Stress or Identification? – The Relationship between Participation and Persistence in Environmental Activist Groups

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Abstract

Identifying predictors of retention time in climate activist organizations is vital for building an impactful, long-term climate movement. This study explores participation in an activist organization as a predictor of persistence, examining the opposing propositions of the conflict hypothesis and role identity theory. The competition hypothesis posits that participation negatively impacts persistence due to time conflicts and stress, while role identity theory suggests a positive impact mediated by interactions and organizational identification. The purpose of this study was to test whether one or both of these processes mediate the relationship between participation and persistence. The hypotheses were tested on a sample of 79 German climate activists and evaluated using confirmatory factor analysis. A relationship between participation and persistence could not be confirmed by the present results. The competition hypothesis was not supported, rejecting the idea that participation might have a negative influence on persistence. The positive influence of participation on persistence as proclaimed by role identity theory can also not be supported based on the present results. The integration of both explanations did not provide an improved prediction of participation in comparison to either of the theories. Still, a positive relationship between identification and persistence was found, indicating that role identity theory could be a suitable starting point for investigating the mechanisms underlying activist persistence more closely. The results indicate the need for additional variables to sufficiently explain the participation-persistence relationship. Climate activist organizations should not be concerned about overwhelming their members with activities and offers; instead, ways to improve group identification should be implemented.

Keywords: climate activism; retention; SEM; stress; identification

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1. Introduction

To meet climate change mitigation goals, individual as well as collective climate action is needed immediately (IPCC, 2023). Worldwide, governments and international organizations struggle to pass sufficient policy that can reduce greenhouse gas emissions effectively and quickly. So, for decades, citizens all over the world have taken matters into their own hands by engaging in climate activism.

According to Stern (2000), climate activism is defined as collective climate action in the public sphere. In a similar vein, van Zomeren (2016) defines collective action as "any action undertaken by individuals as psychological group members to achieve group goals in a political context" (see also Schulte et al., 2020). In contrast to private-sphere environmental behaviours (Stern, 2000), climate action in the public sphere is characterized by its connection to contextual factors. In conclusion, climate activism aims at solving environmental issues through measures like organizing or participating in protests, collecting signatures for a petition or lobbying, and is characterized by group-related variables, for example social contact with other activists (Schulte et al., 2020).

1.1. Retention in Climate Activism

While some of the activities that fall under the umbrella of climate activism need to be done only occasionally, such as attending a protest, a stable base of regular activists is needed to organize coherent and ongoing protest towards a specific long-term goal. Individuals vary widely in their length of volunteer activity (Finkelstein, 2008). In order to build persistent environmental movements and, simultaneously, reduce activist turnover, the identification of factors influencing sustained activism is needed. The concept of sustained activism has been called *retention*, that is the "completion of the term of service and examining time commitment by the intensity and duration of the service" (McBride et al., 2011).

While effective recruitment is important, the reasons for why activists stay with their organization have received less attention (Bunnage, 2014). It is important to understand retention in climate activist organizations because volunteer turnover is costly and time-consuming (Bunnage, 2014; van Ingen & Wilson, 2017). The effort of recruitment and getting used to activist structures withdraws time and energy, and retention of activists is a necessary precondition for achieving growth in a movement. Activists leaving their organizations due to stress can lead to substantial disruptions in the consistency of movements (Gorski et al., 2019). An organization's ability to keep its activists is hence crucial for its ability to create long-term change (Bunnage, 2014). Consequently, the core aim of the present study is to understand factors influencing climate activist retention.

Reasons to join activist groups might differ from reasons to remain in an organization for a sustained period of time (Finkelstein, 2008). A recent meta-analysis has aimed to identify relevant predictors of retention time in volunteer organizations (Forner et al., 2024). One of these factors is the activity level of members, which Forner et al. (2024) call volunteer participation time, and will be referred to as *participation* hereafter. Evidence on the relationship between participation and persistence in volunteering is inconclusive, though. First, the competition hypothesis suggests a negative correlation between participation and persistence. Cress et al. (1997) proposed that higher participation leads to conflicting demands with other social areas, causing early dropout. Second, role identity theory, derived from social identity theory, suggests a positive correlation. Jans et al. (2015) and a meta-analysis by Schulte et al. (2020) found that active participation increases identification with the group, which enhances persistence intentions. These explanations predict opposite associations between participation and persistence: a negative association, driven by time conflicts, and a positive association, mediated by identification. This study aims to determine which explanation is more accurate, and whether they can be integrated.

1.2. Competition Hypothesis

The competition hypothesis proposes a negative relationship between participation and persistence. This idea was proposed by Cress et al. (1997) and was replicated in a recent meta-analysis (Forner et al., 2024). Cress et al. (1997) analysed the data of 1587 voluntary memberships, recorded over the period of 15 years. Not only was participation negatively associated with membership persistence, but the effect becomes incrementally stronger as participation increases. The authors explain this effect by claiming that higher participation in a volunteer organization causes competition for time and resources in other areas of life. These time conflicts increase the chances of dropping out of the organization, thus lead to shorter persistence. Unfortunately, this explanation has not been tested empirically by the authors. The clear correlational evidence emerging from a longitudinal sample like this as well as the recent meta-analysis coinciding is still worthy of further investigation.

Generally, the availability of time and resources has a great influence on activist retention (Bunnage, 2014). Being retired or out of a job increases the likelihood of volunteering (Binder & Blankenberg, 2016; Simonson et al., 2021). Conflicting obligations, such as work, family life, and partnership are obstacles in the way of taking societal action, even when motivation to do so is high (Binder & Blankenberg, 2016; Bunnage, 2014). In a qualitative semi-structured interview study, school workload (57%), other responsibilities (40%) and a lack of bandwidth and energy (32%) are among the most mentioned reasons for not attending activism events in the 6-week study period (Castiglione et al., 2022). All of these pieces of evidence indicate that time constraints play a significant role in whether or not someone volunteers, supporting the conflict hypothesis.

In addition to the mediation through time constraints proposed by Cress et al. (1997), it might be important to consider stress as a second mediator in order to understand activist retention. Participation in an environmental activist group can lead to increased levels of

stress (Gorski et al., 2019). This study proposes that this stress occurs due to the time conflicts described above, because stress commonly occurs when the environmental demands exceed an individual's coping resources (Lazarus & Folkman, 1984). This is relevant because stress and persistence in activist groups have been shown to be related. Qualitative studies report unmanageable stress as a reason for participant dropout (Santos Nascimento et al., 2021). There is quantitative evidence of a strong negative influence of stress on activists' persistence as well (Mannarini & Talo, 2011). Specifically, stress was found to negatively predict persistence above and beyond the other variables included, such as commitment to the organization, organizational functioning, and role satisfaction within the organization (Mannarini & Talo, 2011). Stress might thus be one of the mechanisms by which participation and persistence in environmental activist groups are related, extending the competition hypothesis.

1.3. Role Identity Theory

Role identity theory (RIT) is a line of research understanding sustained volunteer engagement through social identity theory (SIT; Finkelstein, 2008). According to SIT, people constitute their identity through two processes: the distinction from others, i.e., their *individual identity*, as well as their group memberships, i.e., their *social identity* (Tajfel & Turner, 1979). This means, when considering themselves as group members, people constitute their personal identity as part of a collective (Masson & Fritsche, 2021). A social identity can mean identification with larger social groups such as nationality, gender, or even humanity, but also smaller groups, for example one's work team or local climate activist group.

Similarly, RIT conceptualizes the self as being comprised of several role identities, which are created in interactions with other people in a social context (Finkelstein, 2008). Social interactions are a core part of collective climate action, or it wouldn't be collective

(Goedkoop et al., 2022). A membership in a climate activist group can thus be considered a role identity (Finkelstein, 2008; van Ingen & Wilson, 2017). The present study will hence rely on RIT to understand activist retention.

Group identity plays a significant role in explaining collective climate action (van Zomeren, 2016). Identification with a politicized group is a strong and proximal predictor for activist pro-environmental behaviours (Schmitt et al., 2019), even when controlling for other predictors of environmental action (Masson & Fritsche, 2021). Additionally, stronger identification is related to a higher likelihood of attending an energy initiative meeting (Goedkoop et al., 2022) and higher intensity of volunteering (van Ingen & Wilson, 2017). Identification can explain on average 31% of the variance in climate activist behavioural intentions and actual behaviour (Schulte et al., 2020). Social Identification is thus a central factor in understanding environmental activist behaviours.

While identification with the climate movement can lead to the decision the engage in climate activism, the participation itself can also alter the identities of activists (Bunnage, 2014). To understand this, it is important to take interactions with other activists as a mediator into account. As described above, a shared group identity emerges through shared knowledge about properties of the group (Finkelstein, 2008; Tajfel & Turner, 1979). Through interaction with other members of the group, this knowledge is being shared and mutually integrated, which strengthens group social identity (Jans et al., 2015). Similarly, a greater time investment in volunteering, as well as more interactions with other volunteers can positively influence the identification with the volunteer role (van Ingen & Wilson, 2017). In the context of an energy community, interpersonal interaction with community members and identification with the community were strongly positively correlated (r = 0.54; Goedkoop et al., 2022). The positive influence of participation and interaction on group identification is clearly established.

Social identity is crucial when aiming to understand persistence in environmental activist groups because it can explain sustained engagement even when high personal costs are involved (Bunnage, 2014). Identification with the organization supports persistent commitment to the engagement (Driscoll, 2018) and collective identification with a common cause can foster strong and sustained bonds to the movement (Bunnage, 2014). Empirical evidence on the relationship between identification and persistence in an activist group is scarcer than the well-established association between identification and the decision to join an activist group; this research gap will be addressed in the present study.

1.4. This study

In a world where the climate is rapidly changing and action from authorities continues to be insufficient, a strong and effective base of climate activists, working towards bottom-up change, can be a driving force towards climate change mitigation. The reduction of turnover and the increase of persistence in activist organizations is important to be able to effectively use the resources of climate activist groups for climate protection. This study will investigate two possible ways in which persistence might be predicted by participation: negatively, mediated by time constraints, which leads to stress and finally decreases persistence, or positively, via increased interactions with other activists and subsequently stronger identification with the activist group and increased persistence.

While Cress et al. (1997) and Forner et al. (2024) have provided convincing evidence for a negative relationship between participation and persistence among volunteers, an explanation for this relationship has only been hypothesized. This study will try to replicate this effect among climate activists specifically, and test the competition hypothesis proposed by Cress et al. (1997). Additionally, this study will expand the competition hypothesis by including stress as a second mediator, influenced by time constraints, as stress was found to be a predictor of persistence (Mannarini & Talo, 2011). Stress might thus be one of the

mechanisms by which participation and persistence in environmental activist groups are negatively related.

An alternative explanation that suggests a positive relationship between participation and persistence builds on the established link between identification and persistence in activism. Participating in climate activism is expected, through interactions with other activists, to strengthen the activist identity. Role identity theory suggests that interaction fosters identification, which will be tested in the present study (Goedkoop et al., 2022). Identification, in turn, guides future activist behaviour (Finkelstein, 2008). Hence, participation can positively affect persistence by reinforcing activists' identities.

The decision to remain in or leave an activist group is complex and it is not assumed that persistence is explained by either of the processes described above alone. Even though the two models propose opposing effects of participation on persistence, they will not be treated as competing ideas but as complementary. For example, Goedkoop et al. (2022) identify a strong association of both community interactions and identification with willingness to participate in an energy initiative, but not with initiative meeting attendance. An explanation for this, as suggested by the authors, might be time constraints. Despite willingness, they argue, outside factors may be a barrier to participating in pro-environmental initiatives. So, competition hypothesis and role identity theory might predict persistence simultaneously, as displayed in the joint model in Fig. 1.

Figure 1

Structural Joint Model
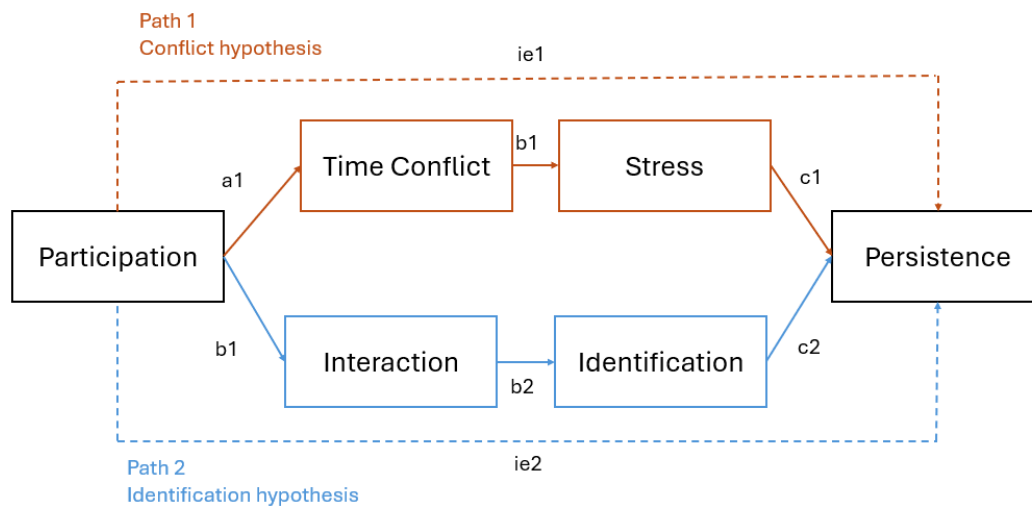
1.5. Hypotheses

Based on the previous assumptions, the following hypotheses are proposed:

1. Participation negatively predicts Persistence, mediated by Time Constraints and Stress.

2. Participation positively predicts Persistence, as mediated by Interaction and Identification.

3. Participation predicts Persistence, mediated by the Stress path and the Identification path simultaneously.

   a. The joint model is better suited at explaining the data than either of the other models alone.

2. Methods

2.1. Participants

Following the suggestion of Goedkoop et al. (2022), this study will investigate these questions with a sample of activists already involved in an environmental group. Participants

(*N*=79, 31 women, 43 men, 5 no answer) were recruited from the volunteers associated with the environmental activist organization LocalZero, a suborganisation of the Germany-wide organization GermanZero e.V. Participants had to be 18 years or older, a current member of LocalZero, and could not be paid employees of the organization, i.e., needed to be volunteers. When speaking of members of the organization, this denotes any person that is currently or has been in the past active for LocalZero, formal member or not.

LocalZero is a climate activist organization with the goal of reaching carbon neutrality in Germany in the year 2035. They have about 1000 people volunteering with them, organized in over 90 local teams all over Germany. Each team is working towards passing legislation for carbon neutrality in their respective city or municipality, with the aim of having a positive climate impact locally and more quickly than when targeting national legislation. They do so by using petitions to force referendums or by convincing local politicians to propose their legislation in a council session. After such a legislation has been passed, they supervise the implementation of the stipulated measures and hold local authorities accountable to their promises.

Participants were between 18 and 80 years old, with most of them being between 41 and 65 years old (33; 41.77%).

Using the webtool power4SEM, a RMSEA-based post-hoc power analysis was conducted for the power for measurement model misspecification (Verdam, 2024). For this study to have 80% power to correctly reject an RMSEA of .05 with a significance level of α=.05, the minimum needed sample size is N=50. The final sample size met these requirements.

2.2. Recruitment

Participants were recruited by the monthly email newsletter of the organization as well as through targeted emails to certain local teams that had expressed interest in partaking

in the study (Appx. A). Additionally, recruitment took place personally by the researcher during the teams' regular online or in-person meetings to which the researcher was invited. As an incentive, the researcher prepared a one-hour presentation and workshop on the current environmental psychological research about environmental activism. Some local teams took the offer and participated in the workshop prior to being given the questionnaire link, while others simply received a brief explanation of the study in an online meeting or merely a link to the questionnaire via email, depending on the teams' preferences, interests, and time capacities. Twice, in March and April 2024, the researcher visited the monthly Germany-wide networking zoom call to which all local teams are invited and promoted the study there in a 5-minute pitch.

2.2. Materials

The present study was approved by the ethics committee of University of Groningen on March 25th, 2024. The study was conducted by means of an online questionnaire implemented through the platform Qualtrics, version 04/2024 (Qualtrics, 2020). As the study was conducted in Germany, the language of the questionnaire was German. Participants were informed about the terms and conditions of joining the study and the processing of their data (Appx. B). They subsequently had to opt into both.

The questionnaire started with the participation measures. Following Cress et al. (1997), participation was measured in two ways: firstly, in the amount of hours spent on activist work in the past week as a proxy for average hours per week (M=5.10, SD=7.70, min=0, max=55), and secondly, an item on the relative amount of participation in group activities ("How often do you participate in activities and meetings of your local team? Please enter your best estimation."; M=5.39, SD=1.55). The answer was indicated on a 7-point Likert scale from 1 ("never") to 7 ("always"). For this analysis, only the second measure of participation was used.

Retention time was assessed by asking participants to enter the number of months they had already spent with the organisation (Cress et al., 1997; M=22.55, SD=13.13, Md=24, min=1, max=48). Participants were asked to provide their best estimate.

Time conflicts were measured by the time pressures dimension of the daily hassles scale-revised (DHS-R; Holm & Holroyd, 1992). The subscale consists of seven items (e. g. "I had too much to do"), each to be answered on a 6-point Likert scale from 1 ("did not occur") to 6 ("occurred, extremely severe"; M=3.05, SD=1.18, α=.92). The items and answering scale were translated by the researcher.

Stress was measured with the perceived stress questionnaire (PSQ; Levenstein et al., 1993). The items included in the questionnaire were adapted from the validated German translation of the 10-item version of the PSQ (PSS-10; Schneider et al., 2020). The items were to be answered on a 5-point likers scale from 1 ("never") to 5 ("usually"; M=2.63, SD=0.59, α=.86; e.g., "In the last month, how often have you felt confident about your ability to handle your personal problems?" (reverse coded)).

Interaction levels between members of the organization were measured by the interactivity dimension of the entitativity scale (Blanchard et al., 2020). It consists of 5 items (e.g., "We communicate with each other.") that are to be answered on a 7-point Likert-scale from 1 ("strongly disagree") to 7 ("strongly agree"; M=5.39, SD=0.86, α=.87). The subscale was translated to German by the researcher.

Initiative identification was measured by a modified version of the in-group identification scale (Leach et al., 2008). The German version was derived from the validated translation provided by Roth and Mazziotta (2015). This questionnaire has been validated to be a suitable instrument for measuring organizational identification. In this questionnaire, only the nine items capturing self-investment in the group were included. Self-investment describes the emotional bond with the group as well as the importance and salience of the

individual's group membership (Leach et al., 2008). The other dimension, self-definition, was excluded as it mainly describes the perception of the self as being similar to other group members (Leach et al., 2008). This was not the main focus of the study, so to shorten the questionnaire, this dimension was excluded. All items were modified in such a way that they referred to the identification with the specific team a volunteer is part of instead of the Germany-wide organization LocalZero (e.g., "I often think about the fact that I am a part of my local team."). The items were to be answered on a 5-point scale from 1 ("do not agree at all") to 5 ("fully agree"; M=3.79, SD=0.76, α=.90).

For the structural model, see Fig. 2.

Figure 2

Structural joint model.
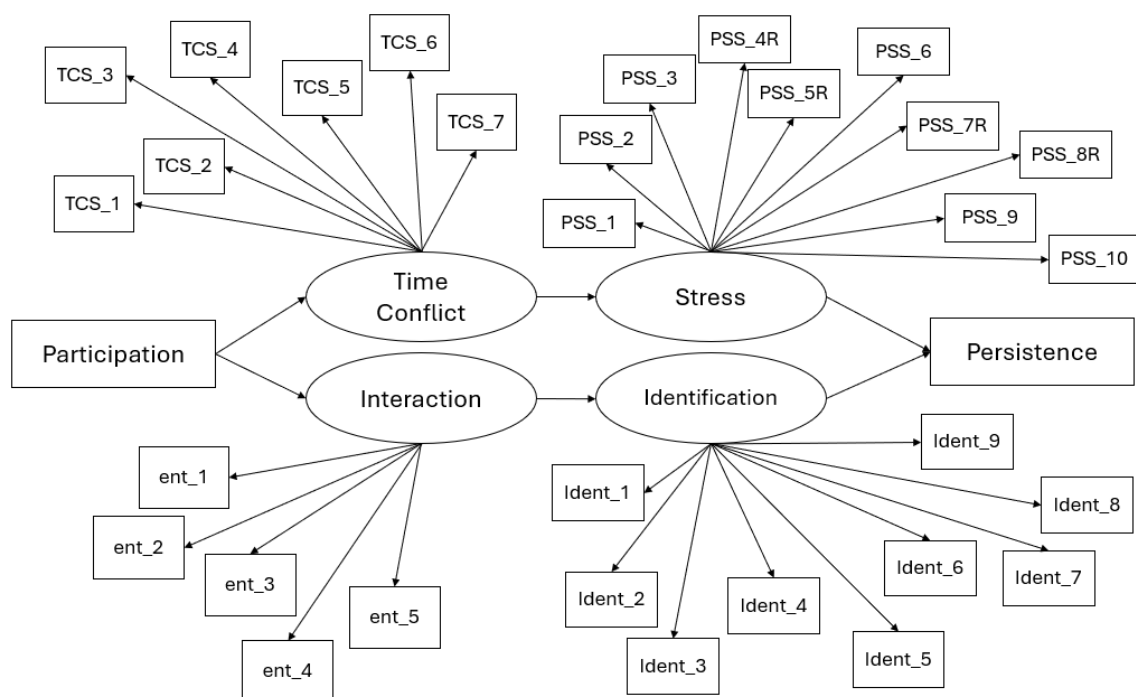
The scales measuring competition, stress, interaction, and initiative identification were presented to the participants in randomized order. Finally, participants were asked to indicate their age group and gender. Other than the items mentioned above, the questionnaire

included several items that will not be included in this analysis (for the full questionnaire, see Appx. C).

2.3. Statistical analysis

Analyses were conducted using the open-source freeware R, version 4.4.1 (R Core Team, 2018).

2.3.1. Data cleaning

The initial dataset consisted of N=97 observations. For the exact numbers of observations lost per cleaning step, see Table 1. The initial dataset was cleaned of all observations in which consent to participation or data processing was not given. Subsequently, all observations that did not provide an answer to at least one of the items measuring participation or persistence were excluded. Observations with other missing data were kept in the dataset as they might be useful for analysing models 1 or 2. Additionally, all observations that claimed more than 60 hours of volunteering in the last week were excluded as these were deemed unrealistic. Other outliers were kept in the analysis. Finally, the mean values for Time Constraints, Stress, Interaction and Identification were added to the dataset. The final dataset consisted of N=79 observations.

Table 1.

Data cleaning overview

	Number of observations dropped (percent)	Number of observations remaining
		99
No consent to participate	2 (2.02%)	97
No consent to data processing	9 (9.28%)	88
Didn't answer the Participation or Persistence measures	8 (9.09%)	80
Unrealistic volunteering hours	1 (1.25%)	79

2.3.2. Data Analysis

All hypotheses were evaluated by means of confirmatory factor analysis (CFA), using the R package lavaan 0.6-18 (Rosseel, 2012). In total, 3 models were fitted and tested: model 1, containing the first path from Participation, over Time Constraints and Stress, to Persistence; model 2, describing the path from Participation, over Interaction and Identification, to Persistence; and model 3, containing both paths simultaneously.

Using the two-step approach, for each model, the measurement model was tested and adjusted first, before testing the full model, which includes the structural model as well (Kang & Ahn, 2021). Model fit will be assessed using χ^2 and the indices comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) in joint interpretation (Nye, 2023). Following Hu and Bentler (1999), the traditional cutoff values for good model fit will be applied (CFI≥.95, TLI≥.95, RMSEA≤.06, SRMR≤.08).

The metric of each latent variable was set by constraining the factor loading of one item per latent variable to 1.00 (Nye, 2023). Error terms are assumed to be uncorrelated, unless indicated otherwise. Model fit estimations were made using the Bollen-Stine bootstrapping method. To compare goodness-of-fit between models, chi-square difference tests using the robust Satorra-Bentler-method were applied.

If an insufficient model fit is observed, it will first be assessed whether the exclusion of items with low factors loadings and secondly, whether the addition of new parameters based on modification indices might improve the model fit. Correlations of error terms will only be added to a model if the respective items belong to the same scale. Crossloadings of items on constructs other than originally intended will only be allowed if they logically align with the theory.

3. Results

3.1. Preliminary Analyses

3.1.1. Correlations

An overview over all mean values, standard deviations and correlations between variables can be found in Table 2. Time constraints and stress, being the mediators of path 1, correlate with each other but not with the mediators of path 2. The same is true the other way around for interaction and identification, the mediators of path 2; they correlate with each other, but not with the mediators of path 1. This could be a hint that there might be two separate processes in this model. Persistence correlates significantly only with one variable, namely identification. Notably, participation and persistence do not significantly correlate with each other (r=.10).

Table 2

Means, standard deviations, and correlations with confidence intervals

Variable	*M*	*SD*	1	2	3	4	5
1. Participation	5.41	1.51					
2. Time Constraints	3.05	1.17	-.01 [-.24, .22]				
3. Stress	2.65	0.60	-.04 [-.27, .19]	.67** [.52, .78]			
4. Interaction	5.39	0.87	.35** [.13, .53]	.03 [-.20, .26]	-.00 [-.23, .23]		
5. Identification	3.79	0.77	.53** [.34, .68]	.03 [-.21, .25]	.00 [-.23, .23]	.42** [.21, .59]	
6. Persistence	22.82	13.30	.10 [-.13, .32]	.06 [-.17, .29]	-.14 [-.36, .09]	-.14 [-.36, .09]	.29* [.06, .49]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates *p* < .05. ** indicates *p* < .01.

3.1.2. Normal Distribution

Normal distribution of the data is assumed in SEM and was tested here using QQ-plots and Shapiro-Wilk tests. Evaluation of those tests resulted in the conclusion that only the variables identification and stress are clearly normally distributed. Participation, persistence, and interaction are clearly not normally distributed. The results for time constraints are inconclusive.

Hence, normal distribution cannot be assumed for the present data. Fit indices are sensitive to normal distribution of the data (Kang & Ahn, 2021). Minor deviations from the traditional guidelines for good fit might need to be accepted, if it is likely that, in the specific case, they are attributable to nonnormality of the data (Nye, 2023).

3.2. Structural Equation Modelling

Structural equation modelling was applied to assess the hypotheses. As normality of the distribution cannot be assumed for many variables, the models were fitted using the Bollen-Stine bootstrapping method and only robust fit measures will be reported here. To retrieve modification indices, a model fitted with maximum likelihood estimation was used.

3.2.1. Model 1: Competition

The first model was created to test hypothesis 1 and assessed the relationship between participation and persistence, mediated by time constraints and stress. In a first step, the measurement model was evaluated and showed a poor model fit ($\chi^2(118)=271.46$, p<.001, CFI=.797, TLI=.766, RMSEA=.132, SRMR=.099). Thus, several iterative model modifications were performed to improve the model fit while staying as close to the original model as possible. First, it was assessed whether items could be excluded from the analysis. Second, model fit was improved based on modification indices. For every modification, it was carefully assessed whether the changes were in line with the underlying theory. For a detailed step-by-step report of the measurement model modifications, see Appx. D. It should

be noted that, by doing so, the confirmatory scope of CFA is left, and this method is being used for explorative purposes in the present study.

The model fit of the final measurement model was acceptable to good (χ^2(72)=116.40 p=.068, CFI=.937, TLI=.920, RMSEA=.091, SRMR=.085). The χ^2-test indicates that the model does not significantly deviate from the data. CFI, TLI, and SRMR indicate a medium and RMSEA indicated a poor fit to the data. There were no more large modification indices that are theoretically justifiable to add to the model or items with low factor loadings to be excluded from the model. Even though this model does not fit the data perfectly, it was accepted as the final measurement model for path 1. See Appx. F for an overview of the factor loadings.

Subsequently, the full model, including the direct effects between the four variables participation, time constraints, stress and persistence as well as the indirect effect of participation on persistence was fitted to the data. If hypothesis 1 is correct, the model should have good fit to the data.

The full path 1 model fit the data to an acceptable extent (χ^2(99)=144.54, p=.150, CFI=.932, TLI=.918, RMSEA=.079, SRMR=.090). While it did not differ significantly from the data and CFI and TLI show an acceptable model fit, RMSEA and SRMR indicate a rather poor model fit. There were no large modification indices that might have justified model modification.

For an overview of all paths, factor loadings, and error variances, see Fig. 3. The only significant path in the model was the one from competition to stress (β=0.48, p<.001). The direct effects of participation on competition (β=0.00, p=.983) and stress on persistence (β=-3.36, p=.123) were not significant. The indirect effect of participation on persistence, mediated by competition and stress, was also not significant (β=0.00, p=.986). The model

explained 3.9% of the variance in persistence (R^2=.039). See Appx. H for an overview of the results of the CFA. Hypothesis 1 was mostly rejected.

Figure 3

Full Path 1 Model with Paths, Factor Loadings and Error Variances.
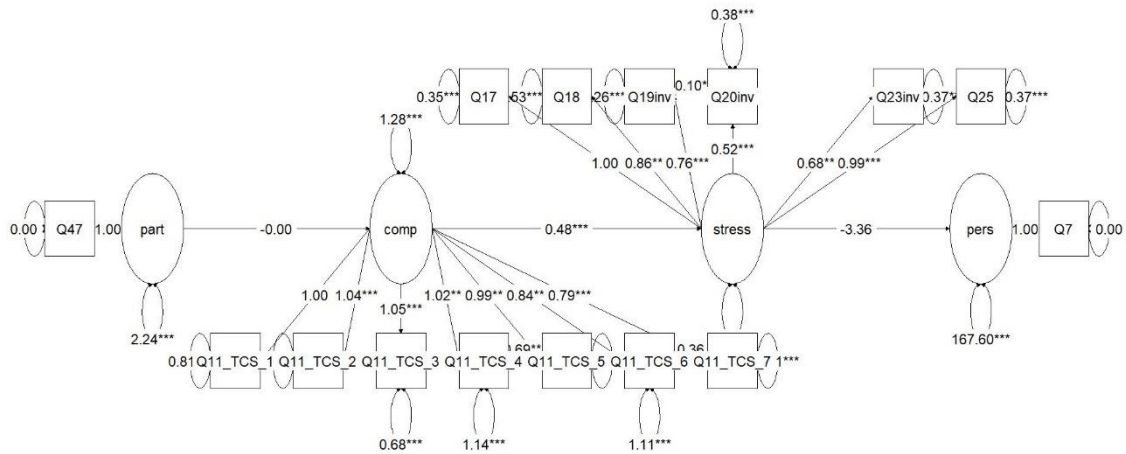
Note. p<.05*, p<.01**, p<.001***.

3.2.2. Model 2: Identification

The second model assessed the relationship between participation and persistence, mediated by interaction and identification, aiming to test hypothesis 2. The initial measurement model showed a poor fit (χ^2(76)=169.18, p=.005, CFI=.843, TLI=.812, RMSEA=.128, SRMR=.090). In an iterative process, it was assessed whether items should be excluded from the model, and modification indices were assessed for further fit improvement. In the end, covariances between the error variances of Q26/Q34, Q27/Q28, and Q52/Q52 were added to the measurement model. For reasoning and a detailed report of the model modifications, see Appx. E.

The model fit of the final measurement model was acceptable to good (χ^2(73)=106.61, p=.212, CFI=.943, TLI=.929, RMSEA=.078, SRMR=.080). The χ^2-test and SRMR indicated good, CFI and TLI indicated acceptable and RMSEA indicated poor model fit. As most

goodness-of-fit measured indicated at least an acceptable fit and no large modification indices were present, it was decided to use this measurement model.

In the second step, the full model, including the direct effects between the four variables participation, interaction, identification, and persistence as well as the indirect effect of participation on persistence was fitted to the data. See Appx. F for an overview of the factor loadings. If hypothesis 2 is correct, the model should have good fit to the data.

The full model had an acceptable to poor fit ($\chi^2(100)$=170.26, p=.076, CFI=.890, TLI=.868, RMSEA=.098, SRMR=.115). All direct effects were significant: the effect of participation on interaction (β=0.17, p=.011), of interaction on identification (β=0.52, p=.011), and of identification on persistence (β=4.74, p=.042). The indirect effect of participation on persistence did not reach significance (β=0.41, p=.088). The model explained 6.6% of the variance in persistence (R^2=.066). See Appx. H for an overview of the results of the CFA.

See Fig. 4 for an overview over the path 2 model. Hypothesis 2 was mostly accepted.

Figure 4

Full Path 1 Model with Paths, Factor Loadings and Error Variances.
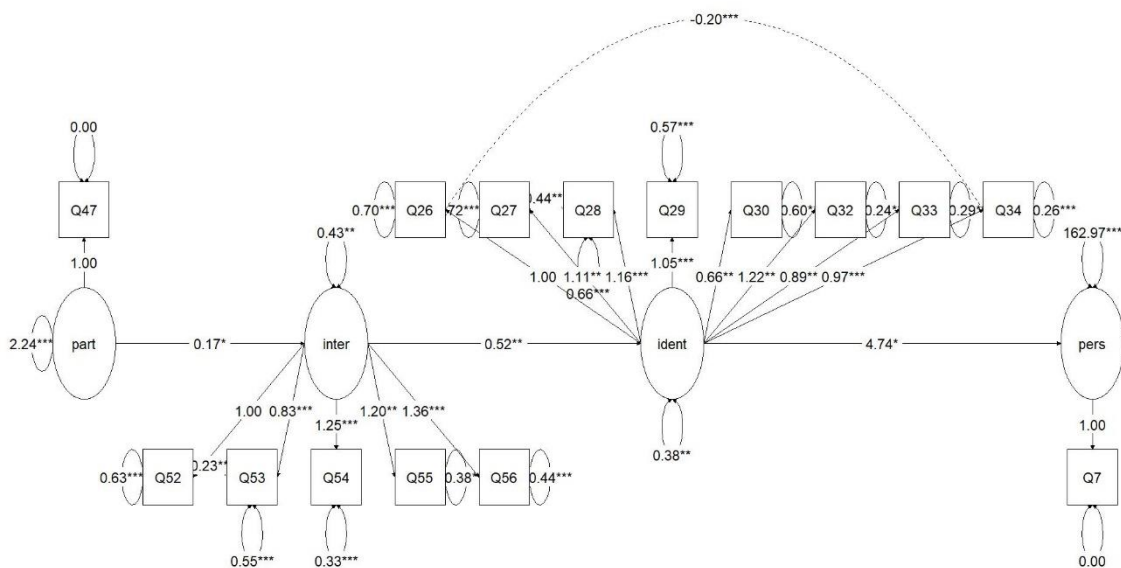
3.3.3. Model 3: Joint Model

Lastly, the joint model, containing both the competition and the identification path, was assessed. The measurement model was derived from the corrected measurement models of the two single paths. The joint measurement model showed acceptable to good model fit (χ^2(337)=440.74, p=.605, CFI=.921, TLI=.911, RMSEA=.064, SRMR=.087). There were no large modification indices that would have changed the measurement model in a way that aligns with the theory, so no modifications were applied. See Appx. F for an overview of the factor loadings.

If hypothesis 3 is correct, the full joint model should fit the data well. The full joint model, including the structural model, does not ideally fit the data (χ^2(394)=550.84, p=.544, CFI=.884, TLI=.872, RMSEA=.074, SRMR=.099). The chi-square test indicates that the model does not differ significantly from the data. All other goodness-of-fit indices indicate a poor model fit, though.

The direct effect of participation on interaction (β=0.17, p=.018), of interaction on identification (β=0.52, p=.009), and of competition on stress (β=0.48, p<.001) were significant. The direct effect of identification on persistence was marginally significant (β=4.81, p=.066). The other direct effects were not significant (see Fig. 5). See Appx. 7 for an overview of the results of the CFA.

Figure 5

Full joint model
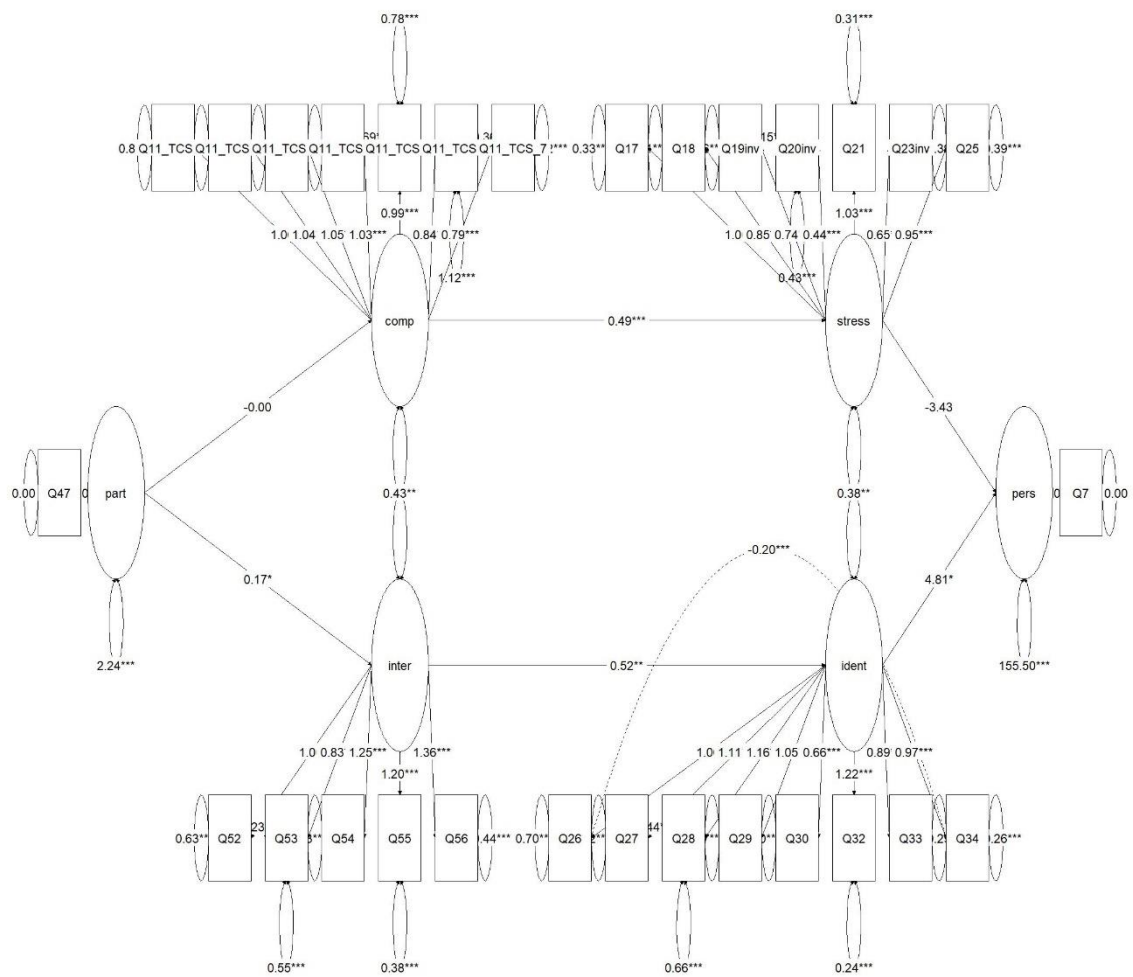
The indirect effect of Participation on Persistence, as mediated by Competition and Stress, was close to zero and not significant ($\beta=0.03$, p=.986). The other indirect effect of Participation on Persistence, as mediated by Interaction and Identification was nonsignificant as well ($\beta=0.41$, p=.082). The model explained 10.6% of the variance in Persistence ($R^2=.106$).

3.3.4. Model comparison

Finally, it was assessed whether the joint model fit the data better than any of the smaller models. If hypothesis 3a is correct, this would be the case.

Model 1, containing the Competition path, fits the data significantly better than the joint model ($\Delta\chi^2(295) = 406.30$, p < 0.001). With regard to relative fit indices, it can be concluded that model 1 displays lower values on Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) compared to the joint model, suggesting a better fit relative to the number of parameters (Table 3). This leads to the conclusion that model 1 provides a significantly better fit to the data than the joint model.

Results are similar for model 2, which fits the data significantly better than the joint model ($\Delta\chi^2(294) = 390.75$, p < 0.001). AIC and BIC are lower for model 2 in comparison with the joint model (Table 3). In conclusion, model 2 fits the data significantly better than the joint model.

Hypothesis 3 could not be confirmed and is rejected.

Table 3

Results of the Chi Square Difference tests

	df	AIC	BIC	χ^2	$\Delta\chi^2$	Δdf	p
Comparison 1							
Model 1	99	3418.10	3502.80	144.54			
Joint model	394	5833.40	5996.00	550.84	406.30	295	<.001
Comparison 2							
Model 2	100	3269.6	3352	170.26			
Joint Model	394	5833.40	5996.00	550.84	380.58	294	<.001

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion

4. Discussion

This paper investigated the relationship between level of participation in environmental activist groups and activists' persistence in such groups. Firstly, the competition hypothesis suggested a negative relationship between participation and persistence, mediated by time conflicts that arise through increased participation, which lead to stress and ultimately to reduced participation. Secondly, role identity theory proposed a positive relationship between participation and persistence, mediated by interactions with

other activists, which leads to identification with the activist group, causing increased persistence. Finally, it was assumed that the combination of both theories is the most accurate explanation for the relationship between participation and persistence out of the three.

The main goal of this study was to identify whether participation might be a predictor for persistence in environmental groups, and if so, in what way and through which psychological mechanisms. Based on the results of this study, it cannot be confirmed that participation is a relevant predictor for persistence in environmental activist groups. When accounting for the mediators, no evidence for any relationship between participation and persistence was found, positive or negative. This was true for all tested models. Other predictors might explain retention time in climate activist organizations better, like task satisfaction, appreciation of the volunteer, or commitment to the organization (Forner et al., 2024).

Out of all the predictors of persistence investigated, only the relationship to identification could be replicated in this study (Bunnage, 2014; Forner et al., 2024). The present results also expand the literature by providing evidence of this relationship for climate activists specifically. Additionally, this study shows that identification not only leads to increased commitment and behavioural intentions (Bunnage, 2014; Driscoll, 2018), but is positively related to a behavioural measure of persistence as well. This study adds to the notion that identification as an activist seems to play an important role in understanding and predicting activist persistence.

The findings of the present study are in line with the propositions of role identity theory. More interactions with other activists lead to a stronger identification with the activist group, which is in line with the assumption of RIT that role identities emerge through interaction with others in social contexts (Finkelstein, 2008; Goedkoop et al., 2022; Jans et al., 2015). As shown in this study, the mere participation in an environmental activist group

can increase interaction with other environmental activists. If activist organizations have the goal to increase their volunteers' identification with the organization, it is thus advisable to offer more possibilities to participate in meetings and activities of the organization.

At the same time, the results indicate that, while the connections between the variables in the identification path seem to be largely in line with the assumptions, the tested model is does not represent the data well. This means that there are likely components missing to fully represent the underlying relationship between participation and persistence. Possibly, additional variables need to be considered when trying to understand how participation, interaction, identification and persistence are related. Seeing that identification, an established predictor for whether someone engages in climate activism, is related to the persistence in a climate activist group as well, it might be worthwhile to investigate whether other predictors of activism might also be related to persistence. Future studies that aim to include further variables it could be explore whether people retain in climate activist organizations for the same reasons they join them, for example environmental concern (Binder & Blankenberg, 2016), experience of environmental threats (Driscoll, 2018), the desire for agency or moral considerations (van Zomeren, 2016). A meta-analysis identified interaction as a predictor of persistence as well, so adding a direct path from interaction to persistence might increase the explanatory power of the model (Forner et al., 2024; see also Goedkoop et al., 2022). Additionally, years spent as a volunteer can also have an influence on volunteer identity, so the relationship between persistence and identification might be reversed (van Ingen & Wilson, 2017). All of these relationships and additional explanations might be the reason for the unsatisfactory match between the proposed model and the data, but they need to be confirmed in future research.

The results of this study stand in contrast to the negative relationship between participation and persistence proposed by Cress et al. (1997) and Forner et al. (2024).

Additionally, in this study, neither participation nor persistence were related to the mediating variables, time constraints and stress. While the latter two show a strong association with each other, the results indicate that the time constraints and stress some volunteers experience is unrelated to their volunteer work. Considering that the tested model represented the data well, it is likely that the relationships found in this analysis represent the underlying dynamics between variables accurately. Therefore, it can be assumed that increased participation does not cause time conflicts with other areas of life, and stress does not lead to sooner dropout of the activist organization. Hence, based on the results of this study, it can be concluded that the competition hypothesis is not suited for explaining the relationship between participation and persistence.

Still, it is possible that the failed replication can be attributed to methodological issues of the present study. In comparison to Cress et al. (1997) and Forner et al. (2024), the present study had a considerably smaller sample, was not a meta-analysis and provided only cross-sectional data. Additionally, the present sample only included activists who were still with the organization at the point when the study was conducted, which might lead to systematic biases. It is likely that the present sample might have missed the part of the activist population that was affected the most by time conflicts and stress caused by volunteer work and has subsequently already dropped out before the study was conducted.

The lack of an association between participation and time conflicts with other areas of life is in contrast with the literature (Cress et al., 1997). This might be due to good time management skills of the activists. Even when volunteering a lot, they take on only as many tasks as are managable for them personally. This way, a lot of participation does not lead to high time conflicts. This makes sense regarding that populations with lots of leisure time, like jobless or retired people, are generally more likely to volunteer (Binder & Blankenberg,

2016; Simonson et al., 2021). Leisure time and job status was not assessed for the present sample, though, and should be included in any further research.

Stress not being related to persistence in this study might be attributable to activists using other coping strategies. Qualitative evidence on activists' stress and coping are in line with this approach. Environmentalists have often reported that, in times of stress and hardships as activists, they seek out means of coping, yet discontinuing the activist engagement is usually off the table for them (Driscoll, 2020; Mannarini & Fedi, 2012). This makes a reverse relationship between stress and participation likely. Especially when volunteering is a meaningful part of one's life people might not drop out of the organization but instead reduce volunteering hours. In order to exclude or confirm stress as a predictor for persistence, in future research a relationship from stress to participation could be included as well. This might give insights into the way volunteers handle stress caused by their volunteer work.

When integrating both models, the relationship between identification and persistence observed in the identification model largely disappeared. This suggests that the stress path might contain confounders or mediators that explain the relationship between identification and persistence away. This might be in line with the results of Goedkoop et al. (2022), who identify a relationship group identification and activist participation intentions, but not behavior. Since this study measured persistence behavior, the results indicate that identification predicts persistence, but this relationship vanishes when stress is taken into account. This might be an explanation for the intention-behavior gap observed by Goedkoop et al. (2022). However, these results need to be interpreted cautiously, as the joint model was worse at representing the relationships of the underlying variables than either of the individual models alone. This suggests that the additional complexity introduced by

combining the models does not enhance, and may even detract from, understanding the relationships between identification, stress, and persistence.

In conclusion, the present study could not provide evidence for a relationship, positive or negative, between participation and persistence in climate activist groups. Time constraints and stress seem to be mostly irrelevant relevant factors when trying to understand activist retention. Identification seems to be positively connected to both participation and persistence and could be a good starting point when aiming to understand climate activist retention more thoroughly.

4.1. Implications

This study suggests that, for increasing activist persistence, it is not sufficient to merely have them participate more in activities of the organization. Instead, it is advisable for climate activist organizations to cultivate a group identity in their volunteers. Increased participation can be a way, but a more proximate means of increasing identification, according to this study, is to encourage interaction with other activists. An organization can do so by offering social events, using team building activities and avoiding online networking if possible (Jans et al., 2015). Based on the results of this study, organizations should also make an effort to increase activists' group identification in other ways, like clearly communicating group goals and values (Masson & Fritsche, 2021) or the dissociation from other groups (Tajfel & Turner, 1979).

At the same time, activists seem to be very good at managing their own time and availabilities and at not overworking themselves. Thus, climate activist organizations should not worry about overwhelming their members with activities, possibilities and tasks. A possible caveat that hasn't been assessed in the present study that organizations should pay attention to not develop a culture of pressure and self-sacrifice as that, in combination with increased volunteer work load, can foster activist burnout (Gorski et al., 2019).

4.2. Limitations

The most important limitation concerns the measurement of the outcome variable. The aim of the study was to gain insights into factors that influence climate activist retention, while including only people in the sample that were still currently active with the activist organization at the time of data collection. In doing so, this study misses the potentially important data points of former activists, which might have been very insightful and should be included in future research.

Additionally, there might be systematic differences between study participants who received the researchers' presentation on environmental psychology and those who only received the study link. Even though the workshops excluded any contents relevant for the study, like the role of identification and stress in the context of climate activism, it might have still influenced the answers. This possibility cannot be eliminated or confirmed in hindsight, though.

The final limitation to the study is the use of confirmatory factor analysis for explorative purposes, which is not the intended use of this method. Post-hoc model fitting can reduce the reliability and validity of the results. In the present case, it was necessary to adjust the measurement models to preclude measurement errors and arrive at interpretable results. The models were adjusted as little as possible; still, the final model differed from the theoretically proposed model. Further research is needed to confirm the relationships and fits reported here with a new sample.

4.3. Recommendations for future research

This study was a cross-sectional investigation of the processes through which participation and persistence in environmental activist groups might be related. Even though theoretically assumed, causal relationships between the discussed variables cannot be proven by the present results. Further experimental (e.g., Thomas & McGarty, 2009) or longitudinal

research should be considered, as associations present during a singular observation might not hold up over time (Finkelstein, 2008). Especially Jans et al. (2015) provide evidence with a longitudinal experiment that increased interaction influences group identification *over time*. It might thus be insightful to further investigate the model proposed here and especially the assumed relationships that could not be confirmed in a longitudinal study design.

Future research should undertake a re-evaluation of the explanations that role identity theory offers to understanding at least climate activist retention. In the light of the results of this study it is recommended to expand the model by including further relevant variables, such as connectedness to nature, climate worry, or experience of climate threats. Simultaneously, the connection between the proposed predictors might be more complex than suggested in this study. A re-evaluation of interaction and identification as mediators for participation and persistence, potentially including further variables, might be promising.

Finally, role identity theory might provide a more coherent and theoretically sound framework for investigating the variables of time constraints and identification. Considering that other work commitments do not significantly predict retention, whereas volunteer work conflicting with home responsibilities does (Forner et al., 2024), it is possible that different types of time conflicts affect activist retention differently. A line of research has explored these differences more closely, identifying identity conflicts as a source of stress (Wiley, 1991). An alternative approach could, therefore, conceptualize pressures from other areas of life not as time constraints and stress, as suggested in this study, but as competing role identities that compete for limited time resources with the activist identity. This approach might also be in line with the observation that the relationship between identification and persistence disappears when introducing stress into the model and could be a possibility for integrating the results of this study with the negative relationship between participation and persistence observed in the literature.

4.4. Conclusion

This study aimed at identifying how environmental activists' participation is related to their persistence in an activist group. To answer this question, two paths, predicting opposite relationships between participation and persistence, as well as their integration, were tested. This study found no effect of participation on persistence. The claim of a negative relationship between the participation and persistence, mediated by time conflicts with other areas of life and stress, is in no way supported by the results of this study. A positive association between participation and persistence, mediated by interaction with other activists and identification with the activist group, cannot be confirmed, but might be interesting for further investigation. The results provide support for SIT and RIT, while standing in opposition to the competition hypothesis. Climate activist organizations should focus on creating a strong group identity shared between their members to promote persistence.

5. **References**

Binder, M., & Blankenberg, A.-K. (2016). Environmental concerns, volunteering and

 subjective well-being: Antecedents and outcomes of environmental activism in

 Germany. *Ecological Economics*, *124*, 1–16.

 https://doi.org/10.1016/j.ecolecon.2016.01.009

Blanchard, A. L., Caudill, L. E., & Walker, L. S. (2020). Developing an entitativity measure

 and distinguishing it from antecedents and outcomes within online and face-to-face

 groups. *Group Processes & Intergroup Relations*, *23*(1), 91–108.

 https://doi.org/10.1177/1368430217743577

Bunnage, L. A. (2014). Social Movement Engagement over the Long Haul: Understanding

 Activist Retention. *Sociology Compass*, *8*(4), 433–445.

 https://doi.org/10.1111/soc4.12141

Castiglione, A., Brick, C., Holden, S., Miles-Urdan, E., & Aron, A. R. (2022). Discovering

 the psychological building blocks underlying climate action—a longitudinal study of

 real-world activism. *Royal Society Open Science*, *9*(6), Article 210006.

 https://doi.org/10.1098/rsos.210006

Cress, D. M., McPherson, J. M., & Rotolo, T. (1997). Competition and Commitment in

 Voluntary Memberships: The Paradox of Persistence and Participation. *Sociological

 Perspectives*, *40*(1), 61–79. https://doi.org/10.2307/1389493

Driscoll, D. (2018). Beyond organizational ties: foundations of persistent commitment in

 environmental activism. *Social Movement Studies*, *17*(6), 697–715.

 https://doi.org/10.1080/14742837.2018.1519412

Finkelstein, M. A. (2008). Predictors of Volunteer Time: the Changing Contributions of

 Motive Fulfillment and Role Identity. *Social Behavior and Personality: An*

International Journal, *36*(10), 1353–1363.

https://doi.org/10.2224/sbp.2008.36.10.1353

Forner, V. W., Holtrop, D., Boezeman, E. J., Slemp, G. R., Kotek, M., Kragt, D., Askovic, M., & Johnson, A. (2024). Predictors of turnover amongst volunteers: A systematic review and meta-analysis. *Journal of Organizational Behavior*, *45*(3), 434–458.

https://doi.org/10.1002/job.2729

Goedkoop, F., Sloot, D., Jans, L., Dijkstra, J., Flache, A., & Steg, L. (2022). The Role of Community in Understanding Involvement in Community Energy Initiatives. *Frontiers in Psychology*, *12*, Article 775752.

https://doi.org/10.3389/fpsyg.2021.775752

Gorski, P., Lopresti-Goodman, S., & Rising, D. (2019). "Nobody's paying me to cry": the causes of activist burnout in United States animal rights activists. *Social Movement Studies*, *18*(3), 364–380. https://doi.org/10.1080/14742837.2018.1561260

Holm, J. E., & Holroyd, K. A. (1992). *PsycTESTS Dataset.* https://doi.org/10.1037/t57783-000

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55.

https://doi.org/10.1080/10705519909540118

IPCC. (2023). Summary for Policymakers. In I. P. o. C. Change (Ed.), *Climate Change 2022 – Impacts, Adaptation and Vulnerability* (pp. 3–34). Cambridge University Press.

https://doi.org/10.1017/9781009325844.001

Jans, L., Leach, C. W., Garcia, R. L., & Postmes, T. (2015). The development of group influence on in-group identification: A multilevel approach. *Group Processes & Intergroup Relations*, *18*(2), 190–209. https://doi.org/10.1177/1368430214540757

Kang, H., & Ahn, J.-W. (2021). Model Setting and Interpretation of Results in Research Using Structural Equation Modeling: A Checklist with Guiding Questions for Reporting. *Asian Nursing Research*, *15*(3), 157–162. https://doi.org/10.1016/j.anr.2021.06.001

Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. Springer Publishing Company.

Leach, C. W., van Zomeren, M., Zebel, S., Vliek, M. L. W., Pennekamp, S. F., Doosje, B., Ouwerkerk, J. W., & Spears, R. (2008). *PsycTESTS Dataset.* https://doi.org/10.1037/t05289-000

Mannarini, T., & Talo, C. (2011). When Commitment Is Not Enough: How Stress and Individual-Organization Interface Affect Activists' Persistence. *Psychology*, *02*(05), 450–455. https://doi.org/10.4236/psych.2011.25070

Masson, T., & Fritsche, I. (2021). We need climate change mitigation and climate change mitigation needs the 'We': a state-of-the-art review of social identity effects motivating climate change action. *Current Opinion in Behavioral Sciences*, *42*, 89–96. https://doi.org/10.1016/j.cobeha.2021.04.006

Nye, C. D. (2023). Reviewer Resources: Confirmatory Factor Analysis. *Organizational Research Methods*, *26*(4), 608–628. https://doi.org/10.1177/10944281221120541

Qualtrics. (2020). *Qualtrics, vers 04/2024*. https://www.qualtrics.com

R Core Team. (2018). *R: A language and environment for statistical computing*. https://www.R-project.org/

Rosseel, Y. (2012). lavaan : An R Package for Structural Equation Modeling. *Journal of Statistical Software*, *48*(2). https://doi.org/10.18637/jss.v048.i02

Roth, J., & Mazziotta, A. (2015). Adaptation and Validation of a German Multidimensional and Multicomponent Measure of Social Identification. *Social Psychology*, *46*(5), 277–290. https://doi.org/10.1027/1864-9335/a000243

Santos Nascimento, J., Klandermans, B., & Theije, M. de (2021). Recruitment and disengagement: two sides of the same coin or different phenomena? *SN Social Sciences*, *1*(6). https://doi.org/10.1007/s43545-021-00145-2

Schmitt, M. T., Mackay, C. M., Droogendyk, L. M., & Payne, D. (2019). What predicts environmental activism? The roles of identification with nature and politicized environmental identity. *Journal of Environmental Psychology*, *61*, 20–29. https://doi.org/10.1016/j.jenvp.2018.11.003

Schneider, E. E., Schönfelder, S., Domke-Wolf, M., & Wessa, M. (2020). Measuring stress in clinical and nonclinical subjects using a German adaptation of the Perceived Stress Scale. *International Journal of Clinical and Health Psychology : IJCHP*, *20*(2), 173–181. https://doi.org/10.1016/j.ijchp.2020.03.004

Schulte, M., Bamberg, S., Rees, J., & Rollin, P. (2020). Social identity as a key concept for connecting transformative societal change with individual environmental activism. *Journal of Environmental Psychology*, *72*, 101525. https://doi.org/10.1016/j.jenvp.2020.101525

Simonson, J., Kelle, N., Kausmann, C., Karnick, N., Arriagada, C., Hagen, C., Hameister, N., Huxhold, O., & Tesch-Römer, C. (2021). *Volunteering in Germany: Key findings of the Fifth German Survey on Volunteering (FWS 2019)*. SSOAR, GESIS – Leibniz-Institut für Sozialwissenschaften e.V; Bundesministerium für Familie, Senioren, Frauen und Jugend.

Stern, P. C. (2000). New Environmental Theories: Toward a Coherent Theory of

    Environmentally Significant Behavior. *Journal of Social Issues*, *56*(3), 407–424.

    https://doi.org/10.1111/0022-4537.00175

Tajfel, H., & Turner, J. An Integrative Theory of Intergroup Conflict. In *W. G. Austin & S.*

    Worchel: The social psychology of inter-group relations (pp. 56–65).

    https://doi.org/10.1093/oso/9780199269464.003.0005 (Original work published 1979)

Thomas, E. F., & McGarty, C. A. (2009). The role of efficacy and moral outrage norms in

    creating the potential for international development activism through group-based

    interaction. *The British Journal of Social Psychology*, *48*(Pt 1), 115–134.

    https://doi.org/10.1348/014466608X313774

van Ingen, E., & Wilson, J. (2017). I Volunteer, Therefore I am? Factors Affecting Volunteer

    Role Identity. *Nonprofit and Voluntary Sector Quarterly*, *46*(1), 29–46.

    https://doi.org/10.1177/0899764016659765

van Zomeren, M. (2016). Building a Tower of Babel? Integrating Core Motivations and

    Features of Social Structure into the Political Psychology of Political Action. *Political*

    Psychology, *37*(S1), 87–114. https://doi.org/10.1111/pops.12322

Verdam, M. G. E. (2024). Power analyses for measurement model misspecification and

    response shift detection with structural equation modeling. *Quality of Life Research :*

    An International Journal of Quality of Life Aspects of Treatment, Care and

    Rehabilitation, *33*(5), 1241–1256. https://doi.org/10.1007/s11136-024-03605-3

Wiley, M. G. (1991). Gender, Work, and Stress: The Potential Impact of Role-Identity

    Salience And Commitment. *The Sociological Quarterly*, *32*(4), 495–510.

    https://doi.org/10.1111/j.1533-8525.1991.tb00150.x

Appendix A

English Translation of the recruitment email sent to local teams

Dear XXX,

As already announced in the retro meeting/in your team meeting on XX.XX., I am now contacting you with some information about the local team survey that I am conducting together with Philipp Nuske. Great to hear that your team is interested in the survey!

The aim of the survey is to get to know the local teams throughout Germany better and to gain scientific insights that can help to ensure the climate movement in Germany remains stable and sustainable in the long term. By taking part, you will be helping yourself and LocalZero in general, because in the best-case scenario, we will be able to derive recommendations for effectively approaching and retaining members from the results.

As a small thank you, every team that takes part in the survey will be given the opportunity to request a screen print motif. This will then be offered at the next national meeting. So, if you've always wanted a T-shirt or a cloth bag with your local team logo, this is your chance!

You will also be doing me a personal favour by taking part, as I will be evaluating parts of the survey in my master's thesis (which will not be published).

The study will be completely anonymous. Your details will therefore not be linked to you personally at any time.

I would love to come to your team meeting in mid-March and bring you the study. I would explain everything in detail and be available to answer any questions. If you are interested, I can also do a 60-minute workshop on environmental psychology with you. If you have a request for a topic that you are particularly interested in, please let me know and I will see what I can do.

I'm looking forward to hearing from you!

Best regards,

Tabea Kahlstatt

Appendix B

English translation of the participant information form

INFORMATION ABOUT THE RESEARCH

VERSION FOR PARTICIPANTS

"MOTIVATION SURVEY"

➢   Why do I receive this information?

You are invited to participate in the following study. Your participation in particular is important to us, as you are or were an activist in one of the LocalZero local teams, associated with the non-profit organization GermanZero e.V..

This research is being conducted by Dr. Elliot Sharpe (University of Groningen), Prof. Dr. Sebastian Wallot (Leuphana University Lüneburg), MSc Therre van Blerck and B.Sc. Tabea Kahlstatt (University of Groningen) in cooperation with LocalZero and GermanZero.

Participation is possible between March 25th 2024 and April 28th 2024.

➢   Do I have to participate in this research?

Participation in the research is voluntary. However, your consent is needed. Therefore, please read this information carefully. Ask all the questions you might have, for example because you do not understand something. Only afterwards you decide if you want to participate. If you decide not to participate, you do not need to explain why, and there will be no negative consequences for you. You have this right at all times, including after you have consented to participate in the research.

➢   Why this research?

The purpose of this research is twofold. On the one hand, it is important to us to get to know the people in our local teams better. This will hopefully help with communication, providing the support you may need, and winning over new members.

On the other hand, you will support current psychological research by participating in this study. We aim at identifying factors that can contribute to people staying in environmental activist groups over a prolonged period of time as well as reasons for dropping out.

➢　　　What do we ask of you during the research?

Before participating in this research, you will be asked to give your consent. First, we will ask you a few questions about your reasons for joining your LocalZero team. Then, we want to know a few things about how you see the world more generally. Subsequently, we will ask you about some experiences you might have made in you LocalZero team.

Finally, we will ask you a few questions about yourself, such as your age, gender and whether you have a migratory background.

Filling out the questionnaire will take approximately 15 minutes.

You will not personally receive any compensation in exchange for partaking in the study, but your LocalZero Team will have the possibility to request a screen print motive which will be provided at the upcoming Germany-wide LocalZero meeting.

➢　　　What are the consequences of participation?

By participating in this research, you contribute to the future recruitment and communication strategy of LocalZero and GermanZero. This can help strengthen the organizations you are or were a part of and potentially contribute to the achievement of its activist goals.

The insights gained from this study may help the environmental movement in general build more sustained memberships and develop guidelines for how an environmental organization should be structured in order to minimize member dropout. However, insights like this cannot be guaranteed in research.

➢ How will we treat your data?

Your data will be processed for educational purposes as part of a Master Thesis in Environmental Psychology at the University of Groningen. The data will be collected, processed and analysed by B.Sc. Tabea Kahlstatt. Please note that Tabea Kahlstatt is currently also interning with the leader board of LocalZero. She is conducting this research and handling your data in her role as a researcher of University Groningen and as a master student. No other members of LocalZero will have access to your raw or processed data.

We will ask you to indicate your gender, age range and whether or not you have a migratory background, but not your country of origin. Answering any of these questions is completely optional.

Your data will be published in an averaged, processed form as part of the master thesis of Tabea Kahlstatt. Your data might be published in an averaged, processed form within the organisation LocalZero for those who are interested in the results of this research. No singular data points will be published.

The data will be stored until July 5th, 2034, which constitutes a period of 10 years after the research has been completed.

This research has been critically evaluated and approved by the ethics committee of the University Groningen.

➢ What else do you need to know?

You may always ask questions about the research: now, during the research, and after the end of the research. You can do so by speaking with one of the researchers present right now or by emailing t.kahlstatt@student.rug.nl or phoning one of the researchers involved (Tabea Kahlstatt: +49 1575 151653).

Do you have questions/concerns about your rights as a research participant or about the conduct of the research? You may also contact the Ethics Committee of the Faculty of Behavioural and Social Sciences of the University of Groningen: ec-bss@rug.nl (only in English).

Do you have questions or concerns regarding the handling of your personal data? You may also contact the University of Groningen Data Protection Officer: privacy@rug.nl (only in English).

As a research participant, you have the right to a copy of this research information.

Appendix C

Full Questionnaire

Q3	[Participant Information, see Appx. C]	
Q49	I have read the information about the survey. I have had sufficient opportunity to ask questions. I understand what the survey is about, what is required of me, what the consequences of participation may be, how my data will be handled and what rights I have as a participant. I understand that participation in the survey is voluntary. I myself decide to participate. I can end my participation at any time. If I stop, I do not have to explain why. Dropping out has no negative consequences for me. I indicate below what I agree to. Consent to participate in the study:	0: Yes, I agree to participate in this study; this consent is valid until 05.07.2024. 1: No, I don't agree to participate
Q60	Consent to processing of personal data:	0: Yes, I consent to the processing of my personal data as stated in the research information. I am aware that I have until 05.07.2024 to request that my data be withdrawn and deleted. I can also request this if I decide to no longer participate in the research. 1: No, I do not consent to the processing of my personal data.
Q10	In the following we will ask you some questions about your activity at LocalZero. This is not about recording your hours at LocalZero or monitoring or evaluating your commitment. However, people differ in how much time volunteering takes up in their lives. This can have various causes and consequences; we are interested in these causes and consequences. In order to obtain the most accurate scientific results possible, it is therefore important that you answer as honestly and truthfully as possible. Your answers cannot be linked to you personally.	
Q4	How many hours have you spent on LocalZero in the last week? If you don't know exactly, please give your best estimate.	[free entry]
Q47	How often do you take part in the activities and meetings of your LocalZero team? Please give your best estimate.	1: Never 2: Almost Never 3: Rarely 4: About half the time 5: Often 6: Most of the time 7: Always
Q13	My involvement with LocalZero is primarily about…	1: Talking to politicians and administration

		2: Planning, Executing & monitoring of climate legislation in my municipality 3: both 4: something else, namely: [free entry)
Q46	I am active in…	1: A local team 2: The central office 3: both 4: something else, namely: [free entry]
Q7	How many months have you been active with LocalZero? If you don't know exactly, please give your best estimate.	[free entry]
Q11_TCS	Please indicate whether the following experiences have occurred in your life in the last 4 weeks and how serious or stressful you have found them. Please think about your life in general, not just your activities at LocalZero.	
Q11_TCS_1	Too many things to do	1: didn't occur 2: occurred, not severe 3: occurred, barely severe 4: occurred, a little severe 5: occurred, very severe 6: occurred, extremely severe
Q11_TCS_2	Not enough time to do the things one needs to do	
Q11_TCS_3	Too many responsibilities	
Q11_TCS_4	Not getting enough rest	
Q11_TCS_5	Not enough time for entertainment and recreation	
Q11_TCS_6	Too many meetings	
Q11_TCS_7	Social obligations	
Q16	In the last month, how often have you been upset because of something that happened unexpectedly?	1: Never 2: Almost never 3: Sometimes 4: Often 5: Very often
Q17	In the last month, how often have you felt that you were unable to control the important things in your life?	
Q18	In the last month, how often have you felt nervous and "stressed"?	
Q19	In the last month, how often have you felt confident about your ability to handle your personal problems? (R)	
Q20	In the last month, how often have you felt that things were going your way? (R)	
Q21	In the last month, how often have you found that you could not cope with all the things that you had to do?	
Q22	In the last month, how often have you been able to control irritations in your life? (R)	
Q23	In the last month, how often have you felt that you were on top of things? (R)	

Q24	In the last month, how often have you been angered because of things that were outside of your control?	
Q25	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	
Q52	We respond to each other's messages.	1: strongly disagree 2: disagree 3: partially disagree 4: neither disagree nor agree 5: partially agree 6: agree 7: strongly agree
Q53	We interact with each other in these messages.	
Q54	We communicate with each other.	
Q55	We spend time interacting.	
Q56	We build on each other's thoughts and ideas.	
Q26	I often think about the fact that I am a part of my local team.	1: Strongly disagree 2: Disagree 3: Neither agree, nor disagree 4: Agree 5: Strongly agree
Q27	The fact that I am a part of my local team is an important part of my identity.	
Q28	Being a part of my local team is an important part of how I see myself.	
Q29	I feel a bond with my local team.	
Q30	I feel solidarity with my local team.	
Q31	I feel committed to my local team.	
Q32	I am glad to be a p a part of my local team.	
Q33	It is pleasant to be a part of my local team.	
Q34	Being a part of my local team gives me a good feeling.	
Q51	I identify…	1: Only with my local team 2: rather with my local team 3: both equally 4: rather with the Germany-wide organization LocalZero 5: only with the Germany-wide organization LocalZero
Q44	Next, we are interested in why you are involved with LocalZero. Please think back to the time when you started to get involved with LocalZero. What reasons were important for your decision to join LocalZero in particular? Please choose the 3 most important ones.	1: I wanted to work towards carbon neutrality. 2: My city/municipality is important to me. 3: I was looking for a community of like-minded people. 4: I wanted to leave a better world for future generations. 5: I felt responsible to do something for climate protection. 6: Because friends or acquaintances were also active. 7: I wanted to volunteer in a constructive and solution-oriented manner. 8: I was looking for an organization that proceeds professionally. 9: I didn't want to feel passive and powerless towards the problems in this world.
Q45	Vielleicht hat sich Deine Motivation mit der Zeit verändert, vielleicht ist sie auch gleich geblieben. Was sind aktuell Gründe, weshalb Du Dich bei LocalZero engagierst? Bitte wähle die 3 wichtigsten aus.	

		10: Working with LocalZero was particularly fun. 11: Something else: [free entry]
Q59	Were there any important experiences during your involvement that made you want to stay involved? Please select up to 3. - Selected Choice	1: We reached our goals. 2: I have outgrown myself. 3: I have found a community within my local team. 4: I have found a community withing the Germanwide organization LocalZero. 5: I have received feedback from others that my involvement is good and meaningful. 6: My involvement was fun. 7: Something else: [free entry] 8: I did not have an experience like that.
Q58	Next, we would like to find out a little more about you as a person.	
Q35	What is your age group?	1: under 18 2: 18 to 25 3: 26 to 40 4: 41 to 65 5: 66 to 80 6: over 80 7: prefer not to say
Q36	What is your gender?	1: Female 2: Male 3: Something else 4: prefer not to say
Q37	Do you have at least one parent that is not from Germany?	1: Yes, mother 2: Yes, father 3: Yes, both 4: No 5: prefer not to say
	Next, we would like to find out how you perceive the world and the German society. Please click on the link below. It will lead you to the website of the civil society organization More in Common. Please complete the quiz that appears on the page. It takes about 2 minutes. Please remember the result that is given to you at the end of the quiz. We will ask you to enter it on the next page. Link to the quiz This data would contribute greatly to our research. If you don't want to complete it, you can simply skip this page.	
Q15	Please indicate which group the quiz has assigned you to.	1: the open-minded 2: the involved 3: the established 4: the pragmatic 5: the disappointed

		6: the angry 7: prefer not to say
Q48	When you think about yourself and the other people on your LocalZero team, what are reasons for you and the people around you to stay with LocalZero? What might be reasons why people have ended their involvement in the past?	
Q12	Is there anything else you would like to tell us?	

Appendix D

Report of measurement model improvement for model 1

All models were fitted using Bollen-Stine bootstrapping.

Model 1.1:

```
path1_meas1 <- 'comp =~ Q11_TCS_1 + Q11_TCS_2 + Q11_TCS_3 + Q11_TCS_4 +
                Q11_TCS_5 + Q11_TCS_6 + Q11_TCS_7
            stress =~ Q16 + Q17 + Q18 + Q19inv + Q20inv + Q21 +
                Q22inv + Q23inv + Q24 + Q25'
```

The model fit of model 1.1 was poor ($\chi^2(118)$=271.46, p<.001, CFI=.797, TLI=.766, RMSEA=.132, SRMR=.099). Items were assessed for exclusion and three items with standardized factor loadings below .40 were identified: Q16 (λ=.394), Q22inv (λ=.320) and Q24 (λ=.395). As Q22inv has the lowest factor loading out of the three, it was cut from the analysis first.

Model 1.2

```
path1_meas2 <- 'comp =~ Q11_TCS_1 + Q11_TCS_2 + Q11_TCS_3 + Q11_TCS_4 +
                Q11_TCS_5 + Q11_TCS_6 + Q11_TCS_7
            stress =~ Q16 + Q17 + Q18 + Q19inv + Q20inv + Q21 +
                Q23inv + Q24 + Q25'
```

The exclusion of Q22inv did not lead to a significant improvement of model fit ($\Delta\chi^2(15)$=22.99, p=.084).

The item with the next smallest factor loading was identified: Q16 (λ=.352).

Model 1.3

Model 1.3 consists of all the components of model 1, with the exception of item Q16.

```
path1_meas3 <- 'comp =~ Q11_TCS_1 + Q11_TCS_2 + Q11_TCS_3 + Q11_TCS_4 +
                Q11_TCS_5 + Q11_TCS_6 + Q11_TCS_7
```

```
                     stress =~ Q17 + Q18 + Q19inv + Q20inv + Q21 +

                            Q22inv + Q23inv + Q24 + Q25'
```

In comparison to model 1.1, model 1.3 showed a significantly improved fit to the data ($\Delta\chi^2(15)$=27.04, p=.028). Relative fit indices indicated a better fit of model 1.3 (AIC=3057.0, BIC=3133.5) in comparison to model 1.1 (AIC=3245.5, BIC=3326.6) as well.

The model fit of model 1.3 was still poor ($\chi^2(103)$=244.42, p<.001, CFI=.807, TLI=.776, RMSEA=.135, SRMR=.099).

For further model improvement, Q24 was cut from the analysis (λ=.385).

Model 1.4

```
path1_meas4 <- 'comp =~ Q11_TCS_1 + Q11_TCS_2 + Q11_TCS_3 + Q11_TCS_4 +

                     Q11_TCS_5 + Q11_TCS_6 + Q11_TCS_7

               stress =~ Q17 + Q18 + Q19inv + Q20inv + Q21 +

                     Q22inv + Q23inv + Q25'
```

The exclusion of Q24 did not lead to a significantly improved fit to the data ($\Delta\chi^2(14)$=23.11, p=.057). Hence, model 1.3 will be preferred.

The modification indices of model 1.3 indicated that an improvement to the model fit could be made by including the correlation of the error variances between items Q11_TC_4 and Q11_TCS_5 (MI=53.48). As they belong to the same scale and their content is sufficiently similar, it was decided to include this covariance in the measurement model.

Model 1.5

```
path1_meas5 <- 'comp =~ Q11_TCS_1 + Q11_TCS_2 + Q11_TCS_3 + Q11_TCS_4 +

                     Q11_TCS_5 + Q11_TCS_6 + Q11_TCS_7

               stress =~ Q17 + Q18 + Q19inv + Q20inv + Q21 +

                     Q22inv + Q23inv + Q25
```

```
#Covariances

Q11_TCS_4 ~~ Q11_TCS_5'
```

The inclusion of the covariance of items Q11_TCS_4 and Q11_TCS_5 lead to a significantly improved fit to the data ($\Delta\chi^2(15)=71.89$, p<.001), with relative fit indices being larger for model 1.3 (AIC=3057.1, BIC=3133.5) than for model 1.5 (AIC=2812.1, 2886.3) and thus pointing in the same direction.

The model fit of model 1.5 was still unsatisfactory ($\chi^2(88)=172.53$, p=.007, CFI=.882, TLI=.859, RMSEA=.113, SRMR=.095). Even though CFI and TLI have moved into the acceptable area, the other indices still point towards a poor model fit.

Modification indices indicate that allowing item Q18 to also load on the Time Constraints construct (comp) might improve the model fit (MI=15.5). The item Q18 was "During the last month, how often have you felt nervous and stressed?". This is clearly related to the Stress, but not to the Time Constraints construct. It was thus decided that letting Q18 predict Time Constraints is not in line with the theory and will not be included in the model.

The next largest modification index was the suggestion to let the error variances of items Q19inv and Q20inv covary (MI=14.21). As they belong to the same scale and their content is sufficiently similar, it was decided to include this covariance in the analysis.

Model 1.6

```
path1_meas6 <- 'comp =~ Q11_TCS_1 + Q11_TCS_2 + Q11_TCS_3 + Q11_TCS_4 +
                   Q11_TCS_5 + Q11_TCS_6 + Q11_TCS_7
              stress =~ Q17 + Q18 + Q19inv + Q20inv + Q21 +
                   Q22inv + Q23inv + Q25


              #Covariances

              Q11_TCS_4 ~~ Q11_TCS_5
```

```
           Q19inv ~~    Q20inv'
```

In comparison to model 1.5 (AIC=2812.1, BIC=2886.3), model 1.6 (AIC=2799.0, BIC=2875.5) provided a significantly improved fit to the data ($\Delta\chi^2(1)$=15.09, p<.001).

The model fit of model 1.6 was still unsatisfactory ($\chi^2(87)$=157.44, p=.024, CFI=.902, TLI=.881, RMSEA=.104, SRMR=.092).

Modification indices suggested item Q18 to load on comp (MI=14.96) and the error variances of Q11_TCS_6 and Q11_TCS_7 to covary (MI=8.98). For theoretical reasons, it was decided to include the latter option into the model. As those two belong to the same scale and their content is sufficiently similar, it was decided to include this covariance in the analysis, even though the modification index is not the highest.

Model 1.7

```
path1_meas7 <- 'comp =~ Q11_TCS_1 + Q11_TCS_2 + Q11_TCS_3 + Q11_TCS_4 +
                 Q11_TCS_5 + Q11_TCS_6 + Q11_TCS_7

           stress =~ Q17 + Q18 + Q19inv + Q20inv + Q21 +
                 Q22inv + Q23inv + Q25


           #Covariances
           Q11_TCS_4 ~~ Q11_TCS_5
           Q19inv ~~   Q20inv
           Q11_TCS_6 ~~   Q11_TCS_7'
```

The inclusion of the covariance of items Q11_TCS_6 and Q11_TCS_7 lead to a significantly improved fit to the data ($\Delta\chi^2(1)$=8.97, p=.003), with relative fit indices of model 1.6 (AIC=2799.0, BIC=2875.5) and model 1.7 (AIC=2792.1, BIC=2870.9) slightly pointing in the same direction.

The model fit of model 1.7 was still unsatisfactory ($\chi^2(86)$=148.47, p=.039, CFI=.913, TLI=.893, RMSEA=.098, SRMR=.089). The CFI has passed the threshold for a good and the

SRMR for an acceptable model fit, nevertheless it was assessed whether the fit could still be improved.

The modification indices recommended three possible improvements: letting Q18 load on comp (MI=15.00), letting Q23inv load on comp (MI=8.51) or letting the error variances of Q20inv and Q21 covary (MI=8.20). Even though it was estimated to have the smallest model improvement out of the three, it was decided to include the covariance of Q20inv and Q21 in the model because letting an item load on a different construct can be considered a more significant model change that is not in line with theory.

Model 1.8

```
path1_meas8 <- 'comp =~ Q11_TCS_1 + Q11_TCS_2 + Q11_TCS_3 + Q11_TCS_4 +
                  Q11_TCS_5 + Q11_TCS_6 + Q11_TCS_7

            stress =~ Q17 + Q18 + Q19inv + Q20inv + Q21 +
                  Q22inv + Q23inv + Q25


            #Covariances
            Q11_TCS_4 ~~ Q11_TCS_5
            Q19inv ~~   Q20inv
            Q11_TCS_6 ~~   Q11_TCS_7
            Q20inv ~~ Q21'
```

The inclusion of the covariance of items Q20inv and Q21 lead to a significantly improved fit to the data ($\Delta\chi^2(1)$=9.53 p=.002), with relative fit indices of model 1.7 (AIC=2792.1, BIC=2870.9) and model 1.8 (AIC=2784.5, BIC=2865.6) slightly pointing in the same direction.

The model fit of model 1.8 was beginning to be acceptable ($\chi^2(85)$=138.93, p=.044, CFI=.925, TLI=.907, RMSEA=.92, SRMR=.088). As the Chi squared test indicated that the

model still differs significantly from the data, further model fit improvements were investigated.

The modification indices recommended three possible improvements: letting Q18 load on comp (MI=14.76) and letting Q23inv load on comp (MI=9.67). Item Q23inv was: „During the last month, how often did you have the feeling to have everything under control?" This was deemed sufficiently theoretically in line with the concept of Time Constraints, so it was decided to let Q23inv load on competition as well as stress.

Model 1.9

```
path1_meas9 <- 'comp =~ Q11_TCS_1 + Q11_TCS_2 + Q11_TCS_3 + Q11_TCS_4 +
                    Q11_TCS_5 + Q11_TCS_6 + Q11_TCS_7 + Q23inv
               stress =~ Q17 + Q18 + Q19inv + Q20inv + Q21 +
                    Q22inv + Q23inv + Q25


               #Covariances
               Q11_TCS_4 ~~ Q11_TCS_5
               Q19inv ~~   Q20inv
               Q11_TCS_6 ~~   Q11_TCS_7
               Q20inv ~~ Q21'
```

Letting item Q23inv load on comp lead to a significantly improved fit to the data ($\Delta\chi^2(1)$=11.24, p<.001), with relative fit indices of model 1.8 (AIC=2784.5, BIC=2865.6) and model 1.9 (AIC=2775.3, BIC=2858.7) slightly pointing in the same direction.

The model fit of model 1.9 was acceptable to good ($\chi^2(84)$=130.18 p=.101, CFI=.939, TLI=.924, RMSEA=.083, SRMR=.079). CFI, TLI, and SRMR indicate a good and RMSEA a medium fit to the data.

Unfortunately, Q23inv has, contrary to the theoretical expectation, a negative loading on comp (λ=-.51). This relationship between the item and the construct does conceptually not make sense. Hence, even though it had significantly improved the model fit, Q23inv cannot be included to predict competition.

In order to further improve the model fit, the modification indices of model 1.8 were reassessed. Other than the previously rejected loadings of Q18 and Q23inv on comp, there were no large modification indices. In an effort to improve model fit, small factor loadings were reassessed. With a standardized factor loading of λ=.317, the item Q22inv still had a small loading and was thus excluded from the analysis to check if it may improve model fit.

Model 1.10

```
path1_meas10 <- 'comp =~ Q11_TCS_1+ Q11_TCS_2 + Q11_TCS_3 + Q11_TCS_4+
                 Q11_TCS_5 + Q11_TCS_6 + Q11_TCS_7
         stress =~ Q17 + Q18 + Q19inv + Q20inv + Q21 +
                 Q23inv + Q25


         #Covariances
         Q11_TCS_4 ~~ Q11_TCS_5
         Q19inv ~~   Q20inv
         Q11_TCS_6 ~~   Q11_TCS_7
         Q20inv ~~ Q21'
```

Excluding item Q22inv lead to a significantly improved fit to the data ($\Delta\chi^2(13)$=22.53, p=.048), with relative fit indices of model 1.8 (AIC=2784.5, BIC=2865.6) and model 1.10 (AIC=2626.7, BIC=2703.2) slightly pointing in the same direction.

The model fit of model 1.10 was acceptable ($\chi^2(72)$=116.40, p=.061, CFI=.937, TLI=.920, RMSEA=.091, SRMR=.085). CFI and TLI indicated a good and SRMR and

RMSEA indicated a medium fit to the data. The Chi Squared showed that the model does not actually significantly differ from the data.

In order to further improve the model fit, the modification indices were assessed. Other than the previously rejected loadings of Q18 and Q23inv on comp, there were no large modification indices. All remaining factor loadings were larger than $\lambda=.50$. It was thus decided that, even though the model fit is not ideal, it will be accepted.

Model 1.10 was accepted as the final measurement model for path 1.

Appendix E

Report of measurement model improvement for model 2

Model 2.1

```
path2_meas1 <- 'ident =~ Q26 + Q27 + Q28 + Q29 + Q30 + Q31 + Q32 + Q33 +
Q34

              inter =~ Q52 + Q53 + Q54 + Q55 + Q56'
```

The model fit of the initial measurement model for path 2 was poor ($\chi^2(76)$=169.18, p=.002, CFI=.843, TLI=.812, RMSEA=.128, SRMR=.090).

The model was assessed for item exclusion, but all items showed high factor loadings (λ>.05). Thus, the modification indices for the model were assessed. They strongly indicated to include the covariance of error variances of items Q27 and Q28 in the model.

Model 2.2

```
path2_meas2 <- 'ident =~ Q26 + Q27 + Q28 + Q29 + Q30 + Q31 + Q32 + Q33 +
Q34

              inter =~ Q52 + Q53 + Q54 + Q55 + Q56
              Q27 ~~ Q28'
```

Including the covariance of Q27 and Q28 lead to a significantly improved model fit ($\Delta\chi^2(1)$=39.73, p<.001), with relative fit indices of model 2.1 (AIC=2548.0, BIC=2615.2) and model 2.2 (AIC=2510.2, BIC=2579.8) slightly pointing in the same direction.

Model 2.2 showed a borderline acceptable fit ($\chi^2(75)$=129.44, p=.058, CFI=.908, TLI=.888, RMSEA=.098, SRMR=.083). The CFI indicated a good, TLI and SRMR indicated a medium fit and RMSEA indicated a poor fit. The Chi squared test was still marginally significant, so it was investigated whether the model fit of the measurement model could be improved further.

Modification indices were assessed for substantial model fit improvements. The largest modification index suggested to include the covariance of error variances of items Q52 and Q53.

Model 2.3

```
path2_meas3 <- 'ident =~ Q26 + Q27 + Q28 + Q29 + Q30 + Q31 + Q32 + Q33 +
Q34

                inter =~ Q52 + Q53 + Q54 + Q55 + Q56

                Q27 ~~ Q28

                Q52 ~~ Q53'
```

Including the covariance of Q52 and Q53 lead to a significantly improved model fit ($\Delta\chi^2(1)$=10.99, p<.001), with relative fit indices of model 2.2 (AIC=2510.2, BIC=2579.8) and model 2.3 (AIC=2501.3, BIC=2573.1) slightly pointing in the same direction.

Model 2.3 showed an acceptable fit ($\chi^2(74)$=118.45, p=.108, CFI=.925, TLI=.908, RMSEA=.089, SRMR=.082). The CFI, TLI, and Chi Squared test indicated a good fit, the SRMR indicated a medium fit and RMSEA indicated a poor fit to the data.

Still, it was deemed that the model still had room for improvement. After assessment of the modification indices, it was decided to include the covariance of the error variances of items Q26 and Q34 in the model (MI=9.83).

Model 2.4

```
path2_meas4 <- 'ident =~ Q26 + Q27 + Q28 + Q29 + Q30 + Q31 + Q32 + Q33 +
Q34

                    inter =~ Q52 + Q53 + Q54 + Q55 + Q56

                    Q27 ~~ Q28

                    Q52 ~~ Q53

                    Q26 ~~ Q34'
```

Including the covariance of Q26 and Q34 lead to a significantly improved model fit

$(\Delta\chi^2(1)=11.84, p<.001)$, with relative fit indices of model 2.3 (AIC=2501.3, BIC=2573.1) and

model 2.4 (AIC=2491.4, BIC=2565.6) slightly pointing in the same direction.

Model 2.4 showed a medium to good model fit ($\chi^2(73)=106.61$, p=.191, CFI=.943,

TLI=.929, RMSEA=.078, SRMR=.080). The CFI, TLI, SRMR, and Chi Squared test

indicated a good fit, the RMSEA indicated a medium fit.

This model fit was deemed sufficient and model 2.4 was accepted as the measurement

model for path 2.

Appendix F

Table of standardized factor loadings

Item	Model 1		Model 2		Joint Model	
	Factor loading	R^2	Factor loading	R^2	Factor loading	R^2
Participation						
Q47	1.000		1.000		1.000	
Time Constraints		.000				.000
Q11_TCS_1	.783				.783	
Q11_TCS_2	.845				.845	
Q11_TCS_3	.821				.821	
Q11_TCS_4	.735				.735	
Q11_TCS_5	.784				.784	
Q11_TCS_6	.667				.667	
Q11_TCS_7	.684				.684	
Stress		.482				.482
Q17	.796				.796	
Q18	.678				.678	
Q19inv	.759				.759	
Q20inv	.548				.546	
Q21	.823				.824	
Q23inv	.654				.653	
Q25	.787				.786	
Identification				.261		.261
Q26			.651		.651	
Q27			.683		.683	
Q28			.717		.717	
Q29			.706		.706	
Q30			.520		.520	
Q31			.722		.722	
Q32			.872		.872	
Q33			.763		.762	
Q34			.809		.809	
Interaction				.128		.128
Q52			.665		.665	
Q53			.620		.620	
Q54			.839		.839	
Q55			.806		.806	
Q56			.824		.824	
Persistence		.039		.066		.106
Q7	1.000		1.000		1.000	

Note. All items load significantly on their respective constructs (p<.001).

Appendix G

Results of CFAs (maximum likelihood estimation)

	B	SE	p	beta
Model 1				
Time Constraints ~ Participation	0.00	0.12	.982	.00
Stress ~ Time Constraints	0.48	0.09	<.001	.69
Persistence ~ Stress	-3.36	2.04	.099	-.20
Indirect Effect 1	0.00	0.17	.982	.00
Model 2				
Interaction ~ Participation	0.17	0.07	.021	.38
Identification ~ Interaction	0.52	0.17	.002	.51
Persistence ~ Identification	4.74	2.28	.037	.26
Indirect Effect 2	0.41	0.22	.060	.05
Joint Model				
Time Constraints ~ Participation	0.00	0.11	.984	.00
Stress ~ Time Constraints	0.48	0.08	<.001	.69
Interaction ~ Participation	0.17	0.07	.021	.36
Identification ~ Interaction	0.52	0.17	.002	.51
Persistence				
~ Stress	-3.37	2.05	.100	-.20
~ Identification	4.74	2.26	.036	.26
Indirect Effect 1 (Stress)	0.00	0.17	.984	.00
Indirect Effect 2 (Identification)	0.41	0.22	.055	.05

Appendix H

Results of CFAs (Bollen-Stine bootstrap estimation)

	B	SE	P	beta
Model 1				
Time Constraints ~ Participation	0.00	0.11	.983	.00
Stress ~ Time Constraints	0.48	0.10	<.001	.69
Persistence ~ Stress	-3.36	2.21	.127	-.20
Indirect Effect 1	0.00	0.21	.985	.00
Model 2				
Interaction ~ Participation	0.17	0.07	.016	.36
Identification ~ Interaction	0.52	0.20	.008	.51
Persistence ~ Identification	4.74	2.44	.052	.26
Indirect Effect 2	0.41	0.24	.089	.05
Joint Model				
Time Constraints ~ Participation	0.00	0.10	.984	0.00
Stress ~ Time Constraints	0.48	0.10	<.001	.69
Interaction ~ Participation	0.17	0.07	.016	.36
Identification ~ Interaction	0.52	0.19	.006	.51
Persistence				
~ Stress	-3.37	2.19	.124	-.20
~ Identification	4.74	2.67	.074	.26
Indirect Effect 1 (Stress)	0.00	0.20	.986	.00
Indirect Effect 2 (Identification)	0.41	0.25	.091	.05

Appendix I

Declaration of own work

I hereby affirm that the thesis at hand is my own written work and that I have used no other sources and aids other than those indicated. All passages, which are quoted from publications or paraphrased from these sources, are indicated as such.

Groningen, 05.07.2024

Tabea Kahlstatt