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Values, attitudes, moral judgment competence, locus of control and sense of coherence as determinants of pro-environmental behaviors and behavioral intentions

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Abstract - Based on a survey completed by 463 residents in two Swedish cities, the predictive power of value orientations, awareness of consequences, environmental concern, moral judgment competence, locus of control and sense of coherence were examined on eight types of pro-environmental behaviors and behavioral intentions. The best fitting causal model confirms partly the hypothetical model. Values indirect and direct affect pro-environmental behaviors and behavioral intentions with awareness of consequences and environmental concern as intermediate or transmitting variables. Neither pro-environmental behaviors nor behavioral intentions are affected by awareness of consequences, environmental concern, locus of control, moral judgment competence or sense of coherence. The need of more environmentally specific measures of the predictors in relation to specific behaviors is discussed.

Keywords—values;environmental concern; moral judgment competence; locus of control;sense of coherence; pro-environmental behavior and pro-environmental intention

INTRODUCTION

The awareness and knowledge of the Global Climate Change (GCC) have received an increasing attention in the last years coupled with a growing concern for the immense global problems caused by GCC in both the near and far future [1, 2] . In addition there is a growing recognition that human behavior contributes to GCC and environmental problems such as global warming, urban air and water pollution, decline of biodiversity, and desertification [1, 3, 4, 5]. Pro-environmental actions, and a change of individual's daily habits and behaviors, are thus highly necessary for decreasing these problems and to promote environmental sustainability. This study seek to investigate the role of psychological factors which may be critical in determining why some people behave pro-environmentally and others do not, and aim to highlight the significance of psychological factors as determinants of pro-environmental behaviors and behavioral intentions.

Reference [6], defines environmentally significant behavior from the standpoint of its impact on "the extent to which it changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere itself" (p. 408). In the sense of environmental protection, pro-environmental behavior (PEB) can be defined as a behavior with the intention to benefit the environment, whereas pro-environmental behavioral intention (PEBI) refer to the willingness to engage in environmental actions in the future. Intentions are thought to reflect a person´s level of motivation, whereas current or past behavior is seen to be a measure of a person´s habitual patterns of behavior which may facilitate or inhibit future behavior [6]

References [6, 7, 8] propose that different causal variables appear to work in different ways in investigating a great variety of variables in relation to behavior in an environmental context, there is still no agreement as to which of these variables appear to be the strongest determinants of PEB. Before further specifying our aim and hypothetical model, we closely

examine the concepts of the psychological factors and influencing behavior, and therefore responsible environmental behavior is a complex process which appears to involve a multitude of factors, all interacting with each other. Despite a large volume of research during the last decades, present a review of research on these factors as determinants of pro-environmental behaviors and behavioral intentions.

Values and attitudes

Previous research has shown an existing relationship between individuals´ values, attitudes (environmental concern) and PEB [9, 10, 11, 12, 13, 14] as well as positive relationship between values, attitudes (e.g. environmental concerns) and pro-environmental behavioral intentions (PEBI), [15].

Values are general preferences for end states or ways of acting. They are cognitive representations of abstract goals (e.g. a world of equality) or abstract means of behaving (e.g. being unselfish) and serve as guiding principles important to person´s choices of actions [16, 17]. The structure of the human value system is argued to be universal across all people and values are relatively stable across an individual´s life span [6, 18, 19, 20, 21]. In an effort to understand and predict the underlying motivations of people´s behavior theorists, seek to measure people´s priorities for various values [22]. Research showed that the predictive power of a value orientation depends on which belief is being explained, which support other results showing that the relative importance of values in explaining beliefs varies across different types of beliefs [6, 11, 21, 23, 24, 25].

A large body of environmental research concerning values are based on Schwartz´s Value Theory [17, 18]. Schwartz developed a broad model, the Schwartz Value Inventory Scale, for classifying two orthogonal value orientation dimensions: self-transcendence versus self-enhancement, openness to change versus conservatism. Two types of self-enhancement values (e.g. power and achievement) and two types of self-transcendence values (e.g. universalism and benevolence) have been proved to be particularly relevant for understanding environmental beliefs and actions. In general individuals who strongly endorse self-enhancement values are less likely to have pro-environmental beliefs and norms and to act pro-environmentally, while the opposite is mostly true for those who strongly endorse self-transcendence values [6, 11, 14, 23, 25, 26].

Self-transcendence: universalism vs. benevolence

Self-transcendence is defined as a social-altruistic value orientation and comprises two value types, universalism and benevolence. Universalism is a wider form of altruism with the motivational goal of the welfare of all people encompassing humankind, such as social justice, equality and peace of earth. In contrast, benevolence is defined as altruism towards in-groups like loyalty, forgivingness and responsibility. The motivational goal of benevolence is the welfare of close others [17, 18]. While previous studies found universalism positive related to pro-environmental attitudes and behaviors, only inconsistent relations were found between benevolence and pro-environmental attitudes and behaviors [24, 25, 27].

Self-enhancement: power vs. achievement

Self-enhancement is defined as an egoistic value orientation, including the value types power and achievement. The motivational goal of power is on control or dominance over people and resources. Examples of power include authority, social power and wealth and these are opposite to the goals of universalism in Schwartz´s [17] value structure [10]. In contrast, the motivational goal of achievement includes values such as success, capability, and ambition which are opposite to benevolence in the self-enhancement-to-self-transcendence continuum [10, 17]

Studies have shown that individuals rating high on self-enhancement values are less willing to engage in PEB [15, 28, 29]. Moreover, according to [10], the two value type's power and achievement have a negative relationship with pro-environmental attitudes and behavior, even if the differences between them suggest that they may influence attitudes and behavior differently.

In sum, persons holding values high in self-transcendence report favoring PEB, whereas those who tend to hold self-enhancement values see the environment as a source of resources to be consumed [11, 23, 30, 31].

Awareness-of-consequences beliefs (AC)

In the value-belief-norm (VBN) theory [6, 14, 32], AC-beliefs are central constructs referring to beliefs about adverse consequences of environmental problems, meaning consequences that may never actually occur. The VBN theory in turn builds on theoretical accounts of Schwartz´s [33] moral norm-activation theory of altruism, the theory of personal values [17, 18], and the New Environmental Paradigm (NEP) developed by Dunlap and Van Liere [34]. In the VBN theory, beliefs mediate between values and norms to influence behavior. That means for example, that if people value other species very high, awareness of consequences for the biosphere (ACbio), they will be concerned about environmental circumstances that may threaten those highly valued species. Similarly, people with high altruistic values who care about other people, awareness of consequences for other humans (AChum), will be concerned about environmental circumstances that may threaten the well-being of the other people, as well as people with egoistic values will be concerned about conditions that may threaten themselves, awareness of consequences of oneself (ACself). In this way the three values (ACself, AChum and ACbio) are the basis for environmental concerns (ECs) if the individual believes that there are ACs for particular valued object/s. According to the VBN theory, a person is more likely to carry out PEB if this person believes that environmental attributes will

cause ACs for his/her valued object/s and that he/she could reduce the threat and has personal norms for such behaviors.

Beliefs about adverse consequences for valued objects (AC) are shown to activate pro-environmental personal norms and are therefore related to altruistic or self-transcendence value orientation, while self-enhancement has found to be weaker related to the AC-beliefs [11, 13, 14, 21, 23, 24, 26, 35].

Environmental-concern evaluations (EC)

Environmental concern is defined as the personal evaluation of the seriousness of environmental problems. References [36, 37] pointed out that environmental concern is rooted in a person´s value system, which means that people are concerned about environmental problems when these problems threaten things they value. Reference [37] found strong evidence for the distinction between concern for oneself (ECself), concern for others (EChum) and concern for the biosphere (ECbio). Egocentric concerns (ECself) focus on the individual. People with egoistic environmental attitudes are concerned about the environment, but their concern is at a personal level. Thus, the environment should be protected because e.g. I don´t want to breath polluted air, or I don´t want to drink dirty water. Altruistic attitudes (EChum) describe an overall concern about environmental problems because the problems affect other people. Biosphere concerns (ECbio) are based on all living species including nonhuman animals, plants, oceans, forests, and so forth. Each of the three types of attitudes implies concern for the environment, but each is based on different underlying values [26, 36].

Studies of the relationships between EC evaluations and the values adopted from Schwartz have shown significant positive relationships between self-transcendence and biospheric environmental concern (ECbio) as well as between self-transcendence and altruistic concerns (EChum). Self-enhancement was found to be positively related to egoistic concerns (ECself) but negatively related to altruistic (EChum) and biospheric concerns (ECbio) [10, 11, 13, 14, 26]. Furthermore biospheric environmental concern (ECbio) correlated positively with self-reported PEB [26, 37]. Several studies have shown that a strong environmental concern increase the likelihood of PEB [38, 39].

Moral judgement competence

Much of the research about concern for the environment has a foundation in moral/ethical considerations. Different lines of research have focused on the role of moral obligations to act in favour of the common good. It has been shown that PEB is indirectly influenced by values, via behavior-specific beliefs, attitudes and norms [6, 11, 13, 23, 29, 31, 40]. In this respect, personal norms play an important role because personal norms refer to feelings of moral obligations to behave pro-environmentally [6, 11, 23, 29, 41]. There is also evidence linking variations in environmentally responsible behavior to the strength of individuals´ norms for such behavior and especially when it comes to the strength of internalized (i.e., personal or moral) norms [42, 32]. Several studies provide evidence that personal norms contribute to an explanation of PEB as energy conservation [43, 44] recycling [45, 46], travel mode choice [47, 48], and pro-environmental buying [49]. In contrast, evidence about the influence of norms is strangely mixed, and a meta-analysis by [50], examining a variety of social influence, found that norms had only a small effect on behavior.

This is in line with [51], concluding that the concepts of ethics and morality are complex and overlapping, and proposing, “that a valid moral philosophical theory needs to build on an accurate account of moral development and moral capabilities” [51] pp. 466. An extended method for measuring moral-judgment competence (MJC), the Moral Judgment Test (MJT) was proposed by [52, 53, 54, 55, 56]. Based on a review of Kohlberg´s definition of moral-judgment competence [58], Lind developed the dual-aspect theory of moral behavior, where MJT is designed to assess both affective and cognitive mechanisms of person´s judgment behavior as distinct aspects of the same pattern of behavior [57]. This means that moral competence (MJC) is synonymous with both moral internal principles and moral behavior. According to the dual-aspect theory of moral behavior, the moral behavior of a person is defined by the individual´s dedication to basic moral principles (affective aspect) and by his/her ability to reason and act according to those principles (cognitive aspect) [54, 55, 56].

The Moral Judgment Test also measures subjects´ moral ideals or attitudes, i.e., their attitudes toward each stage of moral reasoning as defined by [58, 59]. Kohlberg suggested a definition of moral maturity “as the capacity to make decisions and judgments which are moral (that is, based on internal principles) and to act in accordance with such judgments” [59], pp. 425.

The MJT has mainly been used in the field of moral psychology and education. One line of research has aimed to evaluate educational programs and other conditions of moral development where the MJT has shown to be sensitive to educational treatments. Studies have also tested correlation between moral development and social behavior [57].

Besides the study of [60], stating that principled moral reasoning, the most advanced level of moral development, correlates positively with ecocentrism, that is, belief in the intrinsic importance of nature, there is a paucity of research investigating either how the moral judgment competence (MJC) relate to concern about the environment in general, or whether moral judgment competence (MJC) can be seen as a determinant of PEB and PEBI. Since the MJT is designed to assess both affective and cognitive mechanisms of person´s judgment behavior simultaneously, it will be of certain interest to find out

whether the moral judgment competence (MJC), measured by MJT, may contribute to the prediction of responsible environmental behavior.

Locus of control

Perception of control has been studied within a wide range of psychology, such as learning, leadership and behavior in organizations, health and entrepreneurship [61] over the last decades, with findings revealing that the perception of control influence the individual in any intended actions. In addition locus of control (LOC) has been found to consistently correlate with environmentally responsible behavior and behavioral intention [47, 62, 63, 64, 65, 66, 67]. According to [68] LOC seems to moderate the link between values and PEB. Individuals with an internal locus of control (individuals who perceive that their own behavior makes a difference) more often behaved in an environmentally responsible manner than did individuals with an external locus of control (individuals who perceive that changes are due to random events or the behavior of other more influential individuals). In that sense, LOC may provide a linkage to the study of determinants of PEB and PEBI.

The concept of locus of control (LOC) was originated in social learning theory [69, 70], in seeking to explain the degree to which people believe they can bring about positive events and avoid negative events. Reference [70] defined locus of control (LOC) as a generalised expectancy of perceived internal or external control. The perception of internal or external control refers to the degree to which an individual perceives events as being contingent upon his or her own behavior or own characteristics, which are assumed to be relatively stable across varying conditions. Individuals, placing locus of control (LOC) to a higher degree within them, believe that they can influence outcomes because of their own abilities, skills or characteristics. These individuals are regarded to have an internal orientation (internals). Individuals, placing locus of control (LOC) to a higher degree outside them, perceive that outcomes and events are determined by external forces such as luck, chance and fate. They may also perceive actions and behaviors of other powerful persons as determining coming events and believe that events are unpredictable because of the complexity of the reality. These individuals are regarded to have an external orientation (externals). Individuals are to be classified along a range of very internal to very external.

An internal locus of control has been associated with greater job satisfaction and successful job performance [71], and willingness to purchase ecological products [72], and pro-environmental behavior [68], whereas an external locus of control has been associated with poorer physical and mental health [73], and greater propensity to work-related stress and burnout [74].

However, several studies have used different environmentally specific measures of locus of control (ELOC) as a related construct to LOC [63, 65, 75] and found results mainly consistent with studies that used general, dispositional, non-environmentally specific measures of locus of control (LOC) to predict environmental behavior. However, in the comprehensive meta-analysis of [64], as well as in the replication study [62], it is not clear to the reader what instruments measuring locus of control were used in the studies included in the reviews. In the present study a generalised measure of locus of control was chosen by using the modified non-domain-specific locus-of-control based on Rotter, who claimed that a specific locus of control scale tends to increase as experience of that domain increases. Because of that, a generalised locus of control is better suited for predicting people´s behaviors in situations with which they are less familiar [69].

Sense of coherence (SOC)

Finally the present study will investigate an additional factor, sense of coherence (SOC), introduced by [76] and the extent to which it may be a determinant of PEB and PEBI. Earlier research support the theory about SOC as a salutogenic factor, pointing out a positive relation between a strong SOC and low experienced stress and ability to cope with stress [77]. Furthermore, a strong SOC correlates positively with good quality of life [78], and with health behaviors such as non-smoking [79]. Since health behavior, that is, the ability to make healthy choices, can be seen as a potentially important mediating factor in the SOC-health relationship it would be interesting to examine the relationship between environmentally friendly behavior choices and SOC.

According to the salutogenic theory the concept of sense of coherence (SOC), introduced by [76, 80], is supposed to influence the capacity of people to stay healthy under stressful conditions. Antonovsky has identified three core components of SOC called comprehensibility, manageability and meaningfulness. Persons having a strong SOC were high on these components in contrast to those having a weak SOC.

SOC has been defined as a global orientation "that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli deriving from one´s internal and external environments in the course of living are structured, predictable, and explicable; (2) the resources are available to one to meet the demands posed by these stimuli; and (3) these demands are challenges, worthy of investment and engagement" [80], pp.19. As tentative research evidence support the theory about SOC as a factor promoting health behaviors, it seems logical to expect that a strong SOC, based on the definition of Antonovsky, would in the same way be a factor promoting environmentally friendly behaviors.

A hypothetical model

Considering earlier research reviewed above one can hypothesize that in causal order values first affect awareness of consequences and environmental concern as intermediate or transmitting variables. We assume a causal relationship of the value orientation power with ACself and ECself, a relationship of

achievement and benevolence with AChum and EChum, and universalism with ACbio and ECbio. Further we find it reasonable to assume that awareness of consequences together with environmental concern affect moral judgment competence which in turn, in a causal chain, affect PEB and PEBI.

As outlined in Figure 1, one can also hypothesize a causal relationship of locus of control and sense of coherence with PEB and PEBI.

In sum, the aim of the present study is to explore the relationships of values (i.e. universalism, benevolence, achievement and power), and environmental concern (i.e. awareness of consequences for oneself; ACself, awareness of consequences for others; AChum, awareness of consequences for the biosphere; ACbio, environmental concern for oneself; ECself, environmental concern for others; EChum, environmental concern for the biosphere; ECbio) with moral judgment competence in their role as determinants of eight types of PEB and PEBI. Further the effects of locus of control (i.e. internal locus of control; ILC, external locus of control; ELC), and sense of coherence on PEB and PEBI are to be investigated.

METHOD

Respondents and procedure

A random sample of 2000 residents from the Swedish cities Stockholm and Uppsala between 18 and 65 years old were obtained from the "national personal register of residents in Sweden (SPAR)". A survey questionnaire was mailed to them with a free-of-charge return envelope. This was followed by a first reminder after three weeks and a second reminder after another four weeks. No incentives were offered. A total of 468 usable questionnaires were returned, representing a response rate of 23 %. The analysis, including a total of 463 questionnaires (female 56.8 %), was preceded by deletion of 5 surveys and two variables due to missing values. After deletion the missing data were limited to six cases reaching 10 to 30 %, no variable exceeding 4 % missing data and values missing reaching an overall of 0.54 % of the total values. Cases with missing data were excluded pairwise from the relevant scale data.

The average age of the sample was 42.32 years (SD = 13.63 years). A university degree was held by 287 (62.0 %) respondents, the majority lived in relationships (61.6 %) and 94.2 % had Swedish national status. Respondents living as tenants were 43.4 %, and 47.5 % held owner-occupied apartments.

Measures

In addition to items covering sociodemographic data (e.g. sex, age, education) the main constructs were measured as follows:

Values

A selection of 16 value items from [17] Value Inventory Scale was used to assess the value orientation. The respondents were asked to indicate the degree to which each of the 16 values was a guiding principle in their lives. Each value was rated by the respondents on a scale from 1 "fully disagree" to 5 "fully agree". The values social power, wealth, social recognition, authority, self-respect, ambition, influences, and capability represented self-enhancement. The values social justice, equality, a world at peace, loyalty, forgivingness, tolerance, the welfare of others, and responsibility represented self-transcendence [17]. Items were recoded so as to make higher scores indicate stronger guiding principles in the lives of the respondents. The internal consistency, Cronbach´s alpha, was 0 .69 for the value type power, 0.75 for the value type achievement, 0.61 for the value type benevolence, and 0.73 for the value type universalism. One item was excluded from the power scale and one item from the universalism scale in order to improve reliability. With an internal consistency not reaching 0.70, the value type power showed a mean inter-item correlation of 0.31.

Awareness-of-consequences beliefs

Respondents indicated to what extent they agreed with 9 items measuring egoistic AC, altruistic AC, and biospheric AC using three items for each AC sub-scale after [81] and used by [29]. Respondents rated on a scale from 1 "fully disagree", and 5 "fully agree". Items were recoded so as to make higher scores indicate stronger beliefs that environmental degradation adversely affects valued objects and that environmental protection benefits them.

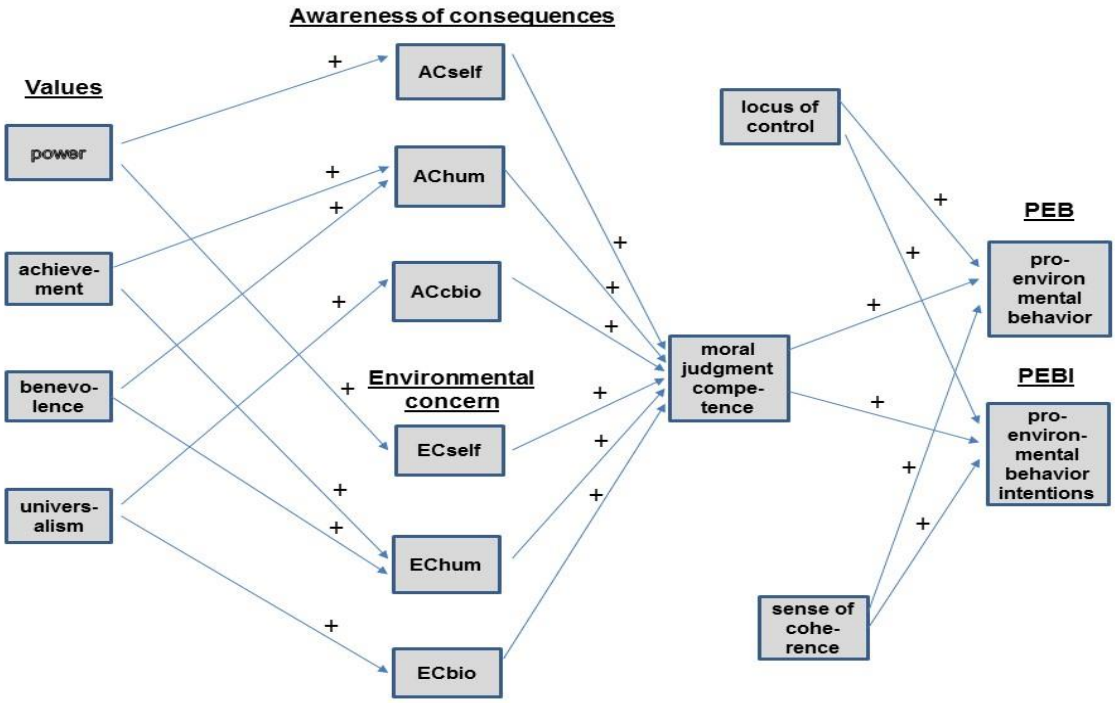

Figure 1. *A hypothetical model of predictors of PEP and PEBI*

After eliminating one question from the awareness of consequences for oneself, ACself scale, and one item from the awareness of consequences for others, AChum scale, the reliability was slightly improved to Cronbach´s alpha of 0.51 for oneself (ACself), 0.50 for others (AChum), and 0.54 for the biosphere (ACbio). The low reliability of these scales is in accordance with [29], with a Cronbach´s alpha reported of 0.45 (ACself), 0.42 (AChum), and 0.54 (ACbio), which is confirmed by [82]. For the two-item scales of ACself and AChum and the three-item scale ACbio, showing low reliability with an internal consistency not reaching 0.70, the mean inter-item correlation
was 0.21 for ACself, 0.11 for AChum, and 0.29 for ACbio.

Environmental-concern evaluations

The procedure suggested by [37] used 12-items to measure environmental concern with the question: "I am concerned about environmental problems because of the consequences for:" (abbreviated version of [37] pp. 338. Participants were asked to indicate the degree to which they were concerned about harmful effects of environmental problems for the following items: egoistic items (ECself): me, my future, my lifestyle, and my health; altruistic items (EChum): all people, children, people in Sweden, and my children; and biospheric items (ECbio): plants, marine life, birds, and animals.

Respondents were asked to rate on a scale from 1 "fully disagree" to 5 "fully agree". Items were recoded so as to make higher scores indicate stronger environmental concern. Cronbach´s alpha reached 0.90 for environmental concern for oneself (ECself), 0.86 for others (EChum), and 0.91 for the biosphere (ECbio). The reliabilities of the three
subscales in this study are well in line with Cronbach´s alpha reported as good to high by [26, 36, 37].

Moral judgement competence

The study used the MJT, a questionnaire created by Lind and derived from his dual-aspect theory. The participants completed the Swedish version of MJT, validated and certificated by [83]. The MJT assesses moral judgment competence (MJC) by recording how a subject deals with arguments, especially with arguments that oppose his or her position on a difficult problem [57]. The main index for moral competencies, the C-score, measures the degree to which a subject's judgments about

pro and con arguments is determined by moral concerns or principles rather than by non-moral opinions. It is an experimentally designed functional measure [57].

In MJT the individual confronts two moral dilemma stories, one about workers dealing with a law violation and a second about a doctor having to decide whether he is going to assist a dying patient to take away her own life (euthanasia), and must express whether he/she approves or disapproves a string of arguments in favor or against the prescribed behavior in each story. After the participant makes a decision about the dilemma described ("Was the behavior of the workers/doctor correct or incorrect?"), the participant is given six arguments in favor of the decision and six against it for each dilemma [84]. These arguments were carefully designed to represent each of Kohlberg´s six moral orientations [58].

The participants responded to a 9-point Likert-type scale ranging from "-4" (completely disagree) to "+4" (completely agree). An example of an item in favor of the workers behavior corresponding to the developmental Stage 1, is "Because they didn´t cause much damage to the company." Another example of an item against the workers behavior corresponding to Stage 4, is "Because we would endanger law and order in society if everyone acted as the two workers did." [84].

The C-score can range from 1 to 100. It indicates the percentage of an individual's total response variation due to a person's concern for the moral quality of given arguments or behavior. The C-score can be categorized as low (1-9), medium (10-29), high (30-49) and very high more than 50 points [85, 87]. Cases with one or two missing data (MD) have been replaced by the individual mean (38 cases). Cases with more than two missing data (10 cases) have been eliminated in the analyses by using "Exclude cases pairwise" [57, 85].

The original German version and all certified translations of the MJT, including the Swedish version translated and validated [83], are valid measures of moral judgment competence (MJC) and moral attitudes by virtue of test design and by five empirical criteria derived from the dual-aspect theory of moral behavior. Conventional criteria of test analysis, based on classical test theory and item response theory ("test reliability", "test consistency") do not apply to MJT because this test has been rigorously validated using theory-based criteria [57]. The C-score is calculated analogously to the multivariate analysis of variance (MANOVA) according to Lind [85, 86].

Locus of control

The scale consisted of 8 statements related to the construct of locus on control (LOC) following [88]. On each statement the subject was asked to rate on a scale from 1 "agree completely" to 5 "disagree completely". The scale has a minimum score of 8 and a maximum of 40, with a low score representing an external locus of control orientation and a higher score representing an internal locus of control orientation.

The variable locus of control (LOC) was dichotomised around the mean of 27.47 (SD = 4.54), with the cut-off point set at 27.47. Individuals who scored 27.47 points or less were designated as having an external locus of control (ELC, 54.2 %) while individuals who scored 27.48 points or more were designated as having an internal locus of control (ILC, 44.1 %).

The locus of control (LOC) scale was tested for consistency using Cronbach alpha. The result shows a coefficient of 0.72 which is well in line with the recommendations of [89].

Sense of coherence

SOC was measured with a 13-item short version of the original scale. It covers the three components of the SOC concept: that is, comprehensibility, manageability and meaningfulness [90]. Respondents were asked to rate on a scale from 1 to 7, with a high score representing high SOC. In this sample the internal consistency of the sum score, assessed with Cronbach´s alpha coefficient was 0.85.

Outcome variables

Eight different specific types of PEB and PEBI were used as outcome variables throughout this paper. Following [3, 91, 92, 93], the targeted behaviors to be studied were carefully selected from everyday behaviors with environmentally great impact which means that promoting change of these behaviors is more effective. The eight types of PEB and PEBI were: 1) using low-energy lighting in the residence, 2) buying garden grown vegetables, 3) using public transport, 4) using well-filled dish-washer and washing-machine, 5) avoiding air travel in the spare-time, 6) showering shortly, 7) recycling the household waste and 8) airing clothes instead of washing. Both current behavior (PEB) and future intentions (PEBI) are measured to get a sense of the existing practices of the respondents as well as their willingness to engage in environmental actions in the future. Respondents were asked to give their opinion on two statements covering the same type of behavior but corresponding to either PEB or PEBI respectively. That means, each respondent had to evaluate 16 statements.

Respondents were asked to rate 1) using low-energy lighting in the residence, on a scale from 1 "everywhere" to 4 "nowhere", while the other seven types of PEB and PEBI were rated on a scale from 1 "always" to 4 "never". Items were recoded so as to make higher scores indicate higher level of environmentally responsible actions, which means a sustainable lifestyle.

Cronbach´s alpha for the total scale of PEB and PEBI together, as sustainable lifestyle, was 0.75. The scale measuring sustainable lifestyle was divided into two separate sections, actual lifestyle, corresponding to PEB, and intentional lifestyle, corresponding to PEBI.

Statistical analyses

Relations of study variables were explored using Pearson product-moment correlation coefficient. Predictors of PEB and PEBI were analyzed by using path analysis. Due to a slight violation of multivariate normality assumptions, robust maximum likelihood estimation was used. Value scales universalism and benevolence, awareness for oneself, others and for the biosphere and environmental concern for others and for the biosphere were transformed using logarithmic transformation. Possible indirect effects were tested by calculating 99 % bias-corrected bootstrapped confidence intervals based on 1000 bootstrapping resamples as suggested by [94]. A chi-squared test ($\chi 2$), root mean square error of approximation (RMSEA), comparative fit index (CFI) and Tucker–Lewis index (TLI) were used to evaluate the goodness-of-fit of the model. The RMSEA < 0.05, CFI > 0.95, TLI > 0.90 and a non-significant ($p > 0.05$) $\chi 2$ test indicate an acceptable model [95]. After fitting the theoretical model all possible modifications were made based on modification indexes. Path analysis was carried out using Mplus version 7.2 [96]. To exclude the effect of possible confounding variables all

path analysis were also analyzed by controlling age, gender and education.

RESULTS

Descriptive statistics and mean values of the predictive variables and outcome variables actual and intentional lifestyle, are presented in Table 1.

The observed correlations (Table 2) did only partly support the main assumptions of the relationships between the study variables as presented in Figure 1. The value orientation power had a negative statistically significant correlation with ACself but not with ECself. The value orientation benevolence had statistically significant correlations with AChum and EChum as well as universalism with ACbio and ECbio, as expected. The value orientation achievement did not meet the assumptions. Furthermore ACself showed the expected significant correlations with moral judgment competence, PEB and PEBI whereas ECself showed negative correlation to moral judgment competence. AChum, EChum, ACbio and ECbio met the assumptions about significant correlations with PEB and PEBI but not with moral judgment competence. There were no significant correlations to be found between moral judgment competence and PEB or PEBI. Locus of control showed no statistically significant correlations with PEB and PEBI whereas sense of coherence had a significant correlation with PEB but not with PEBI.

Path analyses

The fit for the theoretical model was not acceptable (table 3). After fitting the modified model, where non-significant paths were removed and additional direct effects and residual covariances were added to the model based on modification indexes, acceptable fit was achieved. Fit measures of the final model as also presented in table 3 and the final path model is illustrated in Figure 2.

Significant indirect effects were found when predicting intentional lifestyle with universalism. Specific indirect effect were found via awareness for consequences for the biosphere (b=0.26, 99% CI = 0.05-0.48) and via environmental concern for the biosphere (b=0.33, 99% CI = 0.11-0.56). Also direct effect between universalism and intentional lifestyle was statistically significant (b=1.29, 99% CI = 0.60-1.98). Universalism had also significant indirect effect via awareness for consequences for the biosphere when predicting actual lifestyle (b=0.19, 99% CI = 0.022-0.36). Also direct effect was statistically significant (b=0.73, 99% CI = 0.08-1.38).

Most of these results remained also after controlling the age, gender, and education as covariates. Only differences were that direct effects from environmental concern for one self and universalism to locus of control and direct effects from awareness of consequences for oneself to actual lifestyle and to intentional lifestyle were no longer statistically significant.

DISCUSSION

Based on earlier research, a model was proposed, about the predictive power of value orientations, awareness of consequences and environmental concern in explaining pro-environmental behaviors (actual lifestyle) and pro-environmental behavioral intentions (intentional lifestyle). It was expected that values would first affect awareness of consequences and environmental concern as intermediate or transmitting variables. The model also predicted that awareness of consequences and environmental concern would affect moral judgment competence which in turn, in a causal chain would affect PEB and PEBI. In addition a causal relationship was hypothesized from locus of control and sense of coherence on PEB and PEBI. Our results only partly supported this hypothetical model.

Correlations showed that the value orientation power was negative related to ACself and ECbio. The value type benevolence was related to AChum and EChum, universalism to ACbio and ECbio, whereas the value type achievement did not show any relation to awareness of consequences or environmental concern. Path analyses pointed out that among the four types of value orientations only universalism showed significant effects on PEBI with ACbio and ECbio as transmitting variables. According to the path analyses, universalism also showed effects on PEB via ACbio. Additionally the final path model did confirm universalism as having causal direct effects on both PEB and PEBI. These findings, which are to be considered as the only significant effects confirmed by the path analyses, are consistent to earlier research where persons holding values high in the value type universalism, are positive related to pro-environmental attitudes and behaviors [11, 16, 23, 25] and behavioral intentions [15], whereas those who tend to hold self-enhancement values see the environment as a source of resources to be consumed [30, 31]. However, relations between environmental behavior and altruistic and biospheric values are weak, which means that it is important to examine how values best can be changed or how to motivate people to act upon their values of universalism [8].

Correlations pointed out significant relations between ACself and moral judgment competence, which were not confirmed as the expected significant effects of ACself on moral judgment competence by the path analyses. Concerning AChum, ACbio, ECself, EChum and ECbio neither significant correlations nor effects on moral judgment competence by the path analyses were found. These results are not well in line with earlier research where biospheric environmental concern (ECbio) correlated positively with self-reported PEB [26, 37], and egoistic and biospheric AC beliefs significantly predicted behavioral intention, but altruistic AC belief did not [14]. In the same way, path analyses could not confirm the expected effects of moral judgment competence on actual lifestyle (PEB) and intentional lifestyle (PEBI), as well as direct or indirect effects of locus of control (LOC) and sense of coherence (SOC) on PEB and PEBI. The significant correlations found between SOC and actual lifestyle could not be verified by the path analyses.

Table 1
Descriptive statistics, mean values (M) and standard deviations (SD) of demographic variables, sustainable lifestyle, value types, awareness of consequences, environmental concern, locus of control, sense of coherence and MJT

N 463	n*	(%)	M	(SD)
Men	198	42.8		
Women	263	56.8		
Age	463	100.0	42.32	13.63
19-33	155	33.5		
34-50	163	35.2		
51-66	145	31.3		
Marital status				
In relationship	285	61.6		
Not in relationship	177	38.2		
Nationality				
Swedish	436	94.2		
Not Swedish	27	5.8		
Locale of residence				
Stockholm	383	82.7		
Uppsala	79	17.1		
Type of residence				
Tenants	201	43.4		
Owner occupied apartments	220	47.5		
Other type of living	41	8.9		
Education				
Without university	176	38.0		
With university	287	62.0		
Income				
<235.000	174	37.6		
235.001-375.000	145	31.3		
>375.000	120	25.9		
Sustainable lifestyle	449		45.82	6.20
Actual lifestyle	455		22.39	3.17
Intentional lifestyle	452		23.48	3.76
Value types				
Power	460		7.64	2.43
Achievement	461		15.23	2.68
Benevolence	459		16.72	2.04
Universalism	459		16.32	2.57
Awareness of consequences				
For oneself (ACself)	454		8.34	1.55
For others (AChum)	461		8.21	1.48
For the biosphere (ACbio)	463		8.10	1.55
Environmental concern				
For oneself (ECself)	461		13.97	3.86
For others (EChum)	456		15.88	3.26
For the biosphere (ECbio)	460		16.69	3.12
Locus of control	455		27.47	4.54
Sense of coherence	456		63.04	11.68
Moral judgment test	448		22.26	17.31

* Differences in total n (463) are due to missing cases

Table 2
Bivariate correlations between value types, awareness of consequences, environmental concern, locus of control, MJC, sense of coherence, actual lifestyle and intentional lifestyle

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.Pow															
2. Ach	.51**														
3. Bene	-.13**	.30**													
4. Uni	-.21**	.19**	.61**												
5. ACself	-.28**	.03	.23**	.25**											
6. AChum	-.07	.07	.24**	.34**	.09										
7. ACbio	-.06	.12*	.22**	.28**	.15**	.56**									
8. ECself	.03	.07	.11*	.21**	-.07	.46**	.34**								
9. EChum	-.06	.06	.24**	.36**	.12*	.54**	.46**	.78**							
10ECbio	-.11*	.08	.25**	.35**	.20**	.49**	.54**	.55**	.74**						
11LOC	.05	.26**	.12**	-.01	.12*	-.12*	-.04	-.21**	-.15**	-.07					
12MJC	-.05	.04	.04	.12**	.12*	-.01	.01	-.12*	-.02	.03	-.01				
13SOC	-.05	.16**	.25**	.19**	.13**	-.05	-.01	-.12**	-.05	-.05	.39**	.01			
14AL	-.32**	-.16**	.17**	.31**	.22**	.16**	.22**	.10*	.19**	.24**	-.04	.03	.13**		
15IL	-.31**	-.07	.25**	.44**	.26**	.31**	.36**	.24**	.38**	.43**	-.06	.04	.04	.60**	

*p<.05, **p<.01.

NOTES, Pow = power; Ach = achievement; Bene = benevolence; Uni = universalism; ACself = awareness of consequences for oneself; AChum = awareness of consequences for others; ACbio = awareness of consequences for the biosphere; ECself = environmental concern for oneself; EChum = environmental concern for others; ECbio = environmental concern for the biosph ere; LOC = locus of control; MJC = moral judgment competence; SOC = sense of coherence; AL = actual lifestyle; IL = intentional lifestyle.

One can summarize the results of this study by stating that even such a complex method of analysis, like a structural equation model, was not able to reveal more effects between the including variables.

The construct locus of control (LOC) was not found to have an indirect or direct effect on actual or intentional lifestyle, indicating a lack of support for our hypothetical model. Since a large body of earlier research do not refer to LOC, measured by the modified non-environmentally specific Rotter scale, but to different environmentally specific measures of locus of control (ELOC), as an instrument to explore the predictive power of perception of control on PEB and PEBI, one potential explanation for the missing effect of LOC in this study may be found in the lack of specificity of the measures used. Focus had to be directed on the question if environmental behaviors and behavioral intentions are better predicted by internal locus of control measured by environmentally specific items. On the other hand locus of control have found to moderate the link between a person´s values and pro-environmental behavior by using the generalised measure of LOC by Rotter [68]. This means that in order for values to be expressed in pro-environmental behavior, people apparently must believe they have some control of what is happening.

Furthermore, as suggested by [75], and in line with a number of other authors, it has to be tested to what extent PEB and PEBI are situational-specific. That means, while most individuals are generally concerned about the environment, behaviors corresponding to this concern may be manifested in an inconsistent way. In order to explore how LOC relate to PEB and PEBI, not only environmental specific instruments, but also domain-specific measure of LOC should be tested. That is to use different dimensions of the construct ELOC when assessing the extent to which people believe that they have control and the ability to affect outcomes within a specific pattern of PEB. Thus, future research of the predictive power of LOC on PEB and PEBI, should focus on exploring whether different dimensions of the multifaceted ELOC will vary between different specific behaviors, as suggested by [75].

In the same way these findings are inconsistent to the hypothetical model where it was assumed that awareness of consequences and environmental concern would affect moral judgment competence (MJC) which in turn would have effects on PEB and PEBI. These results are neither in line with earlier research on the important role of personal norms as referring to feelings of moral obligations to behave pro-environmentally reviewed above [6, 11, 23, 29, 41], nor with studies providing evidence that personal norms contribute to PEB like energy conservation [43, 44], recycling [45, 46] travel mode choice [47, 48]. One might rather consider [50] in their conclusion that norms have only a small effect on behavior. The fact that MJT measures a person's general normative considerations, not specific to PEB or PEBI, may also contribute to the missing effects of attitudes on MJC and in turn the possibility of MJC to affect PEB and PEBI. The results may reflect that normative influences varies between behaviors, as
suggested by [41]. This means that the predictive power of high moral judgment competence in future research should be tested on a more behavior-specific conceptualization. It might also be of importance if the moral judgment competence would be tested as predictor not through self-report, but with actual behavior as dependent variable.

Table 3
Summary of the goodness of fit indexes of the path models

Model	Relations	Model fit index						
		X2	df	p	SRMR	RMSEA	TLI	CFI
1	Theoretical model	1678.60	90	0.000	0.137	0.134	0.553	0.757
2	Modified model	1797.32	99	0.000	0.138	0.047	0.942	0.964

TLI = Tucker Lewis index, RMSEA = root mean square error of approximation, SRMR = standardized root mean square residual, CFI = Bentler´s comparative fit index

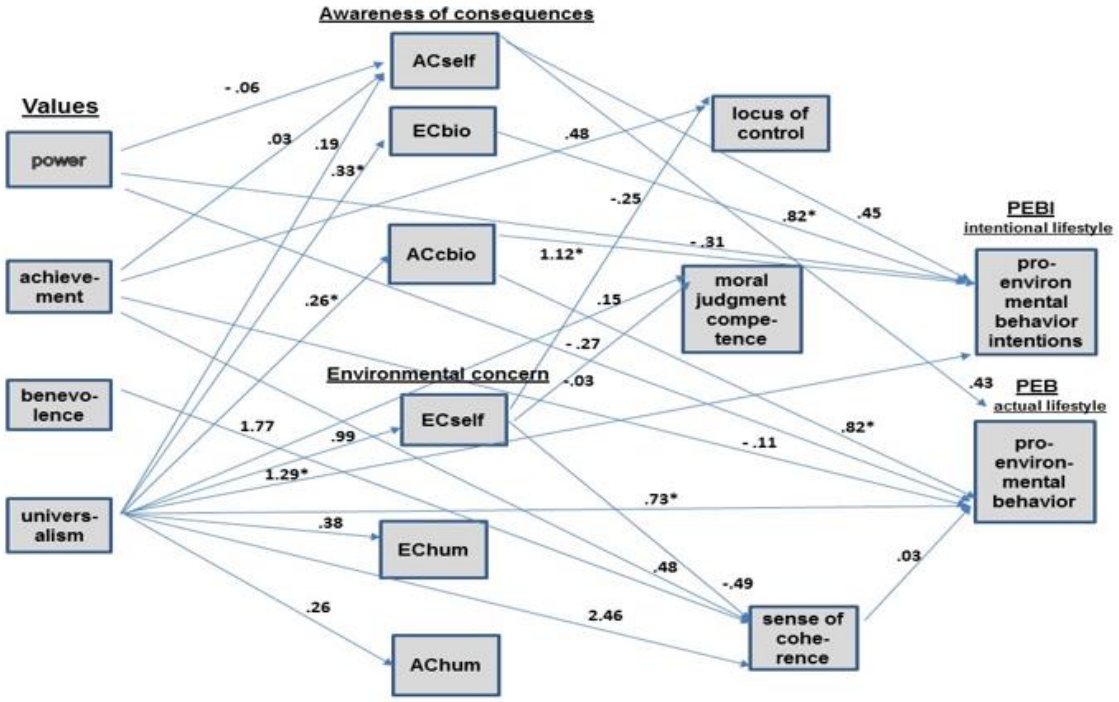

Figure 2. *The final path model of predictors of PEP and PEBI*
**significant path coefficient*

Finally, sense of coherence showed significant correlations with actual lifestyle, but not with intentional lifestyle. No effects on actual or intentional lifestyle were found by the path analyses. These findings are not well in line with the hypothetical model but point out that the concept of sense of coherence may be easier connected to current behavior and not to the willingness to engage in environmental actions in the future. It has to be further investigated if a strong sense of coherence might affect both PEB and PEBI when testing actual behavior and not assessed with self-report measures.

Since PEB and PEBI targeted in the present study had focus on individual consumption behaviors and intentions within the private-sector (behaviors are examined at the level of individuals), it may be plausible that the factors not confirmed as having effects according to the hypothetical model (value orientations benevolence, power and achievement, awareness of consequences, environmental concern, locus of control, moral judgment competence and sense of coherence) are more important determinants of such behavior and intentions that are more related to collective interests (e.g., signing a petition).

A strength of this study is that the sample used was representative because randomly drawn from the population, and not from a student population, which is often used in this type of research. Thus, the sample used in this study will probably guarantee a sufficient variation in responses, which also contribute to a greater generality in making conclusions. Following the relatively low response rate, 23 %, a potential limitation concerns the risk of self-selection bias, in the sense that only respondents with high environmental concern were motivated enough to complete the survey. Pearson correlations, all below .60, did not show

strong correlations between the variables. These relatively low correlations may indicate a low overlap in content of the different constructs and therefore make it more likely that the independent variables contribute uniquely to the explanation of PEB and PEBI.

A number of critical remarks can be made with respect to the empirical assessment and the findings. Only one value type, universalism, showed indirect and direct effects in predicting PEB and PEBI, which is in accordance with other findings where the explanatory power of attitudes on pro-environmental behaviors was rather low [64, 97]. One explanation for the low correspondence between attitudes and behavior may be the used method of self-report. There is no clear agreement whether self-reports are adequate indicators of actual behavior and it is often claimed that the study of pro-environmental behaviors and behavioural intentions is marked by a tendency to over-report what is perceived as socially desirable. As the measurement of participants´ actual behavior in this study was not feasible, ways to collect valid and reliable measures of self-reported PEB and PEBI were chosen according to [97]. Reference [64], as well as [62] noted in meta-analyses that correlations were substantially higher when actual behaviors were assessed instead of self-report. Future studies in this area should therefore prefer measuring actual behavior. The fact that in this study only the value type universalism showed significant direct and indirect effects on PEB and PEBI, also implies that researchers, practitioners, and policy makers should take account of other psycho-social factors such as the social, cultural, and institutional contexts in which values, attitudes and behaviors are formed when further exploring PEB and PEBI and developing interventions for change.

Another critical remark to be made is that the order of the eight parts of the questionnaire was not counterbalanced. This may have caused some negative order effects by the respondents. Since the subscales of awareness of consequences and environmental concern contained only two or three items, one has to consider a decrease in reliability.

When interpreting the results attention also has to be paid to the fact that found determinants of one single behavior may not be applied to other behaviors as dependent variables. The results, pointing at the variables with missing effects, indicate that separate SEM-anlysis for every type of actual lifestyle and intentional lifestyle may have been more successful in confirming these independent variables as determinants of PEB and PEBI. This is in accordance with [97], concluding that no single factor describes different PEB in a similar way and [41] claiming that some determinants, specifically the normative/moral influence, vary between behaviors. Regarding the specificity of the pro-environmental behavior in relation to its antecedents, future research should focus not only on the predictive power of values, attitudes and other personality- and moral factors, but also on the question of when and how they are predictive on behavior. General predictors, like the psychological factors within this study, may be less strongly related to specific behaviors than behavior specific attitudes and beliefs, but they are more likely to predict a range of environmental behaviors [98].

Finally it should be noted that, both in the present study and in several of the previous studies with similar aims, constructing reliable measures of the theoretical constructs can be challenging. One possible reason is that participants fail to clearly distinguish conceptually between the different terms used in defining the scales, which in turn points to the need for researchers to develop more specific instruments covering the complex and multidimensional constructs to study. This may in future studies be even more essential, considering that even such a complex method of analysis like the structural equation modelling (SEM) used in this study, could not reveal more clear effects of the independent variables on PEB and PEBI.

On a more general level, one could of course also argue that the present approach to understand factors promoting responsible environmental behavior is rather restricted, since we here only focus on the predictive power of individuals' cognitions such as values and attitudes. From a more behavioral theory perspective one would argue that the actual consequences of such real-life behavior in the final analysis will be the main motivational factors [99]. Factors such as these are obviously not taken into account in the present analyses, which should be considered when evaluating the partly missing predictive power of the analysed attitudinal factors.

In conclusion, this study represents an attempt to contribute to a better understanding of the complex relationship between a numbers of psychological factors underlying pro-environmental behavior. However, the generally low, and missing, correspondence between psychological factors and PEB and PEBI found in this and other studies, highlights the need for future research to develop more comprehensive and specific instruments and validate these instruments across a variety of specific PEB and PEBI.

References

[50] Abrahamse, W., & Steg, L. Social influence approaches to encourage resource conservation: a meta-analysis. Global Environmental Change, 2013, 23, pp. 1773-1785

[47] Abrahamse, W., Steg, L., Gifford, R., & Vlek, C. Factors influencing car use for commuting and the intention to reduce it: a question of self-interest or morality? Transportation Research Part F, 2009, pp. 317-324

[88] Andersson, G. "Internal-External Locus of Control: Some methodological notes on the research and a factor analysis of a revised I-E scale". Reports from the Department of Applied Psychology. Gothenburg University, 1976, 9, 1.

[76] Antonovsky, A. Health, stress and coping. San Fransisco, CA: Jossey-Bass, 1979.

[80] Antonovsky, A. Unraveling the mystery of health: how people manage stress and stay well. San Francisco, CA: Jossey – Bass, 1988.

[90] Antonovsky, A. The structure and properties of the Sense of Coherence Scale. Soc Sci Med, 1993, 36, pp. 725-733

[38] Bamberg, S. How does environmental concern influence specific environmentally related behaviors? A new answer to an old question. Journal of Environmental Psychology, 2003, 23, pp. 21-32.

[62] Bamberg, S., & Möser, G. Twenty years after Hines, Hungerford, and Tomera: a new meta-analysis of psycho-social determinants of pro-environmental behavior. Journal of Environmental Psychology, 2007, 27, pp. 14-25.

[28] Bardi, A., & Schwartz, S. H. Values and behavior: strength and structure of relations. Personality and Social Psychology Bulletin, 2003, 29, pp. 1207-1220.

[43] Black, J.S., Stern, P.C. & Elworth, J.T. . Personal and contextual influences on household energy adaptations. Journal of Applied Psychology, 1985, 70, pp. 3-21

[45] Bratt, C. The impact of norms and assumed consequences on recycling behavior. Environment and Behavior, 1999, 31, pp. 630-656.

[75] Cleveland, M., Kalamas, M., & Laroche, M. Shades of green: linking environmental locus of control and pro-environmental behaviors. Journal of Consumer Marketing, 2005, 22, (4), pp. 198-212.

[87] Cohen, J. Statistical power analysis for the behavioral sciences, (2nd ed.) Lawrence Erlbaum Associates Inc, 1988.

[99] Cone, J. D. and Hayes, S. C. Environmental Problems/Behavioral Solutions. CA: Wadsworth, 1980.

[9] De Groot, J. I. M., & Steg, L. The role of value orientations in evaluating quality of life consequences of a transport pricing policy. Transportation Research Part D, 2006, 11 (2), pp. 160-165.

[89] DeVellis, R. F. Scale development: Theory and applications (2nd ed.). Thousand Oaks, California: Sage, 2003.

[34] Dunlap, R. E., & Van Liere, K. D. The new environmental paradigm: A proposed measuring instrument and preliminary results. Journal of Environmental Education, 1978, 9, pp. 10-19.

[91] Energimyndigheten. Energiläget 2010. Energy in Sweden- facts and figures 2010. ET2010:45. Statens energimyndighet, 2010a.

[92] Energimyndigheten. Energiläget i siffror 2010. Energy in Sweden- facts and figures 2010. ET2010:46. Statens energimyndighet, 2010b.

[68] Engqvist Jonsson, A-K., & Nilsson, A. Exploring the relationship between values and pro-environmental behavior. Environmental Values, 2014, 23, pp. 297-314

[63] Fielding, K. S., & Head, B. W. Determinants of young Australians´ environmental actions: the role of responsibility attributions, locus of control, knowledge and attitudes. Environmental Education Research, 2012, 18 (2), pp. 171-186.

[3] Gardner, G. T., & Stern, P. C. Environmental problems and human behavior. (2nd ed.). Boston, MA: Pearson, 2002.

[7] Gardner, G. T., & Stern, P. C. The short list: the most effective actions U.S. households can take to curb climate change. Environment, 2008, 50, pp. 12-25

[[93] Geller, E. S. The challenge of increasing pro-environmental behavior. In R. B. Bechtel, & A. Churchman (Eds), Handbook of environmental psychology, New York: Wiley, 2002,(pp. 525-540.

[8] Gifford, R. Environmental psychology matters. Annual Review of Psychology, 2014, 65, pp. 541-579.

[77] Gilbar, O. Relationship between burnout and sense of coherence in health social workers. Social Work in Health Care, 1998, 26 (3), pp. 39-49.

[27] Grunert, S. C., & Juhl, H. J. Values, environmental attitudes, and bying of organic Foods. Journal of Economic Psychology, 1995, 16, pp. 39-62.

[29] Gärling, T., Fujii, S., Gärling, A., & Jakobsson, C. Moderating effects of social value orientation on determinants of proenvironmental behavior intention. Journal of Environmental Psychology, 2003, 23, pp. 1-9.

[74] Hair, M., Renaud, K. V., & Ramsay, J. The influence of self-esteem and locus of control on perceived email-related stress. Computers in Human Behaviour, 2007, 23, pp. 2791-2803.

[10] Hansla, A., Gamble, A., Juliusson, A. & Gärling, T. The relationships between awareness of consequences, environmental concern, and value

orientations. Journal of Environmental Psychology, 2008a, 28, pp. 1-9.

[42] Harland, P., Staats, H.J., & Wilke, H.A.M. Explaining pro-environmental intention and behavior by personal norms and the theory of planned behavior. Journal of Applied Social Psychology, 1999, 29, pp. 2505-2528.

[64] Hines, J. M., Hungerford, H. R., & Tomera, A. N. Analysis and synthesis of research on responsible environmental behavior: a metaanalysis. Journal of Environmental Education, 1986/87, 18, pp. 1-8

[15] Honkanen, P., & Verplanken, B. Understanding attitudes towards genetically modified food.: the role of values and attitude strength. Journal of Consumer Policy, 2004, 27, (4), pp. 401-420.

[48] Hunecke, M., Blöbaum, A., Matthies, E., & Höger, R. Responsibility and environment: ecological norm orientation and external factors in the domain of travel mode choice behavior. Environment and Behavior, 2001, 33, pp. 845-867.

[65] Hwang, Y. H., Kim, S. I., & Jeng, J. M. Examining the causal relationships among selected antecedents of responsible environmental behavior. Journal of Environmental Education, 2000, 31 (4), pp. 19-25.

[79] Igna, C. V., Julkunen, J. & Ahlström, R. Sense of coherence relates with smoking. Journal of Health Psychology, 2008, 13 (8), pp. 996-1001.

[1] Intergovernmental Panel on Climate Change (IPCC). Climate change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 2014, 151 pp.

[71] Judge, T. A., & Bono, J. E. Relationship of core self-evaluations traits – self-esteem, generalized self-efficacy, locus of control, and emotional stability – with job satisfaction and job performance: a meta-analysis. Journal of Applied Psychology, 2001, 86, pp. 80-92.

[78] Julkunen, J., & Ahlström, R. Hostility, anger, and sense of coherence as predictors of health-related quality of life: Results of an ASCOT substudy. Journal of Psychosomatic Research, 2006, 61 (1), pp. 33-39.

[51] Kahn, P. H. Nature and moral development. In M. Killen, & J. Smetana (Eds.), Handbook of moral development Mahwah, NJ: Lawrence Erlbaum, 2006, pp. 461-480.

[30] Kaiser, F. G., & Byrka, K. Environmentalism as a trait: gauging people´s prosocial personality in terms of environmental engagement. International Journal of Psychology, 2011, 46, (1), pp. 71-79

[60] Karpiak, C.P., & Baril, G.L. Moral reasoning and concern for the environment. Journal of Environmental Psychology, 2008, 28 (3), pp. 203-208.

[73] Kirkcaldy, B. D., Shephard, R. J., & Furnham, A. F. The influence of type A behaviour and locus of control upon job satisfaction and occupational health. Personality and Individual Differences, 2002, 33, pp. 1361-1371.

[95] Kline, R. B. Principles and Practice of Structural Equation Modeling (2nd ed.). New York: Guilford, 2005.

[4] Koger, S. M., & Winter, D. D. The psychology of environmental problems: psychology for sustainability.(3rd ed.) Taylor & Francis Group, NJ: Psychology Press, 2010.

[59] Kohlberg, L. Development of moral character and moral ideology. In M. L. Hoffman & L. W. Hoffman (Eds.), Review of child development research, vol. 1, New York: Russel Sage Foundation, 1964, pp.381-431.

[58] Kohlberg, L. The psychology of moral development: the nature and validity of moral stages. New York: Harper and Row, 1984.

[52] Lind, G. Wie misst man moralisches Urteil? Probleme und alternative Möglichkeiten der Messung eines komplexen Konstrukts. (How does one measure moral judgment? Problems and alternative ways of measuring a complex construct). In G. Portele (Ed.), Sozialisation und Moral, Weinheim: Beltz, 1978, pp. 171-201.

[53] Lind, G. Experimental questionnaires: a new approach to personality research. In A. Kossakowski & K. Obuchowski (Eds.), Progress in the psychology of personality, Amsterdam: North-Holland, 1982, pp. 132-144.

[54] Lind, G. The theory of moral-cognitive judgment: A socio-psychological assessment. In G. Lind, H. A. Hartmann, & R. Wakenhut (Eds.). Moral development and the social environment. Studies in the philosophy and psychology of moral judgment and education, Chicago: Precedent, 1985a, pp. 21-53.

[55] Lind, G. Attitude change or cognitive-moral development? How to conceive of socialization at the university. In G. Lind, H. A. Hartman, & R. Wakenhut (Eds.), Moral development and the social environment. Studies in the philosophy and psychology of moral judgment and education, Chicago: Precedent, 1985c, pp. 173-192.

[56] Lind, G. Ist Moral lehrbar? Ergebnisse der modernen moralpsychologischen Forschung. (Research findings from modern moral psychology). (2nd ed.). Berlin: Logos-Verlag, 2002,

[57] Lind, G. The Meaning and Measurement of Moral Judgment Competence. In Fasko, Daniel, Jr. & Willis, Wayne, (eds.). Contemporary Philosophical and Psychological Perspectives on Moral Development and Education, Creskill, Hampton Press, 2008, pp. 185-220.

[84] Lind, G. Moral Judgment Test (MJT). Retrieved March 9, 2009 from http://www.uni-konstanz.de/ag-moral/mut/mjt-engl.htm, 2009.

[83] Lind, G. Validation and Certification Procedure for the Moral Judgment Test (MJT). Retrieved October 25, 2010 from http://www.uni-konstanz.de/ag-moral/mut/mjt-certification.htm, 2010a.

[85] Lind, G. (2010b). Scoring and Interpreting the Moral Judgment Test (MJT), Moralisches Urteil-Test (MUT): An Introduction. Retrieved Mai 15, 2011 from http://www.uni-konstanz.de/ag-moral/mut/mjt-intro.htm, 2010b.

[86] Lind, G. Available at: http://www.uni-konstanz.de/ag-moral/material/moral/messen/MJT_scoring-C.htm (accessed August 2012), 2012.

[94] MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. Multivariate Behavioral Research, 2004, 39, pp. 99-128.

[46] Matthes, E., Selge, S., & Klöckner, CA. The role of parental behaviour for the development of behaviour specific environmental norms – the example of recycling and reuse behavior. Journal of Environmental Psychology, 2012, 32, pp. 277-284

[61] Millet, P., & Sandberg, K. W. Individual status at the start of rehabilitation: Implications for vocational rehabilitation programs. Work, 2003, 20, pp. 121-129.

[96] Muthén, L.K. & Muthén, B.O. Mplus User's Guide. Seventh Edition. Los Angeles, CA: Muthén & Muthén, 1998-2010.

[31] Nilsson, A., von Borgstede, C., & Biel, A. Willingness to accept climate change strategies: the effect of values and norms. Journal of Environmental Psychology, 2004, 24, pp. 267-277.

[11] Nordlund, A. M., & Garvill, J. Value structures behind pro-environmental behavior. Environment and Behavior, 2002, 34, pp. 740-756.

[23] Nordlund, A. M., & Garvill, J. Effects of values, problem awareness and personal norm on willingness to reduce personal car use. Journal of Environmental Psychology, 2003, 23, pp. 339-347.

[66] Ojedokun, O. Attitude towards littering as a mediator of the relationship between personality attributes and responsible environmental behavior. Waste management, 2011, 31, pp. 2601-2611.

[12] Oreg, S. & Gerro, T. K. Predicting pro-environmental behavior cross-nationally: values, the theory of planned behavior, and value-belief-norm theory. Environment and Behavior, 2006, 38, pp. 462-483.

[40] Poortinga, W., Steg, L., & Vlek, C. Values, environmental concern and environmental behavior: a study into household energy use. Environment and Behavior, 2004, 36 (1), pp. 70-93.

[22] Rohan, M. J. A rose by any name? The values construct. Personality and Social. Psychology Review, 2000, 4, pp. 255-277.

[16] Rokeach, M. The nature of human values. New York: Free Press, 1973.

[69] Rotter, J. B. Social learning and clinical psychology. Engle Cliffs. New York: Prentice-Hall, 1954.

[70] Rotter, J. B. Generalized Expectancies for Internal versus External control of locus of reinforcement. Psychology Monographs, 1966, 80 (Whole no. 609).

[36] Schultz, P. W. Empathizing with nature: The effects of perspective taking on concern for environmental issues. Journal of Social Issues, 2000, 56, pp. 391-406.

[37] Schultz, P. W. The structure of environmental concern: Concern for self, other people, and the biosphere. Journal of Environmental Psychology, 2001, 21, pp. 327-339.

[26] Schultz, P. W., Gouveia, V. V., Cameron, L. D., Tankha, G., Schmuck, P. and Franek, M. Values and their Relationship to Environmental Concern and Conservation Behavior. Journal of Cross-Cultural Psychology, 2005, 36, pp. 457-475.

[24] Schultz, P. W., & Zelezny, L. Values as predictors of environmental attitudes: Evidence for consistency across 14 countries. Journal of Environmental Psychology, 1999, 19, pp. 255-265.

[33] Schwartz, S. H. Normative influences on altruism. In L. Berkowitz (Ed.), Advances in

experimental social psychology vol. 10, New York: Academic Press, 1977, pp. 221-279.

[17] Schwartz, S. H. Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. Zanna (Ed.), Advances in Experimental Social Psychology, vol. 25 Orlando, FL: Academic Press, 1992, pp. 1-65.

[18] Schwartz, S. H. Are there universal aspects in the structure and contents of human values? Journal of Social Issues, 1994, 50, (4), pp. 19-45.

[19] Schwartz, S. H., & Bardi, A. Value hierarchies across cultures. Taking a similarities perspective. Journal of Cross-Cultural Psychology, 2001, 32, pp. 268-290.

[20] Schwartz, S. H., Melech, G., Lehman, A., Burgess, S., Harris, M., & Owens, V. Extending the cross-cultural validity of the theory of basic human values with a different method of measurement. Journal of Cross-Cultural Psychology, 2001, 32, pp. 519-542.

[72] Schwepker, C. H., & Cornwell, B. T. An examination of ecologically concerned consumers and their intention to purchase ecologically packaged foods. Journal of Public Policy & Marketing, 1991, 10, pp. 77-101.

[82] Snelgar, R.S. Egoistic, altruistic and biospheric environmental concerns: measurement and structure. Journal of Environmental Psychology, 2006, 26, pp. 87-99

[13] Steg, L., Dreijerink, L., & Abrahamse, W. Factors influencing the acceptability of energy policies: a test of VBN theory. Journal of Environmental Psychology, 2005, 25, pp. 415-425.

[35] Steg, L., & Nordlund, A. Models to explain environmental behaviour. In L. Steg, A. E. van den Berg, & J. I. M. De Groot (Eds.), Environmental Psychology: An Introduction, 2012, Wiley-Blackwell, pp. 185-194.

[2] Stern, N. The economics of climate change. Cambridge, UK: Cambridge University Press, 2007.

[67] Stern, P. C. What psychology knows about energy conservation. American Psychologist, 1992, 47 (10), pp. 1224-1232.

[6] Stern, P. C. Toward a coherent theory of environmentally significant behavior. Journal of Social Issues, 2000, 56, pp. 407-424.

[21] Stern, P. C., & Dietz, T. The value basis of environmental concern. Journal of Social Issues, 1994, 50, (3), pp. 65-84.

[32] Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. A Value-Belief-Norm theory of support for social movements: The case of environmentalism. Human Ecology, Review, 1999, 6, pp. 81-95.

[81] Stern, P. C., Dietz, T., Kalof, L. Value orientations, gender, and environmental concern. Environment and Behavior, 1993, 25, pp. 322-348.

[14] Stern, P. C., Dietz, T., Kalof, L., & Guagnano, G. A. Values, beliefs, and pro-environmental action: Attitude formation toward emergent attitude objects. Journal of Applied Social Psychology, 1995, 25, pp. 1611-1636.

[49] Thøgersen, J. The ethical consumer. Moral norms and packaging choice. Journal of Consumer Policy, 1999, 22, pp. 439-460

[39] Thøgersen, J. Psychological determinants of paying attention to eco-labels in purchase decisions: model development and multinational validation. Journal of Consumer Policy, 2000, 23, pp. 285-313.

[41] Thøgersen, J. Norms for environmentally responsible behavior: an extended taxonomy. Journal of Environmental Psychology, 2006, 26, pp. 247-261.

[25] Thøgersen, J., & Ölander, F. Human values and the emergence of a sustainable consumption pattern: a panel study. Journal of Economic Psychology, 2002, 23,pp. 605-630.

[44] Van der Werff, E., & Steg, L. One model to predict them all: Predicting energy behaviours with the norm activating model. Energy Research & Social Science, 2015, 6, pp. 8-14

[98] Van der Werff, E., Steg, L., & Keizer, K. E. It is a moral issue: the relationship between environmental self-identity, obligation-based intrinsic motivation and pro-environmental behavior. Global Environmental Change, 2013, 23, (5), pp. 1258-1265.

[97] Vining, J., & Ebreo, A. Emerging theoretical and methodological perspectives on conservation behavior. In R. B. Bechtel, & A. Churchman (Eds), Handbook of environmental psychology, New York: Wiley, 2002, pp. 551-558.

[5] Vlek, C., & Steg, L. Human behavior and environmental sustainability: problems, driving forces and research topics. Journal of Social Issues, 2007, 63 (1), pp.1-19.