

# Fridays for Future: Social identity and Activist Self-Identity Predict Participation in Collective Environmental Protest Behavior

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## Abstract

Climate change is a threat whose mitigation can be enhanced by collective environmental protest behavior, so understanding the motivation for collective environmental protests is important. A questionnaire study was conducted among 454 young members of Fridays For Future WhatsApp® groups in Germany to assess whether the frequency of their participation in Fridays For Future events was predicted by identification with the group (social identity), or the individual factors of environmental self-identity, activist self-identity, altruistic, biospheric, egoistic, and hedonic values. An ordinal regression showed that social identity and activist self-identity positively predicted participation in environmental protests, but environmental identity and biospheric values did not. Those who reported higher egoistic values were less frequent protestors. Our results suggest that identifying with the FFF group, and personally identifying as an activist, could be more important motivators of collective environmental behavior than self-identifying as pro-environmental, or than environmental values.

## Introduction

Public attention to the climate crisis is increasing. However, the school strike initiated by Greta Thunberg in August 2018 explosively led to a worldwide student movement called Fridays For Future (FFF). The FFF movement showed clear support for pro-environmental social change, especially from the younger generation. The question of what motivates young people to actively engage in such a pro-environmental movement is likely to be of great interest in many domains (e.g., political, psychological, and social). Understanding the motivations for engaging in collective environmental behavior (i.e., collective protesting) can provide information on how to motivate others to engage in such movements and thereby improve environmental outcomes for future generations. The more people actively engage in climate and environmental protection, the more climate change can be combated [1].

Researchers on environmental social change have identified factors that can motivate people to engage in public protest behavior (e.g., [2,3]). Both group and individual factors seem key for collective pro-environmental behavior [4,5]. In other words, protest behavior to protect the environment may be motivated by self-interest or group interest. As a group factor, social identity (i.e., identification with groups) has emerged as an important predictor of protest behavior in many studies [3,5-8]. Key individual factors influencing participation in protests include environmental self-identity (i.e., the extent to which a person considers themselves to be pro-environmental and therefore acts pro-environmentally), activist self-identity (i.e., the extent to which a person considers themselves as an activist and thus engages in activism), and individual values (i.e., “desirable transsituational goal(s) varying in importance, which serve as guiding principle(s) in the life of a person” [9], 1992, p. 21; see also [2, 10-12]). In the literature, social identity, self-identity, and values all seem to influence protest behavior [13].

## Protest as Collective Action

In psychology, behavior is considered collective when individuals perform the behavior as representatives of a social group and the aim of the common action is to improve group conditions [14]. Protests are a specific form of collective action and differ from other types

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of collective action, such as membership in an initiative, signing a petition, or voting [5]. Importantly, large protest movements (e.g., FFF) can only be realized through the individual participation of many people [15], and the motives of individuals to participate can vary [16]. Depending on the contexts, actions are evoked by individual or collective motivations [17,18].

## Protest as Group-based Action

The social-identity approach is widely applied in socio-psychological research on collective action such as protest [5,13]. The social identity approach includes social identity theory (SIT [19,20]) and self-categorization theory (SCT [18]), which describe processes within social groups and inter-group relations. A social group is a collection of people who perceive themselves as belonging to the same social category, where group membership is emotionally significant for the participants, and there is social agreement on the evaluation of the group and its membership [19]. Group membership is subjective and flexible and not tied to fixed social categories such as nationality or gender. More specifically, people are only part of a group if they feel they belong to that group [18,21,22].

The knowledge of one's own membership of a social group, and the value and emotional significance attached to that membership, form the social identity which is part of an individual's self-concept [19]. Accordingly, social identity refers to the socially shared understanding of what it means to be a group member from which common actions such as protest movements are motivated [3]. It describes the human capacity to define the self in the sense of “we” instead of “I” so that people think and act as groups [23,24].

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Social environmental movements (e.g., protest movements to protect the environment) offer individuals the opportunity to act in the name of their own group, which is most likely if they identify with the group [16]. For example, social identity has been a predictor of environmental behavior [6] and membership of an environmental organization a predictor of activism [25]. Identification with a group can affect whether people take part in protests organised by that group (see meta-analyses [8]). For example, the more farmers identify with other farmers, the more willing they are to participate in farmers' protests [26,27]. Similarly, Wallis and Loy [28] found identification with others who engage in climate protection was an important predictor of the frequency of participation in FFF protests.

Although social identity has repeatedly been confirmed as a factor influencing collective action [3,5,29], it is also possible that participants in social environmental movements are motivated by individualistic concerns [5]. People can perform collective actions such as protesting even if they do not identify with the group, but because they believe in the cause [16]. Climate change may activate an environmental self-identity that motivates people to participate in environmental protests. At the same time, climate change may lead people to participate in environmental protests because they see certain things, such as the environment [2] or the people who are already part of the movement [16], as valuable.

### Protest as Individual Action

Self-identity is assumed to influence behavior [30]. A person can hold several identities, each of which becomes salient depending on the context [31]. For example, environmental self-identity refers to the extent to which a person describes oneself as pro-environmental and behaves pro-environmentally [12,32]. Researchers have found that environmental self-identity predicts private environmental behavior, such as recycling and reducing energy and water consumption (e.g., [33-35]), but not necessarily collective or political actions, such as the frequency of protest behavior [33,36]. Vesely et al. [37] reported strong relationships in meta-analyses between environmental self-identity (and social identity) and a range of pro-environmental behaviors. While environmental activism was included in some of the studies, its relationship with environmental self-identity was not examined separately from individual pro-environmental behaviors. Similarly, although Ucar et al. [35] found a positive relationship between environmental self-identity and collective action, they did not separate protest behavior from other types of collective action, such as signing petitions. Whether environmental self-identity is related specifically to collective environmental protest participation requires further examination.

In contrast to environmental self-identity, activist self-identity has repeatedly been found to be important to protest behavior [5,33,38]. Activist self-identity is based on the extent to which a person describes oneself as an activist or their years of experience as an organizer or participant in protests [39]. Activist self-identity predicts intentions to engage in environmental activism: The more people identify as activists, the stronger their intentions are to participate in environmental activism [38].

Sloot et al. [2] showed that individual values are also important factors influencing community-based action such as protests. According to Schwartz [9], values are arranged on two dimensions. The first dimension encompasses openness to change vs. conservation and describes, for example, the conflict between willingness to change

and resistance to change. The second dimension comprises self-transcendence vs. self-enhancement and describes, for example, the conflict between caring for the welfare of others or the environment and striving for one's own interest or power. In the context of pro-environmental behavior, the dimension of self-transcendence vs. self-enhancement has been suggested to be particularly relevant [2,40].

Values serve as universal guiding principles in people's lives and are context independent [9,41]. They refer to desirable goals that motivate people to act [42]. For example, people who strongly endorse altruistic (e.g., the well-being of others), biospheric (e.g., environmental protection), hedonic (e.g., enjoyment), or egoistic (e.g., approval of others) values will be motivated to engage in behaviors to pursue these goals [43]. Biospheric and altruistic values are predominantly positively related to environmental behavior and negative relationships are usually observed between egoistic and hedonic values and environmental behavior [43].

Sloot et al. [2] showed that altruistic and biospheric values are important factors influencing community-based action, such as protests. Additionally, the relationship between egoistic values and activism or public environmental concern is sometimes positive [44-47]. An important component of egoistic values is power, where the goal is control or dominance over people and resources [42]. People who strongly endorse egoistic values, particularly social power and authority, are more likely to try to influence others to behave pro-environmentally [48]. It may be important for people with strong egoistic values to hold a leadership position and activism may provide an avenue for them to gain respect from others and hold a leadership position [49,50]. Gatersleben et al.'s [51] results supported the link between biospheric values and environmental identity, however, contrary to their expectations, egoistic values were positively related to health, environmental, and moral identities [51].

Furthermore, hedonic values might be an important factor in collective behavior, as individuals report an increased hedonic well-being with increasing engagement in activist activities [52]. In one study, the more people described themselves as activists and participated in activist events, the stronger their hedonic well-being [52]. Activist involvement might be fun, leading to greater well-being and activist participation, which in turn promotes an activist identity. People enjoy joint activities with other people. Therefore, people who value fun (i.e., hedonic values) and experience it in common activist events may be more likely to participate in activism (e.g., protest).

The motivation to participate in environmental protests may be based on both identity and individual values [2]. Relationships between values and self-identities are presumed, but rarely empirically investigated [12,53]. Sloot et al. [2] suggest a relationship between values, self-, and social identities, and proposed that different types of values may lie at the core of these different identities. For example, biospheric values might be more strongly associated with environmental self-identity and altruistic values with social identity [2,54].

Research has confirmed a relationship between biospheric values and environmental self-identity [54]. The more individuals endorsed biospheric values, the more they perceived themselves as a pro-environmental person. A similar link as between biospheric values and environmental identity may exist between altruistic values and social identity. Individuals with a high degree of social identity tend

to behave more pro-socially than people who are not members of a social group [55]. For example, respondents engaged in higher levels of voluntary work and contributed more financially to the common good when they showed a higher degree of social identification [55]. The underlying goal of individuals with strong altruistic values is to support the well-being of others [43]. Therefore, it is not surprising that altruistic values play a role in collective pro-environmental behavior [2,56].

In conclusion, social identity, environmental self-identity, activist self-identity, as well as values seem to be promising motivators for participation in collective environmental protest behavior. Firstly, an important group to which one belongs, and which one is willing to support, could be a motivator for participation in environmental protests. Secondly, a salient self-identity could be important if the behavior expresses how an individual would describe oneself. For example, individuals might participate in protests to protect the environment because they describe themselves as pro-environmental, or to be active activists because they describe themselves as activists. Thirdly, individuals may participate in environmental protests because such behavior involves pursuing a valued goal.

Using a sample of FFF members, we examined relationships between frequency of participation in FFF protests (outcome variable) and social identity, environmental and activist self-identity, and values (altruistic, biospheric, egoistic, and hedonic). In addition, we examined relationships between the different identities and individual values to identify possible relationships between identities, values, and protest behavior.

## Hypotheses

**H1:** Social identity (S-ID), environmental (E-ID) and activist self-identity (A-ID), and individual values will significantly predict frequency of participation in FFF protests.

**H2:** Social identity will be a more important predictor of frequency of participation in FFF protests than self-identities or individual values.

**H3:** Biospheric and altruistic values will be better predictors of frequency of participation in FFF protests than egoistic and hedonic values.

## Method

### Sample

Altogether 781 people followed the link to the online questionnaire. Based on our apriori selection criterion, respondents younger than 16 years ( $n = 210$ ) were excluded prior to analysis. Further respondents were progressively excluded because they had not answered the scales required for the analysis (i.e., A-ID:  $n = 88$ , values:  $n = 17$ , S-ID:  $n = 8$ , and E-ID:  $n = 1$ ). One respondent was excluded because they did not indicate how many times they had participated in FFF events.

The valid sample was 454 respondents, aged from 16 to 85 ( $M = 22.53$  years,  $SD = 11.57$ ; 161 male, 268 female, 25 not specified or not assigned to a binary gender). Respondents between 16 and 20 years (70%) were the clear majority in this sample, and those between 16 and 18 years accounted for more than half of the sample (57%). Most respondents were German ( $n = 436$ ; 96%).

The most indicated educational qualification attained to date was high school education (37%), followed by junior high school certificate (20%), and 19% said they did not yet have a school leaving certificate. The mothers of the respondents had mostly completed

professional training (20%) followed by university degrees (master's degree 17%). Among fathers, most had a university degree (master's degree 21%) followed by professional training (18%).

Respondents were recruited through public WhatsApp® groups on FFF in Germany found on the German website of Fridays for Future (<https://fridaysforfuture.de/regionalgruppen/>). To achieve representation across Germany, we used a stratified sampling method whereby we categorised groups by federal state and then by city. To reach as many respondents as possible, we chose WhatsApp® groups with the most members in those regions. The number of group members varied between 39 and 258, but numbers changed daily.

Not all WhatsApp® groups allowed individual contributions. Of these 25 groups, nine administrators published the invitation to participate in the group. For 14 groups, individual contributions were allowed, so we posted the link directly to the respective groups. The link was also forwarded to at least five other groups. The exact number of groups in which the link was finally published is unclear but can be estimated between 27 and 30. We estimate the number of potential respondents at 3800.

Respondents did not receive any compensation for their voluntary participation. They were blind to the hypotheses and gave informed consent to participate. The Ethics Committee Psychology (ECP) of the University of Groningen, Department of Psychology, permitted the study under the code PSY-1819-S-0275.

### Instruments

The original language of all instruments was English. The first author, as a native German speaker, translated all instruments into German. The translations were checked by a second German native speaker. Respondents could choose to respond in German or English and they could switch between them ( $n = 443$  used German and  $n = 13$  English).

### Demographic data

We collected demographic data on age, gender, nationality, and education. Additionally, we asked for the nationality and education of the parents of the respondents. We placed the question "How old are you?" first. Respondents answered using a drop-down list. For respondents who reported being 15 years or younger, the questionnaire ended on the next page.

### FFF experiences and participation frequency

Frequency of participation in FFF was the outcome variable. First, we asked: "Did you participate in Fridays For Future events?" with a 2-point response scale (yes/no). Then we asked: "How often do you participate in Fridays For Future events?" with a 9-point response scale (1 = once, 2 = twice, 3 = three times, 4 = monthly, 5 = 2-3 times in a month, 6 = weekly, 7 = 2 times a week, 8 = daily; and 9 = "other" including text input). Textual responses (with a numeric response of 9 = "other") were integrated into an 8-point scale (as above but without the value "9") by assigning the scale point that most closely corresponded to the answer given. For example, the response "four times" was allocated to the "three times" category and "five times" to the "monthly" category. Respondents who indicated that they had not participated in FFF events were assigned a "0" for frequency of participation. The outcome variable was therefore measured on an ordinal scale with increasing values reflecting increasing participation in FFF events, without equal intervals between values.

### Individual values

We used the environmental-Schwartz value survey (E-SVS; [40,46,57]), an enhanced adaptation of the Schwartz value survey [9,46]. It is a validated and comprehensive tool for measuring biospheric, altruistic, egoistic, and hedonic value orientations that focus on the dimensions of self-transcendence and self-enhancement [58]. The 16 items are answered on a 9-point scale (from -1 = contrary to my values to 7 = of supreme importance). The respondents indicated how important each value is as a guiding principle in their lives. Example statements for the different values are biospheric: "PROTECTING THE ENVIRONMENT: preserving nature"; altruistic: "HELPFUL: working for the welfare of others"; egoistic: "SOCIAL POWER: control over others, dominance"; and hedonic: "PLEASURE: joy, gratification of desires". Cronbach's  $\alpha$  for altruistic values was  $\alpha = .72$  (4 items), for biospheric values  $\alpha = .81$  (4 items), for egoistic values  $\alpha = .69$  (5 items), and for hedonic values  $\alpha = .79$  (3 items).

### Social identity

To measure S-ID, we used the hierarchical (multicomponent) model of in-group identification (MIGI) by Leach et al. [59]. The MIGI has five sub-scales organized hierarchically on two dimensions, namely self-definition at the group level (i.e., individual self-stereotyping, in-group homogeneity) and self-investment (i.e., solidarity, satisfaction, and centrality). All original items contained the expression "[in-group]". For our investigation, we replaced "in-group" with "Fridays for Future". Responses were given on a 7-point scale (1 = strongly disagree to 7 = strongly agree). The full MIGI scale has 14 items. Cronbach's alpha for these 14 items was .90.

### Environmental self-identity

To measure E-ID, we used the three items used by Van der Werff et al. [12] to measure environmental self-identity and two items from the paper by Whitmarsh and O'Neill ([36]; "I think of myself as an environmentally friendly consumer" and "I think of myself as someone who is very concerned with environmental issues"). In contrast to Whitmarsh and O'Neill [36] and in accordance with Van der Werff et al. [12], the answers were given on a 7-point scale (1 = strongly disagree to 7 = strongly agree). The internal consistency of the five items was  $\alpha = .87$  (Cronbach's alpha).

### Activist self-identity

To measure A-ID, we used eight items of the activist identity and commitment scale (AICS) by Klar and Kasser [52], a subscale of the social identity-specific collectivism scale [60] including a commitment scale developed by Klar and Kasser [52]. Items include "Being an activist is central to who I am", and "I identify myself as

an activist." Respondents answered on a 7-point scale (1 = strongly disagree to 7 = strongly agree). Cronbach's  $\alpha$  for the AICS was  $\alpha = .94$  (8 items).

### Procedure

We distributed the link to the questionnaire on the 22nd and 23rd of July 2019. Data collection began immediately and ended on the 28th of August 2019. First, respondents gave their consent to participate and to the use of their data. If respondents indicated their age as 16 years or older, they proceeded to the questionnaire. Respondents then provided demographic information and frequency of participation in FFF events. Then, respondents completed the various scales. The presentation of both the items within the scales and the scales themselves were randomized by Qualtrics software.

### Software and data analysis

We created the questionnaire using the Qualtrics® XM-Platform™ (<https://www.qualtrics.com>). Respondents were able to complete the questionnaire on a PC, tablet, or mobile phone. For the analyses, we used IBM SPSS Statistics 29\* (<https://www.ibm.com/spss>).

We created new variables by averaging across the items of each scale. We inspected the distribution and outliers of these variables and checked the assumptions for and ran an ordinal regression using protest frequency (PF) as the ordinal outcome variable and S-ID, E-ID, A-ID, and altruistic, biospheric, egoistic, and hedonic values as covariates. We used Spearman's correlations to investigate relationships between S-ID, E-ID, and A-ID, and altruistic, biospheric, egoistic, and hedonic values.

### Results

All assumptions of an ordinal regression were met. The parameter estimates are in Table 1. A multiple ordinal regression predicting collective environmental protest participation from S-ID, E-ID, A-ID, and biospheric, altruistic, egoistic, and hedonic values resulted in a significant model,  $-2LL = 1692.19$ ,  $\chi^2 = 150.32$ ,  $p < .001$ , pseudo  $R^2_{Nagelkerke} = .29$ .

S-ID and A-ID were the only significant positive predictors of collective environmental protest behavior (Table 1). Increases in S-ID and A-ID were associated with increases in the frequency of protest participation. E-ID, biospheric, altruistic, and hedonic values did not significantly predict collective environmental protest behavior. Egoistic values significantly negatively predicted collective environmental protest behavior indicating that increases in egoistic values predicted a decrease in the frequency of protest participation.

Table 1: Parameter Estimates from Ordinal Regression and Odds Ratio Predicting Participation Frequency.

	Estimates	SE	Wald	p	95% CI		OR	95% CI	
					LL	UL		LL	UL
S-ID	.49	.12	18.41	<.001	.27	.72	1.63	1.31	2.05
E-ID	-.10	.12	.63	.43	-.33	.14	.90	.72	1.15
A-ID	.65	.08	58.38	<.001	.48	.81	1.92	1.62	2.25
ALT	-.13	.09	2.37	.12	-.30	.04	.88	.74	1.04
BIO	-.11	.09	1.40	.24	-.29	.07	.90	.75	1.07
EGO	-.20	.07	7.54	.006	-.35	-.06	.82	.70	.94
HED	-.10	.06	2.71	.10	-.22	.02	.90	.80	1.02

Notes. Link function: Logit; SD – standard deviation; LL = lower limit; UL = upper limit; OR = odds ratio; for OR null value of CI = 1; S-ID = social identity; E-ID = environmental self-identity; A-ID = activist self-identity; BIO = biospheric values; ALT = altruistic values; EGO = egoistic values; HED = hedonic values.

We calculated bivariate Spearman's correlations between S-ID, E-ID, A-ID, all four values, and the frequency of FFF participation (Table 2). With 28 correlations, applying a Bonferroni correction to the critical value of p results in a new critical value of  $p < .002$  for individual correlation coefficients to reach significance.

Although only hedonic values were significantly related to protest participation in the correlation analysis (Table 2), only egoistic values were a significant (negative) predictor in the regression model (Table 1), therefore we could not find support for H3 that biospheric and altruistic values would be better predictors of environmental protest

Table 2: Spearman's Correlation Coefficients and 95% Confidence Intervals.

	PF	S-ID	E-ID	A-ID	ALT	BIO	EGO	HED
PF	1	<b>.36</b>	.14	.47	.14	.11	-.13	<b>-.17</b>
S-ID	.28, .44	1	<b>.33</b>	<b>.53</b>	<b>.24</b>	<b>.34</b>	-.08	-.09
E-ID	.05, .24	.25, .41	1	<b>.32</b>	<b>.17</b>	<b>.49</b>	-.13	-.13
A-ID	.39, .54	.46, .60	.23, .40	1	<b>.41</b>	<b>.30</b>	-.03	-.14
ALT	.05, .24	.15, .33	.08, .26	.33, .49	1	<b>.40</b>	-.14	.00
BIO	.02, .21	.25, .42	.41, .56	.21, .38	.32, .48	1	<b>-.17</b>	-.01
EGO	-.23, -.04	-.18, .01	-.22, -.04	-.12, .07	-.23, -.04	-.26, -.08	1	<b>.21</b>
HED	-.26, -.08	-.19, .00	-.22, -.04	-.23, -.04	-.10, .09	-.11, .08	.12, .30	1

Notes. Spearman's rho in upper right portion of table, confidence intervals in bottom left portion. PF = protest frequency; S-ID = social identity; E-ID = environmental self-identity; A-ID = activist self-identity; BIO = biospheric values; ALT = altruistic values; EGO = egoistic values; HED = hedonic values; N = 451; bolded p values < .002.

S-ID and A-ID correlated significantly positively with protest frequency. Hedonic values were significantly negatively correlated with protest frequency.

There were significant positive relationships between S-ID, E-ID, and A-ID and altruistic and biospheric values. The relationships between the three identities and egoistic and hedonic values were weaker and negative.

Lastly, altruistic values were positively correlated with biospheric values, and egoistic values with hedonic, but self-transcendent values (altruistic and biospheric) and self-enhancement values (egoistic and hedonic) were either negatively correlated, or not correlated.

## Discussion

We aimed to better understand the predictors of participation in collective environmental protest behavior (i.e., participation in FFF). Based on previous findings [2,3,5], we hypothesized that group, as well as individual, factors would predict collective environmental protest behavior, in this case, participation in FFF. Our hypotheses were only partially confirmed. As only S-ID, A-ID, and egoistic values were predictive of collective environmental protest behavior, the results only partially support H1: Not all variables significantly predicted participation in collective environmental protest behavior. Nonetheless, this result is consistent with the findings of Fielding et al. [38], where both group membership and self-identity as an activist were important predictors of participation in environmental protests. In contrast, and in line with Whitmarsh and O'Neill's [36] results, environmental self-identity did not appear to significantly predict collective environmental behavior.

Our regression results also do not support H2 that S-ID would be a stronger predictor of protest participation than A-ID and E-ID or individual values. S-ID was one of two significant predictors – along with A-ID – but was not the stronger of the two (Table 1). A-ID predicted participation in collective environmental protest better than S-ID. Identification with a relevant group has been repeatedly confirmed as a predictor of collective action [3,5,61], however, Wallis and Loy [28] found that the perceived activism of friends, followed by identification with the group, were the strongest predictors of participation in FFF protests by young people.

behavior than egoistic or hedonic values. Egoistic values were negatively predictive of the frequency of participation, in contrast to Sloot et al.'s [2] results. Also contrary to Sloot et al. [2] findings regarding effects of altruistic values on other-directed social change actions, neither self-transcendence value was related to participation in environmental protest behavior. This result is surprising given that biospheric as well as altruistic values theoretically refer to any action aimed at improving the welfare of others or the environment [40]. In our results, self-transcendent values did not seem to be important predictors of collective protest behavior. Our results also did not support the idea that people participate in collective protest actions because they are fun (hedonic values [52]) or because it serves the egoistic value goal of influencing others [48] or as a way to gain the respect of others or hold leadership positions [49,50]. Instead, our results align with research showing that pro-environmental behavior is negatively related to self-enhancement values [43].

We found strong positive relationships between S-ID and altruistic values and between E-ID and biospheric values indicating support for previous assumptions and findings about such relationships [2,54]. Another interesting result was a relatively strong relationship between S-ID and A-ID as well as between altruistic values and A-ID. These results suggest, firstly, that A-ID is likely to be associated with group membership, such as politicized groups [10] and, secondly, with the desire for justice and moral obligation [62]. Hence, our findings on the relationships between identities and values support the assumptions of Gatersleben et al. [51] and Sloot et al. [2] that different types of values may form the core of different identities.

Overall, our results indicate that individual and group factors both play a role in participation in collective environmental protests. However, in our study, identity was a more important factor for collective protest participation than values. It may be that S-ID and A-ID were stronger predictors than values in our study because they were more specifically related to the named behavior (participation in protests). If we had asked about pro-environmental behavior more generally, we might have found stronger relationships with biospheric and altruistic values. Both values and identity predict behavior [54], but possibly at different levels, namely specific actions (i.e., protest behavior and identity) and general behavior (i.e., any behavior that is environmentally friendly and values).

Another explanation for why values were not a direct predictor of FFF protests for our young sample might be that 'belonging to the group' is rather important and central to young people. According to Erikson's [63] stages of psychosocial development, group relationships and the development of one's own identity are particularly important for adolescents and young adults. One's own value system (i.e., what is important) is still developing, as is identity formation (i.e., who am I) [9,63]. Given a yet unestablished identity of one's own, it may be difficult to distance oneself from the peer group's opinion [63]. Along with the desire to belong, peer pressure might lead to the social group's identification being salient and thus more predictive of participation in FFF protests.

### Limitations

We used a sample of mainly young people who had already participated in FFF events, however, the sample is not representative of the general population, as only people who have already been involved in FFF were reached. The selection of respondents by the FFF WhatsApp® groups represents a silent selection criterion, which excluded from the selection process people who were not members of an FFF WhatsApp® group.

Furthermore, we used a correlational design. Although the results confirm the existence of relationships between identities and values, no clear conclusions are possible about the direction and influence of these relationships on collective environmental protest behavior. Such conclusions require the validation by experimental designs.

FFF's astonishingly rapid growth may have been possible only because of technical facilities that did not exist in the past. It is likely that only today's (digital) social networks (e.g., Facebook®, Instagram®, WhatsApp®) enabled a mobilization on the magnitude of FFF. We did not consider factors related to such networks in our research, but they may be relevant for investigating factors related to participation in FFF.

### Theoretical and practical implications

For decades, social scientists as well as psychologists have attempted to identify the key factors that motivate people to engage in behavior such as protesting [3,5,10]. Social identity as a group factor as well as specific self-identities and values as individual factors have been identified as motivators for environmental protest [2,23,25]. We expanded the existing literature by comparing relevant factors in one investigation. As specific identities are apparently related to certain individual values [12,55], it would be interesting for future research to explore such relationships more thoroughly. For example, researchers may examine which identities are more strongly related to different values and how they are related and lead to environmental (individual or collective) behavior. Disentangling the relationships between social identity, activist self-identity, and altruistic values might be of great relevance for research on social change and collective environmental protest behavior.

Collective behavior may have greater environmental impact than individual pro-environmental behavior, as, for example, achieving a change in the law through protests may lead to more pro-environmental behavior by everyone [64]. In practice, it therefore seems reasonable to promote collective behavior to protect the climate and the environment. In line with previous findings on collective behavior [6,25], our results imply that identification with

an environmental group (i.e., social identity) can promote collective environmental behavior. For practitioners who aim to support collective behavior to protect the environment, it may be useful to facilitate social identity with environmental groups by expanding environmental-related digital social networks such as FFF WhatsApp® groups, or by improving the accessibility of environmental organisations. One example might be environmental community initiatives as proposed by Sloot et al. [4]. First results indicated that environmental community initiatives promote individual and collective environmentally friendly behavior, with both individual and group factors influencing the extent of environmental behavior [4]. Our findings also indicate that egoistic and hedonic values may hinder participation in environmental protests. In practice, it may be beneficial to strengthen self-transcendent values and to prevent self-enhancement values from being salient for collective (and potentially individual) environmental behavior.

### Competing Interests

The authors declare that they have no competing interests.

### Authors' contributions

Lotta Holsten designed the study, collected, cleaned, and analysed the data, and wrote the first draft of the manuscript.

Rebecca Sargisson supervised and managed the project, reanalyzed all data, and revised the manuscript for publication.

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