

The Semantics of Remorse for the Climate Crisis: Moral Self-Awareness and Its Educational Role

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Summary: The indifference of Earth's inhabitants towards progressive climate crises raises understandable anxiety for ecologists. Searching for effective forms of education aimed at radical and rapid change of attitudes is implemented in various areas of knowledge. This research combines linguistic cognitive workshops, personality psychology, together with a selection of statistical tools. The results obtained through empirical research facilitated the construction of the semantic image of *remorse* and its wider (transcending the lexical) interpretation framework within self-awareness emotional states, and specifically moral feelings. The semantic analyses herein have become the grounds for educational guidelines within the process of attitude changes.

Keywords: Climate crisis; Education; **Semantics**; **Remorse**; Moral self-awareness, Up-bringing

1. Introduction

The power that the image of crisis infused climate degradation presented in the media displays has a strong emotional load, yet it is exceptionally labile. Viewers (listeners) notice the cruelty of a gradual yet deepening destruction of nature, hassled by appeals from ecologists. However, the prospect of the future, which probably will not embrace them, removes the necessary responsibility and blurs existential anxiety. The upcoming ecological crisis resembles the proverbial bomb whose ticking no one wants to hear, thus bear individual responsibility for life that is destroying nature. Does contemporary pro-ecological education have the strength to change people's attitudes and curb their greedy consumerism? Will the obligation of responsibility for the Earth-Breadwinner reach the deepest levels of moral self-awareness called remorse? How do these processes look in adolescent youth, who take responsibility not only for their own, individual fate, but also for the fate of their brothers and sisters of various cultures and political affiliations? How can we learn various attitude mechanisms in order to enable, through language, human minds to open and evoke the emotions necessary for conscious behaviour change, ensuring that these are not isolated situations? This article presents research on moral self-awareness, referred to as remorse, among students from selected tertiary education institutions in Gdańsk. Studies on the feeling of remorse include its semantics, so that having learnt its conceptual complexity as expressed through language we gained tools to facilitate pro-ecological education.

2. On Climate Crisis and Other Ecological Disasters

It is difficult to disagree with a stance expressed in the introduction to *Ecological attitudes. A study on Poles' attitudes and opinions*. [1]. Report that the ecological crisis is first and foremost a crisis of imagination. As per the Report, today it is significantly easier to imagine that the catastrophic consequences of our greed towards Earth may come any day, and not in some unfathomable 50 or 100 years [1] (5). The authors of the Report

conclude that the study subjects are conscious that the situation is bad, but “not as bad for people to take action immediately”, which could otherwise be called denial, a concept that is well defined in medicine and psychology [1] (p.6).

Editor E. Bendyk provides a comment on part of the *Report* research concerning the youth’s ecological awareness. He stated that young people have a less developed ecological awareness than adults. On the other hand, however, there appeared an interesting and unusual phenomenon by way of youth mobilisation within, inter alia, School Strike for Climate. This unprecedented environment and climate movement which spans the whole globe has also come to Poland. Youth from numerous towns and cities have got involved in it [1] (p.17).

This proves that the young generation is a unique group in the context of the ecological reality. This social group displays relatively the greatest ability to adjust to change, and at the same time has relatively the highest levels of criticism concerning the reality at hand [3]. Establishing the desired social eco-development model, Pęczak presents the young generation’s ecological movements as focused on creating pro-ecological attitudes by individuals rather than as a collective action, undertaken consecutively by their current participants. According to Pęczak, previously declared freedom ethos ceases to have a mere political character – It is transformed into a call for freedom from harmful effects of old technology. For young people it is no longer a slogan or a counter-challenge, but a lifestyle above all [3].

One of the *Report* sections concerns responsibility and causality. While discussing the results obtained, Z. Skalska states that most Poles notice how grave the ecological situation is in the world and Poland. Unfortunately, counteracting environmental changes, according to the research, concerns most of all limiting plastic packaging rather than handling air pollution, losing biodiversity or managing one’s lifestyle [4] (p.58). For instance, the quantitative research made by that WWF Poland’s Education Department in May 2020 on Polish school students’ pro-ecological attitudes shows that the three most ecological and impactful behaviours upon environment protection are recycling (72.5%), avoiding plastic packaged products (54%) and water consumption reduction (54%). This shows a conviction as to one’s own behaviour at home, and its direct and significant impact upon the environment [5].

Nonetheless, despite said ecological awareness, people’s actions as regards “here and now” amazes with its inaction. To extend this observation to the philosophical level Eichelberger’s stance can be quoted concerning the ecology of the I-the world relationship, where he anchored the danger of future’s illusion, the form of its realism: “Such a common myth in our culture allowing a real possibility of human commune with the sacrum only in an unimaginable, post-mortem future and ascribing said sacrum exclusively non-material and unreal attributes is probably the principal reason behind such widely spread disregard for the everyday and reality (the obvious) and collective escapism into the future and fiction. Consequently, the moment now and this place here are never our home nor happiness, and responsibility is understood as care about the future, not the present. Due to the fact that happiness can only befall us in the future which in itself is fiction one cannot stop on the way. We live lives of fictitious beings in a fictitious world”[6].

In the conclusions of the results presented in the *Report*, M. Popkiewicz states: „The research results show the same as other reports – the awareness of environmental challenges is disproportionately low to its scale and consequence. A tsunami is approaching, and most people are still playing in their play holes on the beach, confusing the coastline with the horizon”[7] (p.72).

That tsunami of outcomes is a result of the speed the global climate crisis is progressing at, which is closely connected with global warming. As a result, Earth is becoming drier and drier, global temperatures are rising and unpredictable rainfall is more common globally together with other meteorological events. Expert prognoses indicate that extensive water and food shortages are to befall humanity. The temperature rising process is significantly conditional upon the carbon dioxide equivalent of

greenhouse gases released into the atmosphere (the so called carbon footprint). Not only countries or organisations are responsible for it, but also individual people.

The media regularly report expert opinions on yet other results of global warming. The contemporary story of the Thwaites glacier is a good example. It is located in western Antarctica and its size is comparable with Florida. It is also known as the „Doomsday Glacier“ since, according to research, its melting threatens the planet significantly. Sea levels would rise remarkably should it disappear. Researchers claim that Thwaites melting may raise sea and oceans levels by approximately 70 cm. Simultaneously, the glacier is a barricade for the surrounding ice in Antarctica. Should this natural barrier cease to exist, global sea levels will rise even more visibly, i.e. by in excess of three metres [8].

Climate warming is to cause catastrophic results in the years to come, including raised sea and ocean levels, extreme weather conditions, affecting economy, especially agriculture, tourism and forestry. Even now humanity is experiencing unprecedented heatwaves, hurricanes and twisters, difficult to extinguish forest fires, floods and droughts destroying farmland. Due to global warming, certain animal and plant species will not be able to adapt to such violent environmental changes and will eventually become extinct.

It should be noted, however, that numerous global organisations, e.g. the UN, Greenpeace and Rainforest Alliance, are doing anything they can to avoid climate change and environment destruction. They support governments and companies to undertake more conscious steps in environment protection and turn towards sustainable resources. Many countries and businesses are becoming more and more interested in sustainable and renewable solutions, and are trying to give these ideals much values in their policies [9].

3. Climate Crisis and Moral Self-Awareness. Semantics of Remorse.

The term remorse seems to be superficially uncomplicated semantically. However the complexity of conditions to evoke this emotion as a result of moral assessment of own actions takes on a semantically varied nature in the light of psychological research [10]. Referring to the deepest level of moral self-assessment regarding inappropriate behaviour (breaking standards), that is remorse, requires becoming aware realising the main constituents of the concept, Whose existence has been a verified in psychological research and which display the semantic complexity of the term. The applicability of such research allows a more precise reference to not only the question of semantic shades of remorse but also to discover the relations between its elements, their inner conceptual hierarchy and the power of connections with other elements of moral self-assessment. All this in order to reach more effectively the self-assessment stage, and cause desired emotional reactions and behaviours.

Researchers have not devoted any special attention to the semantics of „remorse“. They place it among self-awareness emotions, connected mainly with breaking social standards, and more precisely with the feeling of guilt. The relationship between the awareness of crossing moral norms and remorse evades being framed as a simple consequence. It is possible to be aware of own wrong actions, but without the feeling of guilt. On the other hand, the feeling of guilt may arrive, but without the feeling of shame, or the feeling of guilt together with shame, but without remorse. The ultimate sense of remorse closes the hierarchical list of feelings. What is significant in understanding the genesis of such emotions is the fact their axis is the structure Self, and behaviour assessment standards, as pointed to inter alia by W. Strus and S. Ślaski [11].

In the self-awareness emotions research it is important to pay attention to the role of certain higher cognitive processes, including cognitive development. One of the most important aspects of such development is the emergence of the language symbolism, thus conceptual organisation of knowledge. Therefore, human understanding of self and the world cannot be realised without the sign system and feelings coexisting with it. In this way, one of the manners to steer cognition in people is deep semantic knowledge, yet

individualised, of words that belong in the social influence processes. Linguistic pragmatics, among others, is important for influence effectiveness in the question of education based attitude change concerning action for climate security. It is tightly connected with the semantic knowledge of linguistic tools.

The research in this paper applies W. Strus *Skale Uczuć Moralnych-5 (SUM-5)* [Moral Feelings Scales-5] [10],) as the fundamental tool. It consists in part A (transgressing norms) and part B (observing norms). The subjects selected and assessed situations which crossed or followed moral norms which they defined as important. Then the indicated how often they experienced any of the listed feelings in the selected situations. For the purposes of the research here only the scales in part A are pertinent.

4. Data and Methods

The data used in this study has been gathered through a paper questionnaire. The subjects' responses have been transcribed and unified (e.g. unified terminology has been implemented to indicate different study programmes) as a spreadsheet table. The database was then imported into the R statistical computing environment [12]. All calculations were performed in the R environment with the support of the RStudio programme [13]. Additional function packages were also applied: dplyr and ggplot within tidyverse [14, 15]), readxl [14], knitr [16] (Xie, 2023), Hmisc [17] and lm.beta as prepared by Stefan Behrendt. The survey included 329 respondents, however three people did not answer a significant number of questions. The remaining 326 people provided full responses. The subjects' age ranged from 18 to 50 ($M = 23.43$, $SD = 6.78$), with the age median of 21 years.

The group included 279 women, which constitutes 85.58% of the total. The remaining part were men. The women's average age was 23.63 years (respectively, the average age of men: 22.19), and the standard age deviation was 6.98 years (respectively 5.39). All study subjects were students: some of them full time weekday and some of them part time weekend. Table 1 presents the study group divided by the study programme and certain basic descriptive statistics of demographic variables within the groups.

Table 1. Descriptive statistics concerning study subjects as divided by study programme.

Programme	N	Females		Age	
		N	%	M	SD
Journalism	20	16	80.00	26.05	7.88
Language studies	21	14	66.67	21.00	3.69
Pedagogy	116	107	92.24	28.52	8.09
Psychology	161	136	84.47	19.69	1.24
Management	8	6	75.00	24.50	5.42

Source: own research.

As mentioned above W. Strus' the *Skala Uczuć Moralnych (SUM-5)* [Moral Feelings Scale-5] was used in the study. The tool is used to measure the proneness to experience a variety of emotions in situations where important moral norms are subjectively crossed or realised. SUM consists in part A (transgressing norms) and part B (observing norms). In this study, responses concerning only part A were assessed. The subjects made assessments of particular feelings when experiencing situations of norm crossing on a 7-point scale (0 – never, 1 – hardly ever, 2 – rarely, 3 – sometimes, 4 – often, 5 – very often, 6 – always). The list of feelings in part A SUM-5 contains 26 items which make up 6 scales: Positive emotions, Externalising emotions and distancing from responsibility, Fear of punishment, Shame, Global guilt, Remorse. All scales in part A contain four items each, except for the Global guilt scale with six items.

While analysing the data gathered the diligence of the survey subscales was confirmed. The table below presents reliability ratios for each subscale in both scales.

Table 2. reliability ratios for norm transgressing subscales.

Subscale	α	ω
Positive emotions	0.88	0.88
Externalising emotions and this does distancing from responsibility	0.64	0.64
Fear of punishment	0.78	0.79
Shame	0.76	0.76
Global guilt	0.87	0.87
Remorse	0.78	0.78

Source: own research.

Except for the *Externalising emotions and this does distancing from responsibility* scale, the ratios calculated indicate a good reliability level of the result obtained. The *Externalising emotions and distancing from responsibility* scale has a slightly lower α Kronbach coefficient as well as ω McDonald, yet they are still above the customary acceptable reliability threshold (0.60) – taking into account a small number of questions on the scale (4 questions) this value can be accepted as sufficient. The final measurements for the subsequent subscales were calculated as arithmetic means of responses given to the questions in each sub scale.

Table 3 provides a summary of basic descriptive statistics for the questions in the *Remorse* subscale. Similar descriptive statistics for all survey questions are shown in table A1 in the attachments section.

Table 3. descriptive statistics of responses to test items in the *Remorse* subscale.

Item	N	Mean	SD	% responses							Skewness	Kurtosi
				0	1	2	3	4	5	6		
5	326	1.76	1.53	27.6	19.0	24.2	15.0	7.4	6.1	0.7	0.57	-0.51
6	326	1.32	1.61	47.9	16.9	10.7	11.0	8.3	4.3	0.9	0.99	-0.19
21	326	2.03	1.76	27.6	17.8	14.7	16.6	12.9	8.0	2.4	0.42	-0.97
24	326	1.45	1.55	41.1	16.0	16.3	14.7	8.0	3.1	0.8	0.76	-0.43

Source: own research.

The aggregated results within the scales studied were analysed for correlations. The analysis applies Pearson's correlation coefficient due to the fact that the total results distribution within each subscale did not display a significant divergence from the normal distribution. In order to determine the p-value, the Holm correction was used to cater for multiple comparisons [18]. The table below shows the correlation analysis summary.

Table 4. Pearson correlations of the diagnosis results with subsequent survey subscales.

Subscale	2.	3.	4.	5.	6.
1. Positive emotions	0.42***	0.11	0.16	0.02	0.09
2. Externalising emotions and distancing from responsibility		-0.11	-0.02	-0.14	-0.28***
3. Fear of punishment			0.66***	0.61***	0.50***
4. Shame				0.62***	0.56***
5. Global guilt					0.63***
6. Remorse					

p-value: *: < 0.05, **: < 0.01, ***: < 0.001.

Source: own research.

Moderate positive correlations between the results were noted for all subscale pairs *Fear of punishment*, *Shame*, *Global guilt* and *Remorse*. The correlation between the subscale

results of *Positive emotions*, *Externalising emotions and distancing from responsibility* was slightly lower, but also positive. In turn, the last statistically significant correlation between the subscales of *Externalising emotions and distancing from responsibility* and *Remorse* was negative.

An analysis of single test items of the APS scale (*Remorse*)

One of the analysis stages was matching linear multiple regression models in an attempt to explain the variance in responses to the four test units in the *Remorse* subscale. Table 5 presents a summary of the analysis results.

Table 5. linear regression models explaining the responses to the questions in the *Remorse* subscale.

Variable	Item 5		Item 6		Item 21		Item 24		
	estimate	beta	estimate	beta	estimate	beta	estimate	beta	
Intercept	2.730***	-	2.850***	-	2.474***	-	1.983***	-	
Gender:Male	-0.089	-0.024	0.181	0.049	-0.029	-0.007	-0.192	-0.043	
Age	0.004	0.019	0.005	0.026	0.007	0.032	0.000	0.002	
AUP_res	0.157**	0.165	0.159**	0.168	-0.053	-0.053	0.209***	0.185	
AUE_res	-0.301***	-0.224	-0.352***	-0.264	-0.195*	-0.139	-0.364***	-0.229	
ASK_res	-0.009	-0.009	0.096	0.092	0.053	0.049	-0.011	-0.009	
AWS_res	0.262***	0.247	0.096	0.091	0.233**	0.210	0.250**	0.199	
AGW_res	0.252***	0.246	0.366***	0.360	0.325***	0.303	0.454***	0.374	
F	16.992***	-	23.086***	-	18.159***	-	26.053***	-	
R ²	0.256	-	0.322	-	0.270	-	0.350	-	
p-value:	*.	<	0.05,	**.	<	0.01,	***.	<	0.001.

Source: own research.

High R^2 levels should be noted in the researched models. All models are statistically significant as a result of large F-values and the corresponding p-values. The results obtained indicate that a subject's age and gender bear no connection with which answer they selected in the *Remorse* subscale. The subscale which is clearly the most related to the responses to the questions in the *Remorse* subscale is the *Global guilt* subscale, for which the regression coefficients for all researched models appeared to be significant, positive and fell between 0.252 and 0.454 (for standard coefficients: from 0.246 to 0.374). Lower but still significant and positive relations between the responses to the questions in the *Remorse* subscale were noted for the *Positive emotions* and *Shame* subscales (with the exception of question 6 which appeared to be insignificantly connected with the diagnosis in this aspect). In turn, the *Externalising emotions and distancing from responsibility* subscale showed significant and negative relations with all the questions in the *Remorse* subscale, and the models' coefficients for this subscale fell between -0.195 and -0.364 (for standard coefficient: from -0.139 to -0.264).

While analysing the coefficients indicated in the linear models subscales A can be established which relate the strongest to the responses to particular questions in the *Remorse* scale. Hence, question 5 relates the strongest to the AWS scale ($\beta = 0.247$), although a very similar connection is noted with the AGW scale ($\beta = 0.246$). The other questions in the *Remorse* scale were connected the strongest with the total result of the AGW scale (respectively, for questions 6, 21 and 24 the coefficients β noted were equal to 0.360, 0.303 and 0.374). Do you do the fact that all the listed coefficients were positive, it transpires that on the level of the data obtained the higher total results on the AWS scale go hand in hand with the higher responses to all the questions in the *Remorse* subscale.

In order to identify potential connect between particular questions in the *Remorse* subscale an exploratory data analysis was performed with the use of the R environment and the psych package. The EFA was adapted based on the data from all the questions on the Norm transgressing scale which consisted of the *Positive emotions*, *Externalising emotions and distancing from responsibility*, *Fear of punishment*, *Shame*, *Global guilt* and

Remorse subscales; 26 questions in total. For the adapted exploratory model with a forced selection of 6 latent variables – as provided by the original scale – the Tucker Lewis Index was equal to 0.892, which is very close to the level regarded as acceptable to be a satisfactory adjustment (0.9) and the RMSEA coefficient equal to 0.064 with a 90% reliability range from 0.056 to 0.072, which is an acceptable level to claim a good fit of the model (it is commonly accepted that the top limit in the reliability range be lower than 0.08). The good model fit, however, was not a goal of its own in this research. The analysis focused rather on quantifying the relations between the latent variables measured by the questionnaire and its particular questions.

For the model adjustment oblimin rotation was applied rejecting the orthogonality of the researched latent variables. The next step was to identify which latent variables, based upon the analysis of the load of the questions in scale A, are represented in the original subscales. The load of the adjusted EFA model as presented in Table 6.

Table 6. The load of the adjusted EFA model with reference to the 6 researched subscales on the Norm transgressing scale. The loads in bold refer to the loading power of the *Remorse* latent variable by each questionnaire item and the 4 questions on the *Remorse* scale loading the remaining dimensions.

Item	AGW	AUP	ASK	APS	AWS	AUE
Q1	0.069	0.073	0.312	0.455	-0.077	-0.129
Q2	-0.016	0.705	0.009	0.027	-0.093	0.058
Q3	0.058	0.154	-0.001	-0.647	0.018	0.100
Q4	-0.030	0.205	0.290	-0.198	-0.085	0.382
Q5	0.088	0.131	0.078	0.510	0.116	0.116
Q6	0.261	0.157	-0.056	0.538	0.109	-0.020
Q7	0.742	0.028	-0.040	0.179	0.027	-0.104
Q8	0.795	0.042	0.074	0.059	-0.048	-0.048
Q9	0.296	0.125	0.521	-0.093	0.053	-0.349
Q10	0.661	-0.105	0.024	0.049	0.189	-0.085
Q11	0.040	0.296	0.042	0.041	0.530	-0.083
Q12	0.021	-0.053	0.044	0.002	0.894	0.000
Q13	0.559	0.002	0.171	-0.064	0.191	0.105
Q14	0.055	0.836	-0.071	-0.024	-0.027	0.014
Q15	-0.030	0.348	-0.083	-0.429	0.015	0.171
Q16	0.126	0.070	0.556	0.091	0.049	-0.181
Q17	0.025	-0.057	0.773	-0.051	0.083	-0.026
Q18	-0.132	0.813	0.057	0.035	0.063	-0.005
Q19	0.019	0.876	0.001	0.003	0.013	-0.059
Q20	-0.013	0.047	0.637	0.055	0.109	0.185
Q21	0.156	-0.062	0.136	0.457	0.084	0.227
Q22	0.002	-0.078	0.637	0.188	0.068	0.182
Q23	-0.001	0.398	0.026	-0.170	0.049	0.272
Q24	0.208	0.127	0.012	0.481	0.178	0.171
Q25	0.772	-0.078	0.018	-0.064	0.055	0.172
Q26	0.368	0.027	0.138	0.019	-0.110	0.431

Source: own research.

The *Remorse* scale was successfully reflected in the EFA analysis: The loads noted for the questions actually loaded the highest in this particular diagnosis dimension. Furthermore, the loads for questions 5, 6, 21 and 24 do not exceed the range from -0.1 to 0.3 for the other latent variables accounted for in the model, which might suggest a good question distribution on the APS scale.

The load analysis of all the questions on scale A within the APS subscale suggests low load values: other questions do not load this scale well with the exception of three questions: 1, 3 and 15. The absolute load value for these questions as determined in the EFA analysis is higher than 0.4. The loads for questions 3 and 15 are additionally negative (With the load for question 3 being high and totalling at -0.647).

The last stage in the analysis was to delineate the Pearson correlation between the responses to the particular questions on scale A and the diagnosis results within the AUP, AUE, ASK, AWS, AGW and APS subscales. The analysis outcomes are shown in Table 7. The table also includes the statistical significance range correcting for multiple statistical tests.

Table 7. Pearson correlation coefficients between the responses to each question on scale A and the total results of the AUP, AUE, ASK, AWS, AGW and APS subscales, corrected for statistical significance.

Scale/Item	AUP	AUE	ASK	AWS	AGW	APS
AGW						
Q7	0.01	-0.23**	0.52***	0.48***	0.80***	0.61***
Q8	0.05	-0.15	0.56***	0.51***	0.85***	0.54***
Q10	-0.08	-0.24***	0.53***	0.54***	0.81***	0.55***
Q13	0.07	-0.07	0.52***	0.61***	0.81***	0.46***
Q25	-0.02	-0.11	0.45***	0.48***	0.84***	0.47***
Q26	0.06	0.15	0.24***	0.28***	0.55***	0.29***
APS						
Q5	0.11	-0.19*	0.35***	0.43***	0.43***	0.75***
Q6	0.10	-0.25***	0.41***	0.40***	0.51***	0.78***
Q21	-0.06	-0.21**	0.38***	0.43***	0.48***	0.76***
Q24	0.12	-0.21**	0.40***	0.47***	0.53***	0.81***
ASK						
Q1	0.04	-0.26*	0.66***	0.36***	0.39***	0.47***
Q9	0.16	-0.04	0.81***	0.55***	0.53***	0.34***
Q16	0.10	-0.09	0.85***	0.52***	0.49***	0.39***
Q17	0.03	0.02	0.78***	0.62***	0.48***	0.36***
AUE						
Q3	0.19*	0.70	-0.21**	-0.12	-0.21**	-0.41***
Q4	0.25***	0.63***	0.08	0.13	0.07	-0.05
Q15	0.35***	0.74***	-0.21**	-0.15	-0.24***	-0.28***
Q23	0.38***	0.70***	0.03	0.09	0.01	-0.01
AUP						
Q2	0.80***	0.36***	0.04	0.07	-0.02	0.06
Q14	0.87***	0.39***	0.07	0.11	0.02	0.08
Q18	0.87***	0.36***	0.11	0.19*	0.00	0.08
Q19	0.90***	0.35***	0.14	0.18*	0.07	0.09
AWS						
Q11	0.31***	0.03	0.42***	0.72***	0.39***	0.35***
Q12	0.00	-0.09	0.51***	0.80***	0.55***	0.48***
Q20	0.14	0.06	0.53***	0.77***	0.47***	0.37***
Q22	0.01	-0.06	0.55***	0.75***	0.49***	0.50***
p-value: *: < 0.05, **: < 0.01, ***: < 0.001.						
Source: own research.						

The bolding in Table 7 shows maximum absolute values of the correlation coefficients between the raw responses to the questions and the aggregate results of subscales A. The

information in Table 7 deepens the correlation analysis from Table 4. For example, subscale A that correlates the most strongly with *Remorse* is *Global guilt*. On the level of responses to single questions, the strongest connection of the general result of *Remorse* is with question 7 on the *Global guilt* subscale. Reversely, the question on the *Remorse* subscale that has the strongest connection with the general result of *Global guilt* is question 24.

5. Results and Discussion

When assessing the role of the study subjects' demographic features, in particular *Remorse* items, it appeared that age and gender bear no relations to the responses selected on the *Remorse* subscale. The subscale that is most clearly connected with the responses to the questions on the *Remorse* subscale is *Global guilt*. It was the regression coefficients rather than age and gender that appeared to be significant, positive for all researched models on that subscale. This result may suggest a general human mechanism which establishes a relation to the sense of remorse, where gender and age differences are annihilated. Due to the fact that the subjects' age ranged between 18 and 50 (the age median of the study subjects was 21 years), taking into account the effects of up-bringing and education, age differences do not seem important when deciding upon the form, kind and content of influence. The same is true for gender differences. It can be, therefore, claimed that neither age nor gender changes the semantic profiling of the term remorse. Thus, the semantic image of remorse does not require any modification as to the hierarchy of importance of its constituents in the educational process. It needs to be reinforced, however, that this relates only to a group of young people of 21 years of age on average.

With reference to the relation of *Remorse* (APS – globally) to particular dimensions of scale A, it should be noted that positively, in the relation strength order, APS relates to *Global guilt* (+0.61), and furthermore to *Shame* (+0.50), *Fear of punishment* (+0.47) and *Positive emotions* (+0.09), yet negatively to *Externalising emotions and distancing from responsibility* (-0.41). As for the connections with particular questions of the scales at hand, the positive link on the *Global guilt* scale concerned *anger, self-wrath*. *Shame* connected positively with *anxiety about how others receive me or my behaviour*. *Fear of punishment* connected with *fear of consequence*. Ultimately, *Positive emotions* connected with *excitement and elation*. *Externalising emotions and distancing from responsibility* connected negatively with *indifference*.

The types of emotions presented in the study and experienced in moral norm transgressing situations related to climate crisis events, within the *Remorse* group, place as follows for importance: *taking responsibility for what has happened* (0.538), *care for the effects of own actions for other people* (0.510), *urge to admit, apologise or make amendments for the future* (0.481), *urge to remedy own guilt* (0.457). This order fully epitomises all the stages in the process of becoming emotionally mature with respect to the sense of remorse: starting with taking responsibility for what has happened, then caring for the effects of own actions for other people, and then the urge to admit, apologise, to the decision to remedy only guilt. These stages are unnecessary, and they have their allocated positions in the order, without the need to determine the length of time they need to last, which will depend on the individual.

Among the four types of emotions making up the *Remorse* scale two of them connect the most strongly with other emotions on the other scales. *Responsibility for what has happened* connect the most strongly and positively with *Fear of punishment* (+0.41), and negatively with *Externalising emotions and distancing from responsibility* (-0.25). In turn, *urge to admit, apologise or make amendments for the future* connects the most strongly with *Global guilt*, *Shame* and *Positive emotions*. As can be noted, said connections significantly reinforce and complement the semantics of feelings which co-create the *Remorse* scale.

The study results presented above give grounds for discussion on the semantics of remorse as expressed through language. An order to establish the semantic profile of *remorse*, the discussion should include not only the conceptual layers of the term, but also draw an interpretive frame for the conditions (context) of its function. The fact that the

analysed term is a form of self-awareness, assessment and moral decision forces to perceive it as an individual process whose culmination will be remorse induced obligation. However, this process, as already mentioned, can come to completion sooner, at one of the stages along, which will suggest a certain emotional immaturity of the person undergoing this process. Processuality, both mature and immature, from the point of view of semanticisation, simultaneously becomes an intentional pragmatics, and shows the nature of individual semantic specificity of the term **remorse**. The relation between semantics and pragmatics here is understood in the spirit of Ingarden's theory [19], who brings to life the concept of ideal sense, which belongs to semantics, whereas contextual meaning to pragmatics. This means that language as a system of signs does not describe a given reality, in which it is also anchored, but a "world" of semantic correlates [20].

The relation between semantics and pragmatics interpreted in this way is enriched in this paper by the semantics of understanding as proposed by Ch. Fillmore [21]. He claims that the meaning of a lexical unit is an outcome of interpreting its function in a wide linguistic and extralinguistic context. Fillmore calls this context an interpretive frame [22]. He states that the semantics of understanding postulates that differences in meaning are an outcome of different context of linguistic unit usage in speech, and decoding individual connotations is conditional upon the interpreter's competence, their system of values, adopted stereotypes, or a point of view taken in a given situation. Thus, the semantics of understanding shows both, semantic standards adopted in a given communicative community, and the relativity of the linguistic image of the world of particular subjects interpreting communicative acts [22] (p.133).

Own research for the purposes of this paper looks at four types of feelings experienced by study subjects in situations of moral norm transgressing with reference to climate crisis situations. The feelings placed in order from the most common to the least common or never: *responsibility for what has happened* (0.538), *care for the effects of own actions for other people* (0.510), *urge to admit apologise or make amendments for the future* (0.481), *urge to remedy only guilt* (0.457). As can be seen, it was easier for the study subjects to evoke internally the sense of responsibility than the urge to remedy own guilt through behavioural change. The emotions mentioned in the studies cited here filled the conceptual layer of the term *remorse*. Nevertheless, bearing in mind the pragmatic understanding of the meaning of the term and taking into account its interpretive frame, it should be supplemented with facts such as *responsibility for what has happened* also connects the most strongly and positively with *fear of punishment* and negatively with *externalising emotions and distancing from responsibility*. In turn, *urge to admit, apologise or make amendments for the future* also connects the most strongly with *Global guilt, Shame and Positive emotions*. Additionally, said supplementations (reinforcements) happen processually within the scale of moral feelings, as types of self-awareness emotions. Therefore, based on the results of the study on these emotions, taking into account the emotions connected with transgressing moral norms in the context of ecology, and based on linguistic semantic theories (cognitive and pragmatic), the semantics of remorse presented in this paper offers interpretive frames which may be useful in designing informational and educational activities required for pro-ecological actions.

6. Afterthoughts: Educational Use

Causality and effectiveness of educational impact at school (university) is strictly connected with a teacher's communicative competence. This embraces both skills and knowledge about language tools. The quality of lexis that a teacher has at their disposal in a given situation is not so much about lexical choices, but comes rather from knowing the semantics of words, and more precisely the range of their interpretive frames (semantics of understanding). As shown in this paper, remorse is the final stage, and expected at that, in the process of self-awareness emotional realisation. Producing this effect through educational activities requires specific didactic-persuasive skills. This, in

turn, requires expertise in the semantics of understanding, which must take into account possible differences with reference to the listener's own individual linguistic experience.

What then, in the light of the studies presented above on the semantics of remorse for the climate crisis as an effect of the moral self-awareness process, should be implemented among the persuasive competences for the purposes of shaping desired pro-ecological attitudes? How to evoke remorse in listeners as the only of the moral feelings deemed optimal and conducive to such behaviour? Studies on moral feelings that accompany transgressing moral norms provide enrichment to a teacher-educator's workshop of the following guidelines;

1. The order of the moral feelings (their role and frequency) as presented in the studies should be included in any educational activities aiming for a change in pro-ecological attitudes to more responsible ones. This will allow a more effective distribution of persuasive elements.
2. The connection between the types of moral feelings of remorse with other types moral feelings should be used as crucial information, which will significantly reinforce verbal persuasive tools e.g. *urge to admit apologise or make amendments for the future* connects with *global guilt, shame and positive emotions*.
3. Bear in mind that remorse should be educationally operationalized as one of the moral feelings within the circle of self-awareness emotions.

The above guidelines will be of value not only within this specific topic (creating a change in behaviour towards climate crises), but they also show the importance of deep linguistic studies within semantics (semantics of understanding) in the process of acquiring effective communicative competencies.

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