Meat, Water, and Clothing: Insights into Italian Youth's Willingness to Adopt Sustainable Behaviors

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1. Introduction

The main aim of this article is to address the characteristics of those Italian adolescents who are willing to adopt pro-sustainable behaviors, and to investigate which kind of arguments emerge as more convincing for them fostering this kind of attitudes. The main motivation lies in the fact that adolescents are the future assets of the nation and will be the policy makers governing sustainable environmental practices. Adolescence is a critical period for behavior change, particularly in relation to pro-environmental behavior (Palupi and Sawitri, 2018). From the main related literature, we know that adolescents' biospheric values and environmental self-identity are associated, via personal norms, with a wide range of pro-environmental behaviors, including recycling, environmentally friendly traveling, purchasing environmentally friendly goods and drinking tap water (Balunde, et al., 2020). Pro-environmental intentions among adolescents are fonud to be significantly influenced by the adolescents' awareness (Basri et al., 2015): interventions seem to be effective only among those who were ready to start saving behaviors (Bell et al., 2016). In order to address this issue, we provided questionnaires to Italian high school students in order to answer the following questions:

1. How much do Italian adolescents consider important to decrease the consumption of meat, water, and fast-fashion clothes?
2. Are they more sensitive to Socio/Environmental arguments or Individual/Economic ones?
3. Does this sensitiveness change, depending on specific individual attitudes?

2. Materials and Methods

2.1 Data

The data come from a survey conducted in Italian high schools in the period mid-March 2022 to mid-April 2022. The experiment is conducted within the scope of a collaboration between the University of Siena and the no-profit foundation Fondazione Mondo Digitale (FMD), and it was approved by the Ethical Committee of the University of Siena (CAREUS). The survey was implemented online with the platform Qualtrics. The link was then distributed to the schools that were in contact with FMD. In this sense, we can safely assume that, although schools self-selected to participate in the project, the individual students did not strongly self-select with regards to answering the survey. The survey is implemented in a way such that every individual is randomly assigned to one of the treatments (or control group).

The sample is composed by 829 students enrolled in the Italian Secondary Education System. About them we know: *Gender*: Males (53.8%); Females (41.9%); Others (4.3%); *Age*: 13-16 y.o. (12.3%); 17-20 y.o. (87.7%); *Macro Region*: North (39%); Centre-South (61%); *Parental Education*: At least one HE (32.8%); At least one SE (42.1%); Others (25.1%); *Headache*: 'I'd wait for it to pass' (56.2%); 'I'd take a drug' (37.2%); 'I'd take a natural remedy' (6.6%).

The reason behind the inclusion of the variable *Headache* lies on the *Self-Medication Hypothesis* (Hong et al. 2019): people (especially adolescents) with a greater tendency in internalizing problems is highly associated with the usage of medicines without prescription. Among adolescents, self-medication is associated with higher level of psychological distress in the transition toward adulthood (Damphousse and Kaplan 1998). Regarding natural remedies, among adolescents an emotional affinity for nature is found to be a mediator factor for pro-environmental attitudes (Krettenauer 2017).

Finally, the treatment consists in showing every subject a brief text. Each subject is randomly assigned to one of the two treatments. People in the control group have received no text. There are two types of treatments: a socio-environmental argument and an economic-individual one, in order to investigate if there is a kind of information more convincing for adolescents.

2.2 Measuring Individual Attitudes and Perceived Awareness

In order to measure Individual Attitudes and Perceived Awareness, a Principal Component Analysis for ordinal discrete variables (PRINCALS) (Gifi, 1990) was performes. This approach aims to minimize a loss function, which evaluates the goodness of fit (distance) between the quantifications of item categories and one or more latent variables (dimensions that are not directly observable) that represent the concept of interest. It is very useful for analyzing survey data with ordinal categorical items (Carpita 2003).

To measure Individual Attitudes, we reduced the batteries of questions related to attention toward physical, mental and general wellbeing, and tp importance toward balanced nutririon, preventing and control, sleeping, attention to medicines, social relationships, and physical activities. Consequently, we can give interpretation to the four components obtained accounting more than the 75% of the total variance:

- *Comp.1 - Easygoing:* emphasizes the person's scarce attention toward health, while giving importance to relax and social relationships.
- *Comp.2 - Nutrition Enthusiasm:* emphasizes the person's prioritization about maintaining a healthy and balanced diet to optimize their overall well-being.
- *Comp.3 - Fitness Dedication:* emphasizes the person's dedication to exercise and physical fitness, and suggests that they may prioritize this aspect of their health over other areas.
- *Comp.4 - Health Reliance:* emphasizes the person's reliance on health-related practices, such as medicine or therapy, to maintain their well-being.

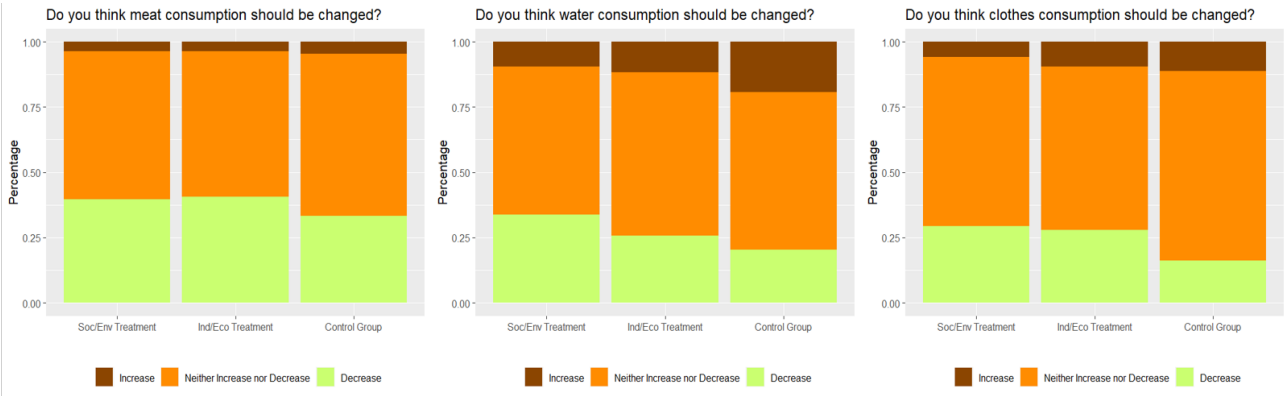
To measure Perceived Awareness, we reduce the battery of questions related awareness toward paper, mobility, waste, nutition, physical activities, and clothing. Consequently, we can give interpretation to the three components obtained accounting more than the 75% of the total variance:

- *Comp.1 - Global:* perception of having high awareness of all the proposed topics.
- *Comp.2 – Self-Referenced:* perception of having high awareness of those items with higher impact on the individual sphere rather than on the environmental or social one.
- *Comp.3 - Material:* perception of having high awareness of issues regarding material objects.

2.3 Empirical Strategy

This article investigates the availability of Italian adolescents in reducing their consumption of meat, water, and clothes. For each item, a question was asked using a 6-level Likert scale, which was later reclassified into a 3-level categorical variable. The questions aimed to investigate students' opinions about the need to adopt more pro-environmental behaviors, and the answers are summarized in Figure 1.

Figure 1: Share of respondents based on the treatment received and the willingness to adopt sustainable behaviors.



In this exploratory analysis, for all the three items listed above are estimated Ordered Multinomial Logit models. Each dependent variable among Meat, Water, and Clothing is classified into three levels: *i)* Increase = 0 (I); *ii)* Neither Increase nor Decrease = 1 (NInD); *iii)* Decrease = 2 (D). Following the main analysis, predicted probability plots will be generated to explore the interaction between treatments and statistically significant principal components, with the goal of identifying specific arguments that could be targeted towards particular groups of people. The parallel lines assumption for all the estimated models was tested using a Brant Test,

and it was found to hold for each regression. The covariates used into each regression are selected through a bidirectional stepwise selection based on the Akaike Information criterion (AIC).

3. Results

Table 1 provides the main results for the three estimated regressions. As it can be seen, with regard to meat, a strong gender difference emerges, with males as the less available in reducing their consumption. The same results, although weaker, emerges for water consumption, while no gender differences are found for clothing. Students from Lyceums (which can be considered as the most academic track for Italian students) are in general more willing to adopt pro-sustainable behaviors with the only exception of clothing consumption, which is on the other side the only case where the macro-region seems to be relevant. From this perspective, southern students are less sensitive to the environmental issues related to clothing and fast-fashion. The way in which individuals cope with the headache gain importance only for the regression related to water: in this case, those who declare of using medicines are less willing to adopt a pro-sustainable behavior, coherently with the hypothesis that a perfunctory usage of drugs is related with lower ecological attitudes. From this point of view, Individual Attitudes appear to be positively related with pro-environmental willingness, especially the component we linked to *Nutrition Enthusiasm*, which could mean that a high attention to the individual health is also associated to high attention toward global one.

Table 1: Ordered Multinomial Logit Regression for the willingness at decreasing the consumption of Meat, Water, and Clothing, after stepwise selection.

Ordered Multinomial Logit						
Dependent Variable	Meat consumption		Water consumption		Clothing consumption	
Independent Variable	$\hat{\beta}$	$\hat{\sigma}$	$\hat{\beta}$	$\hat{\sigma}$	$\hat{\beta}$	$\hat{\sigma}$
Gender (Ref: Males)						
Females	0.883***	0.163	0.281*	0.162		
Others	0.785**	0.371	0.693*	0.359		
School Type (Ref: Not Lyceum)						
Lyceum	0.389**	0.157	0.358**	0.154		
Macro-Region (Ref: North)						
Centre-South					-0.517***	0.154
Headache (Ref: "I'd wait for it to pass")						
"I'd take a drug"			-0.454***	0.151		
"I'd take a natural remedy"			-0.365	0.297		
Individual Attitudes (Principal Components)						
Comp. 1 – Easygoing					0.196**	0.082
Comp. 2 – Nutrition Enthusiasm	0.203***	0.076			0.253***	0.076
Perceived Awareness (Principal Components)						
Comp. 1 – Global	0.312	0.077			0.316***	0.085
Comp. 2 – Self-Referential	-0.241***	0.077	-0.161**	0.072		
Comp. 3 – Material			-0.234***	0.072		
Treatment (Ref: Control group)						
Soc/Env Treatment	0.307*	0.180	0.807***	0.176	0.768***	0.185
Ind/Eco Treatment	0.357**	0.177	0.558***	0.172	0.533***	0.181
$Intercept_{I\|NInD}$	-2.622***	0.214	-1.407***	0.168	-2.322***	0.183
$Intercept_{NInD\|D}$	1.351***	0.161	1.675***	0.172	1.330***	0.164
Brant	χ^2	$Pr(<\chi^2)$	χ^2	$Pr(<\chi^2)$	χ^2	$Pr(<\chi^2)$
Test	7.365	0.500	16.161	0.064	8.379	0.212
Diagnostics	*Reduced Model*	*Full Model*	*Reduced Model*	*Full Model*	*Reduced Model*	*Full Model*
Log-likelihood	-624.072	-622.239	-735.324	-732.494	-660.222	-650.576
R^2 Nagelkerke	0.140	0.145	0.088	0.095	0.077	0.104
AIC	1268.145	1281.467	1492.649	1502.301	1336.444	1339.152
BIC	1281.467	1307.79	1507.303	1528.301	1346.509	1363.056
No. Observations	829					

Notes: * = 0.1 ≥ *p*-value > 0.05; ** = 0.05 ≥ *p*-value > 0.01; *** = *p*-value ≤ 0.01; *I* = Increase; *NInD* = Neither Increase nor Decrease; *D* = Decrease.

Regarding Perceived Awareness, as expected high global awareness is positively associated at least with a reduction in the consumption of meat and clothing, while self-referential and material awareness are negatively associated with the availability of reducing the consumption of water.

Finally, all the treatments always exhibit a positive and significant effect, demonstrating that they are generally effective. Interestingly, for water and clothing the coefficient of the socio-environmental treatment is much larger than the one of the economic-individual one. For meat consumption the coefficient of the economic-individual argument is larger. Nonetheless, a Wald test for the difference of the two coefficients for this regression is not significant ($Pr > \chi^2 = 0.7804$), meaning that the two betas are not statistically different each other.

4. Preliminary Conclusions and Further Development

This exploratory analysis has demonstrated the receptiveness of Italian adolescents towards receiving information about environmental issues, potentially fostering ecological behaviors in these individuals who will become future eco-consumers. Surprisingly, socio-environmental arguments have proven to be more effective than economic-individual arguments in increasing willingness to reduce detrimental consumption habits. For instance, informing adolescents that *"every year, 35kg of textile waste is produced per consumer, which is 400% more than 20 years ago"* is more persuasive in encouraging them to reduce their clothing consumption, compared to stating that *"fast fashion garments are not designed to be worn more than ten times due to poor materials, promoting the need to constantly purchase new clothes."*

Subsequently, this study will involve estimating interactions between treatments and principal components to determine if different types of people, aside from socio-demographic characteristics, are affected differently by specific treatments. Some preliminary analyses have already been conducted (not shown for brevity), leading to interesting insights. For example, with regard to meat consumption, both treatments significantly interact with the *Easygoing* component, resulting in a negative effect. Specifically, for individuals who prioritize relaxation and social relationships over health, the treatments seem to have a counterproductive effect. In the control group, a stronger presence of this component indicates a greater willingness to reduce meat consumption. However, the treated group shows a decrease in this willingness, to the extent that individuals with higher values of this component are predicted to have a higher likelihood of increasing their meat consumption rather than decreasing it.

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