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Connecting the Dots: Group Coordination, Collective Agency, Social Cohesion and Sustainable Behavior

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Abstract

The understanding of the predecessors of sustainable behaviour is currently more crucial than ever, especially for finding ways to delay or stop the harmful impact we are having on the environment. The focus of the current research is to investigate how a psychological understanding of sustainable behaviour can benefit a transition to collective sustainability. This research aims at investigating how collective agency, social cohesion and the intention to behave sustainably are influenced by the degree of coordination that individuals experience. In this experiment, participants completed a task with either a high or a low coordination manipulation and answered a questionnaire once they had finished it (N=84). The hypotheses were that the act of coordination would enhance the sense of collective agency, i.e., it is assumed that individuals experiencing more coordination in a group will report higher levels of collective agency. It was also assumed that the act of coordination would increase the sense of social cohesion, i.e., individuals experiencing more coordination in a group will report higher levels of social cohesion. By addressing both elements, we expected to increase the intention for performing sustainable behaviour. Our results revealed no association between coordination and collective agency or sustainability intention. However, a significant relationship was discovered between coordination and social cohesion. Moreover, in the literature search, social cohesion was found to increase pro-environmental behaviour. Together, these results demonstrate that higher social cohesion and the subsequent positive effects on pro-environmental behaviour are a follow-up of higher coordination. These insights are fundamental for effectively promoting the adoption of environmentally sustainable practices among populations.

Keywords: Sustainability, Sustainability intention, Collective agency, Social Cohesion, Coordination

Connecting the Dots: Group Coordination, Collective Agency, Social Cohesion and Sustainable Behaviour

Introduction

Climate Action from a Psychological Perspective

In recent years the importance of applying psychology to the understanding of sustainable behaviour has increased, especially when learning how to delay or stop the ecologically harmful pathway that the human population is presently creating (Koger & Scott, 2016). The promotion of sustainable alternatives is intricately linked to the understanding of behaviour, behaviour patterns and motivations (Koger & Scott, 2016). Psychological research can offer insights into the motivations driving environmentally destructive behaviour, why and how these behaviours are sustained as well as what is needed for individuals to change (Koger & Scott, 2016). The field of social psychology is especially relevant within this topic as environmental behaviours do not happen independently from the external environment or the behaviour of other people; social influence plays a large role in their development and execution (Koger & Scott, 2016). Interestingly, Wade-Benzoni et al. (2007) demonstrates that depending on the information available to individuals (e.g., environmental standards), this can change the extent to which a person sees themselves as an environmentalist. The fear of being criticized for inaction is less than the fear of being criticised for contributing to the environmental problem (Wade-Benzoni et al., 2007). This adds to the reasoning why individuals sometimes do not act on the known sustainability crisis and highlights the need to encourage individuals to change their behaviour.

Social psychological research is vital for gaining better insights into why people behave unsustainably, how to reduce this behaviour and how to create methods to promote more sustainable behaviour (Koger & Scott, 2016). It has also become obvious for experts in different fields such as conservation biologists and environmental policymakers that collaborating with specialists in psychology is crucial when attempting to change individuals' behaviour to a more sustainable and eco-friendly direction (Koger & Scott, 2016).

In the field of social psychology and social influence, an example demonstrating a mindset that hinders sustainable behaviour is the "free rider problem". This concept refers to individuals who avoid changing their behaviour because they believe that if others are not making changes, there is no reason for them to do so either (Lorenzoni et al., 2007). This

mindset leads people to think they can benefit from others' efforts without making any personal sacrifices for sustainability. However, research by Jugert et al. (2016) suggests that simply conveying the threat of climate change and the need for sustainable action to the public is not sufficient to encourage meaningful change to avoid the free rider problem. Instead, attempting to raise awareness of climate change threats may even have unintended and unexpected consequences, such as triggering defensive responses or denial. Jugert et al. (2016) discovered that making the threat of climate change salient can sometimes lead to rejection of the message altogether thus impeding efforts to foster sustainable behaviour. Frantz and Mayer (2009) made use of a model of helping behaviour developed by Latane and Darley (1970) to address the problem of climate change. This model by Latane and Darley (1970) was originally used to understand why people do or do not help others in emergency situations. It proposes that for an individual to help there are five criteria that must be met. These include the following: the emergency must be noticeable, it must be interpreted as an emergency, there must be an experience of personal responsibility, the person must know what to do, and decide to act (Latané & Darley, 1970). Frantz and Mayer (2009) propose that since the sustainability crisis is not perceived by everyone as an emergency, it is not directly salient, the responsibility of taking action is ambiguous, it is not clear what behaviours are impactful, and unsustainable habits/norms are present, it interferes with the chance of performing sustainable behaviour. This is also elaborated on by Koger & Scott (2016) when they conclude that individualistic views together with cultural, evolutionary and social factors cause individuals to feel that what they do for the environment is insignificant, thus hindering sustainable action.

These insights demonstrate the complexity of promoting sustainable action and highlight the importance of understanding psychological barriers that prevent individuals from working towards sustainability initiatives. It is evident that addressing these mindsets and finding effective ways to overcome resistance is essential for promoting meaningful behaviour change towards sustainability, which is the aim of this study. The current experiment aims to broaden perspectives on how a psychological understanding can benefit the transition to collectively sustainable behaviour.

This research seeks to explore how coordination between individuals in groups influences their sense of social cohesion and collective agency. The aim of this experiment is to investigate if these variables have an impact on intentions and motivations towards sustainable behaviour. These concepts will be elaborated upon in the following sections.

Collective Agency and Coordination

The environmental issues that the world struggles with today have not been caused by single individuals, instead the crisis is a result of non-actions by collectives (Fritsche & Masson, 2021). On their own, individuals cannot stop or adapt behaviour in such a manner that would cause a significant change. This is only possible through collective action. Collective action represents the output of a group, and a strong collective identity is needed for individuals to engage (Bamberg et al., 2015). Those who view themselves as alone in the climate crisis are more likely to feel helpless and not act (Fritsche & Masson, 2021). Based on these findings, it can be suggested that collective action increases the chances of sustainable behaviour which is necessary to transform society into a more sustainable reality (Bamberg et al., 2015). To achieve these goals and act as a collective, humans can coordinate their actions to a remarkable extent (Sebanz & Knoblich, 2021).

Coordination efforts consist of two core aspects which are the ability to integrate movements or tasks to reach a specific goal/level of performance and being able to work in harmony with other participants (Allsop et al., 2016). Overall, coordination can be defined as the arranging of components to achieve a larger task or function (Gorman, 2014). This is a continuous necessity for human activity (Gorman, 2014). Interestingly, coordination has been demonstrated to increase the willingness to participate in collective action (Wiltermuth & Heath, 2009). For instance, by merely observing and experiencing interpersonal coordination, the feeling of commitment for a joint action increase (Michael et al., 2016).

Collective action also requires motivation and capability to act according to the shared goals. This notion refers to collective agency; and is relevant for social or ecological change (Charli-Joseph et al., 2023). Personal agency is the feeling that one has control over ones' own actions or that an individual has the capability to make things happen while collective agency is the ability of a group to act towards shared goals (McCarthy et al., 2006). In other words, collective agency represents the capacity for collective or joint action of a certain group (Pelenc et al., 2015).

According to Pelenc et al. (2015), developing collective agency requires interaction among individual members leading to goals or common understandings and the combining of individual resources such as time or skills. Shared commitments and values can also arise through discussion and social interaction (Pelenc et al., 2015). Members of a group can recognize a shared capacity for climate action when there's a collective commitment or norm toward climate protection that the group actively strives for and is likely to achieve (Fritsche

& Masson, 2021). Fritsche & Masson (2021) further demonstrated that if individuals believe in their collective capacity for change it is linked to their personal perception of their ability to contribute to sustainability efforts. Research further revealed that the strength of collective agency is associated with the degree to which there was coordination among actions within a group (Bolt et al., 2016).

These perspectives are supported in the research by Jugert et al., (2016) who illustrated that believing in the agency of one's group influences an individual's perception of both personal and collective agency, even to the extent of affecting pro-environmental behaviours. Individuals are also more likely to participate in sustainable actions and pro-environmental behaviours if they perceive themselves as part of a collective (Soliman et al., 2018). As demonstrated, collective agency can play a large role in how individuals work together, how motivations and coordination fluctuate and how they perceive to be capable of change. Therefore, the concept of coordination as a prerequisite for collective agency is at the centre of this research with the aim to further expand the understanding of how collective agency is related to sustainable action.

Social Cohesion

Social Cohesion has also proved to be relevant in pro-environmental behaviour. This concept is based on several elements including social relations and identification, i.e., how people feel attracted to groups and how individuals identify with the group (Schiefer & Van Der Noll, 2017). Through coordination in a group, trust is fostered among members and an increased feeling of cohesiveness, and perceptions of shared goals is created (Ip et al., 2006). There are several areas of social cohesion including structural aspects such as family, friendship, or participation in organized activities and cognitive aspects like trust, tolerance, or respect (Dupuis et al., 2016).

It has been further demonstrated that social cohesion has a positive association with pro-environmental behaviour while individualism has a negative one (Moon et al., 2023). Unsurprisingly, social cohesion has been shown to minimize the negative relationship found between individualism and ecologically friendly behaviours (Moon et al., 2023). The research by Moon et al. (2023) also demonstrated higher levels of social cohesion leading to an increased likelihood of coordination (such as helping each other). These positive social interactions result in more motivation and willingness to engage in sustainable behaviours.

This knowledge contributes to the current research as it is evident that social cohesion and the feeling of being connected to a group is fostered through group coordination.

Coordination also influences the way individuals view shared goals (such as sustainable behaviour).

Association between Collective Agency and Social Cohesion

The relationship between social cohesion and collective agency is a result of the interplay between individual autonomy and the surrounding social environments. Research indicates that an individual's agency is influenced by their social context, as highlighted by Fonseca et al. (2019). In other words, an individual's identity and sense of agency are shaped not only by their personal attributes and choices but also by the different contexts within which they exist. Moreover, collective agency, or the ability of a group to act collectively towards a shared goal or belief, is intertwined with shared subjectivity within the group (Shteynberg et al., 2021). This shared subjectivity creates a sense of cohesion and unity within the group, enabling collective action and fostering a shared purpose (Shteynberg et al., 2021). The relationship between social cohesion and agency emphasizes the interplay between individual autonomy and social interconnectedness highlighting the importance of understanding how both aspects influence behaviour.

Ultimately, coordination results in increased trust, participation in collective action (Wiltermuth & Heath, 2009) as well as an increased feeling of cohesiveness (Ip et al., 2006). This is further supported by the theory put forward by Bolt et al. (2016) and Wiltermuth & Heath (2009) stating that coordination alters the way in which individuals perceive collective agency and their willingness to participate in collective action. Moreover, research by Ip et al. (2006) also shows that if there is coordination within a group it also increases trust, the feeling of cohesiveness and shared goals.

Based on the concepts discussed above, our two main research questions are the following: “Does high coordination within a group influence collective agency and social cohesion? How does this relate to the intention of sustainable behaviour?”.

Hypotheses and Assumptions

The first hypothesis of this research is that the act of coordination will enhance the sense of collective agency, i.e., individuals experiencing more coordination in a group will report higher levels of collective agency. The second hypothesis is that the act of coordination will enhance the sense of social cohesion, i.e., individuals experiencing more coordination in a group will report higher levels of social cohesion. The third and final hypothesis is that

through coordination, there will be an increased potential for promoting sustainable behaviour.

This research is a replication of the study by Sarabi et al. (2023) that is based on an experimental design attempting to identify how the variables of social cohesion and collective agency are affected by changing the degree of coordination in a group. There is also the assumption that the relationship with coordination is further associated with the intention to behave sustainably in the future as evidenced in literature.

Methods

Ethical Approval

On 26.01.2024 ethical approval was granted for this research by the Ethics Review Board at Utrecht University Faculty of Social and Behavioural Sciences. The approval is filed under the number 24-0217.

Participants

The recruitment of participants began on 01.02.2024 and the data collection took place on 12.02.2024 and 13.02.2024. Recruitment for the experiment was mainly conducted through the network of the Joint Action Thesis group and by distributing flyers to potential participants. Over a two-day period, members of the thesis group advertised the experiment at Utrecht University campus to recruit more participants. Students of the Social Science Faculty could sign up for the experiment via the SONA system to receive credits for participation.

To be eligible for this experiment, participants had to be adults over the age of 18 regardless of their education level or gender. They needed to be fluent in either English or Dutch. There was no exclusion of participants after the data collection as all participants partaking in the research completed the entire task. Once the entire experiment had been completed, participants were debriefed and offered a small reimbursement in appreciation.

To determine the required sample size, a power analysis with G*Power was conducted. Based on a medium effect size, a significance level (α) of .05 and a power of .80, it was determined that a minimum of 128 participants was necessary. In total, we recruited only 84 participants, consisting of 26 males, 57 females and one nonbinary/third gender. The average age was 28.8 ($SD= 13.55$) with the youngest participant being 18 and the eldest 71. The education levels of the participants were as follows: 63.1% were WO Bachelor students, 14.3% WO Master students, 10.7% HBO students, 7.1% MBO students and 4.8% were PhD

students. The percentages applied to the highest obtained degree of participants and their current course of study (if applicable). On average, participants were familiar or friends with 2.5 ($SD= 1.47$) members in their group.

Design and Procedure

We employed a one factor between subject's design with two conditions (low vs high coordination). The participants were required to select a convenient timeslot already during the recruitment process. Based on the timeslot, participants were randomly allocated to one of two conditions i.e., high, or low coordination group. This allowed for a random allocation of participants to condition. The aim was to have a minimum of four participants per timeslot, five per timeslot would have been ideal. As the number of participants was limited, the experiment went ahead if there were at least three participants available per timeslot. On 12.01.2024 the first seven groups were low coordination and the last seven were high. This was reversed on 13.01.2024. The coordination level was reversed to avoid any risk of time of day influencing the results. To create the manipulation of coordination, depending on their timeslot, participants completed a plant-potting task either independently or together with their group.

Equipment needed for the experiment included soil, flowers to plant, individual flowerpots for the low coordination group and one large flowerpot for the high coordination group, gloves, watering bottle and a planting table. A requirement for conducting this experiment was a planting table that provided space for participants to work comfortably with the materials provided and interact with one another. The table's size had to accommodate up to five participants, allowing them to also stand apart from each other. The distance ensured that participants in the low coordination group could work independently without needing to interact.

As the groups entered the experimental room, a brief (oral and/or written) description related to sustainability and the need to investigate sustainable decisions was provided. Informed consent forms were provided for the participants to sign before they could proceed with participation (see Appendix B). It was made clear that all the information would be processed anonymously, remain confidential and would not be accessible outside of Utrecht University. Participants were free to leave the experiment at any point of time. An information sheet with basic information was available before the start of the experiment (see Appendix C). Once participants had completed the experiment, they were given a debriefing document (see Appendix D) as well as an oral explanation by the Joint Action thesis group.

Once the consent forms had been signed, participants were taken to the planting table where they received an explanation of their task. In the high coordination groups, participants were told they had to plant several plants together into a big pot and share responsibility to perform the task. It was up to the groups how they organised tasks, such as finding gloves for each member of the group, adding soil to the pot (a bit higher than half of the pot's height), placing the plants in the pot, adding soil in the pot around the roots and finally watering the plants. For the high coordination groups, it was decided to have three plants available per person and an additional plant to increase the coordination (i.e., there was not an exact number of plants per participant). For example, in a group of three there were 10 plants available.

In the low coordination groups, the instruction was to plant three plants individually into a pot provided in front of them. Each participant had a pot and a watering bottle to reduce communication between each other. The instructions were to first put on gloves, select three plants, add soil to the pot (a bit higher than half of the pot's height), place the plants in the pot, add soil in the pot around the roots and finally water the plants.

The time taken for the groups to complete the task was recorded in both conditions. It was also recorded if there were noticeable interactions or events during the experiment.

Once the planting task had been completed, participants filled in the survey, provided on iPads. The survey could be completed in either Dutch or English. Once all members within the timeslot had finished the survey, a debriefing document was provided (see Appendix D) and an oral explanation was given by one of the Joint Action thesis members. Any questions that participants had were answered. After completion of the entire experiment, participants were told that they were free to take plants home (maximum three) and were offered a chocolate as a thank you.

Instruments/Measures

This experiment consisted of a survey which involved answering questionnaires concerning the research questions of the Joint Action thesis group (see Appendix A). To answer the research questions of this specific research two questionnaires were used.

The first questionnaire was used to evaluate the level of collective agency participants experienced after completing the coordination task. The Sense of Agency Questionnaire by Tapal et al. (2017) was used for this. The purpose of the Sense of Agency questionnaire is to assess the level of personal agency, however, to measure collective agency the word "I" was replaced by "we". Overall, the questionnaire consisted of 13 questions. These statements also

compromise the Sense of Negative Agency which is the belief that actions are not based on personal control (Tapal et al., 2017). These questions were excluded from the research as not being in control was irrelevant to the investigation. Only five questions answering the Sense of Positive Agency (being in control) were used, for instance “We are in full control of what we do” (Tapal et al., 2017). Subsequently, a scale was created for collective agency by calculating a mean of the five Positive Agency items. The questionnaire used a 7-point Likert scale, with number one categorized as strongly disagree and number seven categorized as strongly agree. The Positive Sense of Agency scale had a sufficient reliability with Cronbach’s α of .73 following a reliability analysis. A good internal consistency ranges between .70 and .90 (Tavakol & Dennick, 2011; Pallant, 2016).

The second questionnaire included in the survey measured Social Cohesion (see Appendix A). This questionnaire was based on a study conducted by Dupuis et al. (2016) measuring Neighbourhood Social Cohesion. The questionnaire was adapted for the purposes of this research and only specific statements that were irrelevant were excluded. The selected statements fitted into the theme of structural aspects of Social Cohesion (Dupuis et al., 2016). Since the questionnaire was originally designed to measure Neighbourhood Social Cohesion, the word “area” was replaced by “group”. An example statement of the modified questionnaire is “People in my group can be trusted”. From the modified questionnaire, 8 out of the 10 statements required an answer where a higher number meant more social cohesion while the two remaining statements were reversed. This questionnaire also used a 7 – point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The Social Cohesion measure had a Cronbach’s α of .66 following the reliability analysis. An alpha above .70 indicates a good reliability (Tavakol & Dennick, 2011; Pallant, 2016). Based on this, it was concluded that the Social Cohesion measure had a moderate internal consistency.

To test the intention to behave sustainably in the future, two scales were created. The first scale used three questions from the measures employed in previous versions of the experiment (Sarabi et al., 2023) (see Appendix A). The statements were “I would like to do a different activity for the environment”, “I would like to do a different activity for the environment with any group” and “I would like to do a different activity for the environment with this group” to be answered on a 1-7 scale. In other words, it measured the “Propensity for Sustainable Action”. The “Propensity for Sustainable Action” scale had a Cronbach’s α of .67 following the reliability analysis, thus having a moderate internal consistency.

The intention to behave sustainably was also measured using a few other statements employed in previous versions of the experiment. The second scale comprised of

motivational statements concerning the intention and personal perception to behave sustainably. The statements included “I am capable of making the environment greener”, “I feel responsible for making the environment greener” and “I am motivated to make the environment greener”. These questions represented the scale “Future Intention and Motivation for Sustainable Behaviour”. A reliability analysis revealed a Cronbach’s α of .71, indicating a good internal consistency (Tavakol & Dennick, 2011; Pallant, 2016).

Statistical Analysis

Randomisation and manipulation checks were conducted before completing the evaluation on the outcomes of the experiment by means of a series of ANOVAs. The main outcomes as determined by a series of ANOVAs were collective agency, social cohesion and sustainability intention. The results of the experiment were analysed using SPSS (Statistical Package for Social Sciences). All statistical analyses used hypothesis testing with $p < .05$. A significant F statistic ($p < .05$) from the ANOVA rejects the null hypothesis (there is no difference between means) (Pallant, 2016).

The ANOVAs provided insight into whether there were differences in the means of the dependent variables (collective agency, social cohesion, and the intention to behave sustainably) based on experimental condition, i.e. the coordination level. It tested whether hypothesized differences exist between the low and the high coordination groups. The tests were only completed once the assumptions for the ANOVA analysis had been met and/or resolved. The first assumption was that the prediction error was normally distributed. A violation to this assumption does not negatively affect the results if the sample size is larger than 30 (Pallant, 2016). In addition to this, a Kolmogorov – Smirnov test was used to check for normality. Non-significant results indicated normality (Pallant, 2016) and in the case of discrepancies, Quantile- Quantile plots were inspected. A straight line suggests a normal distribution (Pallant, 2016). Moreover, it was ensured that the assumption of equal variances (homogeneity) was met. This indicates that the variability of the scores within the groups is similar (Pallant, 2016). Levene’s test for equality of variances was used to assess this. Besides that, the data was also required to be independent from one another (randomly and independently sampled). This means that the results should not be influenced by each other (Pallant, 2016). All assumptions were met before analysis for each variable and were not elaborated on unless there were discrepancies. The interpretations of the effect sizes (Partial Eta squared) following the ANOVA analyses made use of Cohens guidelines. The Cohens

values used for the analyses are .01, .06 and .14 respectively representing small, medium and large effect sizes (Morris & Fritz, 2013).

Results

Randomisation Check

Randomisation and manipulation checks were completed before conducting the analyses on the variables involved in the experiment. The randomisation check ensuring that participants were allocated evenly across the experimental design was important to demonstrate that differences between groups were based on the experimental conditions and not pre-existing differences. A series of ANOVAs was run on age, education and familiarity with other participants as dependent variables and the coordination condition as independent variable. A Chi Square test was run between gender and coordination condition due to it being a categorical variable.

Prior to conducting the gender test, it was necessary to exclude one participant from the analysis. Since only one participant categorized as non-binary/third gender, there was no statistical relevance to conduct the Chi Square test analyses with an addition of the one-person group. The participant was included in all other analyses. The relationship between gender and condition was insignificant following the Chi Square test of independence with $\chi^2(1, N = 83) = 2.635, p = .105$. This means that between the coordination groups, gender was spread without any significant difference, i.e., there was a random allocation of gender between groups.

Where age of the participants is concerned, the corrected model ($[F(1, 83) = 5.630, p = .020]$) was significant with a Partial Eta squared of .064 (medium) meaning that between coordination groups, there was a significant difference in age of participants. We will therefore control for age in all our subsequent analyses.

The corrected model for education ($[F(1, 83) = 2.058, p = .155]$) was insignificant with a Partial Eta squared of .024 (small). This indicates that between coordination groups there was no significant difference in education level.

As to how many of the participants were familiar or friends with each other (acquaintances), the corrected model ($[F(1, 83) = 8.344, p = .005]$) was significant with a Partial Eta squared of .092 (medium/large). Between groups there was a difference in the number of familiar others. This will also be controlled for in the subsequent analyses.

Manipulation Check

The manipulation check was conducted to test whether coordination had the intended effect on the variables. An ANOVA was conducted with subjective experience of coordination as dependent variable and coordination condition as independent variable. The subjective experience of coordination was assessed by two statements “The other participants and I worked well together” and “To what extent did you coordinate your actions with fellow members of your group?”. For the first statement, the corrected model ($[F(1, 83) = 12.61, p < .001]$) was significant with a Partial Eta squared of .13 (large). This means that there were indeed different perceptions of working together depending on the coordination group. For the second statement, the corrected model ($[F(1, 83) = 19.35, p < .001]$) was significant with a Partial Eta squared of .19 (large). In this case it also means that there were different perceptions of coordination depending on the allocated coordination group. Ultimately, the manipulation of coordination did have the intended effect on participants.

Descriptive Statistics

Table 1 provides an overview of the descriptive data of the key variables. There was a total of 84 participants consisting of 26 males, 57 females and one nonbinary/third gender. The average age of participants was 28.8 and most participants were either Bachelor or Master students (also referring to the highest obtained degree). Overall, the levels of Collective Agency and Social Cohesion were moderate to high with means of 4.19 and 5.72 respectively (see Table 1).

Table 1

Descriptive Statistics of Key Variables (Total N=84)

	Entire sample (N=84)		High Coordination (N=47)		Low Coordination (N=37)	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Collective agency	4.19	1.07	4.15	1.01	4.26	1.16
Social Cohesion	5.72	.72	5.88	.64	5.51	.77
Sustainability intention						
Propensity for Sustainable Action	5.71	.78	5.74	.79	5.67	.77

Future Intention and Motivation for Sustainable Behaviour	5.69	.89	5.73	.88	5.63	.91
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Note. The scale for the variables ranges from 1 (strongly disagree) to 7 (strongly agree).

Main Analyses

Collective Agency

The main analysis focused on answering the question as to what extent high vs. low coordination would affect collective agency as hypothesized by means of ANOVA. The hypothesis for collective agency was that being in a high coordination group would lead to an increased sense of collective agency. The null hypothesis was that there was no difference in collective agency means between the low and high coordination groups. The corrected model including the covariates age and number of acquaintances ($[F(1, 83) = 2.338, p = .080]$) was insignificant, with a Partial Eta squared of 0.081 (medium/large). Age was a significant covariate ($F(1, 83) = 4.092, p = .046$) but the number of acquaintances was not ($F(1, 83) = 3.335, p = .072$). The age of participants in the experimental groups had an effect on the influence of coordination on reported collective agency. The insignificant result of the main ANOVA analysis showed that there was no effect of coordination on the level of collective agency. In other words, coordination is unrelated to the perceived collective agency. The hypothesis assuming high coordination would lead to a change in degree of collective agency was rejected and the null hypothesis was maintained.

Social Cohesion

Using this variable, the question whether there was a difference between the high and low coordination groups in perceived social cohesion was analysed. The dependent variable was social cohesion, and the independent variable was the categorisation of low and high coordination. The hypothesis was that higher coordination would lead to a higher level of social cohesion, while the null hypothesis was that there was no difference between coordination groups. The model including the covariates of age and number of acquaintances ($[F(1, 83) = 5.409, p = .002]$) was significant, with a Partial Eta squared of 0.169 (large). Age was not a significant covariate ($F(1, 83) = 1.914, p = 0.170$), but the number of acquaintances was significant ($F(1, 83) = 8.952, p = 0.004$). In other words, being familiar

with others in the experimental group influenced the effect of the coordination manipulation on the experience of social cohesion. Despite this, the significant findings demonstrate a difference in means of social cohesion between the coordination levels. The null hypothesis was rejected which meant that being in a group with a different level of coordination changed the perception of social cohesion. Looking at the descriptive means (see Table 1) it can be concluded that being in the high coordination group resulted in a higher sense of social cohesion ($M=5.88$) compared to the low coordination group ($M=5.51$). Essentially, increased coordination caused a higher sense of social cohesion, confirming the hypothesis.

Sustainability Intention

ANOVAs were completed to test whether the coordination level could predict the intention to behave sustainably in the future. The hypothesis was that increased coordination would result in an increased intention to behave sustainably. The null hypothesis was that there is no difference between the means in sustainability intention within the two coordination groups. The dependent variable was the intention to behave sustainably consisting of the two scales of “Propensity for Sustainable Action” and “Future Intention and Motivation for Sustainable Behaviour”, and the independent variable was the coordination categorisation.

When testing the first scale “Propensity for Sustainable Action”, the Kolmogorov – Smirnov test revealed a violation of normality assumption ($p=.001$). To further assess this, Quantile-Quantile plots were analysed with the observed values plotted against the expected normal distribution. A straight line suggests a normal distribution (Pallant, 2016). The Quantile – Quantile plots show an almost straight line with only a couple of noticeable outliers thus demonstrating a fairly normal distribution. Following this we analysed our data as intended. The corrected model ($[F(1, 83) = .724, p = .540]$) was insignificant after controlling for the covariates age and number of acquaintances, with a Partial Eta squared of 0.026 (small). Neither the covariate age or number of acquaintances had a significant effect on the influence of coordination on the “Propensity for Sustainable Action” with ($[F(1, 83) = 2.005, p = .161]$) and ($[F(1, 83) = .002, p = .967]$). The insignificant main effect indicates there was no difference in propensity for sustainable actions between conditions. In other words, the hypothesis was rejected, and the null hypothesis was maintained positing no difference between means.

Another ANOVA was run on the scale “Future Intention and Motivation for Sustainable Behaviour”. The Kolmogorov – Smirnov test had a significant result with a value of $p < .001$,

indicating a violation of the normality assumption. Looking at the Quantile-Quantile plots, it demonstrated a somewhat normal distribution. The corrected model ($[F(1, 83) = .822, p = .486]$) was insignificant after controlling for age and the number of acquaintances, with a Partial Eta squared of 0.030 (small/medium). Neither the covariate age or the number of acquaintances had a significant effect with ($[F(1, 83) = .763, p = .385]$) and ($[F(1, 83) = 1.281, p = .261]$). The results showed that again, there was no difference in means of the motivation or intention to behave sustainably depending on the coordination group that participants were in. Once again, the null hypothesis was maintained, i.e., there was no significant differentiation between coordination groups and the means in sustainability intention/motivation.

Discussion and Conclusion

The aim of this study was to examine how coordination between individuals in groups influences the sense of social cohesion and collective agency. It was also investigated whether these variables would impact the intention to behave sustainably. The research questions were as follows “Does high coordination within a group influence collective agency and social cohesion?” and “How does this relate to the intention of sustainable behaviour?”.

The hypotheses were that the act of coordination would enhance the sense of collective agency, i.e., individuals experiencing more coordination in a group would report higher levels of collective agency and that the act of coordination would enhance the sense of social cohesion, i.e., those experiencing more coordination in a group would report higher levels of social cohesion. It was also expected that increased coordination (and thus collective agency and social cohesion) would result in an increased intention to behave sustainably.

Results and Previous Research

Results demonstrated that social cohesion was the only variable significantly affected because of the coordination manipulation. The other variables: collective agency and sustainability intention, showed no significant difference in means depending on the coordination groups. Connecting these results with the hypotheses, the assumption of a positive association between coordination and social cohesion was confirmed. The other two variables maintained their null hypothesis.

The non-significant result for collective agency is inconsistent with previous research. For example, Bolt et al. (2016) revealed that the strength of collective agency is associated with

the degree of coordination within a group. Moreover, believing in the agency of one's group should have influenced individuals' perception of both their personal and collective agency even to the extent of increasing pro-environmental behaviours (Jugert et al., 2016). This inconsistency leads to the question as to whether the questionnaire for assessing collective agency in the present study was adequate. Simply substituting "I" with "we" to measure collective agency instead of personal agency might not have been sufficient to capture elements that are essential for collective agency. The method of assessing collective agency was different compared to the methodology of for instance, Jugert et al. (2016). Jugert et al. (2016) proposed that for groups to effectively act on shared goals (collective agency), they must believe in their capability to act. This belief was manipulated by participants being exposed to either successful or unsuccessful group sustainability initiatives (Jugert et al., 2016). Essentially, Jugert et al., (2016) did not use a direct questionnaire, meaning that the method of measuring/manipulating collective agency could have contributed the present non-significant results.

The analyses did not demonstrate an effect of coordination on the intention to behave sustainably. This is inconsistent to the previous research as well. For example, Moon et al. (2023) discovered that supportive interactions (such as helping each other out), being in a group or community with more social cohesion fostering coordination towards common goals and having good connections with others was associated to more sustainable behaviour. This effect of coordination and connection to others on shared goals and intention to behave sustainably was not found in our study. In our study, the intention to behave sustainability was measured via the following two scales "Propensity for Sustainable Action" and "Future Intention and Motivation for Sustainable Behaviour" while Moon et al. (2023) used specific pro-environmental behaviour statements such as "Avoid buying certain products for environmental reasons". The distinction between pro-environmental behaviour and intention to behave sustainably may have contributed to the different results. The inconsistency also posed the question whether collective agency and social cohesion might be influencing the sustainability intention. For example, individuals are more likely to participate in sustainable actions if they perceive themselves to be part of a collective (Soliman et al., 2018). Given the absence of significant findings related to collective agency, it is unclear whether it impacts the intention to behave sustainably. It is important to note that this interpretation is speculative.

The significant association between social cohesion and coordination was on the other hand consistent with previous research. For instance, Ip et al. (2016) posited that through coordination in a group, trust is fostered among members and an increased feeling of cohesiveness and perception of shared goals is created (Ip et al., 2006). Social cohesion also minimized the negative relationship found between individualism and ecologically friendly behaviours (Moon et al., 2023).

Limitations

When discussing the results there are a few limitations to consider. Concerning the generalisability of effects, there was a potential sampling bias as the research was conducted in a university setting and all the researchers in the Joint Action Thesis group were students. Essentially, the participants were more likely to be students due to the researching network and this would not be representative of the wider population. The sample size was also not as large as desired (84 participants instead of 128). Another limitation has to do with the demographic information measurement and the specificity of it. The question assessing education level was “What is your highest obtained degree” (see Appendix A). The statement also referred to the current study of participants. This was a limitation related to the demographic information as it was not possible to evaluate the exact percentage of students compared to other population groups. In other words, the result generalisability remains slightly speculative.

Implications

This study is important to the field of sustainability psychology as it broadens the understanding of mindsets and barriers related to sustainable behaviour. These insights are essential when encouraging populations to adopt more environmentally friendly practices. Previous research demonstrates that higher social cohesion has a positive effect on pro-environmental behaviour (Moon et al., 2023). Therefore, our results showing increased social cohesion through group coordination might shape an individual's perception of shared goals, such as the intention to behave sustainably. Based on these findings, there is potential for upscaling the experiment and making use of the results in practical interventions. By knowing that coordination can increase social cohesion, sustainability initiatives could increase their focus on tasks requiring coordination of participants. The marketing of these initiatives could also focus on addressing successful coordination and emphasize a community spirit. Overall,

this study has successfully broadened the perspectives on how a psychological understanding can benefit the transition to more collectively sustainable behaviour.

Directions for Future Research

Future research should focus on exploring more ways to measure collective agency and social cohesion in relation to coordination and the intention to behave sustainably. For example, this could involve finding improved methods of measuring collective agency such as developing a more specific questionnaire or replicating other studies measuring the variable. It has also been suggested in the literature that measuring the variable of social cohesion between individuals and individuals to groups may be an effective approach (Bottoni, 2018). This could be a useful addition to the present study for future research. Conducting the experiment with a larger sample size would increase the generalisability of the results. It would also be interesting to create coordination within groups in other circumstances to see if there are similar results. Moreover, in the present research there was some variability in group size as some groups consisted of only three participants compared to the expected five. Future research could investigate whether group size affects the degree of coordination and whether it has an influence on the variables of collective agency, social cohesion and sustainability intention.

Overall, the current research has pushed us one step closer to connecting the dots between group coordination, collective agency, social cohesion, and sustainable behaviour and is a fundamental addition to knowledge contributing to the psychology behind sustainable intentions.

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Appendices

Appendix A

Demographics

- Please enter your group number
- Please specify your gender identity (male, female, Nonbinary, prefer not to say, other)
- What is your age?
- What is your highest obtained degree? (MBO, HBO, WO Bachelor, WO Master, PhD)
- How many of the participants did you know from before? (1-5)

“Regular” Outcomes

1. I am capable of potting the plants.
2. I am responsible for potting the plants.
3. I am motivated to pot the plants.
4. As a group, we are capable of potting the plants.
5. As a group, we are responsible for potting the plants.
6. As a group, we are motivated to pot the plants.
7. I felt committed to completing the plant potting.
8. I am capable of making the environment greener
9. I feel responsible for making the environment greener
10. I am motivated to make the environment greener
11. As a group we are capable of making the environment greener
12. As a group we are responsible for making the environment greener
13. As a group we are motivated to make the environment greener
14. I feel committed to making the environment greener
15. The other participants and I worked well together
16. Potting plants was a pleasant experience
17. I felt connected to the others potting the plants

18. In consider myself as someone who is very involved with environment/sustainability issues

In the future ...

19. I would like to do this activity again

20. I would like to do this activity again with any group

21. I would like to do this activity again with this group

22. I would like to do a different activity for the environment

23. I would like to do a different activity for the environment with any group

24. I would like to do a different activity for the environment with this group

Coordination

25. To what extent did you coordinate your actions with fellow members of your group?

Autonomy

26. I felt like I had a choice in how to pot the plants.

27. I felt free to choose how I wanted to pot the plants

28. The circumstances influenced my decisions

29. I felt I had the opportunity to influence the way to pot the plants.

Trust

30. I can rely on those with whom I work in this group.

31. Overall, the people in my group are very trustworthy.

32. There is no 'team spirit' in my group.

33. We have confidence in one another in this group.

Collective agency (Positive agency)

34. We are in full control of what we do

35. Things we do are subject only to our free will

36. The decision whether and when to act is within our hands

37. Our behavior is planned by us from the very beginning to the very end

38. We are completely responsible for everything that results from our actions

Social cohesion

- 39. Most people in my group can be trusted
- 40. People in my group will take advantage of you
- 41. If you were in trouble, there are a lot of people who would help you
- 42. I really feel a part of my group
- 43. Most people in my group are friendly
- 44. People in my group have lots of community spirit
- 45. People in my group do things to help the community
- 46. People in my group treat each other with respect
- 47. People in my group are tolerant of others who are not like them
- 48. In my group there is pressure to behave like everyone else

Need to belong

- 49. I don't like to be alone
- 50. When I don't see my friends for a longer period, I don't find that bothersome
- 51. I experience a strong desire to belong somewhere
- 52. It greatly bothers me when I am not included in the plans of others
- 53. It hurts me when I feel that others do not accept me

Motivation for Future Action

- 54. *Instructions:* In the end, we have suggestions for a few practical activities. Would you like to take part in some? Please, answer according to your wish.
- 55. Would you like to have a coffee with your group? We have a collective voucher for you – do you want to take it?
 - i. Yes, I am up for taking a voucher with my group.
 - ii. No, I don't want to take a voucher.
- 56. Twice a year, the Botanical Garden organizes a planting tree event, where you can plant your tree and contribute to a better environment. Would you be interested in taking part?
 - i. Yes, I'd be interested, please send me more information in the email.
 - ii. No, thank you.
- 57. Utrecht University together with Utrecht Municipality organize Energy saving challenges. This comprises two practical workshops,

where you and your group can find out everything about electricity consumption in your current or future home. You will gain knowledge you didn't learn in school, contributing to both the environment and your wallet. You can be part of this project with your group, would you like to take part together?

- i. Yes, I'm interested!
- ii. No, thank you.

Appendix B**Informed consent (ENG)**

Informed Consent to Participate in

Planting the future

12/13 – 02 – 2024 Utrecht

To participate in this study, it is important that you give permission for the following things. You can only participate if you answer yes to the question. You can withdraw your consent at any time by contacting the researchers.

You have been informed about the purpose of the research and the way in which we handle your data;

Yes / No

Do you give permission to participate in the research and for storing the data you enter in the questionnaire anonymously? You can withdraw your consent at any time without negative consequences.

Yes / No

Name:

Signature:

Informed consent (NL)

Toestemmingsverklaring voor deelname aan
De Toekomst Planten
12/13 – 02 – 2024

Voor deelname aan dit onderzoek is het noodzakelijk dat u toestemming geeft voor de volgende toepassingen. U kunt alleen deelnemen als u alle vragen met ja beantwoordt. U kunt uw deelname ten alle tijden terugtrekken door contact op te nemen met de onderzoekers.

U bent geïnformeerd over het doel van het onderzoek en de manier waarop uw gegevens worden verwerkt;

Ja / Nee

Geeft u toestemming voor deelname aan dit onderzoek en ook voor het anoniem bewaren van uw gegevens die u invult in de vragenlijst? U kunt de toestemming ten alle tijden terugtrekken zonder negatieve gevolgen.

Ja / Nee

Naam:

Handtekening:

Appendix C

Information for subjects invited to participate in (social) scientific research (ENG)

Planting the future

February 12 and 13, 2024. Utrecht

Dear Sir / Madam

Introduction

Through this form we would like to inform you about your participation in the research project called "**Planting the future**". This research is conducted by master students from the masters programme Social, Health and Organizational Psychology at the faculty of social sciences of Utrecht University. This study aims to better understand decision-making processes about sustainable behavior. The results will contribute to our master thesis.

Study procedure

In this study you will participate in a planting activity simultaneously with others.

What is expected of you as a participant

You will participate in a planting activity that will last approximately 25 minutes, including the completion of a survey after the planting activity. You will be asked to plant plants in a pot. After the activity you will be asked to give your feedback about the activity through a questionnaire. You can take a plant with you if you want to (psychology students can choose to receive 0.5 experiment credits instead).

Possible advantages and disadvantages of participation

Due to the nature of the activity, you may find it uncomfortable to use planting tools even though we will provide gloves to protect your hands. The advantage is that your participation can contribute to practical and theoretical insight into how much people enjoy engaging in sustainable behavior.

Confidentiality of data processing

The data you enter in the questionnaire cannot be traced back to you as a person. The data from the questionnaires is stored anonymously for at least 10 years, as prescribed by the guidelines of the 9 VSNU. For more information about privacy, please visit here:

<https://autoriteitpersoonsgegevens.nl/themas/basis-avg/avg-algemeen>. Anonymized data may be included in a public database or used for future research. You have the right to inspect your data, the right to delete your questionnaire data, and the right to withdraw your consent. We will then stop analyzing your data and delete your data where possible. If you wish to exercise these rights, please contact the supervisor of the master students

[d.t.d.deridder@uu.nl] or via privacy@uu.nl or privacy-fsw@uu.nl.

Voluntary participation

Your participation in this research is completely voluntary. You can terminate your participation at any time, you do not have to give a reason, and termination is without negative consequences. If you terminate your participation, we will use your data until you have terminated your participation, unless you wish otherwise.

Independent contact and complaints officer

If you have any questions or comments about this study, please contact the supervisor [d.t.d.deridder@uu.nl]. If you want to make an official complaint about this study, you can send an email to the complaints officer complaints functionaris-fetsocwet@uu.nl. If, after reading this information letter, you decide to participate in this study, we kindly ask you to complete the enclosed informed consent form and give it to the researchers.

With kind regards,

Nadira, Karolina, Felice, Maaïke & Suzanne

Informatie voor deelnemers in sociaalwetenschappelijk onderzoek (NL)**De Toekomst Planten**

12 en 13 februari 2024 Utrecht

Beste meneer/mevrouw,

Inleiding

Met dit formulier willen wij u informeren over uw deelname in het onderzoeksproject genaamd “**De toekomst planten**”. Dit onderzoek wordt uitgevoerd door masterstudenten van het masterprogramma Social, Health & Organisational Psychology aan de Universiteit Utrecht. Het doel van dit onderzoek is om een beter beeld te krijgen in het proces van het maken van keuzes. De resultaten zullen bijdragen aan het schrijven van onze masterthesis.

Studie procedure

In deze studie zult u deelnemen aan een plant activiteit tegelijkertijd met andere deelnemers.

Wat wordt er van u verwacht?

U neemt deel in het potten van een plant, dit zal ongeveer 25 minuten duren (inclusief het invullen van een vragenlijst). Er wordt gevraagd om plantjes in een pot te planten. Hierna wordt u gevraagd om feedback te geven, door het invullen van een vragenlijst. Na afloop van het experiment kun u ervoor kiezen om uw plant mee naar huis te nemen. Psychologie studenten kunnen ervoor kiezen om 0.5 experiment credits te ontvangen.

Mogelijke voor en nadelen

Door de aard van de activiteit, kunt u het ongemakkelijk vinden om de planten te verpotten; wij stellen tuinhandschoenen beschikbaar om uw handen te beschermen. Het voordeel is dat u met uw deelname bijdraagt aan praktische en theoretische inzichten in onderzoek naar het deelnemen aan duurzame activiteiten.

Gebruik en bewaren van uw gegevens

De gegevens die u invult in de vragenlijst zullen niet tot u te herleiden zijn. De gegevens van de vragenlijst zullen worden bewaard voor tenminste 10 jaar, volgens de richtlijnen van de Autoriteit Persoonsgegevens. Voor meer informatie over privacy kun u vinden op <https://autoriteitpersoonsgegevens.nl/themas/basis-avg/avg-algemeen>. Geanonimiseerde data kan worden gebruikt voor vervolgonderzoek of voor toekomstig onderzoek of kan worden opgenomen in een open access database. U heeft het ten alle tijden het recht om uw gegevens in te zien, het recht om uw vragenlijst te verwijderen en het recht om uw toestemming in te trekken. De onderzoeksgegevens die zijn verzameld tot het moment dat u uw toestemming intrekt, worden dan vernietigd. Als u hier gebruik van wil maken, neem dan contact op met d.t.d.deridder@uu.nl of via privacy@uu.nl of privacy-fsw@uu.nl

Vrijwillige deelname

Uw deelname is geheel vrijwillig. Als u wel meedoet, kunt u zich altijd bedenken en toch stoppen, ook tijdens het onderzoek. U hoeft niet te zeggen waarom u stopt, en dit is dan ook zonder negatieve consequenties.

Onafhankelijk contactpersoon

Als u vragen of opmerkingen heeft over dit onderzoek, neem dan contact op met de hoofdonderzoeker via het volgende e-mailadres: d.t.d.deridder@uu.nl Als u na het lezen van deze informatiebrief besluit om deel te nemen aan dit onderzoek, willen wij u graag verzoeken om bijgevoegde toestemmingsverklaring in te vullen en aan de onderzoekers te geven.

Met vriendelijke groet,

Nadira, Karolina, Felice, Maaïke & Suzanne

Appendix D

Debrief (ENG)

Information for participants

Planting the future

Thank you for participating in this research!

Purpose of the investigation

Climate change and environmental issues arise because many people engage in activities that are harmful to the environment. These are collective challenges that require collective solutions. To solve these problems, we must all work together. We need to find ways to encourage people to collaborate and take pro-environmental actions.

Some studies have shown that people are more inclined to do environmentally friendly things when they feel part of a group and believe that the group can make a difference. Additionally, when people work together and coordinate their actions for a common goal, they are more willing to help each other and do things that benefit everyone, especially in terms of environmental measures.

Thus, the aim of this research is to study how collaboration in joint actions is experienced by the participants. We expect more positive consequences from joint actions when conducted collaboratively. The results of this study can help in designing effective policy measures and plans to promote collective pro-environmental actions.

We could not inform you in advance about the nature of the research because it can influence your behavior. Therefore, we told you it would be about decision-making processes, while in reality, it was about the psychological consequences of social interactions. If you want to withdraw your consent to participate and have your data removed, please inform the experimenter now.

Again, thank you very much for participating in this research!

Debrief (NL)

Informatie voor deelnemers

De Toekomst Planten

Bedankt voor uw deelname aan ons onderzoek!

Doel van het onderzoek

Klimaatverandering en milieuproblemen ontstaan doordat veel mensen dingen doen die schadelijk zijn voor het milieu. Dit zijn collectieve uitdagingen met collectieve oplossingen. Om deze problemen op te lossen, moeten we allemaal samenwerken. We moeten oplossingen vinden om mensen aan te moedigen samen te werken en pro-milieuacties te ondernemen. Sommige studies hebben aangetoond dat mensen meer geneigd zijn milieuvriendelijke dingen te doen wanneer ze zich deel voelen van een groep en geloven dat de groep een verschil kan maken. Ook zijn mensen, wanneer ze samenwerken en hun acties coördineren voor een gemeenschappelijk doel, meer bereid elkaar te helpen en dingen te doen die iedereen ten goede komen, vooral bij milieumaatregelen.

Dus, het doel van dit experiment is om te onderzoeken hoe samenwerken met verschillende niveaus van coördinatie wordt ervaren door deelnemers. Als mensen goed samenwerken, denken we dat ze zich meer verbonden zullen voelen met de groep, zich meer in controle zullen voelen en meer toegewijd zullen zijn om dingen te doen om het milieu te helpen. De resultaten van deze studie kunnen helpen bij het ontwerpen van effectieve beleidsmaatregelen en plannen om collectieve pro-milieuacties te bevorderen.

We konden u hierover niet eerder informeren omdat dit eventueel het onderzoek zou kunnen beïnvloeden. Daarom vertelden wij dat onze studie gericht was op het begrijpen van het maken van keuzes.

Nogmaals, bedankt voor uw deelname!