How Your Vegetarian Aunt Could Save the World.

A study into the influence of social connectedness on environmental concern and how income moderates this effect.

Abstract Environmental issues and the emphasis on sustainable living have grown increasingly in the limelight over the 21st century. Rising awareness of urgent issues like climate change is forcing us to rethink our lifestyles, and creating a trend of pro-environmental behaviour. A sociological lens can be applied to look for solutions to these environmental issues, for example through notions like social connectedness and how this impacts on people's level of environmental concern. This thesis examines this relationship between social connectedness and environmental concern, using survey data collected in Switzerland by Enzler, Diekmann and Liebe (2019), as well as including income as a variable that studies have shown can also impact both social connectedness and environmental concern. It is hypothesized that firstly a greater level of social connectedness coincides with a higher level of environmental concern, and secondly that this relationship is stronger for people with a higher income. Statistical analysis was conducted and social connectedness (N=1254) was found to be positively related to environmental concern. However there was no significant effect of the moderation of income. This research could provide a useful source for future policymaking and help to fill the research gap looking specifically at the impact of social connectedness; a concept that is central to every society.

Keywords: Environmental concern, social connectedness, income, pro-environmental behaviour.

15th June 2020

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Introduction

More extreme weather, sea level rise, the warmest five-year period on record and the recent bushfires in Australia; are all global trends linked to current anthropogenic climate change (Van Oldenborgh, Krikken, Lewis et al., 2020). Fossil fuel combustion and consequent carbon dioxide emissions have also steadily increased in the last decade (IPCC, 2017). As a result it is now more important than ever for the world to start acting more pro-environmentally. In the last decade the prevalent approach to solving these issues has revolved around developing new technologies. However new pro-environmental technology is not enough, since the positive effects of new technologies that reduce CO_2 emissions are not able to combat the continuing growth in consumption (Midden, Kaiser & McCalley, 2007). It is therefore imperative that people's consumption behavior changes too. One way in which this behavioural change can be facilitated is through the influence of other people or groups on the individual (Forgas & Williams, 2001). It is thus relevant to research the influence of other people and groups on pro-environmental behaviour. This paper investigates this influence by elaborating on research that has been done by Enzler, Diekmann and Liebe (2019). In their study they combined survey data with metered data on actual electricity usage among swiss households. One of their conclusions is that environmental concern is a predication factor for electricity usage. Environmental concern can be seen as "the degree to which people are aware of problems regarding the environment and support efforts to solve them and/or indicate a willingness to contribute personally to their solution'' (Dunlap & Michelson, 2002). The household-level sectors of energy consumption that appear to have a high emissions-related environmental impact are housing, transportation and nutrition (EEA, 2013; Tukker & Jansen, 2006). In order to reduce these key areas of energy consumption, it is beneficial to look deeper into these consumption behaviours as well as how they differ across different population segments (Moser and Kleinhückelkotten, 2018). To begin with implementing policies and interventions to tackle environmental issues like climate change, knowledge of what determines and motivates people's consumptive decisions and practices is crucial. A driving force behind these policies and interventions is environmental concern (Poortinga, Steg and Vlek, 2004). It is important to look at the variables that can influence environmental concern, for example someone's individual behaviour can be influenced by other people or groups. It is therefore interesting look at the effect of social connectedness on environmental concern. Enzler, Diekmann and Liebe (2019)

included questions on social connectedness in their survey, but did not discuss it in their analysis.

The value-belief-norm theory (Stern, 2000; Stern, Dietz, Abel, Guagnano and Kalof, 1999) contends that individuals who follow a particular social movement believe that valued objects are under threat. They also believe that their actions can help to restore those valued objects and thus experience an obligation for pro-movement action. This creates a predisposition to provide support, and the particular type of support that results is dependent on the individual capabilities and constraints. According to the value-belief-norm theory, pro-environmental behaviour stems from: the acceptance of particular personal values, the belief that aspects important to those values are under threat, and from the belief that actions initiated by the individual can help alleviate the threat and restore the values. The particular type of environmental support that results is dependent on the individual's capabilities and constraints. This is in line with environmental concern in terms of the extent to which people are willing to help and contribute personally to solutions. This also concurs with Schwartz (1994) who argues that values contribute to the explanation of various environmental attitudes and behaviours.

This theory would therefore suggest that certain values can help people to become more environmentally concerned. The research of Enzler, Diekmann and Liebe (2019) did not use social connectedness as a variable for environmental concern. Therefore this paper aims to fill this gap in the literature regarding the specific role of social connectedness on environmental concern. The overarching research question of this thesis is as follows:

"*What is the effect of social connectedness on environmental concern?''*

Studies have shown that environmental concern and socio-economic status can be positively related (Göksen et al. 2002; Givens and Jorgenson 2011, Knight and Messer 2012). However the relationship between environmental concern and income has been researched multiple times; yielding contrasting results (Dunlap and Mertig, 1995; Knight and Messer 2012). Although there is a paradox in this research history according to Givens and Jorgenson (2011) : "A common assumption regarding environmental concern is that only those who are affluent enough to care about concerns beyond immediate survival are able to devote energy problems and to engage in actions that demonstrate such concerns'' (Givens and Jorgenson, 2011). This would mean that people with a higher income tend to be more environmentally concerned than their less affluent counterparts. This is also supported by survey data showing

higher rates of membership in environmental groups and stronger support for the political left among wealthy individuals (Dunlap et al. 2000). On the other hand, research also suggests that people with a higher income are also responsible for the highest level of CO_2 emissions; (Kuzyk 2011; Kennedy et al., 2013). To investigate this further the moderation effect of income on the relationship between social connectedness and environmental concern will also be tested in this thesis. In other words: do people with a higher income have greater social connectedness and therefore more environmental concern? This thesis will first develop a theoretical framework to explore and connect the concepts of social connectedness, environmental concern and income in more depth. Following this, the method section will utilise data from Enzler, Diekmann and Liebe (2019) to test the different hypotheses, which will be discussed further in the result section. The thesis will draw to a close with a conclusion and discussion for any further research.

Theoretical Framework

2.1 Social connectedness and environmental concern

Lee and Robbins (1998) describe social connectedness as an attribute of the self, reflecting perceptions of interpersonal closeness with the social world. It develops early in life and extends throughout the life span. In adolescence, peer affiliations and group memberships allow individuals to identify with others with similarities in appearance, interests and talents. By adulthood these experiences are incorporated into one's overall sense of connectedness. Being socially connected means that these adults have a greater tolerance and respect for interpersonal differences (Baker and baker, 1987), in these groups information is also being exchanged. Being part of these groups also means that you are part of a social network. In these networks information is being exchanged by other's people influence. Social influence occurs when an individual's thoughts, feelings or actions are influenced by other people or groups (Forgas and Williams, 2001). Pro-environmental behaviour could be enhanced through social influence by incorporating theories and principles, such as norms, social learning and social comparison (Cialdini, 2003). Adopting these social norms is important for individuals to gain approval so that other people will think more positively of them. Therefore behaviour can be guided by social norms, even if this is subconscious and we are not actively aware that we are embodying these social norms (Cialdini and Goldstein, 2004). These norms are rooted in values; individuals who accept these values believe that environmental values can be threatened and restored by their actions. According to the value-belief-norm-theory, people who value others will be more concerned about environmental conditions that pose a threat to

them. In this sense, people with a higher social connectedness will be more concerned about environmental conditions. On the other hand, people with a low sense of social connectedness tend to feel more detached from other people and the world in general (Lee, Draper and Lee, 2001). As a result they tend to feel less connected to other people and thus they will be less likely to engage with their environment. These findings correspond with the first hypothesis:

H1: *The more people are socially connected, the more concerned they will be about the environment.*

2.2 Social Connectedness, environmental concern and income

Providing environmental support is dependent on the individual's capabilities and constraints according to the value-belief-norm theory (Stern, 2000; Stern, Dietz, Abel, Guagnano and Kalof, 1999). This would mean that people with a higher income have more capabilities to provide environmental support. Csutora (2012) argues that income plays a central and contrasting role in the different types of support for the environment. In her research she demonstrates that socioeconomic status plays a role in pro-environmental behaviour. Income plays a big role in the socio economic status to act more pro environmentally. Balderjahn (1988) was one of the first researchers to explore this relation between income and environmental concern. In his study he found that people with a higher income tend to have a higher concern about their home insulation and saving energy in their households. This is in line with the value-belief-norm theory, since these individuals have greater capabilities and agency to support the environment. Balderjahn (1988) assumed that people with a higher income are more ecologically concerned than those of lower income groups, for example since they also have more time to devote to the environment. Having a higher income does not only mean that you are personally more ecologically concerned, as Verba and Nie (1972) found that higher-earning and educated individuals are also more integrated in their communities. The reason that these individuals are more integrated in their communities is because they have a stronger social network. These networks involve ties. Ties can be divided into weak and strong ties (Granovetter, 1977). Weak ties can be mainly important to adopt new information between groups, while strong ties can play an important role on the micro level. With these kinds of ties present, communication happens more often, and stronger ties influence the other respondent even more (Brown and Reingen, 1987). Therefore people with a strong social network are expected to be better informed and thus more environmental

concerned, when combining the findings of Balderjahn (1988) and the value-belief-norm theory (Stern, 2000; Stern, Dietz, Abel, Guagnano and Kalof, 1999). with the theory of the strong and weak ties from Granovetter (1977). This gives an indication that people with a higher income are more socially connected, and also have more environmental concern since they have a greater capability to be so. Therefore the second hypothesis is expressed as follows:

> H2: *The relation between social connectedness and environmental concern is stronger for people with a higher income.*

The first and second Hypothesis can be seen in Figure 1.

Method

Data

In this thesis, the influence of social connectedness on environmental concern will be researched. The moderating influence of income on social connectedness will also be tested. In order to test this hypothesis the dataset of Enzler, Diekmann & Liebe (2019) will be used. In their research they collected data by conducting an online survey in the German-speaking part of Switzerland in 2016. This survey was held as a gauge of energy use in Swiss households. The anonymity of the participants was ensured and sensitive questions were avoided. To avoid possible bias, the participants were not told of the data linkage between their answers and their electricity usage. In total 1392 people participated in the survey, which was sent to 10,000 potential respondents. Thus the response rate was approximately 14%. The participants in the survey were not a complete representation of the Swiss population. For example, in the survey 63% of the participants were male, while the male population in Switzerland in 2016 was 49.6% (Jacqueline & Krummenacher, 2017). As well as this the average age of the respondents was 64 years while the average in Switzerland is around 49 years old (Jacqueline & Krummenacher, 2017)
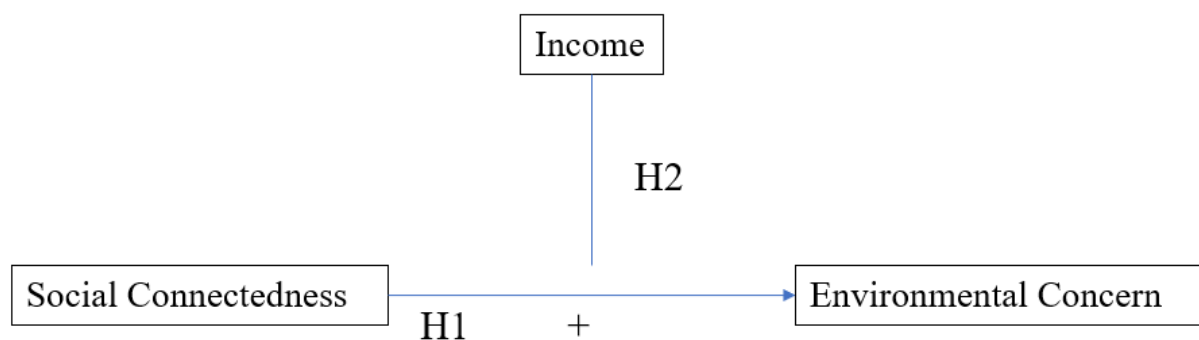

Table 1 First and Second Hypothesis on environmental concern

Environmental Concern	Survey questions
	It bothers me when I think about the environmental conditions in which our children and grandchildren will probably have to live.
	If we continue down the same path, we are heading toward an environmental catastrophe.
	If I read news or watch TV news reports about environmental problems, I often become outraged and angry.
	There are limits on growth that our industrialized world has already exceeded or will soon reach.
	Most people in this country still do not act in an environmentally conscious way.
	In my opinion, many environmentalists exaggerate claims about environmental threats.
	Politicians still do not do enough to protect the environment.
	In order to protect the environment, we should all be willing to reduce our current standard of living.
Social Connectedness	My family
	My friends
	My close Neighbours
	The people in my neighbourhood
	The people who are living in Bern
	The people who are living in the German speaking part of Switzerland
	The people who live in Switzerland.
Income	Net Household income in CHF.

Table 2 Survey questions

<u>Variables</u>

In the study of the effect of social connectedness on environmental concern, several questions from the survey from Enzler, Diekmann and Liebe (2019) will be used. The survey questions can be seen in table 2.

The questions on environmental concern could be answered on a 6 point Likert-scale. (Totally disagree, Tend to disagree, Agree partly, Tend to agree, Totally agree or Don't know). In total there was a set of nine questions to test the level of environmental concern. By calculating Cronbach's alpha ($\alpha=0.866$) it could be concluded that the coefficient was of an acceptable reliability for this research (Santos, 1999; Allen, Bennett & Heritage, 2014). While the questions on social connectedness could be answered on a 5 point Likert-scale. How close they are with different kind of people around them, varying from close neighbours to German-speaking people from Switzerland. (Not at all, Slightly, Average, Strong, and Very Strong). For this Cronbach's alpha an alpha of 0.852 was calculated. All the questions have a Cronbach's Alpha higher than $\alpha=0.700$ which means that they are an acceptable reliability coefficient for this research (Santos, 1999; Allen, Bennett & Heritage, 2014). To test the control variable, people were asked what their net household income was a month, this question could be answered in 8 different variables (under 2.000 francs a month, 2.000 to 3.999 francs a month, 4.000 to 5.999 francs a month, 6.000 to 7.999 francs a month, 8.000 to 9.999 francs a month, 10.000 to 12.000 francs a month, more than 12.000 francs a month. Not specified).

Of the 1392 people who filled in the survey, 1254 people answered all the survey questions on environmental concern and social connectedness. If the variable income is added 1151 answered the questions. For the first model 1254 people will be used, while for testing the second hypothesis 1151 will be used. Therefore only the data from the people who answered all survey questions will be used in the results. Other statistics of the variables can be seen in table 3.

Variables	Minimum	Maximum	Mean(μ)	Std.Deviation	Cronbach's Alpha
Environmental Concern	1,11	5,00	3,0353	0,50249	0,866
Social Connectedness	1,43	5,00	3,8496	0,73104	0,750
Income	0	1	0,5482	0,49789	-

Table 3 Descriptive statistics

Analytical approach

All analyses were carried out using Statistical Package for the Social Sciences 25 (IBM Statistics SPSS 25). To test the hypothesis a multiple regression analysis was performed. For the variable: environmental concern one question in the questionnaire needed to be reversed (In my opinion, many environmentalists exaggerate claims about environmental threats), to get all questions towards the same direction of questioning. For this research, the control variable income was made a dichotomous variable. The average salary in Switzerland is around 6.500 CHF (FOS, 2016), everything under the average is marked as 0, while everything above is measured as 1. Before testing the hypothesis, four assumptions must be looked at (Allen, Bennett & Heritage, 2014). To look for any univariate outliers, boxplots and stem-and-leaf plots were used. After that the Mahalanobis distance was used to test multivariate outliers. Thirdly, multicollinearity has been checked by Tolerance and VIF. Homoscedasticity could be tested with the scatterplot of residuals. All the results of these four assumptions will be discussed in the results section.

Results

The four assumptions from the previous paragraph will hereby be discussed, before interpreting the regression (Allen, Bennett & Heritage, 2014). Firstly the boxplots and stem-and-leaf plots will be looked at for the variables: environmental concern, social connectedness and income. The boxplots and stem-and-leaf plots showed no outliers and the variables were normally distributed. A Mahalanobis distance of 16.115 was obtained for social connectedness and income, and this was higher than the chi-square value for df=2 (α<0.001) 22,291. None of these outliers had a cook's distance of 1, since the highest measured was 0.25. The third assumption that needed testing was multicollinearity. This could be done with the tolerance (1.000) and the low value of VIF (1.000), which does not reach the critical value of 10 (Allan, Bennett & Heritage, 2014). The last assumption was tested with a normal P-P plot of regression standardized residuals and the Scatterplot of standardized residuals showed normally distributed residuals, since the clusters were relatively close to the diagonal line. Since all assumptions were discussed and validated according to Allen, Bennett & Heritage (2014), the testing of the hypotheses could be continued.

Social Connectedness and environmental concern

For the first hypothesis to test the effect of social connectedness on environmental concern a simple regression analysis was done. The results are displayed in figure 4, model 1. It shows that social connectedness has a positive significant effect on environmental concern (B= 0.237; t=5.842; P<0.001). With this result the hypothesis is correct, implying the more you feel socially connected the more environmentally concerned you are. To study the magnitude of this effect, the calculation of Cohen's F can be done. For the calculation of Cohen's F the R-squared value is required, which is 0.027. The calculation of Cohen's F shows that this effect is small (f=0.027) (Allen, Bennett & Heritage, 2014).

Table 4 Calculation for Cohen's F

$$f^2 = \frac{R^2}{1 - R^2}$$

Social Connectedness, income and environmental concern

To test the second hypothesis a multiple regression analysis with social connectedness, income and environmental concern was performed. The results can also be found in figure 4, model 2 and 3. When the moderating variable income is taken into account, social connected has a significant effect (B=0.159 ;t=5.501; P=0.012). However, simply to add the variable income is not enough. In figure 4, model 3　also shows the interaction term (B=0.128; t=1.1519; P=0.129) this is not significant. The effect of social connectedness on environmental concern thus differentiates by income, by which people with an income higher than the average are more environmentally concerned. The second hypothesis that people with a higher income have more environmental concern was not shown to be significant with these results.

Table 5 Model 1, 2 & 3: Social connectedness, income and environmental concern

	Variable	B [95% CI]	s.e.	t	Beta	Sig.
Model 1	Environmental　　concern	3.133 [2.888, 3.378]	0.125	25.133	-	0.000***
	Social Connectedness	0.237 [0.157, 0.316]	0.041	5.842	0.163	0.000***
Model 2	Environmental　　concern	3.257 [2.999, 3.514]	0.131	24.835	-	0.000***
	Social Connectedness	0.231 [0.148, 0.313]	0.042	5.501	0.159	0.000***
	Income	-0.158 [-0.241, -0.076]	0.042	-3.758	-0.109	0.000***
Model 3	Environmental　Concern	3.476 [3.093, 3.858]	0.195	17.833	-	0.000***
	Social　　Connectedness	0.159 [0.034, 0.283]	0.063	2.503	0.109	0.012*
	Income	-.548 [-1.059. -0.038]	0.260	-2.107	-0.377	0.035
	Social Connectedness*Income	0.128 [-0.037, 0.294]	0.084	1.519	0.277	0.129

Notes: Model 1 N=1254, Model 2&3 N=1151　CI=Confidence interval.　P<0.05. P<0.01. P<0.001.****

Conclusion

In the original study of Enzler, Diekmann and Liebe (2019) it was found that environmental concern is negatively related to electricity usage. Or in broader terms; environmental concern can help to change people's behaviour in the right direction to combat climate change. This thesis looked at the influence of social connectedness on environmental concern, meaning in the novel sense that "your vegetarian aunt'' can make an impact on your own environmental behaviour. To study the extent of the influence of social connectedness on environmental concern, quantitative data was used from the survey of Enzler, Diekmann and Liebe (2019). The first hypothesis predicted that the more people are socially connected, the more concerned they will be about the environment. The results testing the first hypothesis showed a positive correlation, meaning that the more people are connected with each other the more environmental concern they will have, although this was a small effect size. As Lee, draper and Lee (2001) stated, people with a higher social connectedness feel more involved with their surroundings and will therefore also be more concerned about the environment. The Value-Belief-Norm theory of Stern (2000) claimed that people with more economic agency have the capability to be more environmentally concerned. This was tested in the second hypothesis. In this hypothesis the relation between social connectedness and environmental concern was tested with income as a moderating effect. Against prediction, in the second model that was tested income had a negative effect on environmental concern. The higher the income the less they were concerned about the environment. In the third model income was used as an interaction effect. In this case income had a positive effect on social connectedness; however this effect was not significant and can therefore not be taken into account. According from the studies of Givens and Jorgenson (2011) and Knight & Messer (2012) there was a positive relation with income and environmental concern, although from testing it with this survey no positive relation with environmental concern and income could be found. From this research social connectedness seems to have an effect for environmental concern. Although with small effects it still is significant and can contribute to the literature. Creating more social connectedness on varying societal scales could contribute to the preservation of the environment for the future generations.

Discussion

The existing research on the effect of social connectedness on environmental concern remains limited. Before this thesis can begin to fill this research gap, a few points must be discussed. The study used by Enzler, Diekmann and Liebe (2019) was based on a survey of the Swiss population; however the respondents of the survey cannot be considered a complete representation of the Swiss population. People were older than average and the income was also higher than the average income in Switzerland. This could potentially be explained by the higher average age. Additionally the response rate was rather low, since only 1.392 of the 10.000 people filled in the survey. The people who filled in the questions on environmental concern, scored high on average, which could have influenced the study of the effect of social connectedness on environmental concern, since it was already considered to be high in this survey. Although Enzler, Diekmann and Liebe (2019) made sure to ensure anonymity, there is always a chance that respondents did fill in the survey in a socially desirable manner. A lot of data was also lost with using the variable income. This could be prevented by making the scale smaller. For future research a comparable survey could be conducted in a country other than Switzerland. In general Switzerland has a high income and is relatively advanced in terms of environmental progress. Therefore it would be wise for future research to find out if geographical location could influence the general level of environmental concern.   The geographical location is not only important to study on environmental concern, since if the geographical location was known it could also be interesting to look at the influence of a geographical location on the social connectedness. In other words; are people from a rural area more socially connected with each other than people who live in more urban environments? In reality the relationship between social connectedness and environmental concern is not so simple, as it is plausible that an individual could have a very high level of social connectedness and a very low level of concern towards the environment. This could depend on many other factors. More clarity could be achieved in further studies by including more variables, such as political preference, to provide a more accurate estimate of people's level of environmental concern. This study can be a small addition to the existing literature regarding the sociological lens on environmental issues. A small step to show how your vegetarian aunt could save the world.

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