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Protecting the commons: Predictors of willingness to mitigate communal land degradation
among Maasai pastoralists

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Abstract

Extensive land degradation is a global problem that presents a critical threat to pastoralists' welfare in East Africa and beyond. Although the reasons for this environmental problem are complex, it is likely to be exacerbated by communal land management practices that have become suboptimal due to changes in land access and population growth. In the present paper we make initial steps towards addressing the problem by exploring socio-psychological predictors of willingness to protect communal land from degradation among Maasai pastoralists in Northern Tanzania. Based on the social identity approach and existing evidence for the role of group processes in pro-environmental action, we have developed and tested a path model predicting willingness to protect communal land. The results demonstrate that community identification is linked to willingness to act via perceived development of action-consistent group and personal norms. In addition, multiple groups analysis demonstrated a number of gender differences within the model. The results are broadly consistent with the existing social identity models of pro-environmental action, extending them into a novel context, and offering practical implications for addressing the issue of pastoralist land degradation.

Keywords: Soil erosion; Group processes; Community identification; Group norms; Communal resources; Pro-environmental action.

Land degradation is a critical environmental problem that affects many areas across the world. According to a recent report by the UN Food and Agriculture Organization, its economic cost can be estimated at 17% of global GDP (UNCCD, 2017), with approximately one third of the planet's land being affected. In addition to economic costs, land degradation has a significant impact on resilience and wellbeing of many communities whose livelihoods are strongly connected to land's health through agriculture and pastoralism (e.g., Borelli et al., 2017; Pimentel, 2006). It appears vital to address the challenge of land degradation, especially in the areas of the world where it represents an immediate threat for populations' health and food security. While a considerable effort has been made in the past to understand physical processes behind land degradation (Blaikie & Brookfield, 2015; Ionita, Fullen, Zgłobicki, & Poesen, 2015; Valentin, Poesen, & Li, 2005), there is less research exploring interactions between communities that occupy the affected areas and their environment (e.g., Ananda & Herath, 2003; Boardman, Poesen, & Evans, 2003), and almost no research addressing socio-psychological aspects of such interactions (Rabinovich et al., 2019). At the same time, understanding these is crucial, since communal land management plays a significant role in mitigating degradation processes (Wynants et al., 2019). The present paper aims to address this gap by exploring group processes that predict communities' willingness to take action to protect their land from increasing degradation in the Monduli district of Northern Tanzanian – an area strongly affected by soil erosion.

Context: Soil erosion in Northern Tanzania

The Monduli district is situated in the North of Tanzania (Figure 1), with Maasai pastoralists representing a significant proportion of the population. This area is strongly susceptible to soil erosion due to its geological and geomorphological characteristics, more

recently exacerbated by climate change, with higher intensity rains and more severe droughts (Nicholson, 2014; IPCC, 2012). In the past, Maasai pastoralists have developed socio-ecological systems that allowed them to thrive in these dry rangelands and have remained sustainable for centuries (Davies & Nori, 2008; Little, 2003). These systems were based on communal access to vast expanses of land and ability to move freely across these: Traditionally, pastoralists followed the rainfall with their herds, without remaining in any one place for a long time. Relatively low population rates and unrestricted access to large territories meant that the pressure on grazing land remained spread, allowing the soil to recover (e.g., Niamir-Fuller, 2000).

In the recent decades, however, several social and economic changes have taken place in the area that have put pastoralist socio-ecological systems under strain. In particular, large areas of land have been converted into commercial farms, wildlife conservation areas, or state military training bases (Wynants, Solomon, Ndakidemi, & Blake, 2018). This restricted Maasai pastoralists' mobility, locking communities within smaller areas and reducing their ability to respond to environmental stressors (such as droughts) in a resilient way (e.g., Agrawal & Redford, 2009; Hughes, 2006; Rangarajan & Shahabuddin, 2006; Wynants et al., in 2019). Coinciding with exponential population growth, these changes have increased the grazing pressure on the rangelands that remain accessible to pastoralists, leading to overgrazing and soil disturbance that make soils vulnerable to erosion. Previous work in the Monduli district demonstrated that there are very significant signs of soil erosion in the area (Blake et al., 2018), with gully formation threatening pastoralists' livelihoods and safety of animals and children (Rabinovich et al., 2019). Currently, there are no centralized programmes aiming to mitigate this issue, although communities receive training and support in sustainable agriculture methods from the local Council.

In response to changing land access, important transformations have also been taking place with respect to land ownership rules. Traditionally, mobile pastoralist tribes had communal access to large areas of land. With mobility becoming restricted, many households are now adopting a more settled way of life, with crop-growing activity supplementing cattle raising and taking place on permanently occupied pieces of land (Western, Groom, & Worden 2009). This change in practice has led to the development of a mixed land ownership system, where some (agricultural) land belongs to individual households, while most of the (pastoral) land remains in communal ownership. It is these communally owned areas that show the most significant signs of erosion.

While soil erosion is partly driven by geological characteristics of the land and more extreme weather events, land management practices also play a significant role. In particular, overgrazing (that destroys vegetation cover, making soil vulnerable to sheet erosion) and intensive cattle tracking along the emerging gullies have been argued to contribute to soil erosion (Blake et al., 2018). Although pastoralist systems remained sustainable for a long time (when mobility and land access remained unrestricted), some practices may become counterproductive in the changing environment, undermining stability of the communal land. Adjusting the approach to land management to ensure continuous sustainability requires communities' willingness to take action to protect the shared areas, despite the fact that individual interests may now be focused on privately owned land. It is, thus, necessary to understand what parameters facilitate or undermine this willingness to act to protect communally shared land from further degradation.

Pastoralist land management as a commons dilemma

It may be useful to frame the challenge of sustainable land management in the above context as a commons dilemma (Hardin, 1968, for general reviews see Messick & Brewer, 1983; Van Lange, Baillet, Parks, & van Vugt, 2014). This term refers to a situation where a shared resource (e.g., communal land) can be accessed without restriction by all community members, who have a choice of maximizing their individual benefit (e.g., by increasing the size of the herd grazing the pasture) or maximizing collective benefit (e.g., by ensuring pasture sustainability for everyone's use). If most community members choose the former strategy, the resource is likely to become depleted (e.g., the land will become vulnerable to erosion). However, since each household's contribution to the land's health is not obvious, the incentive to maximize individual pay-offs is strong. In a longer run, decisions beneficial to individual households (such as maintaining larger herds or not contributing to efforts to fill the existing gullies) will be detrimental for the community as a whole (e.g., land becoming unsuitable for grazing due to erosion). While some communities find solutions to manage commons dilemmas successfully (as many pastoralists societies do), others may struggle to achieve the balance between individual and collective benefit (cf. Ostrom, 2015). Observations suggest that the changes to land availability and ownership described above may have created a commons dilemma that has not so far been successfully resolved (Rabinovich et al., 2019).

The role of group processes in addressing the dilemma of communal land management

Previous research has identified a number of parameters that increase willingness to make cooperative choices in commons dilemmas generally (see van Lange et al., 2013 for a full review), as well as contribute to willingness to engage in sustainable action in response to environmental dilemmas (e.g., Gardner & Stern, 2003 for an overview). While much of this work focused on individual-level predictors (e.g., values, van der Werff, Steg, & Keizer, 2013;

social value orientation, Balliet, Parks, & Joireman, 2009; attitudes, Vining & Ebreo, 1992), recently there has been a growing understanding that taking into account group-level processes is crucial for explaining environmentally sustainable action (Fielding & Hornsey, 2016; Fritsche et al., 2018; Postmes, Rabinovich, Morton, & Van Zomeren, 2014). It has been argued that in order to successfully resolve shared resource dilemmas (such as care for global or local environments), social contexts need to be addressed, because individual responses are ultimately constrained by them (Rabinovich et al., 2012).

In the present paper we suggest that a focus on group processes would be particularly beneficial for addressing environmental social dilemmas of the kind that Maasai pastoralists are facing. Exploring group-level predictors of willingness to protect shared land is important for a number of reasons. First, cooperative behaviour in this context requires collective (rather than individual) action – i.e., only collective regulation of grazing and collective planting efforts (as opposed to actions by single individuals) could make a difference. Second, resolving the soil erosion dilemma requires individuals to think in terms of extended (rather than individual) self – in particular, the benefits of cooperation become personally relevant only when one's self concept is extended to include one's community, cultural and ethnic group, and future generations (cf. Postmes et al., 2014). These are the features that the present context shares with environmental dilemmas across the world (see Fritsche et al., 2018), which makes it a relevant model for understanding environmentally sustainable behaviour more generally. In addition to these, there are also cultural features that make group processes particularly relevant to our study context. Specifically, Maasai culture is characterized by interdependence, a prominent role of collective decision-making (even if not all community segments are equally represented), and strong expectations that individuals should act in line with norms corresponding to their social

roles (e.g., Spear & Waller, 1993). Recent research by Eom and colleagues (2019) suggests that in cultural contexts that prioritize social motives, group processes may become particularly strong predictors of environmentally sustainable action. Given the emphasis of the Maasai culture on social roles and relationships, it seems likely that group processes may play a prominent role in governing individual land management choices.

Social identity framework in application to environmental dilemmas

One theoretical framework that provides a basis for studying group processes in the context of environmental dilemmas is the social identity approach (Reicher, Spears & Haslam, 2010; Tajfel & Turner, 1979; Turner et al., 1987). According to it, the self includes a personal and a collective levels of self-definition. At the former level, individuals identify themselves in relation to unique individual qualities they possess, while at the latter, the self is defined in terms of one's membership in important social groups – i.e., in terms of salient social identities. When a particular group membership becomes salient, the relevant social identity is activated, and individuals' attitudes and actions become guided by the group prototype (i.e., perceived central features of the group). This process of self-stereotyping ensures alignment between actions of individual group members and is thought to be the basis for group-based action (e.g., Hogg & Turner, 1987). In addition, salient group identities are expected to motivate action that benefits the group by increasing the priority of group-level outcomes (Simpson, 2006). Both of these processes (self-stereotyping and prioritizing collective goals) could be expected to motivate sustainable care for group-shared resources.

Previous research has suggested a number of models that specify how exactly group identification (i.e., a sense of belonging to a particular group) is linked to willingness to act collectively for the benefit of that group. For example, van Zomeren and colleagues (2008)

suggested a Social Identity Model of Collective Action (SIMCA), according to which group identification increases group members' efficacy (a perception that collective goals can be successfully achieved) and a sense of injustice (a belief that one's group is not treated fairly), which, in turn, motivate collective action. Thomas and colleagues (2009) suggested an alternative sequence of processes, where group identification is organically developed in the process of interaction and is driven by shared efficacy and outrage. According to their Encapsulated Model of Social Identity in Collective Action (EMSICA), it is this sense of group identification that drives collective action. While both SIMCA and EMSICA provide strong theorizing for the relationship between group identification and collective action, they were primarily developed for contexts related to intergroup injustice and conflict and, as a result, may be hard to apply to environmentally sustainable behaviour in their full form. Environmental action is often required in response to threats that are not (directly) related to intergroup conflict, and addressing these threats may not always involve political action directed at restoring justice. It seems, therefore, that while collective efficacy may play an important role in connecting group identification and willingness to protect shared natural resources, perceived injustice may be a less relevant process for (some) environmental dilemma contexts.

In response to these limitations, Fritsche and colleagues (2018) suggested a Social Identity Model of Pro-Environmental Action (SIMPEA). Drawing on rich empirical evidence, this model proposes that group identification, group norms, and collective efficacy have a combined effect on both appraisals of environmental crisis and responses to it. In addition, crisis appraisals elicit individual- and group-level emotions and motivations that, in turn, shape strength of ingroup identification and content of group norms. From our perspective, one of the crucial contributions of this model is its acknowledgement of the central role of group norms (in

interaction with group identification) in predicting environmental sustainability, and combining this key principle of the social identity approach with the role of collective efficacy derived from the earlier models of collective action.

In the present paper we build on the theoretical approaches reviewed above to synthesize their insights, apply them to the context of pastoralist land management, and propose a predictive model of group processes that contribute to willingness to protect communal land from soil erosion. Below we describe specific paths that our model suggests, and briefly outline empirical evidence that supports these predictions.

Predicting willingness to care for communal land

Based on the social identity framework outlined above, it could be expected that willingness to care for shared environmental resources would be linked to a high level of identification with a group sharing these resources. Indeed, it has been demonstrated that experimentally enhanced group identification leads to more significant contributions to a shared resource in a laboratory context (Wit & Kerr, 2002; see also De Cremer & Van Vugt, 1999). Similarly, Rabinovich and Morton (2011) showed that willingness to protect a shared natural resource (coastline) was increased for participants who experienced a higher sense of connection with a meaningful social group (region; see also Heath et al., 2017 for similar findings in an urban context), and Bamberg, Rees, and Seebauer (2015) provided evidence for the role of group identification in motivating environmental collective action. There is also consistent evidence from non-Western cultures that demonstrates that processes linked to group identification strengthening (such as frequent communication) lead to increased cooperation (e.g., Amirova, Petrick, & Djanibekov, 2019; Cardenas, Ahn, & Ostrom, 2004; Molinas, 1998; Truelove, Carrico, & Thabrew, 2015). A similar relationship could be expected in the context of the present

study – i.e., strongly identified members of pastoralist communities would be more willing to invest efforts into protecting their communal land from degradation than weakly identified ones.

There are a number of processes that are suggested to mediate the relationship between group identification and willingness to take action in order to protect shared resources. According to the theoretical models described above, one of these is collective efficacy (i.e., a perception that one's group is capable of mobilizing action to achieve its aims). There is extensive evidence that strong group identification is associated with higher perceptions of group's ability to achieve its goals in collective action contexts (e.g., Thomas, Mavor, & McGarty, 2012; Van Zomeren et al., 2008; Van Zomeren, Postmes, & Spears, 2004). In turn, collective efficacy has been shown to affect willingness to take collective action: Believing that one's group can be successful makes individual group members feel that their effort will be worthwhile, which motivates action (Miller, Cronin, Garcia, & Branscombe, 2009; Van Zomeren et al., 2008). Moreover, collective efficacy is a powerful predictor of willingness to cooperate in social dilemmas, mediating the effects of other variables, such as group size and identification (Kerr, 1996), and its relevance has been demonstrated in the environmental sustainability domain (e.g., Bamberg, Rees, & Seebauer, 2015). The relevance of efficacy perceptions for participation in community action (in particular, decision-making) has also been shown in non-Western contexts (e.g., Breuer & Asiedu, 2017). Applying these insights to the present context, it could be predicted that community identification will be associated with willingness to protect communal land via increased perceptions that the community is capable of dealing with the soil erosion problem successfully (i.e., collective efficacy).

Another process that can be expected to mediate the relationship between group identification and willingness to cooperate around shared resources is perceived social support.

According to the social identity framework, social support is one of the key psychological resources that cohesive groups provide to their members, and it plays a crucial role in strengthening collective well-being and resilience (Jetten, Haslam, & Haslam, 2012; Haslam et al., 2005). Previous research suggests that when group members feel strongly connected to each other, they are likely to feel supported and to believe that other group members will offer support in case of need (e.g., Avanzi et al., 2018; Haslam et al., 2011). This should lead to increased trust (Dirks & Ferrin, 2002; Tanis & Postmes, 2005), which in the context of shared resources translates into confidence that one's contributions will not be exploited (e.g., De Cremer, 1999; Ferrin, Bligh, & Kholes, 2008) and strengthens willingness to contribute to collective goals. Trust has been demonstrated to play a central role in cooperation. For example, Orbell, van de Kragt, and Dawes (1988) showed that trust in other group members (developed as a result of promise-making) increases cooperation rates in a social dilemma. Similarly, De Cremer, Snyder, and Dewitte (2001) demonstrated that individuals low in trust were significantly less likely to behave in a cooperative way, unless they were placed in a situation of high accountability. In international development contexts, trust and contributions to community projects were demonstrated to change in parallel as a result of empowerment interventions (Janssens, 2010). Despite many similarities between social dilemmas and environmental sustainability contexts, the existing models of collective environmental action do not account for the role of trust. To compensate for this limitation, and in line with the existing evidence for the role of trust in cooperation (e.g., Orbell, van de Kragt, & Dawes, 1988), we propose that in the context of shared environmental resources trust in other group members could promote sustainable resource use. In relation to pastoralist land degradation, it could be expected that community identification

will be linked to willingness to protect communal land through the perception of being supported by, and consequently, trusting in other community members¹.

Finally, in line with the social identity theorizing, the relationship between group identification and willingness to contribute to a shared resource can also be mediated through corresponding group norms. Existing work within the social identity approach has demonstrated that strongly identified group members perceive their group norms to be more environmentally friendly (as compared to weak-identifiers, Masson, Jugert, & Fritsche, 2016), and that an increase in group cohesion over time is associated with developing more cooperative norms (Chatman & Flynn, 2017). In addition, a number of arguments have been put forward suggesting that cooperative norm formation is crucial for cooperation in social dilemma contexts (e.g., Biel & Thøgersen, 2007; Bicchieri, 2002). Indeed, empirical research supports this suggestion, demonstrating that achieving cooperative consensus and internalizing corresponding cooperative norms are essential for making decisions that maximize collective (rather than individual) benefit (Kerr et al., 1997; Orbell et al., 1988). The relevance of group norms for motivating sustainable resource use has also been demonstrated in field contexts related to over-consumption of environmental resources (Goldstein, Cialdini, & Griskevicius, 2008; Schultz et al., 2007), including agricultural practice (Fielding et al., 2008), and its adaptation to climate change in non-Western contexts (Tozier de la Poterie, Burchfield, & Carrico, 2018; Truelove et al., 2015).

According to the self-categorization framework and the SIMPEA model (Fritsche et al., 2018), group identification may not only promote formation of cooperative norms, but also moderate their impact on corresponding action – specifically, highly identified group members should be more likely to act in line with group norms than low-identifiers (Tajfel & Turner, 1986). This suggestion has received ample support in empirical research (e.g., Jetten, Postmes, &

McAuliffe, 2002; Schofield et al., 2001). In relation to environmentally sustainable behaviour in particular, it has been demonstrated that identification with a salient group moderates the effect of this group's norms on sustainable choices (e.g., recycling, Terry, Hogg, & White, 1999), and that self-investment aspects of identification play a central role in this moderation process (Masson & Fritsche, 2014). On the basis of this previous work, in the context of communal land management, it could be predicted that community identification and group norms supportive of land protection will relate to willingness to take action in two ways: First, identification will increase willingness to act by strengthening cooperative and sustainable social norms, and, second, community identification will moderate the relationship between land protection norms and willingness to act in such a way, that norms will be more strongly related to corresponding action for high- (rather than low-) identifiers.

Present research

Previous research, as reviewed above, suggests that cooperative choices ensuring sustainable resource use are linked to high levels of identification with a group sharing the resource. Group identification motivates contributions to and responsible management of shared resources by increasing perceived social support and trust in fellow group members, facilitating development of cooperative group norms, and strengthening collective efficacy beliefs. We expect that the above processes may be related to willingness to protect communal land directly, as well as through personal norm. The concept of personal norm is derived from the norm activation (Schwartz & Howard, 1981) and the value-belief-norm theories (Stern, 2000), and refers to a sense of moral obligation to act in particular way. It is a prominent construct in research on environmental sustainability, having been demonstrated to be significantly related to pro-environmental behaviour (Harland, Staats, & Wilke, 1999), such as transport choices

(Bamberg, Hunecke, & Blöbaum, 2007; Eriksson, Garvill, & Nordlund, 2006). A comprehensive meta-analysis by Klöckner (2013) confirmed that personal norm of environmental sustainability is significantly linked to pro-environmental intentions, and is affected by social norms and perceived behavioural control (a construct close to efficacy). On the basis of this evidence, we expect that a personal norm consistent with communal land protection (e.g., a sense of duty and moral obligation to protect the land) may be linked to willingness to take land-protective action and be predicted by the same group processes (corresponding group norms, efficacy, and trust). The overall model summarizing these relationships is presented in Figure 2. We aim to test the proposed model in the context of managing communal land degradation among Maasai pastoralists in the Monduli district.

In addition to testing the predicted model, we also intend to conduct exploratory analysis by comparing the strength of links within the model for female and male participants. There are significant gender differences in daily lives of women and men in Maasai communities. These include daily activities and responsibilities, access to resources, opportunities for participating in collective decision-making, land ownership rights, and traditional perceptions of status (Spear & Waller, 1993; Talle, 2003). Gender is a very salient social category, and there seems to be significantly more interaction within (rather than between) gender groups. Given this, it could be possible that women's and men's intentions to take action to mitigate soil erosion may be affected by the suggested predictors to a different extent – for example, since women are strongly expected to conform to social expectations, their actions could be guided by community norms to a larger extent. In addition to contributing to further refinement of the theoretical model, understanding gender differences would also be important from a practical point of view, allowing future steps to be tailored to different gender groups. Since, to our knowledge, this is

the first social psychological study that explores gender differences within Maasai communities, we do not make specific predictions and treat the analysis as exploratory.

Method

Participants and design

The study used a survey design. The target population was Maasai pastoralist communities living in the Monduli district of Northern Tanzania. Minimum planned sample size was estimated by using the rule-of-thumb of ten participants per estimated parameter of the proposed model (Byrne, 2010). We overrecruited above this minimum to adjust for no-shows on the day and incomplete responses. The sample consisted of 297 participants (63.9% men, mean age = 36.01, $SD = 11.97$) from eight pastoralist communities². Eleven questionnaires contained a large proportion of missing values and were excluded from the analysis. The participating communities were randomly selected from the list of villages meeting the following criteria: location within the Monduli district, Maasai population, use of communally shared land, presence of soil erosion on the community land, and geographical accessibility. Data collection was conducted in collaboration with local partners (a local University and the district Council), who have established a strong relationship with the local communities. Within each community, participants were recruited with the help of the village leaders (consulted by the local partners before the start of the project), who were asked to invite for participation a mix of community members, ensuring representation of both genders, different age groups, and occupations. Participants were not required to be able to read, and research assistants completed questionnaires verbally with those who needed assistance (a small proportion of participants).

Materials and procedure

Materials were developed in English, translated into Swahili, and back-translated into English to ensure a precise retention of meaning. Several adjustments were made to the phrasing of the items following a comparison of the original and back-translated versions.

Within each community, the data were collected in one session in a village hall. Completing the questionnaire took about 20 minutes, and an effort was made to ensure participants did not communicate during this time. The study was presented to participants as a survey on their opinions about soil erosion and relationships within their community. A considerable effort was made to reduce the length of the questionnaire. Insights from the previous qualitative research in the same area (Rabinovich et al., 2019) were used to adapt the measures (e.g., one of the items measuring social support was re-phrased to match the language that participants in the earlier research used, and sensitive phrasing was used in the items measuring willingness to reduce herd size). Unless stated otherwise, participants responded to all items on a five-point Likert scale (1 = “strongly disagree”, 5 = “strongly agree”). Items within each scale were averaged to compute a single score. Demographic data were collected in the beginning of the questionnaire, followed by the measures listed below.

Community identification was measured with two items adapted from Cameron (2004): “I have strong relationships with other people in my community” and “I am happy about being a member of my community” ($r=.423, p<.001$). Two items adapted from Zimet, Dahlem, Zimet, and Farley (1988) were used to measure social support: “If I need help or support with anything, I can always get it from people in my community” and “I have good cooperation from people in my community when I need it” ($r=.596, p<.001$). Collective efficacy in dealing with erosion was measured using two items: “As a community, there are actions we can take to prevent soil

erosion” and “I am confident that, as a community, we can manage land well to prevent further soil erosion” ($r=.363, p<.001$). Two items were designed to measure trust in the community: “People in my community can be trusted” and “Most people within my community can be counted on to do what they say they will do” ($r=.674, p<.001$).

Following this, we measured perceived cooperative group norms and intentions to take cooperative action. Items measuring these concepts focused on the types of action that would promote collective (rather than individual) interest, such as reducing one’s herd size or investing effort into gully restoration. Seven items were developed to measure perceived social norms related to taking action to protect communal land from soil erosion (e.g., “Most people in my community think that we should change our ways to help stop soil erosion on our land”, “Most people in my community think that cattle stock planning and reducing herd size to prevent soil erosion is a good idea”, “Most people in my community think that planting grasses and trees to prevent soil erosion is a good idea”, $\alpha = .816$). Seven corresponding items were used to measure intentions to take action (e.g., “I will make changes to how I run my household in order to stop soil erosion”, “I am willing to reduce the size of my herd to reduce grazing and help the land to restore”, “I will take part in planting grasses and trees to fix the gullies”, $\alpha = .806$). Personal norm to take action on soil erosion was measured with a single item “It is my duty to do whatever I can to prevent soil erosion”³.

After completing the questionnaire, participants were thanked and a short illustrated talk on the physical processes behind soil erosion was given. Participants then had an opportunity to ask questions and engage in a discussion, and were compensated for their time. The whole session lasted for 1.5-2 hours, depending on participants’ interest in the discussion. The study was approved by the departmental Ethics Committee.

Results

Means, standard deviations, and bivariate correlations for all variables are shown in Table 1⁴.

To test the overall model fit we conducted a path analysis with Mplus 8 software (Muthén & Muthén, 2017) using maximum likelihood estimator with robust standard errors. Interdependence of observations within communities was accounted for by creating seven dichotomous variables coding village membership and including these as covariates in all analyses (cf. McNeish & Stapleton, 2016).

Testing of the initially suggested model (Figure 2) demonstrated that it did not fit the data very well: $\chi^2(9) = 21.69, p = .010$, CFI = 0.97, TLI = 0.78, RMSEA = .07, 90% CI [.03; .11], SRMR = .03. While the chi-squared could be inflated by the large sample size, and CFI and SRMR fit indices indicate good fit, the TLI and RMSEA indices (that penalize complex models) suggest that the model needs to be modified.

We have made a number of simplifications to the model, removing non-significant direct links between identification and trust, trust and intentions, efficacy and personal norm, and trust and personal norm, and a correlation link between efficacy and trust. In addition, based on the modification indices, we added a correlation link between social support and group norms. No direct links were added to the model. The modified model fit the data well: $\chi^2(12) = 15.29, p = .226$, CFI = 0.99, TLI = 0.96, RMSEA = .03, 90% CI [.00; .07], SRMR = .02, see Figure 3. Analysis of the indirect effects demonstrated that there was a significant indirect link between community identification and intentions via group norms ($\beta = .08, SE = .03, p = .003$), a significant indirect link between community identification and personal norm via group norms ($\beta = .04, SE = .02, p = .033$), and a significant indirect link between community identification and

intentions via personal norm ($\beta = .14$, $SE = .04$, $p < .001$). There was a marginally significant two-step link between identification and intentions via group norms and personal norm ($\beta = .01$, $SE = .01$, $p = .063$). The indirect effect of community identification on intentions via efficacy did not reach statistical significance ($\beta = .04$, $SE = .03$, $p = .106$). Indirect effects via trust could not be tested since trust was not significantly linked to any of the outcomes.⁵

Interaction between community identification and norms

It was predicted that there would be a significant interaction between community identification and perceived norms on intentions to protect communal land. The data supported this suggestion in principle: $\beta = -.20$, $SE = .06$, $p = .001$. However, the specific nature of the interaction was different from what was predicted. The simple slopes analysis demonstrated that community identification was positively linked to intentions at a low level of group norms ($b = .21$, $SE = .06$, $p < .001$), but not at a high level of group norms ($b = -.06$, $SE = .06$, $p = .263$). Decomposing the interaction differently, the analysis showed that group norms were significantly linked to intentions to act at a low level of community identification ($b = .38$, $SE = .07$, $p < .001$), while this link was weaker at a high level of community identification ($b = .14$, $SE = .06$, $p = .024$). This demonstrates that low-identifiers were more likely to take action when they perceived that community norms approved of such action (rather than when they perceived no such approval), while high-identifiers were affected by perceived norms to a smaller extent (see Figure 4).

Multiple groups analysis

We conducted an exploratory multiple groups analysis of the modified model to compare the strength of the links between individual variables for female and male participants. To achieve this, we ran a number of analyses where we constrained one link at a time to be equal for

participants of both genders, and compared the fit of each constrained model to the fit of the unconstrained model where all links were allowed to vary across gender groups. Satorra-Bentler scaled chi-square difference test was used (Bryant & Satorra, 2012).

The unconstrained multiple groups model demonstrated good fit on CFI and SRMR fit indices, and poorer fit on TLI and RMSEA indices that penalize complex models: $\chi^2(24) = 38.80$, $p = .029$, CFI = 0.97, TLI = 0.84, RMSEA = .07, 90% CI [.02; .10], SRMR = .03. Table 2 summarizes the results for all constrained models. It demonstrates that only two links could be considered to be equal across genders (links between collective efficacy and intentions, and between group norms and personal norm). Constraining each of the other links in the model to be equal for both gender groups led to a significant deterioration in the model fit (see Table 2). The links between community identification and intentions to act, and between group norms and intentions to act were stronger for women than for men, while all other links (constraining which led to a significant deterioration of the model fit) were stronger for men.

Discussion

The present paper explored group processes linked to pastoral communities' willingness to take action to protect their communal land from soil erosion. Building on the social identity framework, we developed and tested a model predicting willingness to cooperate around shared environmental resources. By doing this, we started addressing the gap in the existing research on the role of group processes in mitigating environmental crises in general (cf. Fritsche et al., 2018; Postmes et al., 2014), and land degradation in particular (cf. Blake et al., 2018), as well as contributed to the wider bodies of work on motivating environmentally sustainable action (e.g., Bamberg, Rees, & Seebauer, 2015; Rabinovich et al., 2012) and enhancing cooperation in social dilemmas (e.g., van Lange et al., 2013), extending them into the new environmental and cultural

context. The present research also contributes to the process of integration between individual-based (e.g., Klöckner, 2013) and group-based (e.g., Fritsche et al., 2018) models of pro-environmental behaviour by demonstrating the links between group processes and the concept of personal norm as a key predictor of willingness to contribute to shared environmental resources.

In line with the social identity theorizing (Tajfel & Turner, 1979; Turner et al., 1987), the results supported the core prediction that social identification with a group of actors is linked to willingness to protect resources shared by that group. The data also provided some support for the psychological processes that were predicted to mediate this link. In particular, in line with the predictions, action-related group norms mediated the relationship between community identification and willingness to act. At the same time, the data provide limited support for the role of efficacy and no evidence for the role of trust in shaping cooperative intentions.

The results are consistent with the SIMPEA model (Fritsche et al., 2018) in supporting the key role of group identification in motivating pro-environmental action. They are also in line with previous research that demonstrated the effect of group identification on contributions to shared resources in laboratory social dilemmas (e.g., De Cremer & Van Vugt, 1999; Wit & Kerr, 2002) and willingness to take collective environmental action (Bamberg et al., 2015). We extend these findings by demonstrating the role of group identification in managing shared resources in a new field context, where the resource in question is of high importance for the communities involved.

The findings are also generally consistent with the social identity and self-categorization perspective on the role of group norms in motivating behaviour (Turner et al., 1987), as well as with the earlier evidence of the impact of norms on environmental intentions and action (e.g., Biel & Thøgersen, 2007; Fielding et al., 2008). The present results align with the findings linking

relevant group norms to environmental sustainability (Goldstein et al., 2008; Rabinovich et al., 2012), supporting the suggestion that social norms should be included into theoretical models of pro-environmental behaviour (Fritsche et al., 2018). In addition, our findings provide support for the claim that cooperative norms are crucial for cooperation in social dilemmas (e.g., Kerr et al., 1997), extending the application of this principle to non-Western community contexts.

Our results are in line with the work demonstrating a strong link between group identification and collective efficacy (e.g., Thomas et al., 2012). However, contrary to the SIMCA model (van Zomeren et al., 2008), we do not find significant support for collective efficacy mediating the link between group identification and willingness to care for communal land, and the results suggest that the role of efficacy is weaker than that of group norms. One possible explanation for this is that in strongly collectivistic groups with high levels of group identification following group norms is of higher importance than considerations of efficacy. This is supported by the finding that there is a significant correlation between group norms and collective efficacy – the extent to which community members feel efficacious as a group may be to a large extent determined by whether they perceive support for action from other group members.

While the results are consistent with previous research demonstrating strong links between group identification, social support, and trust (e.g., Avanzi et al., 2018; Haslam et al., 2011), they are not in line with the work on the role of trust in cooperation in social dilemmas (e.g., De Cremer, 1999; Orbell et al., 1988). One possible explanation for this finding is methodological – while items measuring norms and efficacy were formulated with a direct reference to the problem of soil erosion on communal land, those measuring trust did not specifically refer to trusting in other group members' cooperation around communal land

degradation. Future research should provide a stronger test of the link between trust and cooperation in field settings by ensuring a stronger correspondence between these measures (cf. Sutton, 1998).

Some of the results could be related to specific features of the cultural context – in particular, this refers to the unexpected findings on the interaction between group identification and norms, and the exploratory findings on gender differences. We discuss each of these context-specific results below. First, while the social identity approach suggests that norms should be more strongly linked to corresponding intentions for high- (rather than low-) identifiers, our data demonstrate the opposite: High-identifiers are less strongly affected by perceived group norms than low-identifiers. This finding could be explained by the fact that Maasai culture places a stronger emphasis on collective decision-making and expects stronger conformity to collective opinion than Western societies where the social identity approach was developed (e.g., Spear & Waller, 1993). This high level of conformity could explain why even relatively weakly identified group members are willing to take action when they perceive supportive group norms (or group pressure). It should also be noted that the average level of community identification was high in the present sample, and participants who place one standard deviation below the mean still report a level of identification above the mid-point of the response scale. Hence, the difference that we observe is between very strongly identified individuals (who are strongly motivated to take group-benefitting action and are less dependent on norms), and moderately strongly identified group members (who are guided by group norms, in line with the social identity approach). These findings may suggest implications for applying the social identity approach to understanding the relationship between norms and behaviour in groups where levels of both identification and norm conformity are high: Highly identified members of such groups may be

less impacted by norms, especially if behaviours in question are in the group's interests. This suggestion would be consistent with previous research showing that high-identifiers are motivated to increase their individual contributions when they perceive that the group's performance is poor (Rabinovich & Morton, 2012).

Second, it is important to note that most links within the model were of different strength for women and men. In particular, for women, intentions to take action to protect and restore communal land were most strongly linked to perceived group norms, while for men the strongest predictor of intentions was personal norm. This difference may reflect cultural gender norms, where Maasai women are expected to conform to community prescriptions and have fewer opportunities for independent decision-making, while men are expected to lead their communities (after achieving the elder status, e.g., Talle, 2003). Given this gender gap in expectations and experience, women may be more strongly guided by collective preferences, while men could demonstrate a stronger reliance on a more individualistic sense of moral obligation. It should also be noted that there is a significant gap in Maasai women's and men's ability to take some forms of action that affect sustainability of communal land – for example, women normally do not own large cattle herds and may not directly contribute to decisions pertaining to grazing arrangements and herd size. Fewer opportunities to take some types of action (related to cattle management) may explain the weaker link between generalized personal norm and specific intentions for women. Future research in societies with pronounced gender gaps in opportunities, responsibilities, and access to resources (including decision-making) should consider the implications of these for models of environmentally sustainable behaviour.

The present study provides some suggestions for practical approaches to mitigating land degradation in areas inhabited by Maasai pastoralists. On a general level, it suggests that paying

attention to group processes taking place within stakeholder communities is important for making successful mitigation steps. It also highlights the importance of taking into account cultural context and provides a ground for cautious optimism, as the data suggest that Maasai pastoralists are open to exploring opportunities for sustainable land management. On a more specific level, it indicates that in order to motivate mitigating action within pastoralist communities, future projects may consider enhancing community identification and ensuring equitable access to decision-making and resource management for both gender groups. Our findings also suggest that group norms around sustainable land management should be targeted as a powerful predictor of corresponding behavioural intentions. Approaches based on group discussion may be instrumental for enhancing community identification and norm development (e.g., Thomas, McGarty, & Mavor, 2009).

Limitations and future research

The implications discussed above should be considered with several limitations of the present study in mind. The most important of these is the correlational nature of the data. Although the theoretical model assumes causal relationships between variables, the data do not provide information about directionality of the observed relationships. Since testing models with reversed links using the same correlational data does not allow to resolve this uncertainty (e.g., Thoemmes, 2015), future research should adopt an experimental approach. In particular, it could develop and pilot a context-specific intervention aimed at enhancing group identification and developing relevant group norms within the stakeholder communities. This future research should also extend the range of outcome variables to incorporate measures of observed behaviour.

Another limitation of the present study is that it was not always possible to use complete validated scales due to significant restrictions on the questionnaire length. This bears implications for future psychological research in field contexts that require brief measures accessible to participants with limited levels of formal education and restricted amount of time they can dedicate to research participation. Work on developing and validating very brief versions of existing scales would make a significant contribution to research in such contexts.

Finally, the conclusions have to be interpreted in the light of the fact that participation in the study was voluntary and a self-selection bias could have been present. We may not have been able to access the most disengaged or the least included community members (although different age and gender groups are well represented within our sample). While this limitation extends to most research based on self-report (either quantitative or qualitative), it would be reasonable to expect that the observed links between variables could be weaker for the least engaged community members.

Conclusion

The present paper provides the first quantitative exploration of group processes associated with willingness to take action to mitigate soil erosion on communal land by Maasai pastoralists in Tanzania. The findings suggest that community identification is linked to willingness to protect communal land through the process of building cooperative group norms and a sense of personal moral obligation. The present study contributes to the existing literature by bringing together research on cooperation in commons dilemmas and social identity-based models of environmentally sustainable action, and testing the existing theoretical propositions in a novel and challenging field context. We demonstrate that while the support for many principles is found in the present context, there are also parameters not accounted for by the existing theory

and research (such as the interaction pattern between group identification and norms, and the extent to which gender issues may be implicated in communities' ability to equitably resolve shared resource dilemmas). Finally, our findings have implications for practical approaches to addressing the problem of pastoralist land degradation: They suggest that the way forward may be facilitated by strengthening community identification and developing group norms linked to sustainable land management practice.

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Notes

1. While the relationship between group identification, perceived support, and trust is likely to be bi-directional (trust in other group members could increase group identification, and so could perceived support), here we are primarily interested in exploring processes that mediate the relationship between group identification and the key outcome of willingness to care for communal land. Given this focus, and to avoid complicating the model, we omitted the reversed links from the model (i.e., links from trust and support to identification).

2. Eighty-four percent of participants were married, 88.7% owned some land (either directly or, in case of some women, via male family members), and 80.6% used communal land for livelihood activities. Of those who reported the highest school grade they completed, 68.6% completed grade 7 (the last year of “primary school” in Tanzanian system), 14.1% completed secondary school, and 4.2% studied to the college level. Nearly 65% of participants reported that cattle raising was their main occupation, and almost all participants were estimated to own some cattle (this estimate was made by the Tanzanian members of the team on the basis of their familiarity with the local context).

3. Participants also completed a number of measures that were included for exploratory purposes and are not analysed in the present paper: Perceived understanding of causes of soil erosion ($M = 3.90$, $SD = 0.99$), perceived threat ($M = 4.34$, $SD = 0.85$), issue prominence/ discussion frequency ($M = 3.48$, $SD = 1.21$), perceived effectiveness of different measures to reduce erosion (overall $M = 3.72$, $SD = 0.72$), trust in experts ($M = 4.34$, $SD = 0.82$), cultural group identification ($M = 4.13$, $SD = 0.92$), and perceived need for change ($M = 4.32$, $SD = 0.61$). No

gender differences were observed, except for issue discussion frequency, where the mean for male participants was higher ($t(272) = 1.99, p = 0.48$)

4. Mean levels for all variables are relatively high. Our observations suggest this is likely to reflect actual level of commitment and willingness to take action in the study communities. We cannot exclude the possibility that the data collection in a shared session could have influenced participants' responses to some extent. Several points need to be noted in this respect: 1) Any interaction between participants during the data collection part of the session was minimized; 2) Our predictions concern relationships between variables rather than their absolute levels, and these relationships are unlikely to have been affected by the data collection setup; 3) Decisions with respect to communities' actions are made in collective settings and, in this sense, our data collection setup approximates actual decision-making and action contexts.

5. During the review process it was pointed out that some of the existing models of pro-environmental action (e.g., SIMPEA) would predict an interaction between group identification and collective efficacy on pro-environmental intentions. We ran an additional (modified) model with this interaction included. The results showed that the interaction between identification and efficacy was not statistically significant ($\beta = -.02, p = .851$), and the model fit was reduced ($\chi^2(17) = 27.69, p = .049, CFI = 0.98, TLI = 0.89, RMSEA = .05, 90\% CI [.00; .08], SRMR = .03$).

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Figure 1. Monduli district in Northern Tanzania (study site).

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Figure 3. The modified model showing the relationships between socio-psychological parameters and willingness to act to prevent further soil erosion on communal land.

Figure 4. Interaction between community identification and group norms on intentions to act to prevent further soil erosion on communal land.

Table 1.

Means, Standard Deviations, and Correlations between All Study Variables

	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	1	2	3	4	5	6
		Women	Men						
1. Community identification	4.40 (0.63)	4.36 (0.63)	4.42 (0.62)						
2. Social support	4.09 (0.87)	4.17 (0.69)	4.04 (0.95)	.46***					
3. Collective efficacy	4.34 (0.66)	4.33 (0.69)	4.35 (0.65)	.43***	.30***				
4. Community norms	4.04 (0.70)	4.05 (0.66)	4.04 (0.72)	.27***	.36***	.38***			
5. Community trust	3.79 (0.99)	3.93 (0.90)	3.72 (1.03)	.24***	.49***	.20**	.33***		
6. Personal norm	4.45 (0.76)	4.48 (0.66)	4.44 (0.81)	.49***	.27***	.35***	.29***	.18**	
7. Intentions to take action	4.24 (0.60)	4.22 (0.60)	4.25 (0.59)	.45***	.34***	.38***	.47***	.33***	.29***

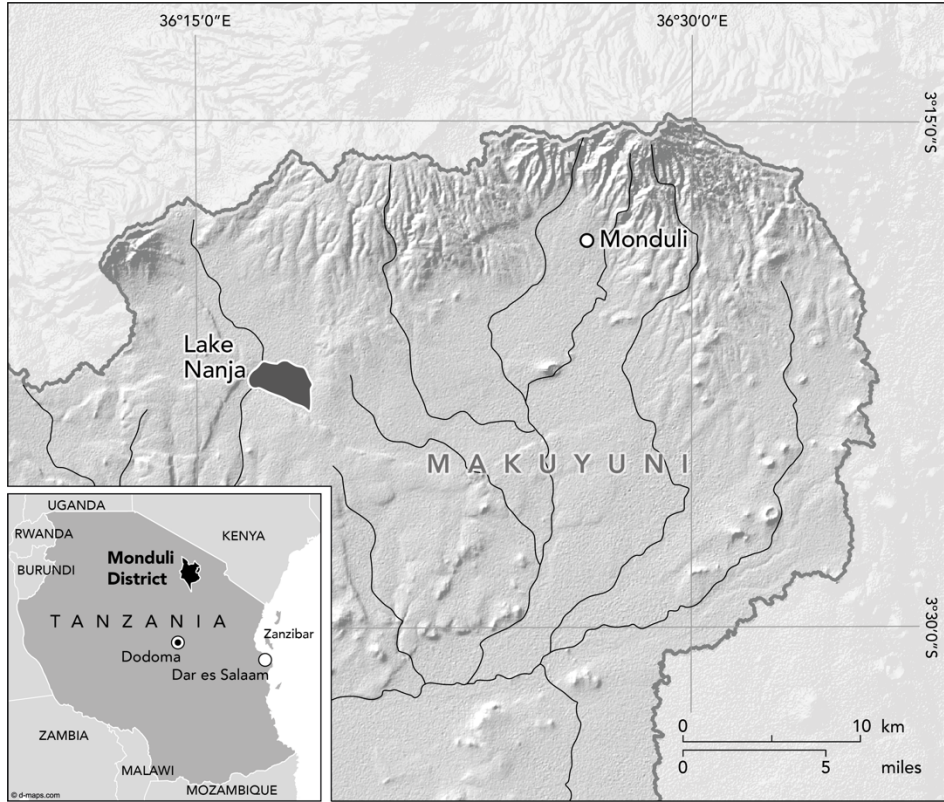
Note. No statistically significant gender differences were observed. *** $p < .001$, ** $p < .01$

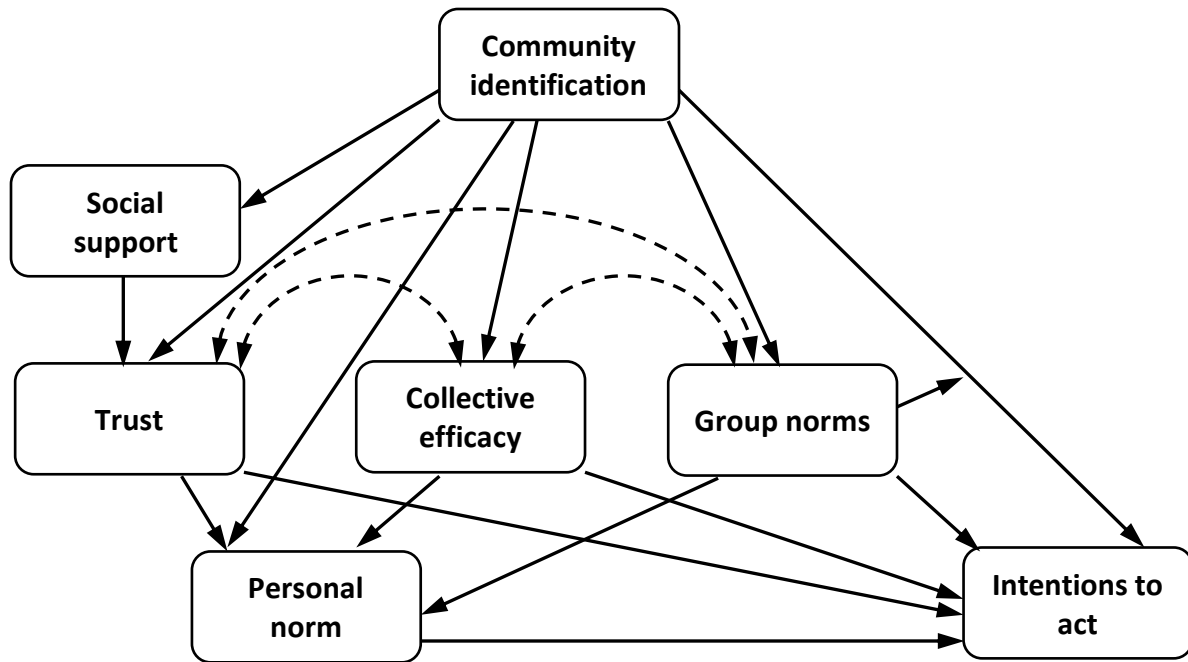
Table 2.

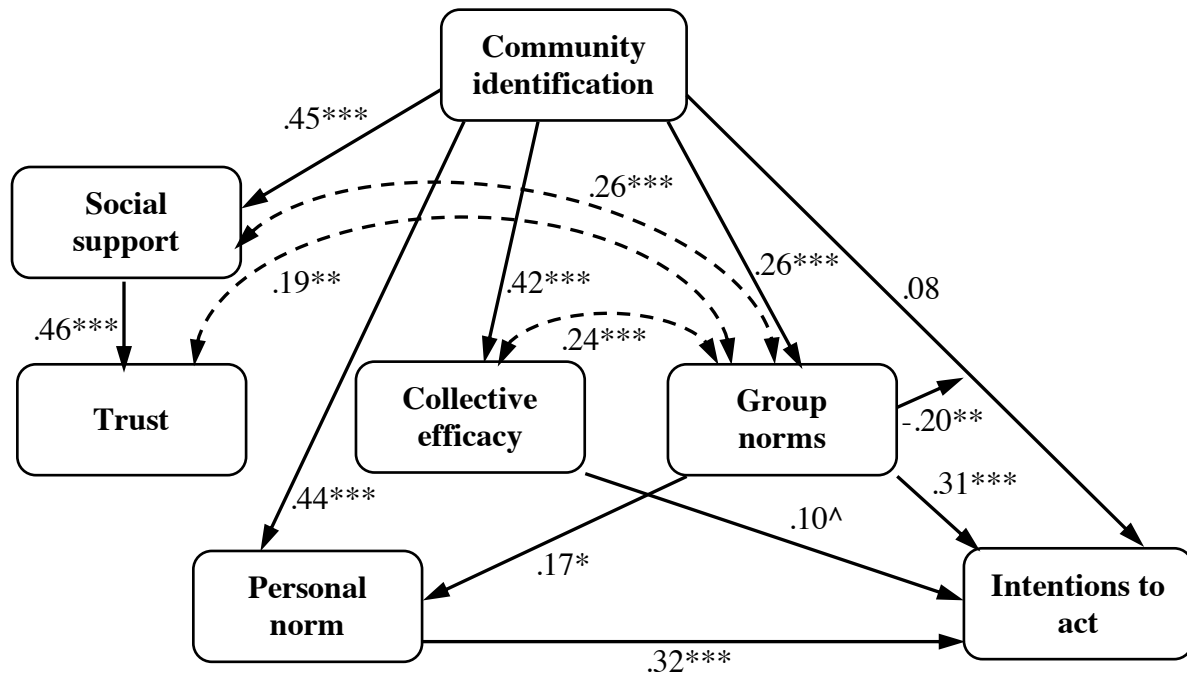
Multiple Groups Analysis

Path constrained to be equal across gender groups	Overall model fit (χ^2)	Satorra- Bentler scaled $\Delta\chi^2$	Standardized estimate, male participants	Standardized estimate, female participants
Identification -> social support	81.98***	37.83***	.473***	.422***
Identification -> efficacy	70.90***	27.59***	.406***	.383**
Identification -> group norms	52.04**	12.57**	.282***	.211 [^]
Identification -> personal norm	80.54***	40.30***	.458***	.413***
Identification -> intentions to act	43.55*	6.08*	.086 ^{ns}	.159 [^]
Social support -> trust	80.75***	32.33***	.476***	.409**
Efficacy -> intentions to act	41.05*	1.88 ^{ns}	.081 ^{ns}	.029 ^{ns}
Personal norm -> intentions to act	65.93***	43.05***	.406***	.095 ^{ns}
Group norms -> intentions to act	66.80***	36.19***	.184**	.469***
Group norms -> personal norm	43.88*	4.83 [^]	.179*	.095 ^{ns}

Note. * $p < .05$, ** $p < .01$, *** $p < .001$, [^] $p < .10$.







Note. Model fit: $\chi^2(12) = 15.29, p = .226, CFI = 0.99, TLI = 0.96, RMSEA = .03, 90\% CI$ [.00; .07], SRMR = .02. Double-ended arrows show covariance between variables. Standardized coefficients are shown. *** $p < .001, ** p < .01, * p < .05, ^ p < .10$.

