



UNIVERSITY OF PADOVA

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Final Dissertation

Pro-environmental Behaviour in relation with Social, Emotional and Behavioural Skills in
adolescents

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Introduction

Chapter 1 Pro-Environmental Behaviour and Social, Emotional and Behavioural Skills

1.1 Pro-Environmental Behaviour

1.2 Pro-Environmental Behaviour Scales

1.3 Social, Emotional and Behavioural Skills

1.4 Relation between Pro-Environmental Behaviours and Individual Dispositions

Chapter 2 The Research

2.1 Goals and Hypothesis

2.2 Method

2.2.1 Participants

2.2.2 Materials

2.2.3 Procedure

2.3 Results

2.4 Discussion

Chapter 3 Conclusions

References

Introduction

The goal of this thesis is to study the relationship between Social, Emotional and Behavioural skills (SEB skills) and Pro-Environmental Behaviours (PEBs) in adolescents. The study attempts to contribute to the understanding of behaviours that mitigate climate issues.

The first chapter presents the concept of PEBs (Lange et al., 2019; Markle, 2013; Menardo et al., 2020; Stern, 2000), the definition of them, what means of measurement are available and how it came to the creation of a new scale. Moreover, the framework behind SEB skills, the Behavioural Emotional Social Skills Inventory (BESSI) will be investigated. Specifically, each of the five skill domains will be examined for deeper comprehension of the key role they display during adolescence.

The second chapter describes the execution of the study and the following results. The goal and hypotheses are explained as well as the materials, procedure and the reference population. Finally, how data analysis was conducted will be disclosed and results will be discussed. The positive correlation between the two variables of interest will be underlined in this section, and, more specifically, the results regarding each dimension of the BESSI will be interpreted.

In the third chapter the conclusions will be drawn as a consequence. Also, it will be looked at what future research based on this study might bring.

Chapter 1: Pro-Environmental Behaviour and Social, Emotional and Behavioural Skills

1.1 Pro-Environmental Behaviour

Environmental issues like climate change, pollution and loss of biodiversity are majorly influenced by human behaviour (Stern, 1992; Lange et al., 2019). It is crucial to understand the behaviours that reduce or intensify environmental issues (Lange et al., 2019) for policy makers and other stakeholders to focus on the development and implementation of effective solutions (Markle, 2013). Psychology can play a paramount role in the understanding and measuring of those behaviours. The main goal of the branch of psychology called conservational psychology is to find the influencing factors for people to behave in a way that is good for the environment (Menardo et al., 2020)

Pro-Environmental Behaviours (PEBs) are the set of behaviours that include “the commission of acts that benefit the natural environment [...] and the omission of acts that harm it” (Lange et al., 2019). Examples for such behaviours are personal and public transportation, heating and cooling systems, household appliances and electronic devices, food habits and actions related (Menardo et al., 2020). It can thus be defined as behaviour that has a positive impact on the environment: behaviour that changes the material- or energy availability, the structure and dynamics of the ecosystems (Stern, 1997; Stern, 2000).

In order to be able to understand PEBs they need to be measured because of the necessity to uncover underlying mechanisms, and that is where the role of psychology becomes crucial.

In this study we have examined a series of different questionnaire scales that assess PEBs, yet we have encountered shortcomings that we needed to contrast by developing a new scale.

Our scale wanted to be a short and direct tool that measures behaviour in an adolescent

reference population. Nevertheless we have used the following ones as a starting point for our development.

1.2 Pro-Environmental Behaviour Scales

In the following part the main scales used to assess PEB will be presented.

The General Ecological Behaviour Scale (Kaiser, 1998; Kaiser et al., 2007)

In 2007 Kaiser et al. developed a behaviour-based scale for adolescents starting from their original General Ecological Behaviour. A list of actions groups 40 items into the six domains of energy conservation, mobility and transportation, waste avoidance, recycling, consumerism, and vicarious behaviours toward conservation. Examples for items of this scale are: “I buy products in refillable packages”, “I use writing pads from recycled paper” or “For short distances (within 15 minutes), I walk or ride a bike”. This instrument was too long for our purposes considering that we also administered an additional scale to assess SEB skills.

Children’s Responsible Environmental Behavior Scale (Erdogan et al., 2012)

With this scale researchers assessed PEB in children aged 10-11 with 23 items in the four domains of eco-management/physical action, consumer and economic action, persuasion and political action. It was not suitable for our needs because we considered many items relating to consumer and economic action and political action as almost inapplicable to our reference population of adolescents. According to our opinion it is plausible to assume that adolescents in Italy engaging in behaviours like “Talking with officials for solving environmental problems” or “Donating to NGOs” are rather exceptional, especially for the youngest participants of our sample.

Pro-Environmental Behaviour Scale (Markle, 2013; Menardo et al., 2020)

Menardo and colleagues adapted the original PEB scale by Markle to an Italian reference group and reduced the number of items from 19 to 15, maintaining the original four dimensions of conservation, environmental citizenship, food and transportation. Examples for items of this scale are: “During the past year have you contributed money to an environmental, conservation, or wildlife protection group?” or “Please answer the following question based on the vehicle you drive most often: approximately how many kilometres per litre does the vehicle get?”. This scale is destined for adult participants and has items not suitable for our adolescent reference population.

The sample of this study refers to the population of Italian adolescents between 10 and 18 years of age, and the scales measuring PEBs by Erdogan et al. (Children's Responsible Environmental Behaviour Scale, 2012) and by Markle or Menardo et al. (Pro-Environmental Behaviour Scale, 2013; Italian version of the Pro-Environmental Behaviour Scale, 2019) are not suitable for it. Additionally, because our administration also involved the SEB skills questionnaire we needed a PEB scale that is short and direct, so we excluded the possibility of using Kaiser's et al. General Ecological Behaviour Scale (Kaiser, 1998; Kaiser et al., 2007). This is why we decided to develop the Adolescents PEB scale, an applicable tool for studying the relation between PEBs and SEB skills.

In the following part SEB skills will be accurately explained.

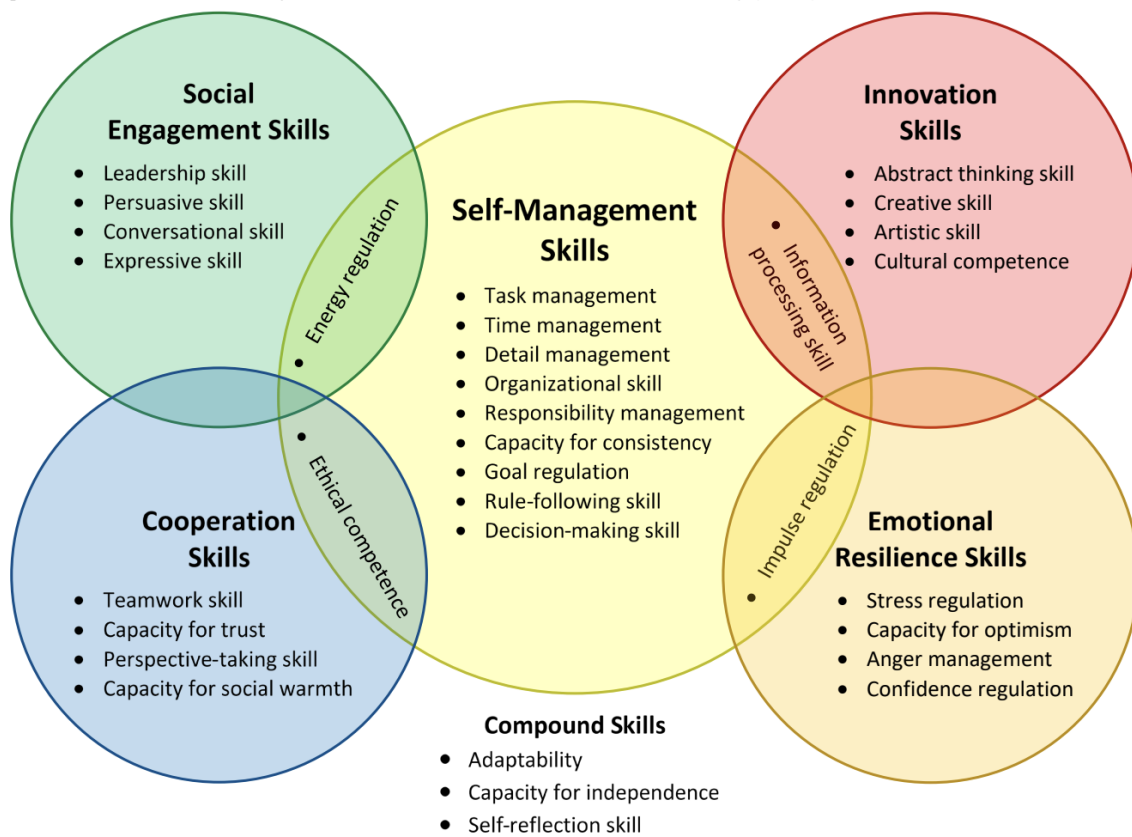
1.3 Social, Emotional and Behavioural Skills

In the present study we used the framework provided by Soto and colleagues on SEB skills and used the corresponding measurement tool called the BESSI (publications starting from 2021; <http://www.sebskills.com/our-research.html>).

To study Social, Emotional and Behavioural Skills they need to be defined first. According to Soto et al. (2021) they “are capacities that people use to maintain their social relationships, regulate their emotions, manage their goals, and learn from experience”. Furthermore, as they are defined as skills they “can be learned, practised, measured, and improved over time” (Soto et al., 2021). This definition clarifies two key points: these capacities are functional and related to both overt and covert behaviour forms. The first key point states that these abilities are acquired and can thus be trained. In the second key point overt behaviours are observable from the outside, for example social interactions and completion of tasks, while covert behaviours are not evident from the external, for example the pursuit of goals and emotion regulation (Soto et al., 2021).

In a definition the distinction from other elements is important. In case of SEB skills they need to be distinguished from other psychological constructs like personality traits, because they are related (Soto et al., 2021). Personality traits however are defined as the characteristic patterns of people’s thoughts, feelings and behaviours or someone’s tendency to behave, as the average across many situations (Allport, 1937; Soto et al., 2021). Soto et al. (2021) explain the difference between traits and capacities or skills analogously by the “difference between [...] an athletes’ typical performance and maximal performance” (Sackett et al., 1988).

In the publication of 2021, Soto et al. aimed to give a broad domain-organisation to their integrative framework of SEB skills. They proposed five domains plus one that would organise the skill facets of Social, Emotional and Behavioural Skills, as seen below.



1. **Self-Management:** it includes the skills needed to effectively pursue goals and complete tasks. The dimension of self-management measures abilities such as working persistently to complete tasks and achieve goals, using time effectively, doing careful and accurate work, organising personal spaces and items, keeping promises and commitments, reliably performing routine tasks, setting clear and ambitious personal goals, following instructions, rules, and standards, and making reasoned and deliberate decisions.
2. **Social Engagement:** it involves the skills used to actively and effectively manage relationships with other people. Among these skills, we find the ability to assert one's opinions and speak in a group, present arguments effectively, initiate and maintain

social interactions, communicate one's thoughts and feelings to other people, and channel energy in a productive manner.

3. **Cooperation:** this domain includes the set of skills used to build and maintain positive social relationships, such as: working effectively with other people to achieve common goals, forgiving others and seeing the good in people, empathising with others and understanding their feelings, making people feel comfortable and happy, and behaving correctly and respectfully, even in difficult situations.
4. **Emotional Resilience:** it refers to all those skills used to regulate emotions and moods according to the tasks and situations of the moment, such as the ability to regulate stress, anxiety and fear, maintain a positive attitude in difficult situations, regulate anger and irritation, maintain a positive attitude towards oneself, and intentionally resist impulses and temptations.
5. **Innovation:** this includes the ability to create, handle, and learn from new ideas and experiences. These abilities include creative skills, openness to difference and other cultures, generating new ideas, creating and appreciating art, and processing and applying new information.
6. **Compound skills:** they combine aspects of multiple skills domains, and entail trying new things and adapting to change, thinking, working, and making decisions by oneself and understanding one's own thoughts and feelings.

(additional information can be found at <http://www.sebskills.com/about-seb-skills.html>)

In this framework SEB skills are assessed by the measurement tool BESSI (Behavioural Emotional Social Skill Inventory) that measures the skill facets of the domains by asking the respondents to rate how well they can execute stated behaviours. It is a “reliable, valid, efficient and flexible assessment” (Feraco et al., 2023; Soto et al., 2021).

In a series of studies conducted by Soto and colleagues (publications starting from 2021) SEB skills have been found to be fundamental in adolescence where the need for goal attainment, identity formation, autonomy, and intimate relationships grows. It is a period of significant brain development: synaptic pruning and increased activation of the prefrontal cortex boosts self-management abilities and executive functions.

Furthermore, it has been demonstrated that they are meaningful in predicting outcomes such as academic performance, engagement, vocational interests, social relationships, and well-being. (Soto et al., 2021; <http://www.sebskills.com/our-research.html>)

1.4 Relation between Pro-Environmental Behaviours and Individual Dispositions

Environmental psychology has studied the relation of PEBs to personality traits (Menardo et al., 2020; Stern, 2000) because of their stable nature and because they could influence “environmental values, attitudes and behaviour” (Menardo et al., 2020; Stern, 2000). The model of the Big 5 is frequently looked at when considering personality traits and it gives the following explanations: openness indicates abstract thinking and the curiosity for variety of experiences; conscientiousness is characterised by self-discipline, respect for duty and desire for achievement; extraversion reflects sociability and outlook for activities; agreeableness indicates social harmony and the ability to get along with others; neuroticism is the tendency for negative emotions like anger, anxiety and depression, it is however often switched for its opposite: emotional stability (McCrae et al., 1997; Brick et al., 2016). Facets of these traits could reflect relevance in the engagement in PEBs, as hypothesised by several studies. For example, openness could be the necessary characteristic for long-term and long-distance imagination of environmental consequences (Brick et al., 2016).

It has been found that PEBs are positively correlated with, or positively predicted by four personality traits:

- openness (Brick et al., 2016; Hirsch et al., 2007; Hilbig et al. 2013; Markowitz et al. 2012; Menardo et al., 2020)
- agreeableness (Fraj et al., 2006; Hirsch et al., 2007; Milfont et al., 2012; Poškus et al., 2017; Menardo et al., 2020)
- conscientiousness (Brick et al., 2016; Fraj et al., 2006; Milfont et al., 2012; Menardo et al., 2020)
- extraversion (Fraj et al., 2006; Hilbig et al. 2013; Menardo et al., 2020).

Due to the stableness of traits, however, they can hardly be trained or modified. On the other hand, since SEB skills can be trained and improved because of their functional nature, studying them in relation to PEBs has the applicative purpose of finding training strategies of SEB skills that promote PEB. Adolescents have been chosen as a reference population because of the brain's malleability and the growing importance of SEB skills of the period. Researching what PEBs are determined by and how they can best be improved in this population is decisive because the sustainable future is in the hands of the younger generations.

Chapter 2: The Research

2.1 Goals and Hypothesis

The main goal of the research is studying the relationship between PEBs and SEB skills in adolescents. Developing a new scale on PEBs was a secondary goal out of necessity. In order to reach the goal we administered the BESSI and the newly developed Adolescents PEB scale.

We hypothesised that higher scores in the BESSI would be correlated with higher frequency of PEBs. This is because we assumed a better ability to engage in PEBs thanks to a higher motivation. The assumption is made on the basis of passed studies that showed predictions of life outcomes like civic engagement by SEB skills (<http://www.sebskills.com/our-research.html>)

Specifically, we expected to find for the BESSI domains:

- Strong relations between Self-Management and Innovation domain with the Adolescents PEB scale. The former aligns with the personality trait of conscientiousness and the latter with openness to experience (Soto et al., 2021), which both are correlated to PEBs (Brick et al., 2016; Fraj et al., 2006; Hirsch et al., 2007; Hilbig et al. 2013; Markowitz et al. 2012; Menardo et al., 2020; Milfont et al., 2012). An explanation for the hypothesis is that individuals who exhibit strong self-management skills and are innovative are likely to demonstrate proactive and responsible behaviour and we supposed that this behaviour could also be directed toward the environment.
- Medium relations between Social Engagement and Cooperation domain with PEBs. They are not the primary target of the Adolescents PEB scale domains, however

engagement in PEBs may be facilitated by higher scores. They align respectively to the personality traits of extraversion and agreeableness (Soto et al., 2021) which were both found to be correlated with PEBs (Fraj et al., 2006; Hilbig et al. 2013; Hirsch et al., 2007; Milfont et al., 2012; Poškus et al., 2017; Menardo et al., 2020).

- Weak relations between Emotional Resilience domain and PEBs. This domain aligns with the personality trait of emotional stability (Soto et al., 2021) which has not been found to be correlated to PEBs. It may not have a direct connection to PEBs due to the domain's focus on emotional well-being of the individual.

It is worth mentioning that this study was part of time 2 of a large research project that investigated SEB skills and extracurricular activities in adolescents. The research was conducted by Dr. Tommaso Feraco and internship trainees under the supervision of Prof. Chiara Meneghetti in the Department of General Psychology of the University of Padova.

2.2 Method

2.2.1 Participants

The sample is composed by 490 (257 females) participants between 10 and 18 years (age $M = 13.49$ $SD = 1.84$), i.e. from first year of middle school (“scuola secondaria di primo livello”) to the last year (fifth year) of high school (“scuola secondaria di secondo livello”). The sample size was assessed beforehand through a power analysis with the level of significance at 0.05 and a statistical power of 0.85 (based on the effect sizes of Ahuja et al., 2023; Brick et al., 2016; Dorofeyeva, 1975; Fraj et al., 2006; Gibbon et al., 2021; Hendrickson et al., 1975; Hilbig et al., 2013; Hirsh et al. 2007; Markowitz et al., 2012; Milfont et al., 2012; Schmitt et al., 2018; Shen et al., 2019; Soutter et al., 2020). I personally

enrolled students from 4 classes of the following schools: Gymnasium “Walther von der Vogelweide” Bolzano, Istituto di Istruzione Superiore Statale Cesare Battisti Bolzano, Istituto di Istruzione Superiore “La Rosa Bianca” Cavalese and Wirtschaftsfachoberschule Ora.

sex	grade								Total
	1	2	3	4	5	6	7	8	
male	1	26	13	36	33	27	86	11	233
female	0	32	6	32	45	64	55	23	257
Total	1	58	19	68	78	91	141	34	490

Table 1. Contingency table of participants by sex and grade.

2.2.2 Materials

All materials relevant for this study were in self-report format and administered in Italian.

Demographic data

Participants were asked general demographic questions about their age, sex and grade.

Behavioural Emotional Social Skills Inventory (Feraco et al., 2023; Soto et al., 2022)

The version used has 45 items and does not go into the specific 32 skill facets but measures the 5 broad SEB skill domains of:

- Self-Management skills (for example: “Plan my time”)
- Innovation skills (for example: “Understand difficult concepts”)
- Cooperation skills (for example: “Understand how others feel”)
- Emotional Resilience skills (for example: “Calm down when I feel anxious”)
- Social Engagement skills (for example: “Be the leader of a group”)

The items are statements and participants need to evaluate how well they can do the stated on a scale from 1 to 5, where 1 corresponds to “not at all well”, 2 to “not very well”, 3 to “pretty

well”, 4 to “very well” and 5 to “extremely well”. Each of the domains has 9 items and the domain scales are scored by averaging the items.

Adolescents PEB scale (created ad hoc based upon scales by Erdogan et al., 2012; Kaiser et al., 2007; Markle, 2013; Menardo et al., 2020)

It is composed by 3 items for each of the 5 categories of:

- Environmental Citizenship (for example: “I keep myself informed about environmental issues (e.g. climate change, pollution, renewable energy)”)
- Conservation - Energy (for example: “If I see a light on in another room, I go and turn it off even if I have not forgotten it”)
- Transportation (for example: “When I get the chance, I go to school by car”)
- Recycling (for example: “I collect waste dispersed in the environment”)
- Food (for example: “I eat seasonal fruit and vegetables”)

All of the items are behaviours in form of statements of which the participants are asked to evaluate the frequency of engaging in that behaviour on a scale from 1 to 7, where 1 corresponds to “never”, 2 to “almost never”, 3 to “sometimes”, 4 to “occasionally”, 5 to “often”, 6 to “almost always” and 7 to “always”.

The internal consistency of the current sample was Cronbach’s alpha at 0.67.

The Self-perceived Action Competence for Sustainability Questionnaire and the Connectedness to Nature Scale were included as part of the validation of the Adolescents PEB scale. However, they will not be further described as the validation is not part of this thesis.

2.2.3 Procedure

In order to have a representative sample, secondary schools all over Italy were contacted via telephone and email. A letter of presentation of the study was always attached explaining the purposes, methodology and circumstances of the study. Once adhesion to the study was granted by the schools the involved teachers obtained an accurate guide through the steps of the research. First, all of the participating students' parents signed the informed consent which thoroughly described privacy, data processing and storage norms and guaranteed the right to withdraw one's child from the research at any time in line with the ethical principles of the Italian Psychological Association.

The questionnaires had to be administered in class under the supervision of an experimenter or, when not possible, of a teacher. Thus a date for administration was fixed. The day of administration the link of the online questionnaire was made available on the school's devices or was sent to the students' smartphones. Completion of it took a maximum of half an hour. Data collection was carried out on qualtrics.

2.3 Results

The analysis of data was implemented in R studio.

In order to reach the main goal of the project the regression analysis results between the Adolescents PEB scale and each of the five BESSI dimensions were of interest.

Significant positive correlations between the Adolescents PEB scale and BESSI dimensions were observed with Innovation skill and Self-Management skill, respectively with $r = 0.26$ and $r = 0.25$. The Cooperation dimension of the BESSI showed a weaker positive correlation with the Adolescents PEB scale with $r = 0.19$. The dimensions of Emotional Resilience and

Social Engagement presented no significant relationship with the Adolescents PEB scale with $r = 0.11$ and $r = 0.03$ respectively.

	PEB	SMD	IND	COD	SED	ESD
PEB	-					
SMD	0.25	-				
IND	0.26	0.31	-			
COD	0.19	0.36	0.34	-		
SED	0.03	0.38	0.41	0.43	-	
ESD	0.11	0.38	0.23	0.42	0.32	-

Table 2. Pearson’s r between variables of interest. *PEB: Pro-Environmental Behaviour; SMD: Self-Management domain; IND: Innovation domain; COD: Cooperation domain; SED: Social Engagement domain; ESD: Emotional Resilience domain.*

A multiple linear regression was conducted to investigate the relationship between PEBs and the five BESSI domains as predictor variables. The results of the regression indicated that three of the predictors explained a significant amount of variance in PEBs: Self-Management ($\beta = 0.28$, $p < .001$), Innovation ($\beta = 0.31$, $p < .001$), and Social Engagement with a negative value ($\beta = -0.22$, $p < .001$). Cooperation was also significant, but with a smaller effect ($\beta = 0.18$, $p = .013$). Emotional Resilience was not significantly related to PEBs ($\beta = -0.015$, $p = .771$).

The model approximately explains 13.3% of the variance in PEBs. The adjusted R^2 , which accounts for the number of predictors in the model, was slightly lower at .124.

In conclusion, Self-Management, Innovation and Social Engagement have significant effects on PEBs, with Innovation having the strongest and Social Engagement having a negative effect.

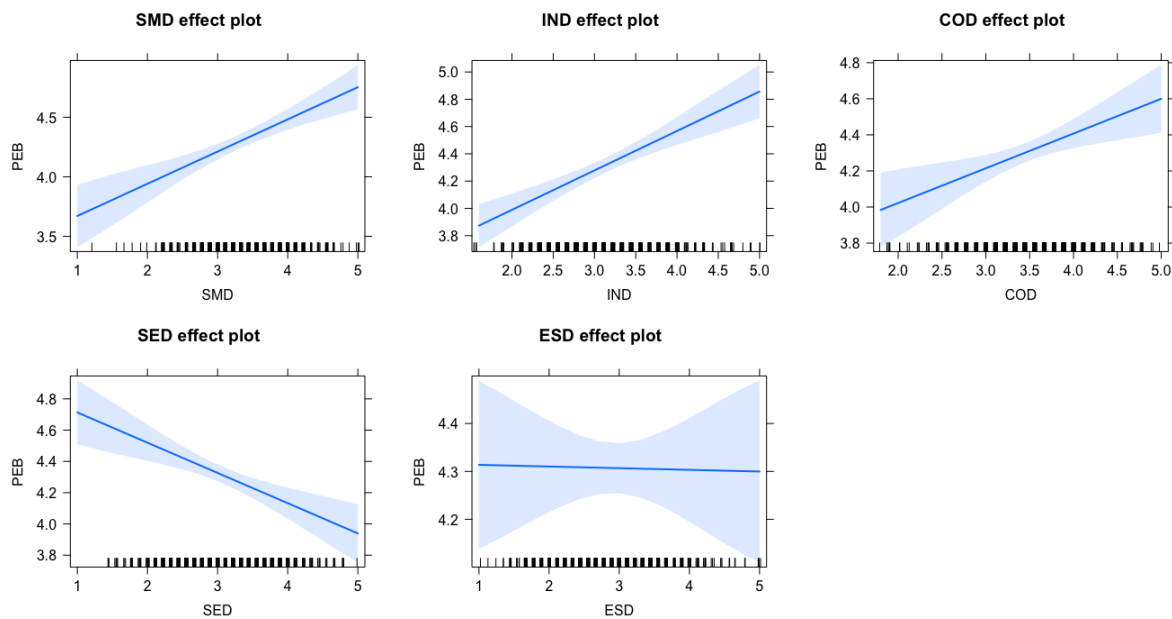


Figure 1. Effects plots of five domains in the multiple linear regression model. *SMD*: Self-Management domain; *IND*: Innovation domain; *COD*: Cooperation domain; *SED*: Social Engagement domain; *ESD*: Emotional Resilience domain.

2.4 Discussion

The results of the study suggest that adolescents with higher scores in the BESSI dimensions of Innovation and Self-Management tend to exhibit a higher frequency level of PEBs. On the other hand, there seems to be no connection between Emotional Resilience and PEBs as no statistical significance was demonstrated.

According to this interpretation the study's hypothesis is majorly confirmed. The BESSI domains of Innovation and Self-Management skills displayed the strongest correlations with the PEBs. Contrary to our expectations the Social Engagement domain showed no correlation with PEBs. This may be explained by the domain's focus on the interaction between people rather than an interaction between the individual and the environment. On the other hand, all three domains show a significant effect on PEBs, with Innovation having the strongest.

These findings contribute to our understanding of the factors associated with PEB and can inform interventions aimed at promoting environmentally friendly actions. It can help develop interventions specific for the improvement of Innovation and Self-Management in schools or extra-curricular programs. Longitudinal studies could investigate the effect of SEB skill training over a longer period of time on PEBs. Also, studies could be conducted on how working on PEBs affects SEB skill development. These results can also be studied in younger children and eventually develop strategies for PEBs in early schooling years. Both SEB skills and PEBs are gaining importance and the results achieved in the present study contribute to the gradual progress for the understanding and improvement of them.

Chapter 3: Conclusion

This research aims to investigate the relationship between SEB skills and PEBs in adolescents as they are both aspects of emerging importance. To measure SEB skills the recent Behavioural Emotional Social Skills Inventory has been used and this contributed positively to the framework behind it. A new scale was developed to assess PEBs in a short and simple way suitable for adolescents. It was accomplished by adapting several PEB measuring scales.

The hypothesis of a positive significant relationship between both the Innovation and Self-Management skill domains of the BESSI and the new Adolescents PEB scale was confirmed. This reinforces not only the potential for training of PEBs through SEB skills, but also the work of the BESSI (Soto et al., 2021) which predicted relations between SEB skills and personality traits. Relations between personality traits and PEBs have been shown in the past (Brick et al., 2016; Fraj et al., 2006; Hirsch et al., 2007; Hilbig et al. 2013; Markowitz et al., 2012; Menardo et al., 2020; Milfont et al., 2012; Pořkus et al., 2017) and with the present study we could progress into the direction of finding improvable individual dispositions that can mitigate climate issues.

Based on this study future research can be performed on the causality of PEBs, as this thesis was limited to a correlational study. Thanks to the study it can be concluded that the new Adolescents PEB scale could become relevant and beneficial for future studies on PEBs in adolescents also adapted to different contexts from SEB skills. The validation of the scale first in English and then in further languages could be the following step.

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