman, L.C. (1993). The educational benefits of being spaced out : Sibship density and educational progress. *American Sociology Review*, 58, 367-381.
- Powell, T. C. (2011). Neurostrategy. *Strategic Management Journal*, 32, 1484-1499.
- Powell, T. C., Lovallo, D., & Fox, C. R. (2011). Behavioral strategy. *Strategic Management Journal*, 32, 1369-1386.
- Pruitt, D., & Kimmel, M. (1977). Twenty years of experimental gaming: critique, synthesis, and suggestions for the future. *Annual Review of Psychology*, 28, 363-392.
- Putnam, R. (1993). The prosperous community: Social capital and public life. *American Prospect*, 13, 35-42.

## R

- Raiffa, H. (1982). *The art and science of negotiation*. Cambridge, MA: Harvard University Press.
- Rapoport, A., Guyer, M., & Gordon, D. (1976). *The 2 x 2 game*. Ann Arbor: University of Michigan Press.
- Rasmusen, E. (2001). *Games and information: an introduction to game theory* (3rd ed.). Cambridge: Basil Blackwell.
- Robinson, J. P., & Shaver, P. R. (1973). *Measures of social psychological attitudes*. Ann Arbor, MI: University of Michigan, Survey Research Center, Institute for Social Research.
- Rotter, J. B. (1954). *Social Learning and clinical psychology*. Englewood Cliffs, NJ: Prentice-Hall.
- Rotter, J. B. (1966). A new scale for the measurement of interpersonal trust. *Journal of Personality*, 35, 651-665.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of

reinforcement. *Psychological Monographs: General and Applied*, 80, whole number 609.

## S

Sally, D. (1995). Conversation and cooperation in social dilemmas. A meta-analysis of experiments from 1958-1992. *Rationality and Society*, 7, 58-92.

Sally, D. (2001). On sympathy and games. *Journal of Economic Behavior and Organization*, 44, 1-30.

Schiff, M. (1992). Social capital, labor mobility, and welfare. *Rational Society*, 4, 157-175.

Schlenker, B. R., Helm, B., & Tedeschi, J. T. (1973). The effects of personality and situational variables on behavioral trust. *Journal of Personality and Social Psychology*, 25, 419-427.

Schmid, A.A. (2004). *Conflict and Cooperation. Institutional and Behavioral Economics*. Oxford: Blackwell.

Schramm, A.J.H.C (1998). What have we learned from experiments? Presidential Address, European Public Choice Society, Gothenburg.

Seibert, S.M., Kraimer, M.L., & Liden, R.C., 2001. A social capital theory on career success. *Academy of Management Journal*, 2, 219-237.

Snell, S. A., & Dean, J. W. J. (1992). Integrated manufacturing for human resource management: A human capital perspective. *Academy of Management Journal*, 35, 467-504.

Snyder, M. (1974). The self-monitoring of expressive behavior. *Journal of Personality and Social Psychology*, 30, 526-537.

Snyder, M. (1987). *Public Appearance/Private Relatives: The Psychology of Monitoring*. New York: Freeman.

Snyder, M., & Gangestad, S. (1986). On the nature of self-monitoring: Matters of assessment, matters of validity. *Journal of Personality and Social Psychology*, 51, 125-139.

Spitzer, M., Fischenbacher, U., Hernberger, B., Grön, G., & Fehr, E. (2007). The neural signature of social norm compliance. *Neuron*, 56, 185-196.

Stulz, R., & Williamson, R. (2001). Culture, openness and finance. NBER working paper 8222.

## T

Tan, J.H.W., & Zizzo, D.J. (2008). Groups, cooperation and conflict in games. *The Journal of Socio-Economics*, 37, 1-17.

Thornquist, M.H., Zuckerman, M., & Exline, R.V. (1991). Loving, liking, looking and sensation seeking in unmarried college couples. *Personality and Individual Differences*, 12, 1283-1292.

## U

Uejio, C. K., & Wrightsman, L. (1967). Ethnic group differences in the relationship of trusting attitudes to cooperative behaviour. *Psychological Reports*, 20, 3-571.

## W

Watson, W., Steward, W. H., & BarNir, A. (2003). The effects of human capital, organizational demography and interpersonal process on venture partner perceptions of firm profit and growth. *Journal of Business Venturing*, 18, 145-164.

Weber, M. (1905). *The Protestant Ethic and the Spirit of Capitalism*. London: Unwin.

Weiss, H. M. & Adler, S. (1984). Personality and organizational behavior. *Research in Organizational Behavior*, 6, 1-50.

Wilson, EO (2002). *The Future of Life*. New York: Alfred A. Knopf. van Witteloostuijn, A. (2015). What happened to Popperian Falsification? A Manifesto to Create a Healthier Business and Management Scholarship — Toward a ScientificWikipedia.

## Y

Youndt, M. A., Snell, S. A., Dean, J. W. J., & Lepak, D. P. (1996). Human resource management, manufacturing strategy, and firm performance. *Academy of Management Journal*, 39, 836-866.

## Z

Zaheer, A., McEvily, B., & Perrone, V. (1998). Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science*, 9, 141-159.

Zizzo, D.J. (2002). Between utility and cognition: The neurobiology or relative position. *Journal of Economic Behavior and Organization*, 48, 71-91.

Zuckerman, M. (1979a). *Sensation seeking: Beyond the optimal level of arousal*. Hillsdale, NJ: Lawrence Erlbaum.

Zuckerman, M. (1979b). Sensation seeking and risk taking. In: C.E. Izard (Ed.). *Emotions in Personality and Psychopathology*. New York: Plenum Press, 163-197.

Zuckerman, M. (1994). *Behavioral Expressions and Biosocial Bases of Sensation Seeking*. Cambridge MA: Cambridge University Press.

# INDEX CSE MONOGRAPHS

## **Centre for Sustainable Entrepreneurship, Monograph Series.**

- No 1. de Jong, Gjalt (2016). Successful strategy and individuals.





**The monograph series of the Centre for Sustainable Entrepreneurship offer state-of-the art academic research related to understanding the causes and consequences of sustainable entrepreneurship. The monographs offer a unique opportunity for new thought leadership and new path-breaking research.**

**The Centre for Sustainable Entrepreneurship is dedicated to the circular society. Sustainable entrepreneurship offers the creative potential needed to balance and preserve economic, social, and ecological systems. The Centre will offer a master of science in sustainable entrepreneurship for students, master classes for business leaders and sustainability labs for academics scholars.**

**The Centre for Sustainable Entrepreneurship invites you to join its activities and foster sustainable welfare for all.**

*Gjalt de Jong, PhD  
Series Editor*