COOPERATIVE BEHAVIOR IN STRATEGIC DECISION MAKING:
HUMAN CAPITAL AND PERSONALITY TRAITS

GJALT DE JONG
UNIVERSITY OF GRONINGEN
g.de.jong@rug.nl

and

JAN VEIJER

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

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 (Hirs & 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.

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 Knüpfen (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 then 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 then 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.

**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.

[Insert Table 1 about here]

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. 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 I and II 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 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.

**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.

[INSERT TABLE 2 and TABLE 3 ABOUT HERE]

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.

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.

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 (Nootboom, 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 constitutes 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 ($P_i$ stands for the pricing strategy of firm $i$, with $i = \text{I, II}$).

<table>
<thead>
<tr>
<th>Firm II</th>
<th>Low price</th>
<th>High price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low price</td>
<td>(-30,-30)</td>
<td>(600,-600)</td>
</tr>
<tr>
<td>High price</td>
<td>(-600,600)</td>
<td>(300,300)</td>
</tr>
</tbody>
</table>

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. $P_I$ low = $P_{II}$ 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. $P_I$ low < $P_{II}$ 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. $P_I$ high > $P_{II}$ 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. $P_I$ high = $P_{II}$ 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).

<table>
<thead>
<tr>
<th></th>
<th>Firm II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low price</td>
</tr>
<tr>
<td>Firm I</td>
<td></td>
</tr>
<tr>
<td>Low price</td>
<td>(-20,-20)</td>
</tr>
<tr>
<td>High price</td>
<td>(-400,800)</td>
</tr>
</tbody>
</table>

Proceed as in Game IV.
REFERENCES


<table>
<thead>
<tr>
<th>Game #</th>
<th>Type of game</th>
<th>Main characteristics of game</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>“One-shot”</td>
<td>12 choices (low or high price) against fictitious party &lt;br&gt;No information on past behavior of other party &lt;br&gt;Baseline game</td>
</tr>
<tr>
<td>II</td>
<td>“One-shot”</td>
<td>12 choices (low or high price) against fictitious party &lt;br&gt;Information on past behavior of other party</td>
</tr>
<tr>
<td>III</td>
<td>Repeated</td>
<td>Subjects make independent and simultaneous choices in each round &lt;br&gt;Exchange of choices made by other parties after each round &lt;br&gt;Unknown horizon (“infinite” game) &lt;br&gt;Final payoff equals sum of payoff in each round</td>
</tr>
<tr>
<td>IV</td>
<td>Repeated</td>
<td>Same as game III, except horizon that is finite and known (12 rounds)</td>
</tr>
<tr>
<td>V</td>
<td>Repeated</td>
<td>Same as game IV, except payoff matrix that is changed to elicit cooperation</td>
</tr>
</tbody>
</table>
Table 2. Correlations, means, and standard deviations

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

*Correlation coefficients larger than 0.02 and 0.05 are significant at p < 0.05 and p < 0.01, respectively*
Table 3. Human capital, personality traits and decision-making behavior\textsuperscript{a,b}

<table>
<thead>
<tr>
<th>Variables</th>
<th>Research Model 1</th>
<th>Research Model 2</th>
<th>Research Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.670</td>
<td>-2.114</td>
<td>-3.066</td>
</tr>
<tr>
<td></td>
<td>(0.531)</td>
<td>(0.559)</td>
<td>(0.601)</td>
</tr>
<tr>
<td>Trail</td>
<td>0.015</td>
<td>0.016</td>
<td>0.016</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>Other person's choice lagged</td>
<td>1.522</td>
<td>1.513</td>
<td>1.511</td>
</tr>
<tr>
<td></td>
<td>(0.054)</td>
<td>(0.054)</td>
<td>(0.055)</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.117</td>
<td>-0.112</td>
<td>-0.122</td>
</tr>
<tr>
<td></td>
<td>(0.057)</td>
<td>(0.059)</td>
<td>(0.059)</td>
</tr>
<tr>
<td>Age</td>
<td>0.058</td>
<td>0.072</td>
<td>0.079</td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.027)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>Religion</td>
<td>0.166</td>
<td>0.157</td>
<td>0.143</td>
</tr>
<tr>
<td></td>
<td>(0.059)</td>
<td>(0.060)</td>
<td>(0.060)</td>
</tr>
<tr>
<td>Large family</td>
<td>-0.265</td>
<td>-0.245</td>
<td>-0.273</td>
</tr>
<tr>
<td></td>
<td>(0.056)</td>
<td>(0.057)</td>
<td>(0.057)</td>
</tr>
<tr>
<td>Exposure to science education</td>
<td>0.461</td>
<td>0.416</td>
<td>0.403</td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td>(0.061)</td>
<td>(0.061)</td>
</tr>
<tr>
<td>Southern community type</td>
<td>-0.340</td>
<td>-0.329</td>
<td>-0.323</td>
</tr>
<tr>
<td></td>
<td>(0.108)</td>
<td>(0.109)</td>
<td>(0.110)</td>
</tr>
<tr>
<td>Exposure to cooperative courses</td>
<td>0.082</td>
<td>0.478</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
<td>(0.096)</td>
<td></td>
</tr>
<tr>
<td>Exposure to competitive courses</td>
<td>-0.220</td>
<td></td>
<td>-0.202</td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td></td>
<td>(0.036)</td>
</tr>
<tr>
<td>Locus of control</td>
<td>-0.017</td>
<td>-0.059</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.008)</td>
<td></td>
<td>(0.019)</td>
</tr>
<tr>
<td>Cooperative courses * locus of control</td>
<td>-0.037</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.008)</td>
</tr>
<tr>
<td>-2 log likelihood</td>
<td>-4.008</td>
<td>-3.987</td>
<td>-3.977</td>
</tr>
<tr>
<td>model chi-square</td>
<td>1,055</td>
<td>1,098</td>
<td>1,118</td>
</tr>
<tr>
<td>change chi-square</td>
<td>1,055</td>
<td>43</td>
<td>120</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Standard errors in parentheses with n = 6,553  
\textsuperscript{b} *** p < 0.01, ** p < 0.05, * p < 0.10