**Thesis**

Behavioural Economics

Homo Economicus vs Homo Ecologicus

The Effect of Economics Education on Environmental Attitudes and Behaviours
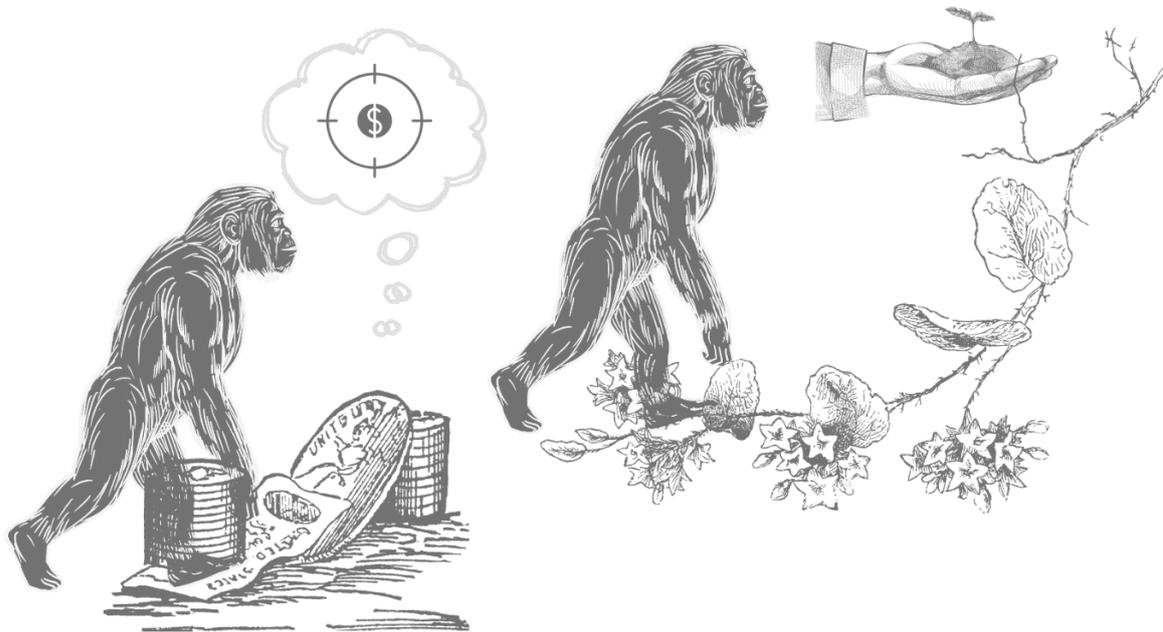
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Abstract

A growing body in sociology and behavioural economics has investigated the ability for economics education to be self-fulfilling and to lead to the cognitive construction of behaviours. However, whether these effects result from a self-selection effect or an educational effect remains to be elucidated. Moreover, recent evidence has emphasized the role of implicit connexion with nature in predicting environmental behaviours and the ability for implicit attitudes to better predict socially sensitive behaviours. In light of conflicting findings, this paper aims to explore the extent to which economics education based on the rational economic man can be self-fulfilling by encouraging unsustainable attitudes and behaviours. To this aim, an empirical method and primary data collection were used. 108 students that follow(ed) their studies in the Netherlands have participated in an implicit association test, public good game, and real task choice. This, to successively measure implicit environmental attitudes, the contribution to an environmental conservation project, and the willingness to pay for water conservation programs. The resulting findings lacked significance, validity, and reliability. Thus, there was not enough evidence to conclude that implicit connection with nature may predict sustainable practices and that economics education may inhibit Homo Ecologicus' attitudes and behaviours. Explicit attitudes, however, were found to significantly influence environmental behaviours. Similarly, being an economic student appeared to be negatively associated with high explicit environmental attitudes. Hence, further investigations were recommended to overcome the study's limitations and reach a higher understanding of the effect of economics education on attitudes and behaviours.

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Introduction

"The more economics students learn about the rational economic man the more they become like him" claimed Kate Raworth (2017) in an interview for *the next system projects*. Yet, 86% of the Dutch economics curriculum is exclusively devoted to teaching Neoclassical theories that rely on the assumptions that individuals behave as Homo Economicus (Tieleman et al.,2017). Similar observations can be drawn when looking at economic studies in countries like France, the United Kingdom, and Germany (PEPS-Economie, 2014; Hautcoeur, 2014; Fauser & Kaskel, 2016 and Earle et al., 2016). Homo economicus is a theoretical construct that postulates that human economic interactions are primarily motivated by calculated self-interest (Urbina & Ruiz-Villaverde, 2019). In this context, can Homo Economicus also be Homo Ecologicus? Findings by Thomas and Walker (2016) seems to suggest otherwise since they have found that implicit connectedness with nature was negatively correlated with egoistic concerns. As neoclassical economics gained prominence in the field, this simplistic representation of human beings has become the basis of any standard economics model taught in most economics' classrooms (Schneider, 2010). Nevertheless, not only has this assumption been challenged by empirical evidence that demonstrates a regular violation of rationality and self-interest in human behaviour, but it may also have strengthened the idea of radical individualism as a norm (Mele & González-Cantón, 2014; Schneider, 2010). In the context of a dual crisis of unprecedented biodiversity loss and rapid climate change that is known to be intrinsically linked to, if not caused by human economic activities (Matthews & Keys, 2019 and National Geographic, 2019); One may stress the danger of an economics teaching that forgoes any other motives of human behaviour apart from individualistic economic gains and utility maximization. Neoclassical economics theories only exceptionally mention the environment. Thus, students enrolled in economics studies are familiarised with an institutionalized knowledge about human economic interactions which is very much disconnected from any environmental and ecological concerns (Green, 2013). One may, therefore, think that theories can become self-fulfilling (Ferraro et al., 2005). Approaches from both psychology and sociology seems to point towards this fact (Molinsky et al., 2009). Hence, not only does economics education foster the formation of attitudes based on the institutionalized knowledge it transmits but also by the norms and values it may convey (Rudman, 2004). Such that economists trained in mainstream neoclassical economics may overtime internalize the doxa of the neoliberal doctrine (Van den Berg, 2014). Ultimately, this may lead them to consequently view natural resources and species losses as non-economic issues that are consequently not worth studying or caring about. Pro-environmental attitudes and behaviours have been shown to be positively associated with altruism and to be significantly impacted by learning experiences (Stern & Dietz, 1994; Schultz et al., 2004 and Bruni, Fraser, & Schultz, 2008). Nonetheless, research has shown that studying economics inhibits

altruism (Wang et al., 2011 & Frank et al., 1993). Hence, from these observations, our research question arises; **To what extent is economics education self-fulfilling and what type of environmental attitudes and behaviours does it eventually promote?**

There is yet little research that has empirically investigated the link between economics education and the cognitive formation of environmental behaviours. Brennan et al. (2015), have demonstrated that access to higher education leads to higher environmental concerns. Nonetheless, their findings did not distinguish attitudes between departments and specializations. Moreover, although Van den Berg (2014) has theorized that the doxa characterising economics studies leads practitioners to see the natural environment as exterior to their concerns; To this day, there is no existing literature that has empirically verified this relationship. This paper will, hence, intend to bridge this gap in the literature. Furthermore, Frank et al. (1993) and Gandal et al. (2005) have demonstrated that economics students are on average more likely to be selfish and to free ride. Nevertheless, whether these results reflect self-selection or learning effects remain to be elucidated. In their research, Carter & Irons (1991) have not found any significant evidence of such learning effects. On the contrary, their findings suggest that enrolled economics students share pre-existing common traits and attitudes. However, these findings were refuted by Ferraro et al. (2005) and Goossens & Méon (2010) who stress that economic theories can be self-fulfilling. Thus, the goal of this paper is also to contribute to the academic discussion on the existence of learning effects. Finally, the present research wishes to add to the extensive literature in psychology on the implicit formation of attitudes and behaviours (Ajzen & Dasgupta, 2015). Devos (2008) and Rudman (2004) have emphasized that implicit attitudes are influenced by socialisation processes and cultural evaluations. Ergo, this research aims at empirically exploring this theory by focusing on economics education.

The IPCC[1] (2020) report enhances the human's responsibility in land degradation and climate change through excessive over-exploitation of resources, pollution of the air, soils and water. Thus, to tackle the environmental crisis, individual actions and eco-friendly behaviours play a key role. Pro-environmental behaviours refer to actions seeking to reduce the negative impact of one's choices and activities on the environment and ecosystems through energy and resources' conservation, among others (Kollmuss & Agyeman, 2002). As citizens, students have an individual social responsibility. Hence, economics education could be transformed to meet the challenges of the 21st century and encourage individual to act pro-environmentally. Moreover, today's economics students are tomorrow's researchers, professors, advisers, and policymakers. Thus, as future powerful decision-makers they will get the opportunity to take key economic decisions that will shape society. The

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[1] IPCC The Intergovernmental Panel on Climate Change

current ecological and environmental crisis poses a direct threat to the viability of the world's economies and societies (WCED, 2008). More specifically, researchers have warned on the danger of a systemic economic and financial collapse comparable to 2008 as a consequence of this crisis (Langton, Rankin, & Baxter, 2019). One may therefore want future policymakers to express concerns for the environment and to be endowed with the necessary tools to engage in the ecological and environmental transition. Hence, this paper may ultimately serve as empirical evidence for the need for substantial curriculum changes in economics education.

Hence, with the aim to elucidate the self-fulling power of Economics education, the paper will first support its hypotheses using the existing literature. Finally, before presenting the result and discussion sections, the methodology used to assess these hypotheses will be described.

Theoretical Framework

The Rational Economic Man in Economic Theories

The Homo Economicus is a theoretical construct which infers that rational economic thinking rules human interactions (Urbina & Ruiz-Villaverde, 2019). Hence, it posits that individualistic and calculated rational self-interest is the primary motive of transactions and market decision-making. This oversimplified notion of human behaviour dates back from 1776 and was later theorized by John Stuart Mill in the 19th Century. In 1776, in *The Wealth of Nations*, Adam Smith emphasized the role of self-interest motives in market exchange. He developed the influential idea that guided by an "invisible hand" individuals that seek the satisfaction of their self-interest on the market would ultimately serve the common good (Mele & González-Cantón, 2014). This notion was further elaborated by John Stuart Mill, who additionally introduced the notion of rational utilitarianism as the object of human desire (Urbina & Ruiz-Villaverde, 2019). The concept of utility refers to the satisfaction or happiness one experiences from economic exchanges and interactions. Hereby, the maximization of one's utility is considered by Mill as the main driver of one's actions. Furthermore, Mill argues that the economic agent has the capabilities to rationalize the means necessary to this end. In the 20th century, as Neoclassical economics gained influence, other assumptions were added to the Homo Economicus to support the claim that through the invisible hand mechanism, the economic system would tend towards the overall equilibrium and the efficient allocation of resources (Urbina & Ruiz-Villaverde, 2019). For instance, the Homo Economicus was then consequently assumed to have rational, stable, transitive and complete preferences while behaving as a utility maximiser in a world of perfect and relevant information. The 1960s' were dominated by fierce intellectual battles that led to the convergence towards a dominant approach to economic issues. This context allowed for the

Neoclassical school to take-off as the new "mainstream" of the economics discipline. Hence, as Becker (1976, P.5) puts it: "The combined assumption of maximizing behaviour, market equilibrium and stable preferences, used relentlessly and unflinchingly form the heart of economic approach as I see it". Thus, while the Homo Economicus was originally not intended to represent an accurate representation but rather a model of human behaviour, it has become overtime a central axiom of mainstream Neoclassical theories and models (Mele & González-Cantón, 2014). As emphasized by Tieleman et al. (2017), the curriculum consequently, quickly followed suit. Most of the economic theories taught in the economics classrooms are upshots of the Neoclassical synthesis that relies on the assumptions that individuals behave as Homo Economicus - rational economic men- (Cherrier, 2016). In the Netherlands, 86% of the curriculum is dedicated to teaching Neoclassical theories while only 4% is devoted to alternatives like Behavioural Economics (Tieleman et al., 2017). The remaining 10% is shared among a diverse set of economic schools of thought like Complexity Economics, Post Keynesian Economics, Feminist Economics, among others. Similar findings are observed in countries like France and Germany where neoclassical economics also dominates the curricula whereas other theories and methodologies only get a marginal attention (PEPS-Economie, 2014 & Fis & Kaskel, 2016).

Nonetheless, despite their hegemony, the neoclassical assumptions and the Homo Economicus model have been deeply challenged by empirical evidence. For instance, a behavioural experiment by Gintis (2000) emphasises how, unlike predicted by Neoclassical models, economic agents are not self-regarding but often are instead strong reciprocators and strategic co-operators. Similarly, a cross-cultural study by Henrich et al. (2005) indicates that the assumption of self-interested utility maximization is violated for nearly all participants from all the 15 small-scales societies studied. Moreover, the rational economic man model is further challenged by findings from Yamagishi et al. (2014). The researchers endowed participants with a specific income and, defined anyone that would apportion the entire endowment for himself, leaving no share for his partners as predicted by the Neoclassical Economics model, as a Homo Economicus. Their finding found that only 31 residents out of 446 (0.07%) residents of relatively wealthy Tokyo could be considered "Homo Economicus" while 0.09% of them displayed the profile of "Quasi Homo Economicus". Similarly, many findings in Behavioural economics have demonstrated that individuals systematically violate the assumption of rationality. For instance, on average, economic agents are loss averse, sensitive to choice architecture and highly inconsistent in their preferences (Kahneman, 2011). Hence, while the Homo Economicus model validity remains highly debated in the academic sphere, it remains nonetheless, the cornerstone of economics education state of the arts. Thus, some may infer that this may be problematic if theories were to be self-fulfilling.

The Self-Fulfilling Power of Economics Theories.

<u>Socialisation Processes & Field Habitus</u>

It was hypothesized by Ferraro et al. (2005) that theories can be self-fulfilling by creating the behaviours they predict. According to the author, social sciences like economics, influence the creation of social norms and expectations which are ultimately applied to the professional sphere, shaping institutional designs and professional practices. Hence, by legitimizing its theories through an institutionalised speech, economics education promulgates a language and a set of assumptions that over time become more widely accepted by economic students. In Philosophy, it is often said that reality is a social construct which is framed by language. Hence, economic theories provide a common language for human beings to understand and perceive the world surrounding them and its numerous underlying economic phenomena. In other words, by equipping student with a common language, economic studies also influence their perception of reality and of their role within this reality. The language specific to economics may therefore shape one's decision making. However, as emphasized by Ferraro et al. (2005) this process is not necessarily systematic nor universal. For instance, some cultures may be more receptive than others to the neoclassical economics assumptions. Western cultures, namely, are defined by individualism (Markus & Kitayama, 1991). Hereby, the "self" is considered to be a self-contained entity, autonomous and independent being. Consequently, such cultures may be more likely to display a higher sensitivity to the mainstream economics language and assumptions.

Similarly, sociologists like Pierre Bourdieu and Pierre Berger have theorized that behaviours can be influenced by (1) sharing institutionalized knowledge that contributes to the socialisation process and (2) by promoting a field habitus which is overtime internalised by students and practitioners. Socialisation is a dynamic process that takes place during one's life and which leads the construction of an individual's social, political and cultural identity (Castra, 2013). During this lifetime process, habits, norms, values and cultures are transmitted to the individual. Through exchange and communication with socialisation instances like school, family circles and peers' circles, individuals interiorize certain roles, norms and values which shape their social identity and ergo, their behaviours. Part of this process is voluntary while part of it takes place outside one's awareness due to latent mechanisms like involuntary imitation. The secondary socialisation unlike the primary socialisation, takes place in adult life and allows for individuals to absorb new realities from new social spheres by internalizing their related values, norms and roles (Qribi, 2010). Thus, individuals may be influenced by economic theories when following economic courses during their higher education. As a result, they may internalise the institutionalized language, expectations, norms, roles and values of mainstream

economics and reproduce them in their personal sphere and social life. For instance, a study by Molinsky et al. (2009) showed that many interiorise the assumption of rationality and self-interested motivations as a normative value judgment. This may lead them to believe that they ought to behave rationally. As emphasized by Miller (1998), students may be incentivised to behave accordingly to the Homo Economicus or risk appearing naive and exploitable. Thus, in theory, at least, the secondary socialisation may influence the formation of economics students' identity and behaviours. Hence, the secondary socialisation process could allow for the self-fulfilling characteristic of economic theories to be achieved, as theorized by Ferraro et al. (2005).

Moreover, as emphasized by Bourdieu (1993), the culture of one's field of specialisation is often embraced as a subculture or adds-in to one's existing habitus that have originally resulted from primary and secondary socialisations. Hence, by evolving as an economics student, researcher, or practitioner, one may unconsciously develop a set of beliefs and attitudes that are linked to the culture of economics academia and, more specifically, neoclassical economics. A field, as defined by Bourdieu (1992 & 1996), is the social or intellectual arena where people are the most active and within which they get the opportunity to further develop their social, cultural and economic capital. The notion of field, as developed by Bourdieu, is rather large and encompasses general and repeated interactions with one's close social and economic environment (Van den Berg, 2014). For instance, students specialized in art studies may adopt a distinctive artistic and alternative lifestyle, as well as worship values of freedom of speech, creative expression. They may even become more politically engaged. It is worthwhile to notice that although their field's culture often varies or even drastically differs from their primary habitus, most people still embrace it. In everyday life, most individuals pay high attention to their professional or social environment and identify themselves with the particular habitus and culture of their field of expertise and work environment. This internalisation process can be explained by the internal and potentially unconscious desire to fit in and to be recognized by their field. Hereby, "economists come from a great many ethnic, national, and other social cultures, but as quickly becomes obvious to anyone attending an international economics conference, they all dress, act, talk, and present research that uses very similar models, procedures, and presentations. Nearly all economists tend to judge their colleagues by the same set of criteria covering the subjects, methods, and procedures that have come to be viewed as appropriate in their field" (Van den Berg, 2014 p. 60).

According to Bourdieu (1996), a field's culture does not only rely on a field's habitus but also on its doxa. While the habitus refers to the specific subjective yet homogeneous set of attitudes, perceptions, customs, conventions, norms, behaviours and dispositions which are esteemed and recognized as desirable by the field's practitioners; The doxa is the set of beliefs, symbols and doctrines which are built to support and justify the somewhat arbitrary construction of the field's habitus. The doxa

includes unproven but widely accepted general assumptions, social philosophies and assorted political or economic views (Van den Berg, 2014). Hence, one may argue that economics and, more specifically, mainstream economics, is heavily influenced by the neoliberal doctrine. Consequently, the beliefs that human beings ought to behave as rational self-interested maximisers and that free markets and perfect competition can lead to an optimal allocation of resources constitute the core of the mainstream economics doxa (Harvey, 2004). The neoliberal doxa is also strongly biased against collective actions like labour unions and, state intervention which is seen as coercive. On the contrary, this doxa is rather favourable to free enterprising. This may explain why a large part of the literature in economics seems to forego the existence of institutions, political power, collective actions, non-market economic interactions and, distributive justice concerns (Van den Berg, 2014). It also unravels why economists are more likely to believe in the benefits of neoclassical economics' assumptions to support and uphold economic efficiency and gain from trade (Ferraro et al., 2005). Thus, one may say that by promoting certain norms, values, habitus and doxa through socialisation processes and the institutionalised transmission of the economic field cultural capital, economic studies have the ability to considerably influence student's attitudes and behaviours in their personal and professional activities and decision-making.

Empirical Evidence of Self-Fulfilling Economic Theories

A growing body of scholars has stressed and tried to empirically assess that self-interest behaviours, among others, are learned behaviours (Ferraro et al., 2005). Marwell & Ames (1981) were among the first researchers to empirically assess the tendency for economics students to behave as Homo Economicus. To this aim, they have run a series of experiments where the respondents could decide whether or not to contribute to a common pool investment to supply public goods. Neoclassical theories predict that a rational economic agent will choose to donate any number larger as close to zero but larger than zero to optimize its own personal payoff. As the benefits from the usage of public goods are open, non-rivals and, non-excludable, there are little to no incentives for the Homo Economicus to invest. This is why, Neoclassical economics theorises that, in this context, the agent will free-ride. Marwell and Ames' (1981) findings suggest that their respondents' choices consistently contradict the Neoclassical predictions, at the exception of economic students. They observe that graduate students in economics are more often free-riding than their counterparts. Hereby, while non-economists contributed 42% of their endowment to the public good, economists only invested 20% of their original income. Hence, the authors concluded that studying economics can encourage selfish and self-interested behaviours. Carter & Iron (1991) confirmed these findings and demonstrated that economics students when playing a dictator game, during which they have to decide how much of their endowment they wish to share with the other player, are usually less generous than other

undergraduates. Moreover, they showed through a time series analysis that economics students adapt their behaviours over time to the basic axioms of the Homo Economicus. Nevertheless, the authors also show that unlike theorised these behaviours do not appear as learned but rather endowed, which makes the author conclude that "economists are born not made" (Carter & Iron, 1991, p.174). Frank et al. (1993), however, did find a causal effect of training in economics and, showed that on average, when playing a behavioural cooperation game, called the *Prisoner's dilemma,* economists defect more often than non-economists. Their study also revealed that on average economic professors are less likely to express altruist behaviours like donating to charities. Thus, their findings seem to imply that studying economics and working as a professional or academic economist may inhibit cooperation and altruism. Economics education has also been shown to be positively associated with greed and the acceptability of behaviours motivated by greed (Wang et al., 2011).

Moreover, other scholars have empirically verified that, as suggested by Ferraro et al. (2005) and Van den Berg (2014), studying economics may affect one's attitudes, beliefs and behaviours. For instance, Goossens & Méon (2010) have observed freshman and senior economics students, and compared the evolution of their beliefs over time. Interestingly, their results suggest that the set of beliefs of students that shared the same specialisation becomes more homogenous as they grew academically. Similarly, the belief that voluntarily exchanges make all agents better-off appears to be strongly supported by economics students as compared to law, psychology, or other social sciences students. Furthermore, this belief seems to be reinforced over time as economic students gradually complete their bachelor's. More importantly, Goossens & Méon (2010) were able to report both learning and self-selection effects of economics education. Ergo, their findings show that while students may self-select themselves into economic programs that fit their existing beliefs and habitus, these students may still internalize learned beliefs, attitudes, and behaviours by following such courses. Similarly, Gandal et al. (2005) have demonstrated that economics students seem to attribute higher value and importance to self-enhancement and individualistic values like power and personal achievement. On the other hand, they seem to enhance less salience to collective values. In line with these findings, studying economics appears to reduce trust and inhibit compassion to those in need (Xin et al., 2013 and Molinsky et al., 2009). Hence, empirical findings seem to confirm the self-fulfilling power of mainstream theories taught in the economic classrooms by influencing the formation of behaviours. But how are behaviours formed? What are the cognitive mechanisms which economics' training may influence? More importantly, if economics education teaches self-fulfilling theories, to what extent is economics education shaping pro-environmental behaviours?

<u>Once upon a time an attitude, an intention and a behaviour.</u>

In the 1960s, Fishbein and Ajzen developed the theory of planned behaviours, that aims to explain how human behaviours result from the cognitive interactions between intentions, values, and attitudes (Bruning et al., 2011). When applied to research, this theory allows for the study of the cognitive formation of behaviours and enables for the distinction of the influence of attitudes and beliefs on behaviours from intentions (Gold, 2011). Thus, it has been inferred that behaviours are the upshots of one's intentions to act. These intentions are best predicted by one's attitudes towards the related behaviours, normative beliefs and perceptions of control (Fishbein & Ajzen, 1974 and Ajzen, 1991). As emphasized by Olson et al. (2008), attitudes can be explicit or implicit. Unlike explicit attitudes, implicit attitudes are unconscious cognitive constructs that are formed outside one's awareness and bypasses one's deliberation and introspection. Originally, it was theorized that explicit attitudes could better predict planned, deliberate and thoughtful behaviours while implicit attitudes could better explain behaviours that are repetitive and automatic. Nevertheless, as emphasized by Ajzen and Dasgupta (2015) this is very unlikely to be a credible hypothesis considering the flourishing evidence suggesting otherwise. The authors have suggested that explicit attitudes could not alone fully predict deliberate behaviours. A meta-analysis by Greenwald et al. (2009) allowed to empirically demonstrate that on average, implicit attitudes could predict up to 7.5% of the variance in behaviour while explicit attitudes independently have a predictive power of 13%. More importantly, this meta-analysis concluded, using evidence from 122 studies, that explicit and implicit attitude measures could be used jointly to predict behaviours. Similar findings were also monitored with regards to pro-environmental behaviours and attitudes. In meta-analyses of this literature, Hines et al. (1986) and Bamberg and Möser (2007) found average explicit environmental attitudes and pro-environmental behaviour correlations of 0.35 and 0.42, respectively. It was also demonstrated by Geng et al. (2015) that implicit environmental attitudes, as measured by the implicit association test (IAT) are highly positively correlated (r= 0.56) with pro-environmental behaviours. Moreover, as noted by Ajzen and Dasgupta (2015), implicit attitudes can better predict behaviours, specifically in the event of cognitive depletion, uncertainty, the prevalence of stereotypes, and, more importantly, social desirability contexts. Hence, in the event of strong social norms or social stigma, explicit attitudes may be strongly influenced by social desirability bias. Social desirability bias is the tendency of subjects to adapt their attitudes and actions to their audience to present socially desirable behaviours (Fisher, 1993). This mechanism may be further enhanced by the existence of social expectations (Paulhus, 1991). This last decade, the fight against climate change and for sustainable development has become more widespread and heavily promoted by social movements like "Fridays for future". Thus, one may think that a new ecological norm has arisen,

leading unsustainable attitudes to be less socially accepted and, therefore, less easily expressed. In which case, implicit attitudes could better predict behaviours (Ajzen and Disgupta, 2015). This is why, this research will mainly focus on the unconscious construction of implicit attitudes. Therefore, one may expect implicit attitudes towards nature to predict environmental behaviours (Greenwald et al., 2003). **This is why, it is hypothesised that a strong implicit association with nature will predict and positively affect pro-environmental behaviours while a low implicit association with nature will inhibit pro-environmental behaviours (H1).**

Can the Homo Economicus be a Homo Ecologicus?

The Homo Economicus identifies the natural environment as means to an end, that is the satisfaction of one's biological survival needs, and not as an interconnected living world to which they are bounded and trough which they have the opportunity to draw their inspiration and creativity from (Van den Berg, 2014). Hence, the Homo Economicus is unlikely to exhibit strong implicit environmental attitudes, more commonly referred to as implicit connexion with nature (Schultz et al., 2003). In fact, pro-environmental attitudes have shown to be positively associated with altruism and negatively associated with egoistic concerns (Stern & Dietz, 1994 and Thomas & Walker, 2016). Similarly, a study by Schultz et al. (2004) has shown that implicit environmental attitudes are positively correlated with biospheric concerns. Nevertheless, biospheric concerns can theoretically be considered to lay outside of the Homo Economicus' concerns.

The sources of implicit attitudes are diverse (Rudman, 2004). They originate from early socialization processes, diverse learning, and affective experiences, among others. Recent findings have found that implicit environmental attitudes could be significantly impacted by learning experiences (Bruni et al., 2008). Using an experimental design encouraging interactions with nature and observations of the environment and its biodiversity, the malleability of implicit environmental attitudes was emphasized. An education that stresses biological and environmental process principles was shown to strengthened connectedness with nature (Lieflander et al., 2013). Nonetheless, the current economic curriculum in most European countries and specifically in the Netherlands is lacking real-world perspectives and foregoes any environmental concerns. Only 5% of the Dutch curriculum in economics extensively covers real-world economic issues like the financial collapse or climate change-related issues. But, as claimed by Wang et al. (2016 p.1), "Environmental problems are routed in blind spots and in the denial to be parts of nature". Similarly, Van den Berg (2014) stresses in his work the many risks implied by the tendency of mainstream economics models to oversimplify economic realities and to forego the interdependence between economic activity, institution, society and the natural environment. More importantly, as revealed by the interview of hundreds of economics professors teaching freshman

courses at university, the environment is barely only mentioned as an exception to the rule of efficient and perfectly competitive markets (Green, 2013). The environment is usually addressed under the form of externalities and market failures and rarely as a source of wealth, happiness or, even natural limit to economic growth. Hence, one may say that the neoliberal doxa which currently fuels the economic curriculum, may lead economists towards developing the belief that issues like the biodiversity loss and environmental crisis are non-economic related issues that therefore are not worth caring about both professionally and personally. Thus, as beliefs, norms and cultural valuations are among the main drivers of attitudes, one may hypothesise that studying economics can influence student environmental attitudes. **As a result, economic students may display lower implicit associations with nature than their fellow students (H2).**

In this context, one may wonder whether it is reasonable to think that a trained Homo Economicus could become a Homo Ecologicus. The Homo Ecologicus is a philosophical concept that was originally developed by Becker (2006). It refers to the modelling of human beings as not merely driven by self-interested motivations but also by their affiliation with nature and society. Ergo, the Homo Ecologicus relation with the community allows for strong reciprocity, fairness concerns, political ties, and collective actions to be included in economic analysis. Moreover, by acknowledging the interconnection of human beings with society, one allows for a sustainable vision to be included in economic models. Hence, the Homo Ecologicus model implies a strong concern for the well-being of future generations. Nonetheless, this quest is conflicting with the concept of Homo Economicus which forbids for the systematic interest in future generations that would come at the expense of personal present utility satisfaction (Becker, 2006). Besides to its relation to the community, the Homo Economicus is characterized by its relation with nature. While the Homo Economicus only perceives nature from a utilitarian and practical perspective, the Homo Ecologicus recognizes himself as inherently part of the natural environment and biodiversity. Consequently, one may say that Homo Economicus can hardly be recognised as Homo Ecologicus. Only one study by Georgantis et al. (2013) seems to contradict this hypothesis as the authors' findings show that the economics training appears to be positively influencing sustainable behaviours with regards to the exploitation of common goods (eg. fishing). Nevertheless, the lack of citations and reliability of such results make their conclusion relatively less plausible. Thus, it is hypothesized that by specializing or graduating in economics, students run the risk to become Homo Economicus themselves instead of Homo Ecologicus. **Hereby, economics students are expected not to behave as Homo Ecologicus, but instead to display unfriendly environmental behaviours (H3).**

Thus, overall, this paper aims at assessing the following relationships (Figure 0.1)
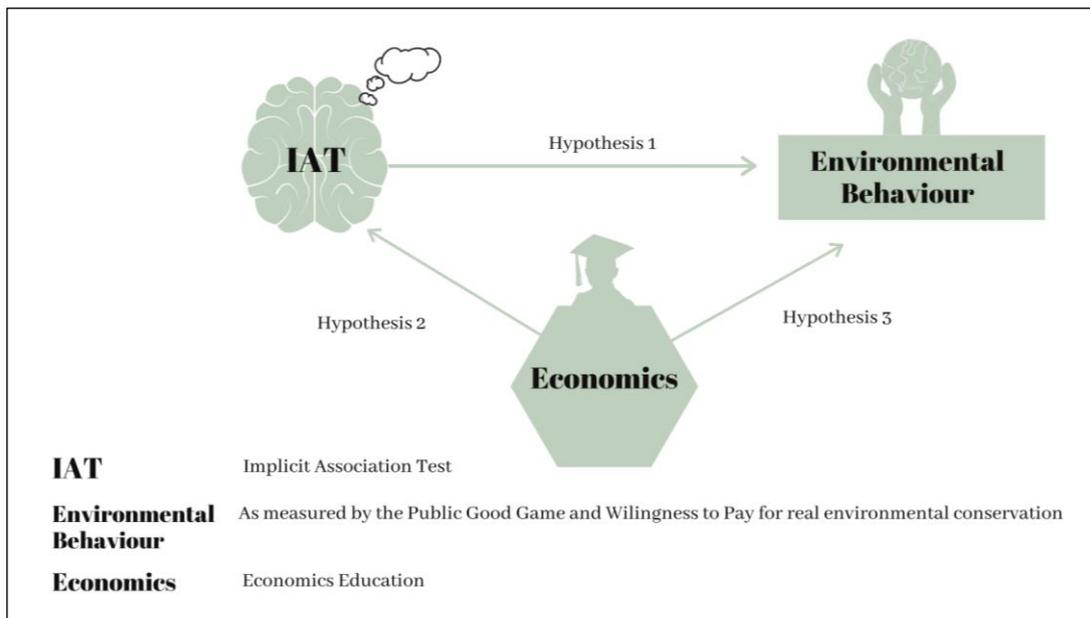
Figure 0.1: Relationships investigated by the present research

Methodology

Survey Design & Procedure

With the aim to answer the paper's research question and assess its inherent hypotheses, an empirical methodology was used. The data was collected through a survey which, for convenience, targeted students. Ultimately, the survey was widely shared through social media and private messages with a diverse set of students currently following their studies in the Netherlands. Economic curricula may highly vary from one country to another. As a result, the educational effect observed may as well be driven by unobserved differences between the education systems which may inherently lead to potential biases and incorrect results. Thus, it was preferred to reduce this risk by exclusively focusing on the educational effect of the Dutch economic training. Moreover, freshman and senior economic students were also specifically targeted trough posts in their respective official Facebook and WhatsApp groups. To increase the completion rate private messages were also sent. Due to the length of the implicit association test, the risk of attrition in this research was particularly high. Therefore, respondents were financially incentivized to fill in the survey. To reach internally valid results, the desired sample size was originally set around N=200.

Materials and Measures

Environmental Behaviours

Different proxies were used to measure the variables of interest, as summarized in Table 0.1. Firstly, environmental behaviours were measured using a one-shot public good game (PGG), and a real choice measure where the respondent's willingness to pay (WTP) was estimated. While using a behavioural game has proven useful to identify whether respondents act as traditional Homo Economicus rather than Homo Ecologicus, the real choice question has allowed for a more realistic measure of genuine environmental behaviours (Goeschl et al., 2020). Thus, in the linear one-shot PGG, all respondents were endowed with twenty tokens which corresponds to four euros (Goeschl & Lohse, 2018). For the purpose of this research one token can be converted into twenty cents. During the game, respondents had to decide how much of this endowment they wished to invest in a local communal project dedicated to protect and restore the water quality of the canals and local rivers. An increase in the water quality theoretically leads to future withdrawal benefits for municipal water supply as well as domestic, agricultural usage benefits, among others (Dumas et al., 2005). Hence, if translated into monetary terms, each contribution to the water conservation plan, in the context of this game, yielded a 100% return on investment. As a result, the contribution rate doubles (forty cents). Nonetheless, this return, once split among all the four players equals ten cents and, is therefore inferior to the individual return (twenty cents). Thus, as theorized by Neoclassical economics theories, players that are rational self-maximisers are de facto incentivized to free-ride. Ultimately, four players were randomly selected to be matched as "real players" of the game and to receive their entitled payoff. Ergo, the payoff scheme can be summarized as followed: $\pi = 0.2(w - x_i) + 0.1\left(\sum_j^3 x_j + x_i\right) \quad \forall\, i\_ \neq j$. Hence, if all four players, that are randomly chosen, have each contributed ten tokens to the game they will eventually all received respectively, six euros. In this context, Neoclassical economics predicts that the Homo Economicus will defect and invest as little as possible into this public project. Therefore, players that are observed free-riding during this game will be considered to be displaying unfriendly environmental behaviours. To ensure that confusion is minimized and that students fully understand the behavioural game, guidelines were displayed on the screen and some additional control questions were added before the start of the behavioural game (Fischbacher, Gächter, & Quercia, 2012). For instance, after being informed that one token corresponds to twenty cents, respondents had to compute very easy conversion calculations (Goeschl et al., 2020).

At the end of this first set of questions, the respondents were informed that to thank them for their participation, they were eligible to randomly win a thirty euros cash price. They were then asked to specify how much of this prize they would like to donate to the ONG plastic Ocean that actively works

in favour of maritime conservation (PlasticOcean, 2020). They were also provided information about the different programs and projects the organization is currently developing and to which they could contribute by agreeing to donate part of their income. Hereby using a scale from zero to thirty, participants' willingness to pay for environmental conservation was estimated.

Economics Education

Moreover, to measure the effect of being an economic student on environmental attitudes and behaviours, three proxies were used. The first proxy simply consists of a dummy variable that specified whether the participant is an economics student. This proxy allows for traditional with-and-without comparisons. Nevertheless, this proxy does not enable us to differentiate between the effect of self-selection in economic programs and the educational effect of studying economics. Hence, since it is not unlikely that non-economic students may also have followed at least one economics course in their past, it was decided to also compare the effect of the number of courses in economics on environmental attitudes and behaviours. Finally, in case the sample may reveal a satisfying level of heterogeneity, the level of studies was self-reported to distinguish between freshman first-year students and senior economics students (Carter & Irons, 1991).

Implicit Environmental Attitudes

Last but not least, implicit environmental attitudes also referred to as connectedness with nature, were measured using a modified version of Greenwald's (2003) implicit association test (IAT). Following the methodology developed by Carpenter et al. (2019), the IAT test was incorporated into the Qualtrics survey. As one may fear that the behaviour games decisions could be influenced by the rather time consuming IAT test, the IAT was performed second. This should not affect the IAT scores since the IAT appears as a rather robust tool which is little influenced by previous tasks (Nosek et al., 2005). During this test respondents were asked to classify words that refer to natural and built environments with the pronouns "Me" or "Not Me" as quickly as possible (Figure 0.2). The response time was then recorded in milliseconds and used to measure the association between "self" and "nature" (Schultz et al., 2004). Such that the strength of this relationship is reflected by the time necessary to complete the compatible trials (Me and Nature) relative to the incompatible trials (Not Me and Nature). Hence, the individuals most concerned with the environment should be more at ease when associating words for incompatible trials. Both of these compatible and incompatible trials were subdivided into 40 critical trials and 20 practice trials. Additionally, target and attribute trials were also included in the test, where respondents successively practiced associating words with targets (Nature or Build) and pronouns with attribute (Me or Not Me). A reversed trial was ultimately added to eliminate the association learned in previous blocks. Thus, ultimately, participants performed a total of seven stimuli blocks that were

randomly ordered and associated a total of twenty words were associated during each block (Table A.2). The negative or positive associations with nature relatively to build environments were then estimated as D-scores using the online software IATGEN designed by Carpenter et al. (2019). Such that a positive D-score will indicate a positive association of the self with nature relatively to build environment.
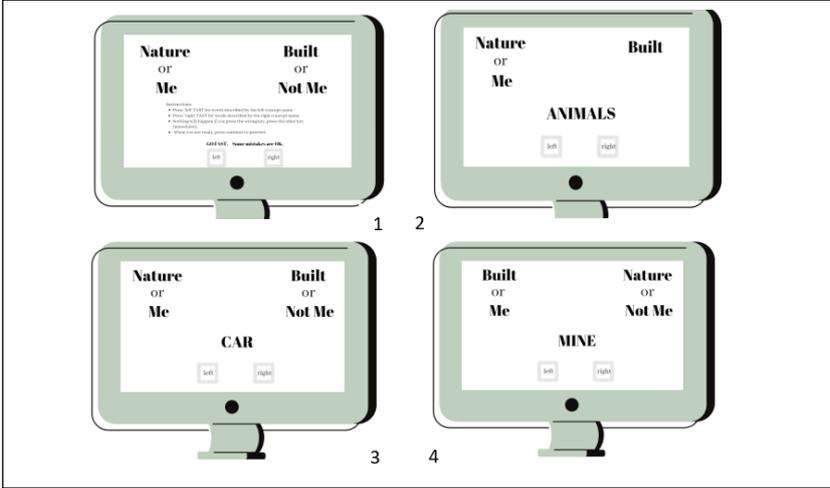
Figure 0.2: Implicit association test (IAT), examples

Note*: Example 1, shows the instruction of the test, while example 2 shows a practice trials where the correct answer is "NATURE". Example 3 and 4 are respectively showing a compatible and incompatible trial.*

Table 0.1:

Overview of the present study's variables and proxies

Variables	Proxies	Survey Order
• Implicit Environmental Attitudes	• IAT score (Greenwald et al., 2003)	2
• Explicit Environmental Attitude	• Self-reported Environmental concern (7 points Likert scale)	6
• Environmental Behaviours	• PGG: Public Good Game, Water Conservation Plan (Amount of tokens invested) • WTP Environmental Conservation (Amount of euros donated)	1
• Economics Education	• Dummy: Economics student • Continuous Variable: Academic Level • Continous variable: Number of economic classes	4

Table 0.1 *: Continued*

Variables	Proxies	Survey Order
• Demographics	• Age	
	• Gender	
	• Studies	
	• Degree	
	• Major chosen/ Specialization	3
	• Nationality	
	• Socio-Economics Background	
	• Raised in the country side vs urbanized and industrialized areas	
	• Average time spent per week in Nature	
• Attention checks	• "please select 6"	5

Demographics

Before the end of the survey, respondents were asked to answer general demographics questions that were used to control for variables affecting respondents' attitudes and behaviours as well as the likelihood to be an economic student. Thus, for instance, information about respondents' age, gender, and socio-economic background, were collected. Similarly, as the time spent in nature may influence one's implicit association with nature, the respondents were asked to inform the average percentage of time per week that they spend outside immersed in nature. Moreover, respondents answered the following question: "How concerned are you about the environment?" (Schultz & Tabanico, 2007). This question was designed to measure self-reported explicit attitudes and was used to check the correlation between implicit and explicit attitudes. To reduce the risk of rationalization and contamination, this measure was embedded in general questions.

Methodology for Statistical Analysis

Hypothesis (1)

With the aim to test the hypothesis that ensued from the literature review, various statistical methods were used. First and foremost, the IAT D-scores was used to regress environmental behaviours measured by the public good game and real contributions on respondents' implicit association score. To this end, a linear least square regression was used. Such that,

$$Environmental\ Behaviours\ =\ \alpha + IAT\beta_1 + Cov_n\beta_n + \cdots + \varepsilon$$

Where environmental behaviour was successively measured by the PGG and WTP. Covariates were also added to the model (Cov). The proxies used to measure environmental behaviours are likely to be

censors since they limit the contribution of students to an amount between zero and twenty tokens or thirty euros. A dependent variable is said to be censored if a value takes the value of a specific threshold observed in the sample, although, in reality, the true value may actually lay outside this threshold. As a result, some data may be omitted as the true value of one's contribution may fall outside of the observed range. In the case of the theoretical and real contribution to environmental conservation, one may argue that some may desire to contribute more than their endowed income, using their personal saving for instance. Not controlling for this possibility may lead to biased results. Hence, a Tobit censored regression analysis was also used to mitigate this risk. A Tobit regression relies on the same central assumptions than an Ordinary Least Square Linear Regression. Hence it assumes, linearity, heteroskedasticity, and the normal distribution of the residuals. Note, however, that the Tobit censored regression is more sensitive to the violation of its central assumptions. It was is therefore advised to carefully interpret the findings resulting from this model.

Hypothesis (2)

Furthermore, a Linear regression will be used to estimate the effect of economics education proxied by three different measures on implicit environmental attitudes (IAT). The covariate used previously will also be added to the model to increase the explanatory power of the model and reduce the risk of selection bias. Such that the following relationship will be estimated,

$$IAT\ score\ =\ \alpha + EconStudents\beta_1 + Cov_n\beta_n + \cdots + \varepsilon$$

$$IAT\ score\ =\ \alpha + EconLevel\ \beta_1 + Cov_n\beta_n + \cdots + \varepsilon$$

$$IAT\ score\ =\ \alpha + NbrEconCourses\ \beta_1 + Cov_n\beta_n + \cdots + \varepsilon$$

Hypothesis (3)

Similarly, the effects of economics education on the respondents' behaviours were appraised by running both Linear and Tobit regressions. As a result, the following relationships were evaluated.

$$Environmental\ Behaviours = \ \alpha + EconGraduates\beta_1 + Cov_n\beta_n + \cdots + \varepsilon$$

$$Environmental\ Behaviours\ =\ \alpha + EconLevel\ \beta_1 + Cov_n\beta_n + \cdots + \varepsilon$$

$$Environmental\ Behaviours = \ \alpha + NbrEconCourses\ \beta_1 + Cov_n\beta_n + \cdots + \varepsilon$$

Finally, through an exploratory analysis, the relationship between self-reported environmental attitudes, environmental behaviours and the effect of economics education was also assessed following the methodology described hereabove.

Results

Sample

Once the data collection achieved, the sample counted 209 responses. Nevertheless, 101 responses were ultimately withdrawn from the sample as they were incomplete. In fact, only 119 participants or, in other words, 57% of the sample had participated in the IAT test. Consequently, the remaining 43% of the respondents were automatically removed from the sample as their responses could not be exploited. Moreover, 11 other participants had completed the IAT test but, potentially tired and discouraged by the length of the survey decided to not go forward with the second half. Hence, the final sample size was reduced to 108. For the analysis revolving around the contribution to the public good game, this size was further reduced as the respondents that had failed to understand the game guidelines were removed from the sample. Such that for the PGG, the sample size shrank to 75 observations.

Descriptive Statistics

Demographics

Overall, the sample is mainly constituted of Female students (56%) who are, on average, 22 years old (Table 1.1, Panel A). Moreover, the sample is characterized by a large pool of respondents (87%) that are currently following a university bachelor (WO). Hence, relatively few of the observed students are enrolled in master programs or in bachelors of applied sciences (HBO), respectively, 19% and 17%. Furthermore, 68% of the respondents are currently or recently graduated from the Erasmus University. While economics students represent 53% of the sample, the finance major remains the most represented specialization in the sample (11%). One can also notice, despite a high level of dispersion of the observations, that a mean of nearly 12 classes in economics was observed. In this case, the high heterogeneity in the number of classes followed may allow for an educational effect to be witnessed.

Moreover, with the aim to analyse these observations, the data set was transformed. First, to allow for more convenient and meaningful comparisons between the contributions observed for the PGG and real choice question, these contributions were expressed as proportions in percentage of the initial endowment and added as ancillary variables. Moreover, a dummy was created for students who graduated or are currently graduating in Economics. Similarly, other dummies were generated to account for respondents' gender, nationality, and university of studies, among others. Furthermore, some variables like nationality were aggregated for convenience. For instance, to account for the

dominant nationalities represented in the data, the students' nationalities were grouped per world regions. Such that, it was observed that 87% of the students originated from Europe and Central Asia. Furthermore, the respondents' socio-economic background was accounted for. Likewise, whether a participant has spent his/her childhood close to nature or, on the contrary, to urbanized areas, was also included in the analysis by creating a variable which indicated, on a scale from one to four, how close as one lived near the city. This allowed us to notice that, on average, the study's respondents appear to have lived rather close to the city and build environment (2.84) and grown up in rather comfortable families from the upper-middle class (2.8). Moreover, as emphasize by Table 1.1, the respondents reported spending, on average, 10% of their weekly time in contact with nature.

<u>Main Variables of Interest</u>

The descriptive statistics indicate that, on average, the sample is characterized by a strong positive and implicit connexion with nature relatively to build environments (Mean D-Score = 0.46, P-value < 0.001) (Table 1.1, Panel B & Table A.1). The IAT results also display a reliability score of 0.61. Moreover, the standard deviation and reported minimum and maximum suggest that the observed implicit attitudes are relatively sparse. A similar observation can be made when looking at the mean and median explicit environmental attitudes reported by our respondents (respectively, 5.76 and 6 out of 7). Furthermore, one may already notice that, on average, it appears that participants have contributed between 47% and 61% of their endowment in both tasks, contradicting the predictions of Neoclassical Economics. Moreover, on average, participants seem to be more collaborative and generous for the real choice task than for the public good game.

Table 1.1

Descriptive Statistics of the Variables, used in the analysis

	Obs	Median	Mean	Sdt.Dev	Min	Max
Panel A: Demographics Characteristics						
Age	108	/	21.79	2.76	17	34
Gender	108	/	0.44	0.50	0	1
Europe-Central Asia Region	108	/	0.87	0.34	0	1
Dutch	108	/	0.45	0.50	0	1
Erasmus University	108	/	0.68	0.47	0	1
Bachelor WO	108	/	0.63	0.48	0	1
Bachelor HBO	108	/	0.17	0.38	0	1
MA	108	/	0.19	0.40	0	1

Table 1.1 : *Continued*

	Obs	Median	Mean	Sdt.Dev	Min	Max
Majoring in B-Economics	108	/	0.046	0.21	0	1
Majoring in Finance	108	/	0.11	0.36	0	1
Hours Spent in Nature %	108	/	10.85	9.83	0	71.43
Childhood Background	108	/	2.84	1.14	1	4
Socio-Economic Background	108	/	2.81	1.14	1	4
Panel B: Main Variable of Interest						
Contribution PGG %	75	50	47.27	27.19	0	100
Contribution WTP %	108	50	60.93	32.13	0	100
IAT Score	108	0.47	0.45	0.33	-0.34	1.24
Explicit EA	108	6	5.76	1.12	2	7
Economic (Under) Graduates	108	/	0.53	0.50	0	1
Economic Studies _ Years	51	/	2.71	0.78	1	4
Nbr Economic Courses	108	/	11.76	11.60	0	50

Note: *when studying the effect of being a freshman economic student versus a senior is restricting the sample t respondents that are economic students. This is why the observed sample size shrinks to 51.*

Correlation Table

Last but not least, the spearman rank correlation matrix only shows few significant correlations. However, none of these correlations are observed among the main variables of interest (Table A.3, Appendix A). For instance, only self-reported explicit attitudes appear to be significantly correlated with environmental behaviours (PGG_r = 0.19, p-value< 0.05 and WTP_r = 0.32, p-value <0.001). On the contrary, not only is the correlation between implicit environmental attitudes and environmental behaviour insignificant, but also reversed and negative (-0.04 and -0.07). Similarly, implicit and explicit attitudes are only weakly and insignificantly correlated (0.16). Moreover, the correlations between economics training and both environmental attitudes and behaviours are relatively low and insignificant. Similarly, there is no significant correlation between the time spent in nature, the type of childhood, and socio-economic background with the IAT nor the environmental behaviours of respondents. Hence if, as expected, the correlation matrix enables for the relationship between the main variable of interests to be anticipated, one may expect to find no-to-little effect of economics education on attitudes and behaviours. Similarly, a first look at the scatter plots between the IAT, Economics training and environmental behaviours, suggest that it may be difficult to infer a relationship between these variables (Figures A.3, A.4& A.5).

Hypothesis Testing

<u>The Predictive Power of Implicit Attitudes (H1)</u>

Tables 2.2 and 2.3 report regression results which aimed to test hypothesis 2, namely to assess whether stronger implicit attitudes with nature are associated with greater pro-environmental behaviours, as proxied by the willingness to pay for environmental conservation (Table 2.2) and contribution to a common investment for environmental conservation (Table 2.3). Both tables report separately OLS and Tobit estimates, with and without covariates. Firstly, linear regressions were modelized. The resulting estimates show that implicit attitudes are not significantly influencing the formation of behaviours, independently of the way behaviours are proxied. Nevertheless, the histograms (Figure 2, Appendix A) suggest that censoring may be present in the data. Ergo, a Tobit regression is also performed, enabling for any potential bias linked to censoring to be minimized. This allows for the coefficient of interest to be corrected from what appears to be a strong negative bias. Although more adequate, this new model does not reveal a significant effect of implicit attitudes towards nature on neither one's willingness to pay or game contribution to environmental conservation projects. Moreover, unlike expected, the resulting regression coefficient displays a negative sign which would imply that a one-unit increase in the IAT score is associated with a decrease in one's predicted willingness to pay for environmental conservation of 2.50 euros. With regards to the contribution to the public investment, however, an equivalent increase of the IAT score leads to an insignificant associated increase in the contribution of 0.69 tokens. Moreover, once the covariates added, the percentage of variance explained by the censored regressions remains relatively low (2.6% to 4%). Thus, one may not infer that from these results that IAT can significantly predict environmental behaviour. As a consequence, our first hypothesis (**H1**) is rejected.

Furthermore, although one would expect the average weekly time spent in nature and childhood close to the city to significantly impact environmental behaviours, the results display no significant effect of these variables on the contribution to the PGG and real choice task (WTP). Among the covariates, only a few have a significant effect on environmental behaviours. Hence, while the socio-economic background (r=5.17), finance major (r= -0.03) and Erasmus University (r= -7.86) are positively associated with one's willingness to pay for environmental conservation (p-values<0.05), the behavioural economics major and Dutch nationality seems to be negatively associated with an increase in the PGG contribution (respectively, r=-8.34 and r=-4.70, p-values<0.01). Nonetheless, Table B.1 outlines that assumption of normally distributed residuals is violated.

Table 2.2

The Effect of Implicit Attitudes on Willingness to Pay (WTP) for Environmental Conservation

	Models			
N = 107	**OlS Regression (A)**		**Tobit Regression (B)**	
Model Number	(1)	(2)	(1)	(2)
(pseudo) R-Squared	0.008	0.1264	0.0015	0.0261
WTP	**Coefficient β**		**Coefficient β**	
IAT score	-2.84	-1.74	-4.34	-2.52
	(2.83)	(2.86)	(4.43)	(4.29)
Age		0.70		1.29
		(0.45)		(0.73)
Gender - Male		2.91		4.67
		(1.84)		(3)
Europe-Central Asia		1.79		3.20
		(2.71)		(4.70)
Dutch Nationality		-3.10		-5.57
		(2.20)		(3.35)
BA WO		0.77		3.71
		(2.69)		(5.03)
BA HBO		*Omitted*		2.79
				(5.82)
MA		-1.05		*Omitted*
		(4.34)		
Finance Major		-0.47		-0.03*
		(4.11)		(4.76)
Behavioural Econ Major		-0.78		-1.90
		(4.37)		(7)
Erasmus University		-4.72*		-7.86*
		(1.95)		(3.32)
Hours in Nature %		-0.17		-0.29
		(0.08)		(0.15)
Socio-Economic Background		3.08		5.17*
		(1.78)		(2.25)
Childhood Close to the City		0.73		0.87
		(0.94)		(1.36)
Constant	19.43***	-3.86	22.61***	-20.10
	(1.61)	(11)	(2.52)	(21.53)
Left – Censored (N)	/	/	6	6
Right – Censored (N)	/	/	34	33

Note: *P<0.05*, P<0.01**, P<0.001***. W*here, the number under parenthesis corresponds to the standard deviation. Some dummies were omitted to avoid multicollinearity and were, thus, used as a baseline.*

Table 2.3

The Effect of Implicit Attitudes on the Contribution to the Common Investment for Environmental Conservation (Public Good Game)

	Models			
N=75	OlS Regression (C)		Tobit Regression (D)	
Model	(1)	(2)	(1)	(2)
(pseudo) R-Squared	0.0011	0.1887	0.0003	0.0402
PGG	Coefficient β		Coefficient β	
IAT score	-0.54	0.56	-0.86	0.69
	(1.97)	(1.96)	(2.26)	(2.25)
Age		0.47		0.60
		(0.34)		(0.42)
Gender - Male		2.49		3.03
		(1.35)		(1.54)
Europe-Central Asia		4.25		5.30
		(2.28)		(2.80)
Dutch Nationality		-3.60*		-4.70**
		(1.61)		(1.80)
BA WO		1.99		2.46
		(1.93)		(2.77)
BA HBO		*Omitted*		-0.42
				(3.17)
MA		0.19		*Omitted*
		(2.53)		
Finance Major		-1.51		-1.50
		(2.50)		(2.31)
Behavioural Econ Major		-0.78		-8.34**
		(4.37)		(3.13)
Erasmus University		-1.73*		-1.97
		(1.50)		(1.82)
Hours in Nature %		-0.02		-0.03
		(0.05)		(0.07)
Socio-Economic Background		1.08		1.51
		(1.19)		(1.14)
Childhood Close to the City		0.95		1.03
		(0.74)		(0.73)
Constant	9.71***	9.46	9.96**	-14.06
	(1.18)	(9.52)	(1.31)	(12.25)
Left – Censored (N)	/	/	5	5
Right – Censored (N)	/	/	8	8

Note: P<0.05*, P<0.01**, P<0.001***. W*here, the number under parenthesis corresponds to the standard deviation. Some dummies were omitted to avoid multicollinearity and were, thus, used as a baseline.*

<u>The Effect of Economics Education on Implicit Environmental Attitude (H2)</u>

Table 3.1 reports regression results which aimed to test hypothesis 2, namely to assess whether economics education could influence the formation of implicit environmental attitudes, hereby testifying of a learning effect. To this aim, three proxies are used.

The resulting regression coefficient measuring the effect of being an economic student on the IAT is very small (0.05), positive and insignificant, unlike hypothesized (Table 3.1). Likewise, measuring the effect of studying economics within different generations of economics students (freshmen versus seniors) did not lead to significant findings. Despite being insignificant and of low magnitude, the regression coefficients are surprisingly positive, suggesting that studying economics and reaching a higher academic level could be associated with a higher IAT score (respectively, r= 0.05 and r=0.06). Moreover, although not significant, the regression coefficient that serves as a proxy for economics training shows that following one extra class of economics may lead to an increase of the IAT score by around 0.002. One may notice, that none of the covariates when used jointly to the proxies of economics education, significantly explain the respondent's IAT score (Table 3.1). This is also revealed by the very low R-squared of the different models which reveals that only 0.1% to 8% of the variance in the IAT score can potentially be explained by those models. Furthermore, the change from negative to positive of the coefficient of "number of economics courses" suggests that the model may suffer from omitted variable bias.

Hence, in the context of this research, one may reject our second hypothesis (**H2**) as this research did not find any significant evidence of any educational effect of economics training on student's implicit environmental attitudes.

Table 3.1

The Effect of Economics Education on the respondent's implicit attitudes

	Model					
	OIS Regressions					
	(F)					
Model number	(1)	(2)	(3)	(4)	(5)	(6)
N	108	108	75	75	108	108
(pseudo) R-Squared	0.0001	0.08	0.01	0.26	0.0002	0.08
IAT	Coefficient β					
EconStudent	0.007 (0.06)	0.05 (0.08)				

Table 3.1: *Continued*

IAT	Coefficient β					
EconLevel			0.05 (0.31)	0.06 (0.09)		
NbrEconCourses					-0.0004 (0.002)	0.002 (0.003)
Age		-0.02 (0.02)		-0.02 (0.03)		-0.02 (0.02)
Gender - Male		0.02 (0.07)		0.13 (0.11)		0.03 (0.07)
Europe-Central Asia		-0.13 (0.11)		-0.08 (0.12)		-0.12 (0.099)
Dutch Nationality		0.04 (0.09)		0.09 (0.12)		0.02 (0.08)
BA WO		0.003 (0.09)		-0.11 (0.22)		0.01 (0.09)
BA HBO		*Omitted*		0.07 (0.24)		*Omitted*
MA		-0.03 (0.14)		*Omitted*		-0.03 (0.14)
Finance Major		-0.20 (0.12)		-0.23 (0.12)		-0.19 (0.11)
Behavioural Econ Major		-0.14 (0.13)		-0.14 (0.17)		-0.15 (0.13)
Erasmus University		-0.02 (0.08)		-0.02 (0.13)		-0.03 (0.08)
Hours in Nature %		0.0001 (0.0003)		-0.006 (0.007)		-0.001 (0.003)
SocioEcon		-0.06 (0.05)		-0.07 (0.04)		-0.07 (0.04)
Childhood_City		-0.01 (0.03)		-0.07 (0.04)		-0.06 (0.05)
Constant	0.44*** (0.05)	1.08* (0.43)	0.31 (0.16)	1.41 (0.74)	0.45*** (0.04)	1.13** (0.45)
Shapiro Test Z-score		-0.55		0.73		0.60

Note: $P<0.05*$, $P<0.01**$, $P<0.001***$. W*here, the number under parenthesis corresponds to the standard deviation. Some dummies were omitted to avoid multicollinearity and were, thus, used as a baseline.*

<u>Economicus or Ecologicus Behaviours (H3)?</u>

Finally, Tables B.2, B.3, 4.1 and 4.2 report regression results which aimed to test hypothesis 3, namely to assess whether economics education could influence the formation of behaviours. The results show that there seems to be no-to-little significant effect of economics education on behaviours. First, a linear model was estimated and allowed for the identification of a significant positive association

between the number of economics classes and the contribution to the public investment in environmental conservation (PGG) (Table B.2). Furthermore, the results suggest that being an economic student is associated with a lower contribution to the public good game. Similarly, the linear model displays a negative relationship between being an economic (under) graduate and the willingness to pay for environmental conservation (Table B.3). Nonetheless, both estimates are not significant and can therefore only serve as an indication of the sign and magnitude of the true effects of being an economic student on environmental behaviours. Surprisingly, yet in accordance with our previous findings, growing academically as an economic student appears to be insignificantly but positively associated with the PGG and real contributions (WTP). Thus, the overall explanatory power (R-Squared) of the linear model is negligible. To get a more valid picture of the effect of economic education on environmental behaviours, a Tobit censored regression model was performed. As emphasized by the table 4.1 and 4.2, the results that ensued from it, are very similar to the ones observed in the linear models. Thus, unlike originally theorized there seems to be no significant self-selection nor educational effect of economics education on environmental behaviours. This is further emphasized by the rather low pseudo R-squared of these models. Nonetheless, while most of the models only explain between 0.1% to 10% of the total variance in the contribution to the public good game and real environmental task, one model stands out by explaining up to 24% of the variance in the willingness to pay for environmental conservation. The R-squared from the Model K(6) appears to have increased as covariates that significantly influence the formation of behaviours were added. For instance, studying at the Erasmus university appears to be associated with a decrease in 7.60 euros in the contribution made to the ONG "Plastic Ocean" (Table 4.2). Similarly, majoring in behavioural economics is shown to be associated with a reduction of one's contribution by 2.11 euros. Hence, it is not unlikely that these students specialized in behavioural economics may have a superior understanding of the game and decide to optimize their payoffs by deliberately acting as Homo Economicus. Note, also, that the signs of the explanatory variables' coefficient reversed, once modelled by the Tobit regression, when regressing the WTP on economics education. Thus, economics education appears to be negatively associated, although not significantly, with the contribution to the real choice environmental task (Table 4.2).

These results lead us to reject our third hypotheses (**H3**) since there is not enough evidence demonstrating the effect of education on behaviours. Consequently, it is not possible to infer from these findings that theory may be self-fulfilling, leading economics students to behave as Homo Economicus rather than Homo Ecologicus.

Table 4.1

The Effect of Economics Education on the Contribution to the Common Investment for Environmental Conservation (Public Good Game), analysed with a TOBIT model.

	Model TOBIT					
N = 75	**Tobit Regressions (H)**					
Model Number	(1)	(2)	(3)	(4)	(5)	(6)
(pseudo) R-Squared	0.0001	0.04	0.001	0.05	0.01	0.05
PGG	**Coefficient β**					
EconStudent	0.27	-0.89				
	(1.51)	(1.92)				
EconLevel			0.57	0.55		
			(1.33)	(1.94)		
Nbr EconCourses					0.10	0.14
					(0.06)	(0.07)
Age		0.62		-0.02		0.44
		(0.42)		(0.02)		(0.42)
Gender - Male		3.16*		0.03		2.67
		(1.58)		(0.07)		(1.50)
Europe-Central Asia		5.65		-0.12		5.06
		(2.92)		(0.01)		(2.68)
Dutch Nationality		-4.86***		-6.45**		-4.74**
		(1.84)		(2.48)		(1.75)
BA WO		2.85		-0.91		1.96
		(2.84)		(4.68)		(2.70)
BA HBO		-0.07		-4.72		-1.10
		(3.18)		(5.80)		(3.09)
MA		Omitted		*Omitted*		*Omitted*
Finance Major		-1.45		-3.42		-2.25
		(2.29)		(2.45)		(2.21)
BehaviouralEcon Major		-8.11***		-0.47		-8.50**
		(3.16)		(3.79)		(3.05)
Erasmus University		-1.71		0.36		-3.51
		(1.93)		(4.76)		(1.90)
Hours in Nature %		-0.04		-0.01		-0.02
		(0.07)		(0.16)		(0.07)
SocioEcon		1.57		0.71		0.89
		(1.15)		(1.36)		(1.15)
Childhood_ City		1.01		1.44		1.06
		(0.71)		(0.94)		(0.69)
Constant	9.39***	-14.50*	8.26*	1.33**	8.22***	1.33**
	(1.14)	(12.32)	(3.83)	(21.88)	(1.08)	(21.88)
Left- Censored	5	5	1	1	5	5
Right - Censored	8	8	5	5	8	8

Note: P<0.05*, P<0.01**, P<0.001***. W*here, the number under parenthesis corresponds to the standard deviation. Some dummies were omitted to avoid multicollinearity and were, thus, used as a baseline*

Table 4.2

The Effect of Economics Education on the Willingness to Pay (WTP) for Environmental Conservation (Public Good Game), analysed with a TOBIT model.

Model TOBIT						
N = 108	**Tobit Regressions (K)**					
Model Number	(1)	(2)	(3)	(4)	(5)	(6)
(pseudo) R-Squared	0.0008	0.20	0.0003	0.06	0	0.24
WTP	**Coefficient β**					
EconStudents	-2.08	-3.30				
	(2.89)	(3.68)				
EconLevel			-0.94	-5.61		
			(2.91)	(4.09)		
NbrEconCourses					-0.01	-0.03
					(0.12)	(0.14)
Age		1.34		1.96		1.35
		(0.73)		(1.70)		(0.75)
Gender - Male		5.01		8.15		4.66
		(3.02)		(4.63)		(3.01)
Europe-Central Asia		4.76		3.81		3.54
		(4.87)		(8.86)		(4.68)
Dutch Nationality		-6.49		-0.70		-5.65
		(3.47)		(2.48)		(3.35)
BA WO		4.87		-0.45		3.69
		(5.23)		(10.91)		(5.09)
BA HBO		3.34		4.96		2.76
		(5.85)		(12.33)		(5.84)
MA		*Omitted*		*Omitted*		*Omitted*
Finance Major		-1.46		5.42		0.63
		(4.79)		(5.46)		(4.72)
BehaviouralEcon		-1.35		1.30		-2.11**
		(7.03)		(3.79)		(7.02)
Erasmus University		-6.70		-20.24**		-7.60*
		(3.54)		(8.14)		(3.56)
Hours in Nature %		-0.30*		-0.07		-0.29
		(0.07)		(0.34)		(0.15)
SocioEcon		5.42*		9.10		5.38*
		(2.23)		(1.36)		(2.26)
ChildhoodCity		0.90		0.71**		0.88
		(1.35)		(1.88)		(1.36)

Table 4.2: Continued

WTP	Coefficient β					
Constant	21.73***	-24.26	22.03**	-25.90**	20.75***	-23.43
	(2.13)	(21.22)	(8.16)	(39.22)	(2.09)	(21.74)
Left- Censored	6	6	4	4	6	6
Right - Censored	34	34	15	15	34	34

Note: P<0.05*, P<0.01**, P<0.001*** W*here, the number under parenthesis corresponds to the standard deviation. Some dummies were omitted to avoid multicollinearity and were, thus, used as a baseline*

Exploratory Findings: Explicit Environmental Attitudes

Although, implicit attitudes with nature appear not to predict behaviour, and not to be affected by economics training, explicit environmental attitudes revealed to be significantly correlated with real and game contributions (Figure A.4). Thus, to explore this relationship a similar methodology to the one used previously used was applied to the variable that proxies self-reported explicit attitudes towards nature. The resulting estimates suggest that explicit environmental attitudes are associated with a significant (p<0.01) increase in the willingness to pay for environmental conservation of 4.88 euros (Table C.1). Similarly, higher self-reported environmental attitudes are shown to be significantly associated with an increase in the contribution to the common investment for environmental preservation of 2.19 tokens. (Table C.2). Hence, these findings show that environmental explicit attitudes may significantly predict environmental behaviours. Moreover, adding the IAT score to the model reveals that the effect of explicit environmental attitudes remains positive and significant on both the real and game contributions (respectively, r= 5.20, P-value<0.001 and r=2.31, P-value< 0.01) (Table C.4).

Furthermore, the regressions performed on explicit environmental attitudes seem to indicate a low but significant effect of being an economic student on explicit environmental attitudes (Table C.5). Thus, as emphasized by the linear regression, being an economic student seem to be negatively associated with an increase in environmental explicit attitudes (-0.61, p-value < 0.05). Nonetheless, the results do not reveal any significant learning effect since the effect of being senior economic student relatively to a freshman student and having followed a higher number of economics classes is not significantly affecting self -reported attitudes. Consequently, the present study only appears to witness a self-selection effect rather than a learning effect of economic studies on explicit environmental attitudes.

Discussion

From this analysis, one may notice that this research results seem to substantially deviate from the findings of the existing literature. Greenwald et al. (2009), predicts that up to 7.5% of the variance should be explained by the implicit association test score. Nonetheless, in the present research, the IAT score could only predict up to 4% of this variance, once the covariates added, and was not significantly impacting the cognitive creation of behaviours. Besides, in their meta-analysis, the authors identify a mean correlation between the IAT test and explicit attitudes of 0.21, which would be rather coherent with our finding (0.16) if only they would have been significant.

Moreover, while the findings from Wang et al. (2011) suggest that economics students, on average, contribute less to the public good game (around 10% of their endowment), our study seems to find that economics students contribute on average 47% of their endowment to the environmental conservation project (PGG). Some may argue that both the generations of students and the economic curriculum have considerably changed for the past nine years which may explain this discrepancy. Nonetheless, it may as well be, that the respondents' answers may suffer from social desirability bias. In other words, respondents may have adapted their answers to appear more environmentally friendly. This especially plausible since while Goeschl et al. (2020) finds an average contribution of to climate change mitigation (WTP) of around 27.48%, the present research exihibit an average contribution of 61%.

Furthermore, the Tobit regression model is a very insightful tool yet highly sensitive to the violation of its underlying assumptions. Specifically, the model could suffer from biased estimates and a low internal validity in the event that the assumption of normally distributed residuals was violated. When testing the residuals from the linear regressions, one could observe that the assumption of normally distributed residuals was often violated. Thus, one may fear that the Tobit residuals may similarly not be normally distributed. Moreover, the internal validity of this research is challenged by the limited sample size. While the overall sample is composed of 108 observed individuals, the PGG sample is only constituted of 75 respondents. This relatively low sample size may have biased the coefficients estimates and eventually prevented us from running non-parametric regressions. Non-parametric models dispose of the OLS and Tobit assumptions but, to this aim they require large sample sizes. One may also mention the high risk of omitted variable bias from which this research is very likely to suffer. There is only a small existing body of research that has yet studied the link between economics education and the cognitive formation of behaviours. Ergo, further research may be required to discover new sets of variables which may impact the relationships investigated in the present research.

Furthermore, one may fear that the proxies used to measure implicit attitudes or behaviours may not be capturing well the respondents' actual implicit attitudes and behaviours. More specifically, there is a rising academic debate in psychology and behavioural economics around the use of the IAT test as a reliable and valid measure of implicit attitudes. At the forefront of these critics is the researcher Blanton, who argues that the IAT scoring is rather arbitrary and unreliable (Blanton et al., 2009). More importantly, he emphasizes that the test is particularly sensitive to noises and social contexts. It is therefore not unlikely that the context in which respondents may have participated in the IAT, may have influenced their performance. This is specifically true to the unprecedented corona outbreak context which has forced millions of people worldwide to stay home and quarantine themselves. For instance, when deprived of the freedom to move freely and enjoy natural environments, the desire to be connected with nature may become stronger leading respondents to associate more quickly themselves with nature. Furthermore, measuring behaviour using a behavioural game has often been denounced as an inadequate proxy for real behaviours. Goeschl et al. (2020) have shown that the contributions made in the PGG are only weakly linked to voluntary environmental actions. This is coherent with the weak correlation (0.28) between the PGG and real contribution found in this paper. Thus, one may conclude that the study's validity and reliability are simultaneously reduced by the hereby mentioned challenges. As the external validity emanates from internal validity, it is inferred that this study also lacks external validity. Additionally, this study focuses on students following their bachelor or master in the Netherlands which further reduces its external validity.

Despite these inconclusive and limited results, the present findings identified a significant and strong negative association between studying at Erasmus University and the contribution to environmental conservation. Similarly, one's socio-economic background was estimated to significantly influence environmental behaviour. Hence, one may encourage future studies to further investigate the role of one's socio-economic background in the cognitive formation of environmental behaviour. Researchers could also lead a comparative study among different universities to identify whether some universities may encourage more or less environmentally friendly attitudes and behaviours. Moreover, our exploratory analysis unveiled a positive and significant correlation between explicit environmental attitudes on pro-environmental behaviours. When confronted with the findings by Greenwald et al. (2009), these correlations 0.19 (P-value <0.01) for the PGG and, 0.32 (P-Value < 0.001) for the WTP, are coherent with the range of correlations one shall expect when studying a socially sensitive topic [0.19-0.60]. Although informative, these exploratory findings are only indicative of what may have been found would we have had measured explicit attitudes using a more reliable proxy like the NEP (New Ecological Paradigm) or the INS (Inclusion of Nature in Self) scale. Thus, future studies should be

prompted to further carry the present methodology adding more reliable measurements of explicit environmental attitudes.

Last but not least, with the aim to further explore the effect of economics education on the cognitive formation of environmental behaviour, one may encourage future studies to overcome the risk of social desirability bias using real observed behaviours instead of self-reported measures or behavioural game choices. This will enable more reliable and valid results. To this aim one may also prioritize time-series studies to truly capture the learning effect over time of economic studies on students' attitudes and behaviours.

Conclusion

Thus, although being informative about the potential signs and magnitudes of the relationship between economics education, implicit environmental attitudes, and behaviours, the research led to inconclusive results. Firstly, our findings suggested that implicit connexion with nature is not significantly predicting environmental behaviours. Secondly, there were no evidence of a significant relationship between economics training and implicit environmental attitudes. Furthermore, the results did not indicate a significant learning effect nor a self-selection effect of economics education on behaviours. Ergo, there were no evidence that economics students are more likely to behave as Homo Economicus rather than Homo Ecologicus. **Consequently, to answer this paper's research question, one may only conclude that economics education does not present signs of self-fulfilling power and that there is no tangible evidence suggesting that economics education may promote unsustainable nor sustainable environmental attitudes and behaviours by teaching students about the rational economic man.** Hence, while the present study does not have strong implications for policymakers due to its inconclusive and poorly valid results, it does however contribute to the flourishing and growing academic research in behavioural economics and sociology by exploring the link between the cognitive formation of behaviours and the internalization of the theories, norms, and beliefs that are specific to mainstream economics.

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Appendix A: Methodology

Table A.1

IAT - Implicit association with nature, test results

Data Cleaning Phase	
Number of Participants	119
Timeout Rate	0.0005
Participant Dropped (*excessive speed*)	1
Analysis	

Error rate	Reliability	D-Score Mean	Cohen's d Score
0.08	0.61	0.45***	1.38
		(0.32)	

Note: The time out rate corresponds to the proportion of trials dropped due to excessive duration. The error rate corresponds to the proportion of trials in which erroneous responses happened. The D-Score corresponds to the measure of the association with nature relatively to the association with built environment. The Cohen's d Score corresponds to the D-Score divided by the D-score standard deviation.

Table A.2

Implicit association test attributes and targets

Attribute		Targets	
ME	NOT ME	NATURE	BUILD
Self	It	Forest	Car
Mine	Their	Animals	Street
Myself	Them	Water	Computer
I	Others	Birds	Industry
Me	They	Plants	Building

Table A.3

Correlation Matrix

|	IAT Score	EA	PGG	WTP	Econ Grad	Econ Studies Years	Nbr Econ Course	H/W spent in Nature	Socio-Econ	ChildhoodCity
IAT Score	1									
EA	0.16	1								
PGG	-0.04	0.19*	1							
WTP	-0.07	0.32***	0.28**	1						
EconStudent	0.01	-0.15	0.02	-0.06	1					
EconLevel	-0.0002	-0.12	0.05	-0.09	0.85***	1				
Nbr EconCourse	-0.001	-0.04	0.03	-0.01	0.72***	0.65***	1			
H/W spent in Nature	0.02	-0.12	0.14	-0.09	0.14	0.11	0.14	1		
SocioEcon	-0.06	-0.02	-0.05	0.10	0.13	0.10	0.18	0.12	1	
ChidlhoodCity	-0.10	-0.04	0.08	0.09	0.01	-0.04	0.04	-0.26**	0.09	1
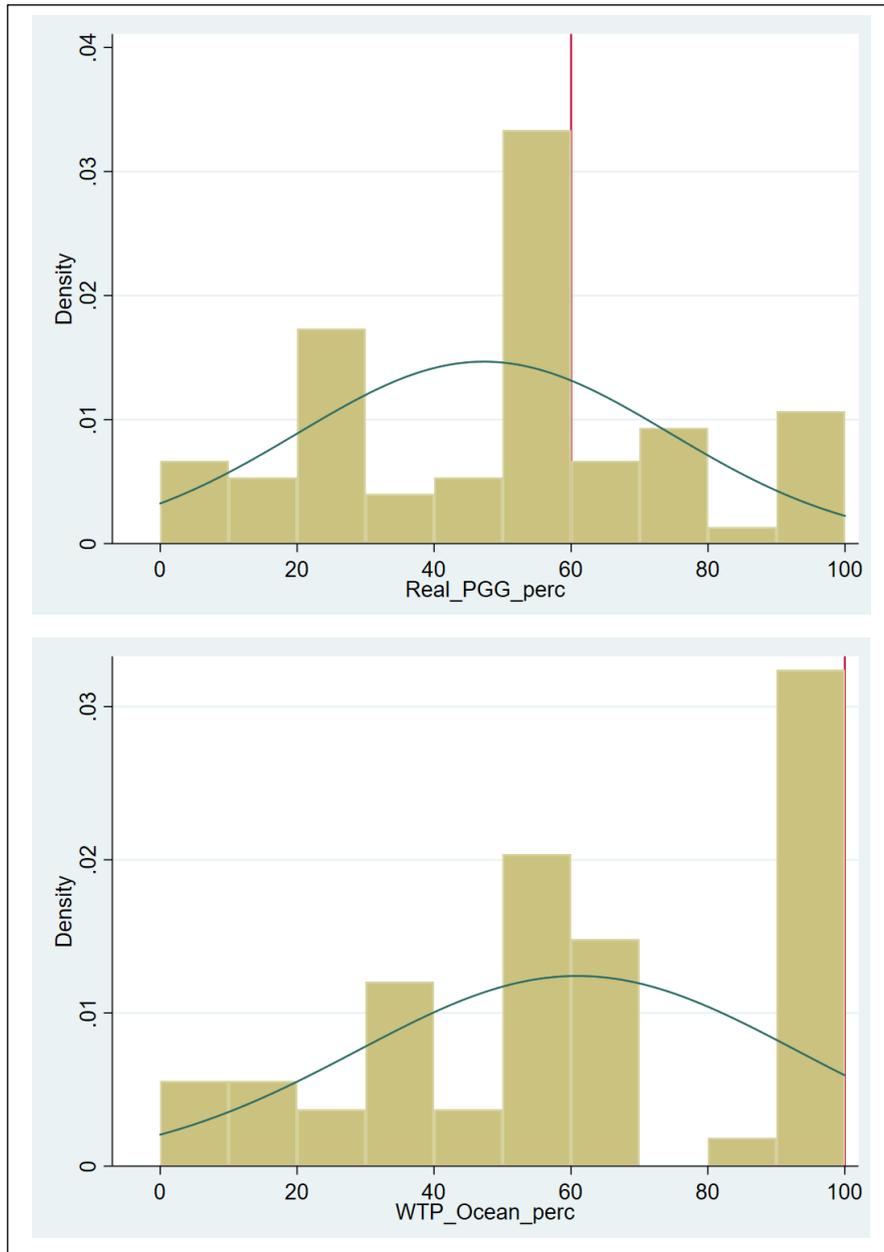
Figure A.1

Histograms of the variables measuring the contribution expressed in percentages, to the public good game and real choice task (WTP).
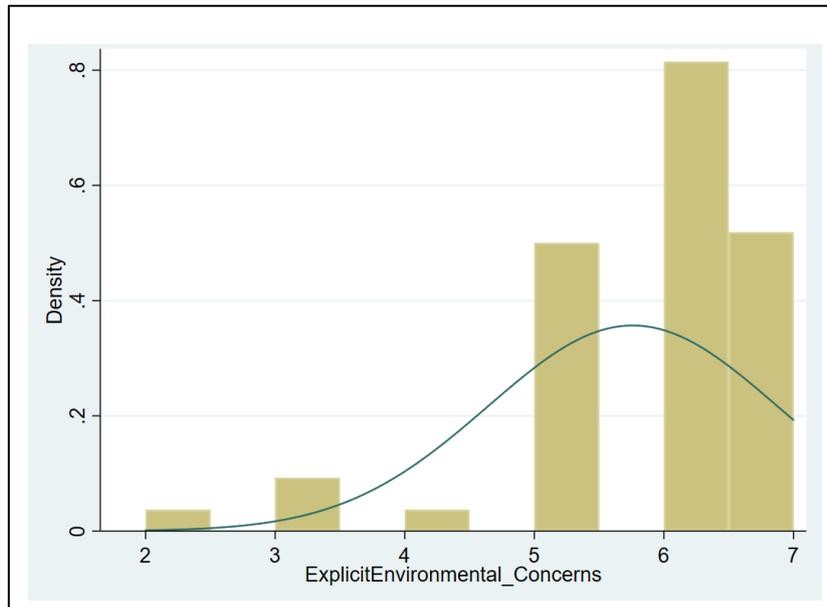
Figure A.2 Histograms of self-reported explicit attitudes.
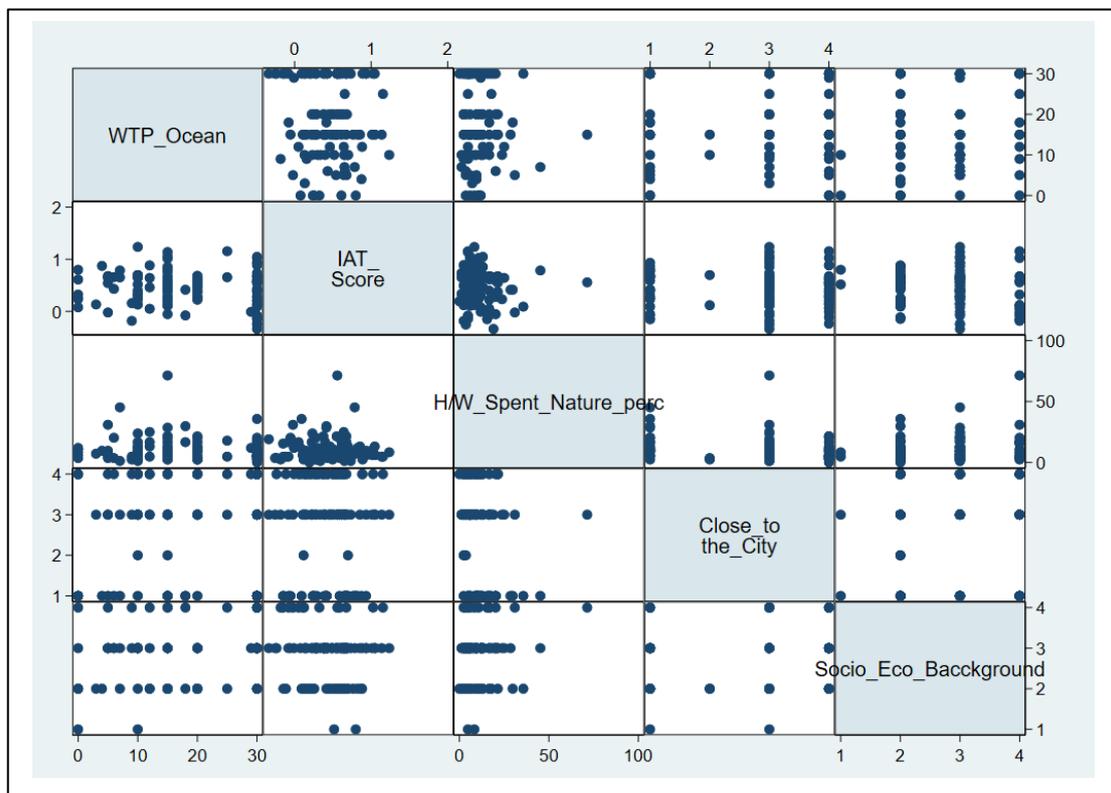
Figure A.3: *Correlations and box plot matrix - WTP*
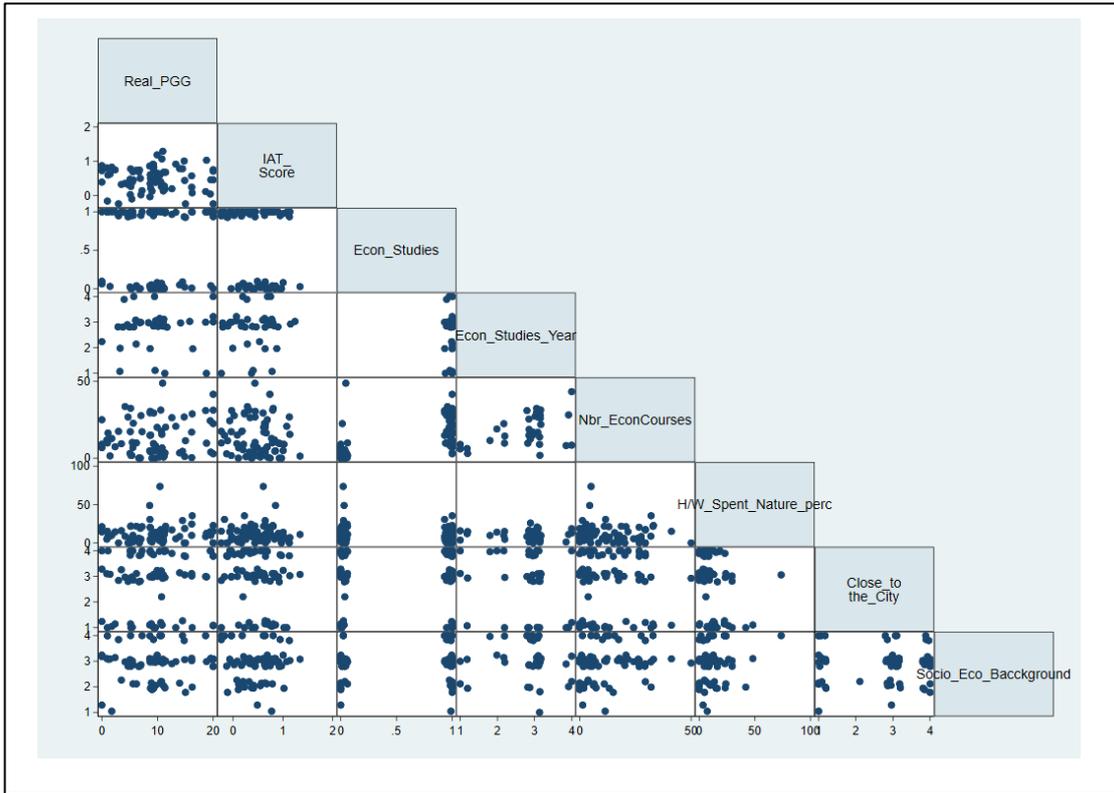
Figure A.4: *Correlations and box plot matrix – PGG*
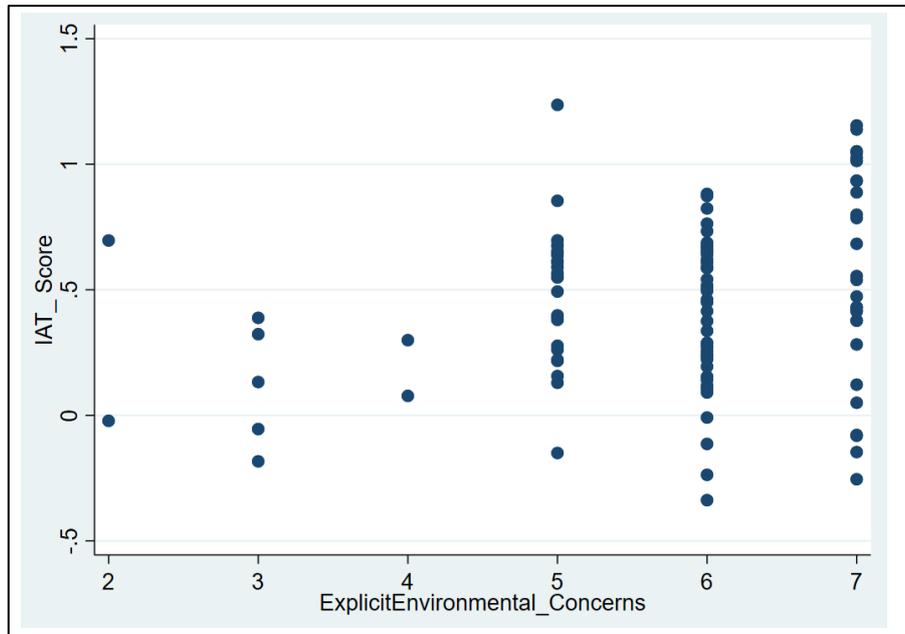
Figure A.5: Correlations and box plot matrix – PGG

Statistical Analysis

Table B.1

Test of the OLS assumption of normal distribution of the residuals.

Residuals Model	N	W	V	Z score	Prob > Z
Residuals - A (2)	107	0.96	3.14	2.55	0.00543**
Residuals - C(2)	74	0.96	2.503	2.002	0.0265*

Table B.2

The Effect of Economics Education on the Contribution to the Common Investment for Environmental Conservation (Public Good Game), analysed trough linear regressions.

	Model OLS					
	OlS Regressions (G)					
Number of the Model	(1)	(2)	(3)	(4)	(5)	(6)
N	75	75	39	39	75	75
(pseudo) R-Squared	0.0001	0.19	0.004	0.24	0.0330	0.23
PGG	Coefficient β					
EconStudent	0.08 (1.24)	-0.65 (1.73)				
EconLevel			0.44 (1.36)	0.48 (1.81)		
NbrEconCourses					0.08 (0.05)	0.12* (0.06)
Age		0.49 (0.35)		0.11 (0.78)		0.33 (0.35)
Gender - Male		2.59 (1.41)		3.62 (2.31)		2.19 (1.34)
Europe-Central Asia		4.52* (2.28)		2.54 (3.62)		4.06 (2.19)
Dutch Nationality		-3.72* (1.60)		-5.04 (2.68)		-3.60* (1.53)
BA WO		2.11 (2.71)		2.36 (2.90)		1.35 (2.25)
BA HBO		0.08 (2.66)		*Omitted*		-0.80 (2.27)
MA		*Omitted*		2.52 (7.22)		*Omitted*
Finance Major		-1.48 (2.45)		-2.93 (2.85)		-2.17 (2.11)

Table B.2: Continued

PGG	Coefficient β					
BehaviouralEcon		-6		-0.36		-6.34*
		(3.12)		(2.41)		(3.13)
Erasmus University		-1.57		-0.04		-3.07
		(1.65)		(5)		(1.62)
Hours in Nature %		-0.02		0.03		-0.01
		(0.05)		(0.17)		(0.04)
SocioEcon		-0.06		0.54		0.53
		(0.05)		(1.46)		(1.14)
Childhood _City		1.13		1.37		0.99
		(1.18)		(0.99)		(0.73)
Constant	9.40***	-9.61*	8.35*	-3.48	8.39***	-4.38
	(0.85)	(10.91)	(3.97)	(20.50)	(0.85)	(10.62)
Shapiro Test Z-score		2.10*		-0.19		1.19

Table B.3

The Effect of Economics Education on the Respondent's Willingness to Pay for Environmental Conservation

	Model					
N = 108	OlS Regressions (J)					
Model Number	(1)	(2)	(3)	(4)	(5)	(6)
(pseudo) R-Squared	0.006	0.13	0.003	0.28	0	0.23
WTP	Coefficient β					
EconStudent	-1.48	-2.23				
	(1.84)	(2.32)				
EconLevel			-0.76	-3.34		
			(1.90)	(2.87)		
Nbr EconCourses					-0.002	0.21
					(0.08)	(0.18)
Age		0.75		0.96		-0.16
		(0.45)		(1.15)		(0.94)
Gender - Male		3.18		5.18		4.56
		(1.81)		(3.44)		(2.87)
Europe-Central Asia		2.95		2.95		2.43
		(2.74)		(3.91)		(4.41)
Dutch Nationality		-3.73		0.46		-0.79
		(2.36)		(3.42)		(3.34)
BA WO		1.22		-0.11		2.37
		(2.79)		(7.63)		(8.60)

Table B.3: Continued

WTP	Coefficient β					
BA HBO		*Omitted*		2.82 (9.13)		4.22 (10.11)
MA		-1.40 (4.43)		*Omitted*		*Omitted*
Finance Major		0.46 (4.02)		0.02 (0.33)		0.73 (4.51)
BehaviouralEcon		-0.46 (4.44)		2.66 (5.93)		0.98 (3.91)
Erasmus University		-3.98* (2.00)		-12.30*** (3.65)		-13.86*** (2.85)
Hours in Nature %		-0.18 (0.09)		0.02 (0.33)		0.09 (0.29)
SocioEcon		3.26 (1.76)		5.29* (2.64)		3.21 (2.51)
Childhood_City		0.74 (0.95)		1.03 (1.37)		0.85 (1.33)
Constant	19.06*** (1.21)	-6.61 (10.72)	19.44*** (5.08)	-8.21 (26.01)	18.31 1.30***	9.48 (28.14)
Shapiro Test Z-score		2.84		1.24		0.715

Table C.1

The Effect of Self-Reported Explicit Attitudes on Willingness to Pay for Environmental Conservation

	Models			
N = 107	**OlS Regression (E)**		**Tobit Regression (F)**	
Model Number	(1)	(2)	(1)	(2)
(pseudo) R-Squared	0.11	0.25	0.02	0.05
WTP	**Coefficient β**		**Coefficient β**	
Explicit Environmental Attitudes	2.89***	3.39***	4.15**	4.88***
	(0.75)	(0.79)	(1.23)	(4.29)
Age		0.59		1.11
		(0.43)		(0.68)
Gender - Male		3.55*		5.74*
		(1.75)		(2.79)
Europe-Central Asia		2.26		3.64
		(2.52)		(4.30)
Dutch Nationality		-1.83		-3.72
		(2.01)		(3.11)
BA WO		-0.33		1.45
		(2.57)		(4.65)
BA HBO		baseline		2.63
				(5.33)
MA		-0.03		baseline
		(4.31)		
Finance Major		3.04		5.21
		(3.48)		(4.48)
Behavioural Economics Major		0.45		0.40
		(3.47)		(6.55)
Erasmus University		-5.06**		-8.31**
		(1.85)		(3.08)
Hours in Nature %		-0.10		-0.19
		(0.09)		(0.14)
Socio-Economic Background		3.75*		6.02**
		(1.68)		(2.07)
Childhood Close to the City		0.88		1.09
		(0.92)		(1.25)
Constant	1.65	-25.58	-3.35	-49.99*
	(4.38)	(11.12)	(7.14)	(20.91)
Left – Censored (N)	/	/	6	6
Right – Censored (N)	/	/	34	33

Table C.2

The Effect of Self-Reported Explicit Attitudes on the Contribution to the Common Investment for Environmental Conservation (Public Good Game)

	Model			
	OlS Regression (G)		**Tobit Regression (H)**	
N = 75	(1)	(2)	(1)	(2)
(pseudo) R-Squared	0.076	0.30	0.014	0.07
PGG	**Coefficient β**		**Coefficient β**	
EA	1.3**	1.68***	1.59*	2.19**
	(0.46)	(0.43)	(0.64)	(0.62)
Age		0.48		0.64
		(0.33)		(0.39)
Gender - Male		2.89*		3.52*
		(1.27)		(1.44)
Europe-Central Asia		4.81*		6.18*
		(2.18)		(2.58)
Dutch Nationality		-3.46*		-4.49**
		(1.48)		(1.67)
BA WO		1.28		1.78
		(2.25)		(2.57)
BA HBO		-0.8		-1.14
		(2.57)		(2.92)
MA		*baseline*		*baseline*
Finance Major		-0.46		-0.08
		(2.11)		(2.13)
Behavioural Economics Major		-5.71*		-8.12**
		(2.62)		(2.96)
Erasmus University		-2.40**		-2.95*
		(1.43)		(1.69)
Hours in Nature %		-0.002		-0.02
		(0.04)		(0.06)
SocioEcon		1.37		1.90
		(1.14)		(1.06)
Childhood_City		1.05		1.22
		(0.68)		(0.67)
Constant	2.02	-20.13	-0.45	-28.96*
	(2.57)	(10.94)	(3.72)	(12.21)
Left – Censored (N)	/	/	5	5
Right – Censored (N)	/	/	8	8

Table C.3

Test for the assumption of normally distributed residuals

Residuals Model	N	W	V	Z score	Prob > Z
Residuals-E(2)	107	0.97	2.26	1.81	0.035*
Residuals-G(2)	74	0.97	1.62	1.05	0.15

Table C.4

Joint Effect of Self-Reported Explicit Attitudes and Implicit Attitudes on the Contribution to the Common Investment for Environmental Conservation (Public Good Game) and Willingness to Pay (WTP)

	Model			
	Tobit Regression (I)		Tobit Regression (J)	
Model Number	(1)	(2)	(1)	(2)
(pseudo) R-Squared	0.02	0.05	0.02	0.07
Independent Variable	WTP	WTP	PGG	PGG
N	108	108	75	75
	Coefficient β		Coefficient β	
EA	4.66***	5.20***	1.884**	2.31**
	(1.25)	(1.22)	(0.67)	(0.65)
IAT_Score	-7.92	-5.86	-2.74	-1.48
	(4.28)	(4.04)	(2.26)	(2.16)
Age		1.04		0.65
		(0.68)		(0.39)
Gender - Male		5.90		3.46*
		(2.6)		(1.44)
Europe-Central Asia		3.10		6.02*
		(4.26)		(2.58)
Dutch Nationality		-3.38*		-4.42*
		(3.08)		(1.67)
BA WO		1.79		1.91
		(4.60)		(2.57)
BA HBO		2.58		-0.94
		(5.28)		(2.92)
MA		*Omitted*		*Omitted*
Finance Major		4.25		-0.34
		(4.46)		(2.15)
Behavioural Economics Major		1.18		-8.09**
		(6.47)		(2.96)
Erasmus University		-8.33**		-3.16
		(3.04)		(1.72)
Hours in Nature %		-0.19		-0.02
		(0.14)		(0.06)
SocioEcon		5.69**		1.89
		(2.05)		(1.06)
Childhood_City		1.04		1.15
		(1.23)		(0.67)
Constant	-2.68	-46.56*	0.36	-28.73*
	(7.02)	(20.83)	(3.70)	(12.19)
Left – Censored (N)	6	6	5	5
Right – Censored (N)	33	33	8	8

Table C.5

The Effect of Economics Education on the Respondent's Explicit Environmental Attitudes using an OLS regression

	Model					
N = 108	**OlS Regressions (K)**					
Model Number	(1)	(2)	(3)	(4)	(5)	(6)
(pseudo) R-Squared	0.04	0.08	0.01	0.28	0.004	0.14
Environmental Attitudes	**Coefficient β**					
Education (under) Graduates	-0.42* (0.21)	-0.61* (0.25)				
Economic (under) Graduates, Study Year			-0.15 (0.17)	0.15 (0.29)		
Number of Economic Courses					-0.006 (0.01)	0-0.002 (0.01)
Age		0.05 (0.05)		-0.03 (0.11)		0.04 (0.05)
Gender - Male		-0.11 (0.23)		0.61 (0.36)		-0.20 (0.24)
Europe-Central Asia		0.18 (0.31)		-0.27 (0.63)		-0.07 (0.29)
Dutch Nationality		-0.54 (0.28)		-0.36 (0.40)		-0.39 (0.27)
BA WO		0.44 (0.32)		0.88 (0.96)		0.32 (0.33)
BA HBO		*Omitted*		0.54 (0.98)		*Omitted*
MA		-0.31 (0.41)		*Omitted*		-0.21 (0.42)
Finance Major		-0.77* (0.38)		-0.59 (0.49)		-0.92* (0.38)
Behavioural Economics Major		-0.28 (0.98)		0.69 (0.51)		-0.44 (0.93)
Erasmus University		0.30 (0.24)		0.11 (0.56)		0.13 (0.24)
Hours in Nature %		-0.02* (0.01)		-0.05 (0.03)		-0.02 (0.01)
Socio-Economic Background		-0.15 (0.18)		-0.28 (0.29)		-0.16 (0.19)
Childhood Close to the City		-0.04 (0.10)		-0.10 (0.13)		-0.04 (0.11)
Constant	5.98*** (0.13)	5.61*** (1.29)	6.03*** (0.45)	7.48* (2.74)	5.83*** (0.14)	5.78*** (1.38)
Shapiro Test Z-score		4.05***		1.36		3.90***