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Who is solidary? A study of Swedish students' attitudes towards solidarity as an aspect of sustainable development

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In this article we explore students' attitudes towards solidarity, as an aspect of sustainable development (SD), and analyse how students can be described as solidary. Our motive is to obtain better knowledge regarding important preconditions for education for SD. We conducted a quantitative study with 782 responding upper secondary students from 22 Swedish schools. A new scale was designed to measure shared responsibility and pro-environmental behaviour as aspects of solidarity. Background variables were sex, parents' level of engagement, geographical knowledge, future orientation, biospheric values and environmental educational tradition. The descriptive results confirm previously found gender differences including women showing considerably higher scores on the three subscales measuring solidarity. The correlation analysis shows significant and moderate correlations between solidarity and biospheric values which is also consistent with previous research. More pioneering is that future orientation correlates significantly and relatively strongly with solidarity. The regression analysis furthermore shows that future orientation is a significant predictor for solidarity. More research is needed before we can draw unequivocal conclusions regarding this relation but meanwhile we interpret the findings as an insistent reminder to highlight the future dimension in education for SD.

Keywords: solidarity; future orientation; education for sustainable development; pro-environmental attitudes; shared responsibility

Introduction

As a bridge between physical and social sciences, geography has a particularly important role for the implementation of education for sustainable development (ESD) (Morgan, 2011; Nakayama, 2012; Sim & Stoltman, 2013). Content analysis from different countries has also revealed that geography bears a large share of the ESD-relevant content (Bagoly-Simó, 2013). We understand ESD as education aiming to integrate ecological, economic and social dimensions to enhance learning on how to treat the dynamic between the physical/biological and socio-cultural environment in future-compatible ways. Our purpose is to propose *solidarity* as a useful ethical concept in ESD whether the educational residence is closest to the traditions of environmental education (EE), development education (DE) or ESD.

The meaning of sustainability varies greatly around the globe due to contextual differences (Haubrich, Reinfred, & Schleicher, 2007). This contingency reflects different priorities between values related to sustainable development (SD). There is, however, no agreement on what these values are and how they relate to SD (Shepherd, Kuskova, & Patzelt, 2009). The Millennium Declaration (United Nations [UN], 2000) suggests freedom, equality, solidarity, tolerance, respect for nature and shared responsibility as fundamental for achieving the millennium goals which are also considered to be “a major

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short-term benchmark for SD” (Leiserowitz, Kates, & Parris, 2006, p. 434). We assume that solidarity is fundamental to SD and thus requires attention within ESD. Further, the future dimension must be a mandatory part of ESD with reference to *our common future* (World Commission on Environment and Development [WCED], 1987) and to the Decade of Education for Sustainable Development (DESD) ambition to promote “critical thinking, imagining future scenarios and making decisions in a collaborative way” (United Nations Educational, Scientific and Cultural Organization, 2013). The importance of these issues is also marked by the fact that papers on students’ attitudes and values and sustainability issues show a steadily increasing publishing rate in International Research in Geographical and Environmental Education (IRGEE) since the 1990s (Kidman & Papadimitriou, 2012).

Lessons from the decade for ESD

In a mid-DESD review Wals (2009, p. 199) stated that most governments “have committed to supporting the inclusion of ESD in formal education”. Despite this formal progress, Mulà and Tilbury (2009) note a lack of both engagement and implementation of the ambitious goal of the DESD – a more sustainable global community. They also underline the difficulty in assessing progress in ESD due to lack of indicators. Bagoly-Simó (2013) contributes to overcoming this gap by developing four indicators of ESD-related content in different subjects, summing up to both depth and breadth of ESD implementation across the entire curriculum. Findings from Bavaria, Romania and Mexico confirm the conclusion of Jucker (2011) that “ESD continues to exist as (hyper-) specialised add-on knowledge in an overcrowded curriculum” (Bagoly-Simó, 2013, p. 109). Adding on, implementation appears to partly explain the lack of integration between the ecological, economic and social dimensions that Tilbury (2012) highlights as one main shortcoming in DESD. Our operationalisation of solidarity presupposes an integrative approach, and there are good examples.

Integrative ESD and geography approaches

One successful ESD approach is the Gestaltungskompetenz programme (deHaan, 2010) which was implemented in parts of Germany. An evaluation shows that 75%–80% of the students believed they had learned “how to look ahead, understand complex facts in the context of sustainability, work with others as part of an interdisciplinary team on problems of (non-) SD, and evaluate various solutions to problems” (deHaan, 2010, p. 319). Solidarity is included, both explicitly and implicitly, as sub-competencies in Gestaltungskompetenz.

Geographical wisdom is an approach suggested by Morgan (2006). Drawing on post-Piagetian development psychology, the aim is to stimulate post-formal thinking, which is characterised by an ability to include multiple dimensions and perspectives. This is what *wicked problems* require (Rittel & Webber, 1973). Such problems are defined in different ways by different actors; it is not clear when the problem is solved and the solutions are better and worse rather than right and wrong. A wicked problem also requires recurring reformulation which activates moral and political dimensions, making them suitable as deliberative issues within ESD. From a similar basis, Puttick (2013) argues for an analytical distinction between *looking at* and *looking along* where the former is associated with formal thinking and abstract knowledge and the latter to situated/committed knowledge.

Aim of the study

Educators do need more knowledge about students' attitudes to common aspects on environmental and social challenges as well as on factors that may affect these attitudes. This study has generated survey data that make it possible to analyse students' attitudes towards various aspects of solidarity and also to characterise the students by examining variables such as sex, parents' level of engagement, geographical knowledge, tradition of EE and future orientation (FO) in the analysis. Thus, our aim is to analyse student's attitudes towards solidarity as an aspect of SD and to explore how the students in our study can be described as solidary. Based on our theoretical understanding of solidarity, the survey questions were constructed and a new scale was designed to measure three aspects of solidarity that we have identified.

The Swedish context

Three EE traditions have been identified in Sweden (Sandell, Öhman, & Östman, 2005). In 2002, 11% of the teachers were characterised as belonging to a factual/scientific tradition, 67% to a normative and 22% to a pluralistic tradition (Skolverket, 2002). During the period between 1990 and 2005, EE was strongly promoted from the policy level. In 1990, an amendment was imposed in the Education Act, stating "respect for our common environment" as a core value in education (SFS 1985:1000, 1 kap, 2§). The new curricula in 1994 decreed that environmental and ethical perspectives should permeate all education. In company with Lithuania, Sweden initiated a process to establish a regionalised Agenda 21, the Baltic21E (2002) strategy for ESD, which was followed by a governmental report on how to stimulate ESD across all education from preschool to university (SOU 2004:104) which, so far, marks the peak of the top-level support for ESD in Sweden.

After 2006, the picture has changed. A series of school reforms have passed where ESD, if mentioned at all, is treated as an exclusively scientific issue. A citation from a governmental report regarding the new teacher student programme illustrates this approach: "such teaching [about SD] requires solid scientific knowledge so that no courses are characterised by general and ideologically related speculation" (SOU 2008:109, p. 278). In 2010, a new Education Act was adopted (SFS 2010:800) where the phrase "respect for our common environment" was discarded, without a word of debate in the parliament. However, in the new curricula in 2011 for compulsory school, SD is mentioned in 10 out of 15 subjects which is more than in the previous curricula; so the local conditions for ESD remain, although the top-level perspective has narrowed. In this context, an opinion from Lidstone and Stoltman (2004, p. 4) is worth considering:

a situation whereby vested interests try to generate curricula in their own image is doomed to failure. A geography curriculum that reflects the values of the government in power can never help our young people to become the knowledge creative, values reflective, adventurous thinkers who will lead the world forward towards greater equity in an increasingly globalised world.

The portal paragraph in the Swedish Education Act underlines that the aim of education is "to acquire and develop knowledge and values". One specified value is solidarity "among people" (SFS 2010:800, 1 kap, §5). The compulsory school curriculum has a somewhat narrower focus: "solidarity with the *weak and vulnerable*". One of the four aims in compulsory school geography prescribes that teaching shall develop the students' skills and ability to "evaluate solutions to various environmental and development issues,

based on considerations founded in ethics and SD” (Skolverket, 2011b, p. 160). In upper secondary school geography teaching includes “ethical issues related to the competition for the earth’s resources, alternative and possible paths to social justice and SD” (Skolverket, 2011a).

An international survey, *Green at fifteen* (Organisation for Economic Co-operation and Development – Programme for International Student Assessment [OECD-PISA], 2009), shows that Swedish students’ sense of worry and responsibility for environmental issues is significantly lower than the average for OECD. In the same time, Swedish students are more optimistic regarding possibilities to solve environmental problems. Sweden also deviates with greater gender differences than OECD average regarding the sense of responsibility for environmental issues where Swedish girls are far more concerned than the boys. Results that emerge in research on geography education are that the subject content is characterised by an essentialistic philosophy of education that excludes the moral dimension and “the opportunities to discuss issues that concern solidarity, social justice, equality, ethnicity and development of a sustainable society is thereby lost” (Molin, 2006, p. 242). Also research on science education shows that the subject content is characterised by selective traditions and an essentialistic approach (Lundqvist, 2009; Östman, 1995; Svennbeck, 2003).

Solidarity as a theoretical concept

Solidarity is a relational concept including mutual obligations and entitlements within some kind of community. Those who share this reciprocity within a society are usually referred to as citizens. More recently, our understanding of citizenship has been challenged by political theorists, arguing that globalisation and the quest for SD require a citizenship that is disentangled from a certain spatial or political construction. *Ecological citizenship* (Dobson, 2007) aims at dissolving the nature/culture and private/public dualisms within traditional citizenship and to base social and environmental justice in awareness of the finiteness and mal-distribution of ecological space (Scerri, 2012). To act in solidarity thus implies being guided by an insight that the way we live our lives can have a range of transboundary effects, both present and future, on other people, species and places, from which follows an obvious responsibility to minimise the negative impact. Before we can design our scales and draw empirical conclusions, the concept of solidarity needs to be fitted into a theoretical framework that provides guidance for operationalisation.

In the 1800s, solidarity became part of the political language and has subsequently been subject to extensive and recurring reconsiderations among philosophers and social scientists. For this study, essentially two themes within that debate are of interest: One of which concerns the *factual* dimension, which are to be included in the circuit of solidarity and the criteria for such qualification. The other theme is the *normative* dimension: how solidarity is expressed in actions and attitudes and under what circumstances the need for solidarity is created (for a comprehensive overview see Bayertz, 1999; Brunkhorst, 2005; Stjernö, 2004). A third theme, which binds together the first two, deals with the relationship between the *particular* and the *universal* (Schwartz, 2007). While representatives of particularism reduce the scope of solidarity to individuals who stand in empathic relationships to one another (Harvey, 2007; Rorty, 1989), universalists widen the potential circuit to all who are united by a “global patriotism” and a cosmopolitan vision of human rights and democracy (Brunkhorst, 2005). One way out of the potential impossibility in universalism is provided by Gould (2007) who stresses that solidarity can never be extended to everyone everywhere, but that there is “a horizon of possibility where it refers to a

disposition that each can have to act in solidarity with some Others” (Gould, 2007, p. 155). While solidarity during the modern period often was associated with sharing similar conditions within a group or class, Gould allows for a postmodern understanding and application of solidarity. Such an approach means that cultural differences between groups must not imply restrictions for solidarity. On the contrary, it becomes irrelevant to try to justify which groups of “the others” should not be subject to human rights. This redefinition of solidarity also corresponds with the meaning of ecological citizens as presented above. Further emphasis on the interests of others is expressed by the standpoint that solidarity implies opposition to “specific exploitative structures and systems” (Mohanty, 2003, p. 49). Also *alterity*, a philosophical term for otherness, moves the focus away “from consideration of individual differences to facilitate recognition of the systematic construction of classes, groups and categories” (McLeay & Chalmers, 2011, p. 269) and simultaneously highlights the importance of geography for understanding spatial relationships with others. The reading of Gould (2007) finally provides a link between solidarity and ESD by her assertion that if people want to help others to improve their lives, it is important to have an idea about the reasons behind the repression underlying the need for solidarity. This opens up a learning field where both policy documents and critical theorists perform a unanimous call for an ESD where solidarity is present.

Solidarity as a value

Following Schwartz (1992), a *value* refers to such basic beliefs that form the basis of persons’ attitudes and guides the individuals’ actions towards the desired destination. Ethical value theories assume that values are influencing people’s decisions and behaviour, arguing that “people consider not just their immediate wants and desires, but they sometimes reflect on deeper concerns about what is important” (Dietz, Fitzgerald, & Shwom, 2005, p. 340). From Dewey’s (1939/1988) point of view, the function of values is to resolve conflicts between our preferences by suggesting which preferences are better by invoking moral considerations. Consequently, values are about what is desirable, whereas preferences are about what is desired (Dietz et al., 2005). According to Joas (2000), commitment to a value is neither an act of willpower nor a result of persuasion but a consequence of exceeding the limits of the self, self-transcendence, when the individual experiences a strong emotion and a sense of connection to the particular value that causes the crossing of a border, at the same time a feeling of becoming stronger is rooted in the inner self, self-formation. The value solidarity may therefore grow from authentic meetings where mutual relationships are revealed by an education that not only engages the intellect, but also emotions and the senses. To integrate cognitive, emotional and aesthetic learning has also proved to be a key for achieving the goals in ESD (Eilam & Trop, 2011).

Previous research

Few empirical studies use the term solidarity when exploring students’ attitudes to different aspects of SD but can be considered implicitly present in studies on altruism and environmental behaviour. A series of studies have identified positive correlations between altruism and biospheric values, showing that care for other people often is extended to also include care for other species and nature in general (Nordlund & Garvill, 2002; Schultz & Zelezny, 1999; Stern & Dietz, 1994; Torbjörnsson, Molin, & Karlberg, 2011). The value belief norm (VBN) theory provides an explanation for this correlation (Schultz et al., 2005; Stern, Dietz, Abel, Guagnano, & Kalof, 1999). Surveys on environmental

issues usually report that females are more concerned than males (Özden, 2008; Torbjörnsson et al., 2011; Tuncer, 2008). Findings also indicate that strong individualism tends to strengthen the gender differences (Zecha, 2010). The significance of primary socialisation emerges in studies from different contexts, showing a positive impact from engaged parents on young people's environmental and social engagement (Grönhøj & Thøgersen, 2009; Pancer, Pratt, Hunsberger, & Alisat, 2007; Smetana & Metzger, 2005).

Future and solidarity

Future education, aiming to stimulate reflective thinking in terms of possible, probable and preferable futures, has been shown to enhance students' feelings of constructive hope and also to develop their social responsibility (Hicks, 2002; Rogers, 1998). There is also evidence that future-oriented people show greater moral concern than present-oriented people (Agerström & Björklund, 2013). Teaching that encourages students to create hopeful stories about preferable futures have, however, proved to be unusual (Hicks, 2002). The importance of future education that enhances constructive hope and inspires one to tell good stories about the future is underlined by Ojala (2007), finding that feelings of helplessness and even hopelessness regarding global problems such as climate change are widespread among Swedish students. When using the consideration of future consequences (CFC) scale (Strathman, Gleicher, Boninger, & Edwards, 1994) to measure FO, correlations emerge between FO, on the one hand, and pro-environmental behaviour and pro-environmental attitudes on the other hand (Corral-Verdugo, Fraijo-Sing, & Pinhero, 2006; Joireman, Van Lange, & Van Vugt, 2004; Kortenkamp & Moore, 2006). Another well-validated FO scale is Zimbardo's time perspective inventory (ZTPI) (Zimbardo & Boyd, 1999). Also when using ZTPI, correlations are found between FO and pro-environmental behaviour, for example, regarding water conservation (Corral-Verdugo et al., 2006). Milfont and Gouveia (2006) found that environmental preservation was positively correlated with FO, but also with biospheric and altruistic values. Carmi (2013) presents a result that challenges the unequivocal picture of the relationship between FO and environmental values/attitudes/behaviour. She treated (pro) environmental behaviour as two separate variables – environmental behaviour with personal benefit and environmental behaviour without personal benefit – and found a correlation with FO only in the case of personal benefit, when pro-environmental behaviour coincided with individual benefit, for example, saving money.

Knowledge and solidarity

Van Peer (2006) compared young people's knowledge about demographic characteristics and their attitudes to intercultural and intergenerational solidarity in five European countries. Clear differences emerged where students from the Czech Republic exhibited the highest solidarity score and students from France the lowest. There was a significant correlation between the level of demographic knowledge and tolerance to immigrant communities but there was no correlation between knowledge and attitudes regarding solidarity with elderly people. Zecha (2010) finds that Bavarian (Germany) students show much higher environmental knowledge than students from Asturia (Spain), but the Bavarian students simultaneously report lower environmental responsibility and personal involvement than the Asturian students. A study of upper secondary students in Chile, England, Switzerland and USA showed no significant correlation at all between environmental attitudes and environmental knowledge (DeChano, 2006).

There are, however, different dimensions of knowledge. The significance of including experiences from marginalised people to strengthen the bonds of solidarity in the students' immediate neighbourhood was shown by Epstein and Oyler (2008). The tension between individualism and "the common good" is present in a study by Seltzer-Kelly, Westwood, and Peña-Guzman (2010). Their findings show that students' solidarity was not primarily based on identification with the oppressed and in a "we-feeling" focusing on similarities, but rather on respect for the obvious differences between groups. Knowledge about how the living conditions differ between groups and about the implications of such differences is thus essential. They conclude that the purpose of solidarity education needs to be changed from a desire to achieve conflict-free multicultural understanding to develop the ability to live with mutual respect with those we actually will not always understand. Here she draws on (Todd, 2009, p. 55) "relations are not about overcoming differences, but about singularity present in a shared world". Tallon (2011) reminds of the risk that teaching about the Other often tends to be influenced by hidden assumptions of moral superiority and a top-down perspective, leading to a mission to "make a better world *for*, rather than *with* others" (Jefferess, 2008, p. 28) and thereby leaning more to charity than to solidarity.

Towards an operationalisation of solidarity

We have searched but not found any proven operationalisation of solidarity as an aspect of SD; so our proposal here must be seen as an initial attempt, not as a definitive guide. Our point of departure was to disentangle various aspects of solidarity and set them in relation to the intentions of ESD. With reference to the philosophy of pragmatism (Dewey, 1939/1988; Joas, 2000), we see solidarity as a value affected from transactional processes in an ever-changing world. From environmental psychology (Schultz, 2001; Stern et al., 1999), we find support to extend solidarity to other than presently living humans, and drawing on postmodern interpretations of citizenship and solidarity (Dobson, 2007; Gould, 2007; Mohanty, 2003) we are justified in emphasising the normative dimension in front of the factual and to interpret solidarity as an expression of ecological citizenship open to time, space and species. An insight that the way we live our lives has a number of effects on other people, species and places implies a responsibility for minimising the negative impact. The survey questions are therefore designed to identify how respondents allocate the responsibilities for carrying out such solidarity actions and also to examine their attitudes towards pro-environmental behaviour. The concept of solidarity is thus made adaptive to ecological citizenship and to postmodern conditions defined by transboundary, anonymous, interpersonal relations founded on social justice, compassion and responsibility.

Method

This section presents the sample group and the instruments. First, the emergence of three new subscales, measuring three aspects of solidarity, followed by a presentation of the other subscales is disclosed. The rationale behind construction and selection of the subscales is consistent with the need to operationalise the factual, normative and temporal levels of solidarity, which were pointed out in the theory section, and also to avoid the concept being burdened by its pre-modern and modern applications, when a specified group affiliation was strongly emphasised. The scales are instead adjusted to conditions

in the contemporary world, drawing attention to the need for transnational solidarities (Gould, 2007), ecological citizenship and solidarity with future generations.

Survey, participants and procedure

This study is part of a multidisciplinary research project aimed at exploring preconditions for environmental moral learning within ESD. A survey, *Young people's attitudes to environment, society, community and commitment*, was digitally distributed to grade 3 students in both theoretical and vocational programmes in 22 upper secondary schools in 17 municipalities of varying sizes, mainly located in southern and central Sweden. The survey contained a total of 202 Likert items and multiple choice questions, grouped in 14 environmental, societal and ethical themes. Eighteen items, besides the background variables, are analysed in this sub-study. Each participating class answered the survey online under the supervision of a teacher during a suitable 45–60-min school-subject position as the school itself selected, during March–May 2012.

The participants were a convenience sample ($N = 782$). The average age is 18.48 years ($SD = .62$), 54% women and 46% men. Students from theoretical programmes comprise 79% and the remaining 21% come from vocational programmes. This distribution deviates from the national shares, which are approximately 50% for theoretical programmes, 30% for vocational programmes and 20% for introductory programmes. Participation was voluntary. Each student was assigned individual log-ins to the survey. As a hired company was responsible for both the mailing of the questionnaire, data collection and compilation of a database, students could be guaranteed anonymity, even from the research team.

Measures

Shared responsibility and *pro-environmental behaviour* as aspects of solidarity were initially measured with 18 items, representing different expressions for a willingness to act or to support actions with other people's best interests in mind and to be frugal with natural resources. The development of the shared responsibility items (1–12 in Table 1) was influenced from a parallel interview study with students regarding lines of responsibility and knowledge need for SD (Torbjörnsson, 2013). A Likert scale measured the degree of agreement with the statements, ranging from strongly disagree (1) to strongly agree (5). Pro-environmental behaviour is theoretically assumed to be a vital aspect of solidarity. To refrain from the use of natural resources is considered an act of solidarity because it reduces the burden on nature and can also increase the opportunity for other people, now or in the future, to benefit from resources. Six Likert items (13–18 in Table 1), developed by Ojala (2012) measured how often the respondent carried out various environmentally friendly actions, ranging from hardly ever (1) to almost always (5).

All 18 items were at first aggregated into one solidarity scale. Thereafter a principal factor analysis (PFA) with direct oblimin rotation was conducted. A consequence of the process was that items 1 and 11 had to be excluded in order to obtain a structure with satisfactory factor loadings. As can be seen in Table 2, the remaining items fell into three groups that can theoretically be separated by one group regarding our common parts of shared responsibility (SolOur), one group focusing on individual responsibility for solidarity (SolMy) and the third group concerning pro-environmental behaviour (SolPro).

In order to ensure that the three aspects of solidarity (SolMy, SolOur and SolPro) can be regarded as interrelated parts of the same superior value (solidarity), a correlation test

Table 1. Items measuring shared responsibility (1–12) and pro-environmental behaviour (13–18) as aspects of solidarity. This operationalisation assumes that solidarity is an expression of ecological citizenship and that the concept is adaptive to integrative ESD approaches such as Gestaltungskompetenz, geographical wisdom and looking at/looking along which are presented in the theory section.

-
- (1) I think it is valuable to be able to help people in my own country (excluded).
 - (2) It is valuable (for all) to be able to help people in other countries (Our)
 - (3) I think it is important that Sweden contributes to development in poor countries (Our).
 - (4) Sweden has enough of its own problems that should be solved first, and then we can start thinking about other countries (Our, reversed).
 - (5) All are of equal worth, for solidarity we should therefore support those who are living under inhumane conditions (Our).
 - (6) It is important to respect other people’s opinions (Our).
 - (7) I would like to work on facilitating how people from different cultures could live together (My).
 - (8) I want to involve myself in issues that make society more humane (My).
 - (9) I think I have a lot to give and really want to help others (My).
 - (10) It is important that people can have confidence in each other (Our).
 - (11) I would rather donate money to different organisations than to commit myself (excluded).
 - (12) I would imagine volunteering, that is, unpaid work, to help people who have difficulties (My).
 - (13) Bike or walk instead of being driven by car or drive a car myself (SolPro).
 - (14) Turn out the lights when I leave an empty room (Pro).
 - (15) Refrain from buying things I do not really need (Pro).
 - (16) Use public transportation instead of being driven by car or drive a car myself (Pro).
 - (17) Switch off the TV set and computer completely when I do not use them (Pro).
 - (18) Trying to get my parents to behave more environmentally friendly (Pro).
-

between the three subscales was conducted. As Table 3 shows, this theoretical assumption can be considered satisfactorily confirmed. There is a strong (Dancey & Reidy, 2004) correlation ($r = .643$) between SolMe and SolOur and there are also moderate to strong correlations between each of these subscales and the SolPro subscale.

Table 2. The two-factor solution of the Sol responsibility scale with rotated factor loadings.

Subscale: item # and factor label	SolOur	SolMy	SolPro
SolOur: 2 other countries	.566	.402	-.066
SolOur: 3 Sweden contributes	.510	.327	.030
SolOur: 4 Sweden first	.551	.279	-.023
SolOur: 5 all of equal value	.617	.214	.061
SolOur: 6 different opinions	.773	-.125	.037
SolOur: 10 confidence	.644	.012	.090
SolMy: 7 different culture	.140	.654	.019
SolMy: 8 more humane	.030	.768	.071
SolMy: 9 contribute	.025	.766	-.002
SolMy: 12 voluntarism	.093	.582	.065
SolPro: 13 bike, walk	-.072	.091	.627
SolPro: 14 turn out lights	.207	-.169	.716
SolPro: 15 refrain from buying	-.084	.007	.620
SolPro: 16 public transport	.071	.004	.616
SolPro: 17 switch off TV	.092	-.014	.622
SolPro: 18 parents	-.094	.331	.476

Note: Total variance explained is 60.19%. Principal axis factoring has been used as the extraction method; the rotation method is direct oblimin rotation.

Table 3. Pearson correlations between the subscales SolMy, SolOur and SolPro.

	SolOur	SolPro
SolMy	.643**	.412**
SolOur	1	.369**

** $p < 0.1$.

The subscale SolOur is constructed by calculating the mean of the six items measuring attitudes towards *common* aspects of shared responsibility; the Cronbach's alpha for SolOur is .88. The same procedure was conducted for SolMy, for the four items measuring *individual* aspects of shared responsibility. The Cronbach's alpha for SolMy is .84. SolPro is constructed by calculating the mean for the six items measuring pro-environmental attitudes to behaviour. Also this subscale shows a satisfying Cronbach's alpha of .79.

Background variables

In order to answer the question on how the solidary students in this survey can be described, the level of solidarity is analysed in relation to background variables that may affect the strength in solidarity. The VBN theory presented above arouses interest when examining the relationship between solidarity and care for nature as an expression for biospheric *values*, here captured by three items, two of which originate from Bråkenhielm (2009) "We must respect the order of nature, even if it affects human welfare" and "The balance in nature is very delicate and is easily disrupted by human impact". The third item, "Changes in the environment for human purposes creates serious problems" originates from the well-used and validated new environmental paradigm (NEP) scale (Dunlap, Liere, Mertig, & Jones, 2000). The Cronbach's alpha is .74.

The theory section emphasised the necessity of a future dimension in ESD. This was operationalised in three items, inspired from Drottz-Sjöberg and Sjöberg (1991), where the respondents consider the extent to which they agree with the statements: "I often think about how the future will be" and "I live in the present and never think of the future" (reversed scoring). The final item asks "How far into the future do you consider your responsibility for the environment extends" and the options are 1, 10, 25, 50, 100 and 500 years. The three items were z-transformed before they were merged into one subscale. Cronbach's alpha is .53.

The easily found conviction that increased knowledge is the first and foremost condition required for SD motivates a closer look at the relationship between factual knowledge and attitudes towards SD. Geographical knowledge about demography, development and climate and environmental issues was therefore measured to examine this relationship.

Five questions were constructed in this section. The responses were scored from 0 to 3 depending on how close to the correct answers the students' answers were. The correct answer is marked in bold font: "How will the sea-level change if all the sea ice in the arctic sea disappears?" The level drops 0.5 metre, **does not change at all**, rises 1 metre, rises 5 metres, rises 10 metres, rises 30 metres. "In 1990 135 million children were born in the world. How many children were born in 2010?" 110, **130**, 160, 195, 220, 250. This item is inspired from an item in a questionnaire used by Swedish International Development Cooperation Agency (SIDA) (2012) aimed at measuring the knowledge about *peak child* (Rosling, 2012). The following questions were regarding what

proportion of the world's population has an income of less than 1\$/day? 2/3, 1/2, 1/3, 1/4, 1/7, 1/10 and how have the CO₂ emissions in the world changed from 2009 to 2010? Decreased by 10%, decreased by 5%, did not change, **increased by 5%**, increased by 10%, increased by 20%. Two final questions were collected from the SIDA survey (2012). "What is the average life expectancy in Vietnam?" 45, 55, 65, **75**, 80, 85 years and finally, "What is the number of children born per woman in Bangladesh?" **2.5**, 3.5, 4.5, 5.5, 6.5, 7.5. An additional item was: "What is the average life expectancy in Sweden?" 45, 55, 65, 75, **80, 85**.

The literature review pointed to the importance of primary socialisation for the students' level of participation and commitment. One aspect of this is *parents' level of engagement* which was measured with a subscale of four items (Cronbach's alpha .78), originating from Amnå, Ekström, Kerr, and Stattin (2010). "My parents know a lot about politics and social issues"; "My parents are interested in what is happening in the world"; "Things that have to do with the environment are important to my parents (recycling, saving energy, reducing driving)"; and "My parents regularly listen/see the news". Each item was followed by a 4-point scale ranging from "not true at all" to "fits very well". The form of EE has been shown to have a potential impact on students' environmental awareness (Coertjens, Boeve-de Pauw, De Maeyer, & Van Petegem, 2010; deHaan, 2010). *EE tradition* was therefore measured with three items asking the respondents if they perceived that the school's EE explains environmental problems as mainly caused by lack of knowledge, by inaccurate values or by conflicts of interest. The three options correspond to the fact-based, normative and pluralistic EE traditions (Sandell et al., 2005). Each item was followed by a 5-point Likert scale ranging from "does not apply at all" to "apply very well".

Results

Descriptive statistics show that attitudes towards solidarity are clearly higher among women than among men. The standard deviation is also lower among women for all three scales.

Table 4 shows that the difference is greatest for SolMy where young women have .65 higher mean than young men on a 5-point scale. Young women also show .49 more positive attitudes to SolOur and .40 higher for SolPro. Correlation analyses were thereafter conducted between, on the one hand the three subscales measuring the three aspects of solidarity, and on the other hand the subscales measuring geographical knowledge, FO, parents' level of engagement, biospheric values and EE traditions (Table 5).

The analysis reveals that the geographical knowledge shows a weak or absent correlation with the three aspects of solidarity. It is quite different when it comes to FO, which shows a moderate correlation (Dancey & Reidy, 2004) to SolOur and somewhat weaker

Table 4. Means according to sex for the three aspects of solidarity.

	Women/SD	Men/SD	Difference
SolMy	3.71 .89	3.06 .99	.65 [$t(606) = 8.65$]*
SolOur	4.29 .75	3.80 .83	.49 [$t(610) = 7.86$]*
SolPro	3.37 .76	2.97 .86	.40 [$t(575) = 6.03$]*

* $p < 0.001$.

Table 5. Pearson correlations between the subscales SolMy and SolOur and subscales for factual knowledge, future orientation, parents' engagement, biospheric values, pro-environmental behaviour and environmental education (EE) traditions.

	SolMy	SolOur	SolPro
Factual knowledge	.118**	.099*	.086*
Future orientation	.348**	.403**	.281**
Parents' level of engagement	.251**	.383**	.329**
Biospheric values	.307**	.418**	.403**
Factual EE	.134**	.159**	.149**
Normative EE	.165**	.230**	.195**
Pluralistic EE	.165**	.118**	.142**

* $p < 0.5$.** $p < 0.1$.

but still evident correlations to SolMy and to pro-environmental behaviour. Parents' level of engagement has a weak correlation to SolMy but somewhat stronger correlation to SolOur and to SolPro. Biospheric values exhibit the most consistent pattern with moderate correlations to SolOur and SolPro and a slightly weaker correlation to SolMy. What kind of EE tradition the students are used to does not seem to affect attitudes to solidarity in any substantial way. The correlations between EE traditions and strength of solidarity are, however, significant in all cases. To determine to what extent each of the correlating factors independently predicts solidarity, the three aspects of solidarity were included in a multiple regression analysis with gender and parents' level of engagement as control variables. As Table 6 shows, gender is a significant negative predictor showing that young women are more likely to take personal responsibility for solidarity and also to act more pro-environmentally than young men. The strength of the gender effect does not decrease appreciably when new elements are added to the analysis while the other control variable, parents' level of engagement, diminishes slightly more when the new elements were added. Biospheric values were the strongest predictor for all three aspects of solidarity with the strongest effect on pro-environmental behaviour. An interesting finding that inspires deeper investigation is that FO appears as an important predictor for both

Table 6. Hierarchical multiple regression models predicting solidarity. Dependent variables SolMy, SolOur and SolPro.

	SolMy step 1 β	SolMy step 2 β	SolOur step 1 β	SolOur step 2 β	SolPro step 1 β	SolPro step 2 β
Sex	-.32**	-.26**	-.28**	-.22**	-.22**	-.16**
Parents' level of engagement	.27**	.17**	.39**	.26**	.35**	.23**
Future orientation		.18**		.18**		.08*
Biospheric values		.15**		.24**		.27**
FactKnow		.05 n.s.		.02 n.s.		.01 n.s.
Factual EE		.01 n.s.		.02 n.s.		.02 n.s.
Normative EE		.02 n.s.		.06 n.s.		.06 n.s.
Pluralistic EE		.08 n.s.		.01 n.s.		.04 n.s.
R^2	.17	.23	.24	.34	.17	.28

Note: n.s. = not significant.

** $p \geq .001$.* $p \geq .01$.

individual (SolMy) and joint (SolOur) responsibility but is a weaker predictor for pro-environmental behaviour. The level of factual knowledge shows no predictive effect on any of the three aspects of solidarity nor is it possible to see any effect of which the EE tradition students say they have been educated within.

When correlations between FO and the three solidarity aspects are taken separately, the analysis reveals that SolPro is more weakly correlated ($r = .28$) to FO than SolMy ($r = .35$) and SolOur ($r = .40$). The regression analysis further shows that FO is a weaker predictor for SolPro (.08), than for SolMy (.18) and SolOur (.18).

Discussion

Our aim in this study was to analyse students' attitudes towards solidarity, as an aspect of SD, and to explore how the students in our study can be described as solitary. To enable such a measurement, we first developed new scales based on our theoretical understanding of solidarity. Initially we want to point out some potential limitations inherent in this study. A methodological overall limitation is that the survey format we used may have invited fast and therefore relatively unreflective responses. Stretching back to Dewey (1939/1988), the function of values is to guide our decisions especially when trade-offs and compromises between different preferences are present. When decisions become routine we may not consciously consider our values before and the questionnaire format could possibly increase the likelihood of routinely responding rather than to encourage reflection about the values. To meet this shortcoming our study will be complemented with an article based on interviews.

Some of the geographical knowledge questions turned out to be too difficult and perhaps also peripheral in relation to solidarity. Furthermore, knowledge here is reduced to facts as figures, leaving other substantial aspects of knowledge aside. This is a concession to the questionnaire format, which is also compensated for in the parallel interview study. Since some of the subscales are newly constructed they need further validation before we can draw general conclusions. This applies especially for the scale measuring FO where Cronbach's alpha is on the low side.

The present study also has a number of strengths. The size and representativeness of the sample are good. Above all, it is the first study to show how the concept of solidarity can be operationalised in relation to SD and ecological citizenship. The discovered correlation between FO and solidarity inspires further studies and also entails a range of implications for ESD and future education and thereby also for geography teaching.

The findings are on crucial points consistent with comparable studies. Two examples are the correlation between environmental attitudes and attitudes towards fellow human beings (Clayton, 2003; Schultz, 2001) and the significant gender-related differences (Torbjörnsson et al., 2011). The study furthermore supports earlier studies regarding the importance of parents' societal interest and involvement as a determinant for young people's solitary engagement (Grönhöj & Thøgersen, 2009; Pancer et al., 2007). More pioneering is that the results also indicate a previously not observed correlation between FO and solidarity. Those who often think of the future express stronger solitary attitudes than those who are more focused on the present. However, more research is needed to find stronger evidence for this relationship, but awaiting such additional research support, considering the findings from studies on how to promote emotions of constructive hope for the future (Ojala, 2007) and social responsibility for future challenges (Hicks, 2002), it should not pose a major risk to give more importance to the future dimension in education in general and in geography and ESD particularly. That becomes even more obvious

in light of the answers from Swedish students on the question on what kind of future education they have faced in school. “The future...we haven’t had time for that”... “. . .there is no subject named future at school” (Torbjörnsson, 2013). The interviews ($n = 20$) also revealed that the students were unfamiliar with the term solidarity. Voices from the classroom thus, with bothersome clarity, convey that the intentions in the steering documents regarding development of the inalienable value solidarity do not seem to have migrated into education to any significant extent.

Only weak correlations were identified between solidarity and EE tradition. There may, however, be good reasons to question the reliability in these specific responses because the response alternatives were worded in a much more detailed manner than the other questions. This item thus deviates from the traditional questionnaire format and respondents may not have given themselves enough time to consider the response alternatives in the way that the detailed response options demands. Consistent with the VBN theory (Stern & Dietz, 1994; Stern et al., 1999), biospheric values turn out to be the strongest single predictor for solidarity, regardless of which of the three aspects of solidarity we look at. The fact that the results within the mentioned fields are both empirically and theoretically consistent with previous research suggests that the overall validity and generalisability is satisfactory, which is encouraging when to draw conclusions from the results that are unique to this study. It is of particular interest to pay attention to the significant and distinct correlations between attitudes to solidarity and FO, because this relationship has not been comprehensively examined previously. A partially comparable study, however, is Carmi (2013). She drew the conclusion that personal gain is a prerequisite for pro-environmental behaviour. Carmi’s conclusion supports an instrumental function of solidarity, as suggested by Hechter (1998) in contradiction to an altruistic motive founded in biospheric values. A plausible explanation may be that Carmi is using the ZTPI scale, which is explicitly related to a personal context, while the CFC scale, used in other studies, is more related to the personal–social context. The subscale used in the present study is not at all geared to the individuals’ future but to the future in general. Such an approach was chosen not to get caught in the well-known pattern that adolescents often report positive expectations about their individual future, but negative expectations about our common future (Hicks, 2002). No significant correlation was found between solidarity and geographical knowledge. This is mainly in line with previous findings (DeChano, 2006; Van Peer, 2006), with reservation for the somewhat different fields of knowledge.

Two of the items regarding geographic knowledge were previously used in a national survey with a representative sample (SIDA, 2012). A comparison between answers from the national sample, where all ages from 18 to 74 are included, and the sample of 17–19-year-old students in the present study, does not reveal any conspicuous differences. In both groups, a clear majority is more or less ignorant of recent important changes in global demographic trends, but there is a higher percentage of students who answered correctly on the questions about life expectancy in Vietnam and children per woman in Bangladesh. The percentage who incorrectly answered that the number of children born in the world is still increasing, however, it was as large as 70% in both groups.

It is a challenge to pinpoint solidarity with the intent to make it measurable in a survey. Especially given that the concept has been more or less theoretically neglected by social science after Durkheim’s pioneering work in the early 1900s (Wilde, 2007). Inspired by the resurgent interest to theorise solidarity (Bayertz, 1999; Brunkhorst, 2005; Gould, 2007; Liedman, 1999; Stjernö, 2004), our ambition was to make solidarity a working concept within ESD. The lack of a previous operationalisation and of studies that relate solidarity to FO and to environmentally friendly behaviour necessarily means that

more work remains before we stand on solid ground. We therefore do not claim to have found more than a challenging entrance into a new field of ESD research. A field that is highly relevant also for geography since geographical keywords such as time, space, humanity and resources are in focus. When relating those keywords to *shared responsibility* within the planetary boundaries, the need for ecological citizenship emerges. We argue that *solidarity* denotes and summarises the characteristics of such an ecological citizen and that a main task for ESD thus is to emancipate ecological citizens.

Implications for ESD

This study provides inspiring guidance on how solidarity, a value often perceived as elusive and abstract, could be transformed into a tangible and engaging educational content in ESD. The relationship between FO and solidarity implies that ESD lessons for the future may be a feasible way to nourish solidarity and thus to a greater extent meet the requirements regarding values in the steering documents. When the results are analysed, the need for a future teaching based on possible, probable and preferable futures, as suggested by Hicks (2002), emerges clearly. Simply by providing these alternative future concepts will foster creative inspiration to tell good stories about the future. Such stories can help students to overcome emotions of worry and hopelessness. This way of working can also realise a pluralistic approach where different alternatives are to be examined and reflected and the “only road” to the future can be replaced by a multi-road junction where careful consideration regarding the choice of road is needed.

When questions of the future not only concern what is desired but primarily what is *desirable*, the parallel to Dewey’s (1939/1988) view on the function of values is obvious. The pragmatic perspective, which inspired the research questions, thus also provides guidance on how to work to find the best answers. “An approach within the critical pragmatism, when it comes to critical conversations about how we want to design our society, is to identify and highlight our alternatives: by identifying the political and moral consequences of the alternatives we can clarify and strengthen our aspirations and visions” (Östman, 1999, p. 263).¹ Further inspiration from pragmatism on how a value such as solidarity can be nourished in ESD is provided by Joas (2000) and his conclusion that commitment to a value is a result of self-transcendence and self-formation. The lesson from that is that ESD needs to offer the students opportunities for self-transcendence. It does not need to involve any major drama. Examples from “solidarity-generating” education presented in the previous sections clarify that attendance and authenticity between participants involved in solidary relations are what matters. If the school has difficulties in gaining access to the physical reality, it is good to know that art, literature and film, as Rorty (1989) reminds us, can offer students meetings with all the circumstances and situations that create the need for solidarity.

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Note

1. Translation from Swedish.

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