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Characterizing Interpersonal Influence for Grassland Conservation Behaviours in a Unique Population

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ABSTRACT
Interpersonal communication can influence the decisions people make about engaging in conservation behaviours. In-depth interviews with Tibetan pastoralists serve as the basis for examining interpersonal communication patterns and sources of interpersonal influence about grassland conservation behaviours. Herding and family groups are key collectives; salient sources of information vary across types of information. Salient individuals are those with credibility and means control: community leaders, elders, veterinarians, and government officials. Explicit information about conservation comes from religious leaders. The findings have significant implications for understanding the function and nature of interpersonal influence in unique population groups regarding conservation actions.

Information emanating from interpersonal communication with others in our social midst serves a key function as we make decisions about our own behaviours. Research suggests that behavioural response to information from groups around us is susceptible to cultural differences (e.g. for water conservation, see Lapinski, Rimal, DeVries, & Lee, 2007). In addition, *who* serves as the source of this information drives the strength of the influence on our decisions (Borsari & Carey, 2003). Information shared through verbal and non-verbal interpersonal communication shapes what people perceive as prevalent and approved behaviour, which ultimately influences peoples' actions. That is, what we see others around us do (i.e. descriptive norms) and what we believe they think we should do (i.e. injunctive norms) can influence our environmental actions (Cialdini, 2003). There is a body of empirical scholarship that holds many lessons about the effects of normative perceptions on behavioural decisions about environment-related actions (c.f., Manning, 2009). At the same time, we know little about the role of interpersonal communication in the process of shaping normative perceptions. Indeed, there remain several key gaps in our understanding of normative influence that this study serves to address.

First, despite that information about what is normative emanating from people around us is used in behavioural decision-making and is shared through interpersonal communication processes, very little is known about the nature of that communication (Simpson, Farrell, Minda, & Rothman, 2015), nor about why certain sources are so influential in shaping normative perceptions (Mollen, Rimal, & Lapinski, 2010). It is through observation and communication, interpersonal and mediated, that people come to accept certain behaviours as normative by means of the descriptive, inferential, and informational beliefs they have formed (Hogg & Reid, 2006). A better understanding of this process can help illuminate why and when social norms are influential in shaping actions.

Second, the existing research on the processes of normative influence may or may not have external validity beyond the cultural contexts within the United States. Many studies examining social norms have been conducted with college students in the US (e.g. Borsari & Carey, 2003), prompting for calls to expand social norms research to unique populations in order to enhance external validity in the corpus of research to account for culturally based concepts and processes (Mollen et al., 2010). Thus, it may be the case that what we know about the communication aspects of normative influence from the existing science does not hold when examined in cultural contexts outside of the US. For example, there is evidence that social norms function differently for people who embrace more collective relative to individualistic orientations (Lapinski et al., 2007) or have an interdependent vs. independent sense of self (Park & Levine, 1999). Both concepts (individualism-collectivism and independence-interdependence) are linked to culture.

The need for a deep understanding of cultural differences in communication processes as well as indigenous ecological knowledge has been addressed by Lester (2015) and others, as a key challenge for the future of environmental communication research and a barrier to progress in theory building. As such, this paper examines the nature of sources of interpersonal information about conservation behaviours among a unique population group. It also examines the nature of interpersonal communication about conservation issues as a basis for understanding normative perceptions. Below is a brief review of the role of normative referents in the interpersonal influence literature followed by several research questions. Data from in-depth interviews about grassland conservation behaviours with Tibetan pastoralists on the Tibetan Plateau in Western China are presented as the basis for addressing the research questions.

Social norms, social referents and social power

The distinction between collective and perceived social norms was conceptualized to reinforce the group-level function of norms and highlight communication with referent group members as a key source of normative information (Lapinski & Rimal, 2005). Perceived norms exist at the individual level and collective norms function at the level of the larger group or collective. The *collective* in normative influence refers to any socio-cultural grouping, which may include a structure of class, roles, statuses, and subgroups (Hogg & Reid, 2006). People who comprise the collective have a sense of identity that is dependent on their membership in the collective (in some cases an *in-group*) which is their group or social identity (Hogg & Reid, 2006).

Important in-groups, in the theory of reasoned action (TRA) termed the "normative referent," can be either a discrete set of individuals or an abstract grouping of those to whom a sense of collective identity is attached (Ajzen, 1988). Normative referents are those who serve as orientation points to guide behaviour. The specific referents may differ for different behaviours, but research in the US indicates that for many behaviours the key normative referents include one's family, close friends, work colleagues, and for some health behaviours professionals such as doctors (Ajzen, 1988). The extent to which individuals and groups are influential seems to stem from several sources: their group membership and a target's identification with that group, the referent's position or control over rewards or punishments, or the expertise of the source. These form the bases of interpersonal power (Kelman, 1961).

Normative influence is, in part, a function of one's feelings of association with the referent groups in question (i.e. group identity). One's sense of group identity moderates the relationship between (descriptive) social norms and behaviours (Lapinski et al., 2007). Hogg and Reid (2006) argue that self-categorization into a group can affect normative behaviour, but to do so, group identity must be salient to the individual. In the theory of normative social behaviour (TNSB) (Rimal & Real, 2005), group identification is conceptualized as similarity and aspiration. That is, the extent to which one is like one's group members and the extent to which one wants to be like those group members.

The role of our perceptions of group members in enhancing the effects of social norms on behaviours appears to be robust, regardless of how referent group membership is operationalized, and to

hold across a number of environmental and health contexts. Neighbors et al. (2010) varied the social distance of referent groups and found that when participants' referent groups were proximal, normative influence on drinking behaviours was stronger. Similarly, influence is stronger when communication of norms occurs from socially proximal others. A meta-analysis of social norms-approach studies on alcohol consumption (Borsari & Carey, 2003) examined 23 studies and found that, as referent distance increased (i.e. from closest friends to typical students), the difference between one's own consumption and perceived consumption by referents increased, though the effects were small to moderate. This effect can be explained by the fact that we have more, and more accurate, information about the behaviours and attitudes of people with whom we are interpersonally or physically proximal.

These studies, testing theories or hypotheses typically conceptualized by scholars in Western, developed nations, show that various referents are differentially influential in behavioural decision-making and that understanding the nature of potential referents and the source of their influence is key to understanding social drivers of behaviour. Fundamentally, the role and nature of referents in behavioural decision-making may or may not be similar for people from cultures other than those where these studies are commonly conducted (for example the US or Canada) or for members of groups that function at the margins of society as a unique populations or co-cultural groups (Orbe, 1998) juxtaposed with a dominant cultural group (see Jensen & Bute, 2010 for example). Particularly, cultural dynamics, unique to a particular group, may influence how important particular referent groups are in decision-making, the basis of a referent group member's influence, and the existence or nature of interpersonal communication about behaviours. Studies of social norms can take into account the cultural context in which normative information is conveyed by using methods that allow for participants' conceptualization of key concepts. This combined emic-etic approach is necessary to avoid imposing concepts and theories developed in one cultural context onto another (Schaffer & Riordan, 2003).

Using this approach, prior research has found that when people have few sources of information about an issue, available referents can become very influential to decision-making. Elwood, Greene, and Carter (2003), in their study of condom use for HIV and STD prevention among men who visited bathhouses, found that limited interpersonal communication about an issue also hinders shared conceptualizations in this unique population about what is the preferred behaviour. The literature also shows that key conceptualizations developed in one cultural context (like that of injunctive norms; social prescriptions for appropriate behaviour) may not exist in the same form when examined through a different cultural lens (Jensen & Bute, 2010). As such, in this study we follow these approaches to uncover our study population's communication networks and patterns of information sharing about grassland conservation behaviour.

This study focuses on a co-cultural group within Western China: Tibetan pastoralists. Their position as a unique or co-cultural group within China makes them an interesting group in which to study social influence processes (c.f., Yeh, 2012). Their significant role in conservation practice and policy in an ecologically sensitive region makes them central stakeholders in the future of this region (Shen & Tan, 2012). This region is ecologically sensitive because it is the headwaters of the three largest watersheds in Asia as well as an economy built on grazing of domesticated animals which impacts the vegetative, soil and water health.

Through discussion among research team members[1] (including the partner non-governmental conservation organization), interviews with key informants, review of the literature about the study region, and field visits, the research team identified animal herding practices and their impact on the grassland and water ecology as salient both for the study population and for conservation practice. Grassland conservation behaviours in this context include herding those types of animals with less ecological impact, reducing herd size, and modifying grazing patterns to protect sensitive areas. Our study questions, which represent a part of a 5-year research and policy project involving multiple studies and topics, address these issues.

The following research questions uncover the key sources of information about grassland conservation behaviours and the source of their social influence. Identification and characterization of salient referents and collectives represents a key first step to characterizing how social norms function (Fishbein & Ajzen, 1975). Salient, in this case, refers to sources of information that participants identify as significant for decision-making relative to other individuals or collectives.

If information-sharing networks are identified, understanding the source of their potential influence on action allows for better understanding of their role and that of individual referents in behavioural decision-making. Sources of influence derive their power to influence decisions from the ways in which people perceive them and their communication; this of course is tied to cultural context and may also be topically dependent. Kelman (1961), French and Raven (1959) and more recently Simpson et al. (2015) have identified and characterized the bases of social influence. Rimal and Real (2005) identified the bases of normative influence. The concepts are summarized in Table 1. Importantly, we focus on the sources of information generally rather than on normative information specifically because it cannot be assumed that all information from others in our social midst forms the basis for normative beliefs. Our second research question asks whether the bases of influence are evident in people's thinking about various sources of information and whether other bases not identified in prior research might be evidenced due to the unique nature of our sample. The third research question asks about the nature of information shared among collectives about grassland conservation issues. In this case, we limit ourselves to social information as opposed to other information used in decision-making about herd management and grassland use (e.g. ecological and market condition). By social information, we mean information shared among people in their social midst. The three questions are stated as follows:

RQ1: Who are the salient collectives and individual sources of information for behavioral decision-making about grassland conservation?

RQ2: What is the basis of interpersonal influence for salient collectives and individual sources of information about grassland conservation issues?

RQ3: What is the nature of social information about grassland conservation issues?

Table 1. Definitions of the bases of influence for information sources adopted from French and Raven (1959), Kelman (1961), Rimal and Real (2005) and Simpson et al. (2015).

Variable	Definition	Source	Example data
Means Control – Actual or Potential	A referent's actual or potential control over specific resources, rewards, and punishments.	Kelman (1961), French and Raven (1959)	If the livestock are ill, I will go to the veterinary station for help. I will report to the township government for other issues. (Their opinion is) very important because I may get some support after reporting to them. (1-4-5)
Attractiveness – Identification	The referent occupies a role which the person desires or which makes the continued relationship desired; also similarity and aspiration.	Kelman (1961) Rimal and Real (2005)	N/A
Credibility	The referent is an expert source of information; makes truthful and valid statements; is perceived as trustworthy and expert.	Kelman (1961)	"I will ask some experienced and educated doctors." (1-3-5) and "I will consult doctors since they are experienced, and I can seek for new vaccination from them." (1-3-4)
Harmony	The referent can help to maintain accord within our group.	N/A	""I will consult other herdsman participating in multi-household herding. To live in harmony, I will need their permission if I want to raise some livestock" (1-3-4)

Method

Study site

This study was conducted in Yulshul Prefecture, *Tsangsum yungyul* (termed Sanjiangyuan in Mandarin, meaning the source of the 3 rivers) National Nature Reserve area, located in southern Qinghai Province on the Tibetan Plateau. Encompassing 395,000 square kilometers, it is home to about 960,000 inhabitants of whom 90% are Tibetan and nearly 70% are pastoralists. Its glaciers and high-altitude grasslands provide significant inputs to three of Asia's major rivers (the Yellow, Yangtze and Mekong) that provide freshwater downstream to nearly a quarter of the world's population including much of China, Myanmar, Laos, Cambodia, Vietnam, and Thailand. The grassland ecosystem on the Plateau has supported Tibetan nomads for thousands of years by supporting seasonal animal husbandry for animal products, and nurtured a unique culture of which a fundamental element is Tibetan Buddhism. Dependent largely on sheep and yaks, as well as cash income from seasonally available caterpillar fungus which is sold for its believed medicinal properties, Tibetan culture has developed strong self-disciplinary norms for individual behaviours that encourage people to live in harmony with, and respect, the land, water and all living beings (Shen & Tan, 2012).

The region is home to numerous sacred mountains and waters that are identified by religious leaders as important Buddhist sites that require special treatment. Grassland around monasteries also receives special protection including grazing restrictions. Local communities have made significant contributions to conservation and are, perhaps, the primary reason why large numbers of wildlife still roam freely on the Plateau. Iconic species include wild yaks, wild asses, and snow leopards. Tremendous changes have occurred on the plateau during the last 50 years as the Chinese government has, among other policies, mandated settlement of nomadic groups, communalized herding practices, promoted fencing, poisoned picas (a native rodent), and taken other steps ostensibly to reduce the stress on the grassland.

Local collaborator

Shan Shui Conservation Center, a non-governmental organization (NGO) and collaborator in this research project, operates a community based conservation programme drawing on local norms in favour of conservation (Shen & Tan, 2012) and includes local Tibetan staff members. This NGO is actively engaged and well known in the communities in which the research was conducted. It is also connected with local government officials responsible for conservation and has brokered agreements in which the government has given local communities greater responsibility for conservation including the introduction of payment for ecosystem services (PES) programmes that pay people to modify their herding practices to protect grassland quality and quantity. The Tsangsum Yungyul region is an appropriate site for this research because of the existing social structures highlighted above such as the unique conservation norms, the types of behaviours important for conservation, the research available on the complex cultural dynamics of the region (e.g. Yeh, 2012), and the potential to provide input for coming large-scale PES work in the region.

Participants

Participants were recruited via network sampling by project partners in four villages in the study region. Recruitment started with village leaders or other potential participants known to the NGO staff of the study team and sampled from the initial contact person's network. In total, 40 male[2] Tibetan pastoralists in four villages participated in the interviews, with an average age of 51.78 (SD = 15.02), ranging from 22 to 78. Most participants belonged to herding groups (77.5%); average herd size of yaks was M = 65.53 (SD = 45.05; Range 7-205). In each village, 10 one-hour interviews were conducted concerning the topic of grazing management including the nature of the existing

Table 2. Demographic characteristics of interview respondents included percentage, Mean (M), Standard Deviation (SD), Minimum (Min) and Maximum (Max) response.

	Percentage	N Responded as "Yes"	M	SD
N of people in the household	–	–	5.33	2.30
N of children	–	–	2.13	0.89
Average age of the children	–	–	15.03	10.44
Participant has children	94.9	37		
Children go to school	69.7	23		
Participant reads	70.0	28		
Participant writes	70.0	28		
Tibetan (read or write)	70.0	28		
Chinese (read or write)	12.5	5		
Participant has had jobs other than herding	30	12		
Holds leadership position in village	85	6		
Receive old-aged pension	41	16		
Considering raising herd size	59.4	19		
Considering buying animals to increase herd size	50	20		

grassland and watershed, grazing patterns, the quantity and types of animals herded, and the threats to the grassland. Demographic characteristics of respondents are presented in Table 2. Following cultural practice, participants were not compensated for participation.

Procedures

Interviews were conducted by four Yulshul local-Tibetan interviewers who are native speakers of the Kham Tibetan dialect and also fluent in Mandarin Chinese. The interviews were conducted without the presence of the US-based investigators[3] but under the supervision of one of the partner NGO staff members who is Tibetan and a lead researcher on this project. Interviewers received training on interviewing skills, the interview protocol, and the protection of human subjects by the study team. The interviews were semi-structured, following an interview protocol to allow for quantitative content analysis but allowing interviewers to ask a follow-up and clarifying questions for additional depth.

The interview protocol was modelled after previous work by the investigators that examined information sources for behavioural decision-making, cultural drivers of normative influence, and Tibetan conservation attitudes and practices (Lapinski, Anderson, Shugart, & Todd, 2014). The interview protocol was developed by all project collaborators including Tibetan field staff from the partner NGO. It was developed in English and Tibetan simultaneously, captured in English, and then translated into Tibetan with flexibility for local variations in the language. The protocol was then back-translated to English to check for accuracy in interpretation and to avoid cultural biases. All questions were discussed at length by members of the study team to enhance conceptual equivalency.

Following consent procedures, the interview protocol began with an overview of the purpose of the study and introductory questions to build rapport concerning the condition of the participants' grasslands. Then questions were asked about the participants' experience with herding management, including whether and how they share herding work with other households (i.e. whether they are part of a herding group), decision-making within the herding group, and plans for grassland management. Next, questions addressed how decisions are made about herding, participants' knowledge of the practices of other herders, and demographic items. Then participants were asked specific questions about who they talk with about their herding practices, why they talk with specific people or groups and nature of that communication. The key questions for this analysis are presented in supplementary Appendix A; the entire protocol is available from the first author.

The protocol was pilot tested with five community members prior to the final study data collection. Modifications were made to question wording (based on interviewer and researcher

discussions) and question order; as such, the pilot data are not included in the final analysis. Interviews were conducted in semi-private settings chosen by participants (including a room in their home, an outside space away from others, or a common area) and lasted approximately one hour each. Interviews were recorded with password-protected digital voice recorders, transcribed from Tibetan into Chinese, and finally to English. Some transcripts were randomly selected to be back-translated by a member of the research team who is a native speaker of Tibetan and fluent in both Chinese and English to check for translation accuracy. Data cleaning and analysis included an examination of the transcripts in all three languages but primarily Chinese and English as well as ground-truthing of results with cultural insiders. All procedures were approved by the institutional review board.

Data analysis procedures

To completely characterize the nature of the data, the data were analysed using three separate techniques led by team members with expertise in each method: content, network, and thematic analyses. In addition to the traditional content analytical method focusing on a descriptive analysis, non-content analytic method was adopted to advance our understanding towards the issue of focus (i.e. sources of normative information). The findings from each analysis technique were combined to form the basis for the findings reported here. The analysis procedures are described in brief; additional detail is available from the first author.

For the content and network analysis, the first step of data analysis consisted of a preliminary screening of all transcripts to develop codebooks using both inductive and deductive approaches (from social norms and social power theory, Kelman, 1961; Rimal & Real, 2005, see Table 1 for example). This combined inductive-deductive approach was used to maintain flexibility to discover concepts and themes outside of existing theories. The responses were broken down into thought units (subject–verb pairings) so that a response to one question could contain more than one thought unit. Two independent coders, separate from the researchers and interviewers, fluent in both Mandarin and English were recruited and trained to use the codes to analyse the interview data. Most categories were coded as either "present" or "absent." The responses to demographic and income questions were recorded directly from the answers.

Following training on the codebook and coding procedures, 10 transcripts were coded independently in 2 coding sessions (5 for each session). Intercoder reliability was calculated at the end of each session. Percentage agreement and Krippendorff's alpha[4] (Krippendorff, 2004) were calculated for each coded category since they were not mutually exclusive from each other. After the intercoder reliability was calculated, the two coders jointly reviewed the coding to combine categories, generate new codes, or delete unnecessary categories, so that the themes provided the best reflection of patterns in the complete data set. Based on the coding of 6675 items across the two sessions, the mean percentage of raw agreement was 83.32%[5] and the mean Krippendorff's alpha was 0.75. Given the length and complexity of the interview protocol, intercoder reliability was determined acceptable, and the coders proceeded with splitting the rest of the transcripts and coded them separately. The coding procedures allowed us to gain a sense of the overall content of the participants' responses and calculate descriptive statistics where appropriate. Network analysis of the coded data was then conducted with *Gephi* (Bastian, Heymann, & Jacomy, 2009), an open source graph platform generating the network visualization for both overall and separate villages.

For the thematic analysis, a researcher independent from the team who designed the study but with familiarity with the study concepts, was employed to examine the corpus of data to understand specific elements of the responses in relation to the research questions posed in this study. The themes generated in this portion of the analysis were not constrained by particular interview questions (as they were in the coding), but were developed on the basis of responses given to multiple, related interview questions. *Nvivo* software *(v.11)* was used to organize the data and themes.

Quotations are included where they are relevant followed by each participant's unique identifier in parentheses (i.e. village number-interviewer number-transcript number). Within quotations, clarifying text was added in parentheses by the researchers.

Results

The findings from this study are presented in the order of answering the three research questions, including results generated from the three data analysis methodologies (i.e. content analysis, network analysis and thematic analysis).

Identify salient sources of information

To address RQ1 and identify key collectives and individual information sources, the data were examined from all three analysis techniques. Participants identified the following collectives as sources of herding information: herding groups of which participants are members (termed here "herding in-group"), family groups, herding groups consisting of other villagers in which participants do not hold membership (termed "herding outgroup"), and village groups. Herding groups are collections of people in a village who may share the duties of tending animals while they are at pasture and may share grassland (see Table 3). The majority ($n = 31$) of our participants reported that they are part of a herding group. Most reported that they were members of a herding group with people who are part of their family ($n = 30$), with friends ($n = 8$), and/or with other people who live in their village ($n = 10$). Many in our sample had formed their herding group based on pre-existing relationships with family or friends ($n = 18$), often with grown children or through marriage, or by the direction of the government ($n = 10$). Just over half the sample reported that they share the work of herding with other people in their herding group ($n = 22$) and most reported that their herding group has been stable over time ($n = 24$). Herders who are members of herding groups other than their own are also mentioned as sources of information, but less often.

Family groups are a second salient collective. The term "family", among members of our sample, includes anyone connected to the participant through marital or blood relationship who may or may not share a household. Participants reported commonly (but not necessarily always) living with extended family within the same household; household size ranged from 1 to 11 ($M = 5.33$, $SD = 2.30$). There is overlap between family groups and herding groups. For example, one participant stated of his herding in-group: "We often solve the problem through coordination since we are friends and relatives" (1-3-1). Another stated: "I will talk to my family members (about) how to arrange herding and (help) them to remember to timely feed yaks with grass and water. There is no dissent for herding in my family. Their feedback is important to me" (2-4-5).

Other salient sources of information identified by participants include veterinarians and local government or party officials. Religious leaders or monks were rarely raised spontaneously as a source of herding-related information, but when asked specifically about whether religious leaders provide information about herding and grassland conservation, 40% of the sample indicated that they do.

Table 3. Herding group information of interview respondents.

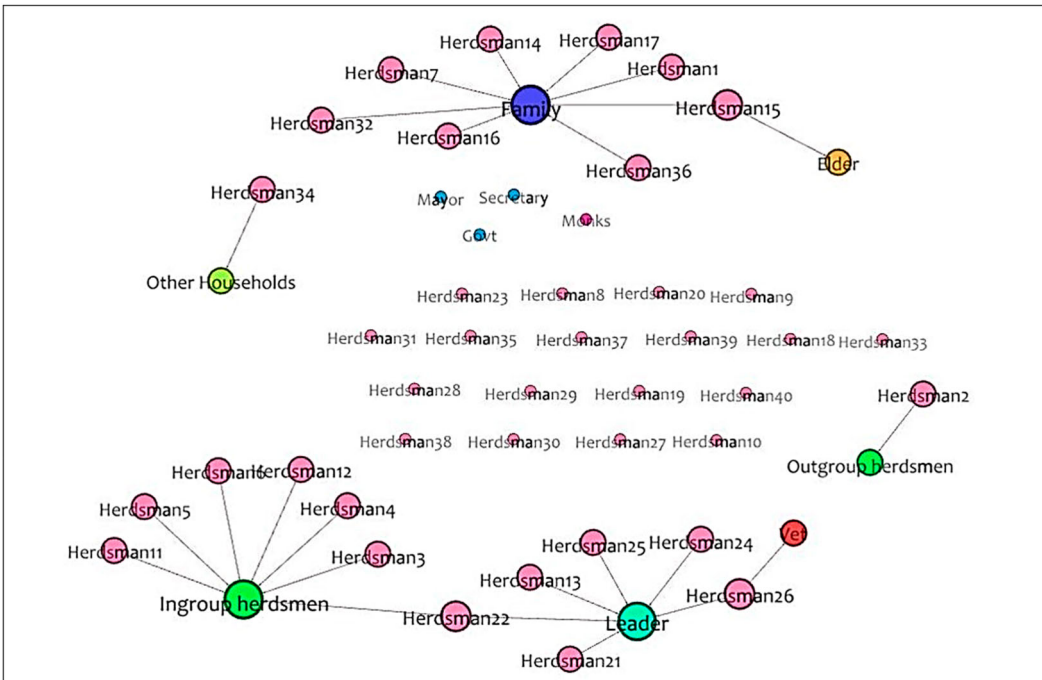|	Percentage	N Responded as "Yes"
Herding with a group	77.5	31
Herding group—with family	75	30
Herding group—with friends	20	8
Herding group—with people living in the same village	25	10
Herding group—formed based on pre-existing relationships	45	18
Herding group—formed by the direction of the government	25	10
Share the work of herding with other people in the herding group	55	22
Herding group has been stable over time	60	24

Figure 1. Referent groups for general issues concerning the herding activities.

Salient sources for general herding-related information

The network analysis data indicate that the importance of these collectives and individuals is dependent on the function of the information sought or received. That is, who participants consider important sources of information differs for general herding or grassland-related information, seeking advice, and solving problems.[6] In the network for general herding-related information, the results (see Figure 1) showed that the average degree is 0.49.[7] Family members received the most directional links ($n = 8$), in-group herdsmen received the second most directional links ($n = 7$), and leaders received the third most links ($n = 6$). Other households, herdsmen in the outside herding groups, village elders, and veterinarians received only one link respectively ($n = 1$). Other sources, such as government officials, majors, secretary of the township, and monks did not receive any links from the herdsmen ($n = 0$). Two herders indicated that they would not talk to anyone on these issues, and 15 herders were not asked this question. The collectives and individuals varied by village. One participant stated the following regarding general information-seeking about herding and grassland quality: "As a herdsman, we basically know how to herd, so we don't need such communication as there is an established way of herding which everyone knows" (1-4-2).

Salient sources for advice-seeking

Different sources were salient when herders needed advice on their herding-related behaviours including the health of their grassland. In the advice-seeking network, the results (Figure 2) showed that the average degree is 0.73. Community leaders received the most directional links from the participants ($n = 12$), other herdsmen in the herding in-group and elders both received the second most directional links ($n = 6$), and family members received the third most links ($n = 5$). Government officials and group leaders received four links respectively. Other households, herdsmen in different herding groups, elders, and monks did not receive any links from the participants. Nine herders indicated that they would not talk to anyone on these issues, and three herders indicated others.
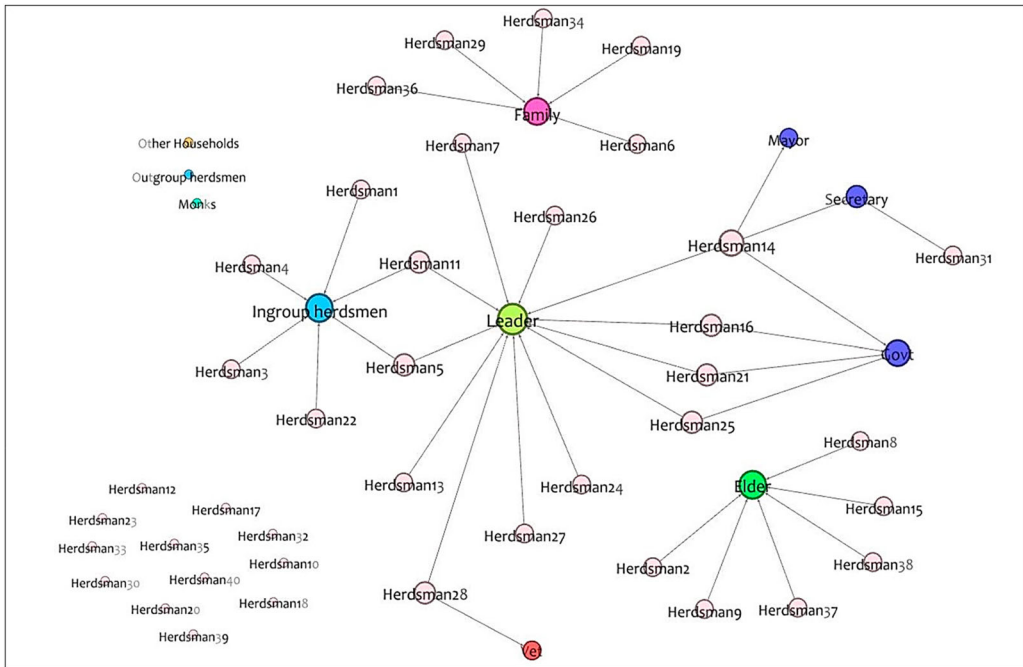
Figure 2. Referent groups for advice-seeking.

Salient sources for problem solving

When trying to solve grassland or herding-related problems (Figure 3), veterinarians received the most directional links from the herdsmen ($n = 26$), followed by government officials ($n = 9$), and community leaders ($n = 8$). Family members received 3 links from the herdsmen, and the secretary of the township received 2 links. Other households did not receive any links from the herdsmen ($n = 0$), and the rest of the information sources all received 1 link respectively from the herdsmen. One herder indicated that he would not talk to anyone on these issues, and three herders indicated other people. In the problem-solving network, the results showed that the average degree is 1.04.

To summarize, key collectives for our participants are herding groups and family groups; key individual information sources include community leaders, government officials, veterinarians, community elders, and religious leaders. About 30% of participants reported not communicating with others about general herding information or for advice, but all the participants identified people with whom they would consult if they had a problem with their animals or grassland.

Bases of influence for the salience sources

The second research question addressed the bases of influence of the collectives and individuals identified by participants using the content and thematic analysis data. Importantly, many participants gave responses that did not provide evidence regarding the dimensions the researchers used to examine the responses; many participants indicated they did not seek information from others, did not know why they went to particular sources, or provided an irrelevant response. For those that articulated why they seek information from different sources, these data show evidence for several of the major bases of interpersonal influence identified in Table 1. Primarily, it appears that means control (either anticipated or current) and credibility of the source are the primary bases of influence identified by our participants for grassland-related information. In terms of
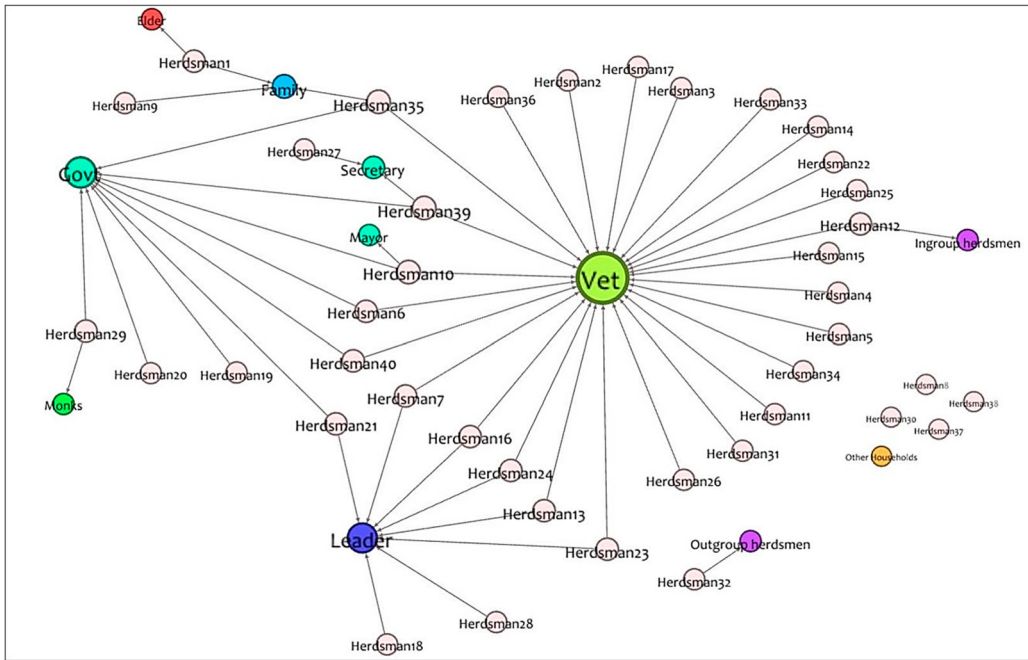
Figure 3. Referent groups for problem-solving information.

means control, this was most often identified as the basis of influence for community leaders, government officials and veterinarians. It was not identified as a basis of influence for other villagers, monks, or elders.

Means control

It was most often addressed as a need for official approval of changes to herding-related practices such as increasing or decreasing herd size or changing grassland use or size. For example: "(I would talk with) leaders or senior cadres, because their approval is needed and we need to discuss with them" (3-3-6). Or: "I will consult the team leader, because I don't have the right to decide how many livestock to raise, while he has the right" (3-4-1). It was also addressed in terms of financial resources that could be available to solve problems that emerge. One participant stated he would be most likely to go to his veterinarian to solve problems related to his herd and that this person's information and opinions are important in his decision-making, " … because I may get some support after reporting to them" (4-4-6).

Credibility of the information source

It was commonly cited as the rationale for seeking advice from veterinarians and elders. The perceptions appear to be based on trust, perceived expertise or wisdom, and experience. For example, one person stated about village elders: "Though not educated, they are experienced and wise. And they are very generous and willing to share their ideas" (1-4-2). Less often, people identified credibility of party officials, family members, and community leaders as the root of their influence. For example, one person indicated he would ask advice from: "the secretary of the group, group head or township mayor, because I trust them" (2-3-4). People did not mention credibility as a basis of influence for outgroup herdsmen, monks, or other villagers. There was no evidence of either source attractiveness or identification as bases of interpersonal power articulated by participants.

Maintain harmony within the groups

Other concepts were not identified in prior explications of the basis of interpersonal influence but discussed in research on small groups were articulated by participants: the ability of referents to maintain group harmony and the will of the majority. In particular, these data indicate that certain individuals were sought-after sources of information because seeking their counsel would maintain harmony within groups: generally in-group herders, family members, and to a lesser extent community leaders. For example, one participant said of his herding group: "I will consult other herdsman participating in multi-household herding. To live in harmony, I will need their permission if I want to raise some livestock" (1-3-4). Another stated: "We share bliss and misfortune together. We are relatives, so we should support each other. As long as my life is not difficult, I won't worry about that. I'm happy because they are happy" (1-4-5).

Will of the majority

Relatedly, the thematic analysis revealed that a number of participants explicitly indicated that the will of the majority was a source of their actions or decisions. When asked about the communication by religious leaders about grassland issues, one participant said: "They will suggest us not to quarrel for grassland or other petty things, not to trade livestock, but to live in harmony. Some people in the village will follow their suggestions, but some will not. Personally, I follow the ideas of the majority" (1-3-3). This is contrasted by participants who did not look to others as sources of grassland and herding information or who made decisions on their own or based on the recommendation of a particular source. One participant stated: "It differs from man to man, and some villagers will follow (the religious leaders') advice and some not. As for me, I will do as advised regardless of others' views" (2-3-7).

In sum, these data provide only limited evidence for the bases of interpersonal influence discussed in existing conceptualizations but provide some evidence for novel and perhaps culturally unique bases including the ability of referents to maintain group harmony and the will of the majority as influential.

The nature of social information about grassland conservation

The third research question addressed the nature of information shared about grassland conservation issues. The nature of information raised by participants is generally source-dependent and varies depending on whether it is regarding general information, advice, or problem solving (as evidenced in the network analysis), yet several broad themes emerged for key collectives and individual sources.

Herding group members

The most common issues discussed are adjustments to where and when to herd animals. As one participant stated: "We will discuss on the grassland distribution by seasons and the place for herding" (1-3-3). Due to climate, the grazing patterns vary seasonally and decisions about when to move to different grassland are negotiated among herding group and family members. As such, family group members discussed where and when to herd animals but also the quantity of animals they keep. These discussions were sometimes linked to ecological conditions of the grassland and preventing overgrazing and degradation of the grassland largely as a means for ensuring the future viability of the grassland for herding. For example, one participant said: "Yes, place and time of herding and the subsistence level of livestock will be involved in the discussion" (2-3-1) and another: "I often tell them that the water and grass must be sufficient, and they should get up early and be diligent" (1-4-4).

Government officials and community leaders

They were the most common source of information about rules and policies; they serve as the arbiter in disputes about herd size, grazing rights, or other disagreements. This information was shared

through community meetings held in the villages or in one-on-one discussions. For example, one participant stated: "In case of quarrels between two villages, complaints will be submitted to government of the township or relevant authority" (3-3-6). Regarding the nature of community meetings, a participant stated that they commonly involve leaders or officials discussing: "Some legal knowledge, and the suggestions about not quarrelling or fighting with others for the grassland" (1-3-6). Specific policies, other than limiting herd size, were infrequently articulated by participants.

Religious leaders

Although rarely raised spontaneously as a source of information, religious leaders were most frequently the source of explicit information about grassland conservation and other ecological issues which may or may not be heeded by participants. This information took two typical forms: to encourage the practice of *karma* and to maintaining peace and harmony in matters related to the grassland. *Karma* is the Buddhist belief that all actions affect present and future life states and serves as a basis for protecting life[8]: "Yes, they will advise us to reduce livestock trading and believe in karma" (1-3-5). One participant stated of the religious leaders and monks:

> They will suggest not to quarrel or fight for the grassland. Most people in the village will take their suggestions. Few will be against it. This varies from person to person. For me, I will obey if I can do it, on the contrary, I will not obey. For example, they will suggest that I should eat less meat, I cannot do it, therefore I will not obey. (2-3-1)

Discussion

Understanding the nature of information sources and interpersonal communication patterns can shed light on why and when certain information sources influence what people consider typical or socially acceptable conservation behaviour. This paper brings a unique contribution to the literature on environmental communication by examining patterns of interpersonal influence among members of a unique population (Lester, 2015) Framed in concepts of normative influence and social power, this examination has implications for theory and practice regarding grassland conservation for this region, but also more broadly. Importantly, this study was undertaken without assumptions about the form or existence of normative influence but serves as a basis for a deeper examination of the sharing of normative information and perceptions to examine patterns of communication. Below we highlight key findings and address the implications of the study results.

Salient sources of information

The influence of salient collectives

Taken together, the results for research question one show a number of important patterns in the salient sources of information about herding generally, and grassland conservation more specifically. Other herdsmen (particularly herding in-group members) and family members are key collectives for our sample. The herding groups often consist of family members, but in some cases also other villagers; either by choice or mandated by policy. The presence of herding groups, some instituted by the central government, functions to consolidate individual grassland resources and means so that what might be a largely solitary activity is a collective behaviour requiring discussion among group members. These groups provide an opportunity for normative influence when decisions allow for individual or collective behaviour change to protect the local ecology. That is, these herding groups and family members can serve as key forces in shaping perceived social norms and behavioural decisions.

The influence of policy implementation

Importantly, our data show there are some behavioural decisions with a tremendous potential ecological impact that are not believed to be under the control of individuals or collectives, but are a

matter of policy and its perceived capricious implementation by local officials. By capricious, we mean unpredictable due to the tremendous variability in the reporting of policy implementation by our sample as well as the geographical dispersion of the region, which may make policy implementation and enforcement challenging. Identifying decisions where there is actual as well as perceived control over one's actions opens the door for understanding normative influence; social norms are more or less powerful depending on the behaviour in question (Manning, 2009). In this study, herd size modification is one such behaviour: this behaviour is perceived by many in our sample to be largely policy-driven and thus, not under personal control. Similarly, these data indicate many herding-related actions are based on tradition and appear to be largely a "taken for granted" aspect of culture rather than something that merits interpersonal communication with others.

The influence of key individuals

There are several issues, however, which are likely to be subject to social influence because participants expressed autonomy over their decisions and actions including: when and where to graze, solving problems related to the health of their animals, and the type of animals herded. Each of these has implications for the health of the grassland. The potential for normative influence appears to be greatest for cases where problems occur or advice is needed. Along with the collectives identified above, individual sources of information including veterinarians, local government officials, and community leaders play a key role in influencing these decisions. Our data indicate that when changes, challenges or problems occur our participants are likely to seek out information from others. It may be the case that the condition of *behavioural ambiguity* (Lapinski & Rimal, 2005), which enhances the potential for normative influence, occurs in these cases. That is, for day-to-day decision-making about grazing practices, there is little need for interpersonal communication and hence, little room for people around us to influence our decisions. In the case of a problem or change, because people are unsure of what to do, they look to others for information. As such, both descriptive norms (what I see others do) and injunctive norms (what is socially approved) can be influential in these cases. Future examinations of normative influence can account for this by identifying and simulating these conditions to study how these factors influence behavioural decisions.

The basis of influence for salient sources of information

These data highlight a broad range of potential sources of information about others' attitudes, beliefs, and behaviours; this was somewhat unanticipated given the tremendous geographical dispersion of the region where a typical village can encompass thousands of square kilometers and homes are often miles apart, there is limited cellular phone service, and motorized transportation is limited. The data on what sources of information are influential show that people largely articulated issues of means control, credibility, harmony, and majority rule. These findings contribute to the broader literature on environmental communication by providing empirical evidence for the role of social power in environmental decisions (Torio & Tam, 2017).

Means control

The identification of means control as a basis of influence suggests that for some decisions, normative influence could be inconsequential. That is, if one seeks information from others primarily because that person controls resources which they may withhold or provide at will, this can result in compliance (that is, one will do the behaviour in question to avoid loss of resources) but not private acceptance of the behaviour (Kelman, 1961; Simpson et al., 2015). It may also override intrinsic motivations like attitudes or normative perceptions.

Maintaining harmony

The evidence for the importance of referents for maintaining group harmony implicates the importance of in-groups and collectives for conservation decisions; participants see their actions as contingent on those of their family and herd group members. When this perception exists, it is likely to enhance the possible influence of social norms. Although social identification is evident in studies of other environmental issues (e.g. Veenstra, Lyons, & Fowler-Dawson, 2016), there was a little explicit discussion on the part of our participants of identification with group members or with attractiveness as bases of influence in our study. Importantly, the open-ended nature of our questions simply means that this issue was not salient to our participants (that is, it was not raised without prompting) and not seeing evidence for it in our data does not allow us to conclude that it is unimportant for grassland conservation behaviour; future studies using methods other than interviews may examine this issue. In short, despite some evidence for means control, credibility, and harmony as identifiable bases of power, these data paint a mixed picture regarding why certain sources are influential. We can only speculate as to the cause and point out limitations in these data.

First, it may be that discussions of social influence processes are not common among members of our sample. That is, it is likely rare that people in our sample take part in scientific studies such as the one conducted here (Anonymous NGO, personal communication). It is also rare that people in our sample are asked explicitly about their interpersonal communication with others and why they value information from others. Thus, they may or may not have the willingness to articulate their beliefs about this issue. It is possible that the use of methods other than in-depth interviews would yield results different from those presented here, offering a key area for future research. Second, it is likely that some of the depth of responses was lost during the translation process. As discussed in the method, the interview data were recorded and then translated across three languages. This was necessary because of our sample population (whose native language is the Kham Tibetan dialect, common to our study region) and to ensure access to the data by the entire research team which includes Tibetan, Mandarin, and English-speaking researchers. Although every effort was made to ensure data quality and the analysis included an examination of the recordings and transcripts in all three languages, certainly some of the depth of people's perception of these issues was lost.

Conclusion

This study provides evidence for the ways in which people comprising a unique population group perceive sources of conservation information and the nature of that information; adding to research on social influence in environmental communication. In moves beyond previous studies of social influence in cultural contexts by providing a multi-method analysis of interpersonal communication patterns and taking a combined emic-etic approach. It adds to the corpus of research on environmental communication by addressing power and influence processes among a group functioning at the margins of Chinese society; a country which over the last 50 years has seen significant ecological challenge and innovation.

Practically, this study provides information to conservation organizations and policy-makers who need to understand how grassland conservation decisions are made to facilitate those decisions or promote sustainable use of the grasslands. In particular, it is clear that people look to a diverse range of sources of information about herd management and grassland conservation issues pointing to these people as important points of entry into these communities to diffuse conservation ideas or practices. The findings here also point to the importance of bringing the diverse views of community members to the process of environmental communication efforts. Environmental communication efforts that are community-engaged can mirror the successes of similar efforts in other fields (e.g. health communication) by identifying key influencers and the bases of interpersonal power as well as existing attitudes and actions. Our study provides one model for how to understand the nature of a particular conservation action using rigorous and validated approaches while attempting to minimize the influence of cultural biases.

The behaviour under study, herding practices, has tremendous implications for the human, animal, and ecological health of the study region and beyond because of its position at the headwaters of the three largest rivers in Asia. Small changes on the part of many people, such as decisions about when and where to graze animals, can have a significant impact on the quality of the grassland and ultimately the health of the watershed. Our approach was intentionally designed to bridge emic and etic aspects of culture and in so doing, provided evidence for existing theoretical frameworks as well as new concepts. It sheds light on the ways in which conservation policies can work in tandem with social influences to impact decisions and provides a firm base for additional inquiry.

Notes

1. The research team included between 15 and 20 total people over the course of the project including undergraduate and graduate students, professional interviewers, NGO staff, translators, transcribers, and research faculty.
2. Males were identified by cultural insiders and local leaders as decision-makers about the study topic. Field observations indicate women play a significant role in the actual herding of animals and were identified during the interview process as influential family members.
3. The US team was present for pilot interviews and worked with the NGO investigators to conduct quality checks remotely during the course of the final interviews. US team members were not present for the final interviews because of the length of time necessary to conduct the interviews.
4. Krippendorff's alpha coefficient is a statistical measure of the agreement achieved between coders when coding textual units. It is widely used in calculating intercoder reliability in content analysis due to its ability in handling missing data, various sample sizes, categories, numbers of coders, and any measurement level of the data.
5. All the discrepancies between the two coders in the first two coding sessions were discussed and resolved among them, resulting in 100% agreement.
6. The question about giving advice was not included in the network analysis due to the substantial data missing from the interviews, which indicated the reticence of people to admit that they "gave advice" to anyone.
7. As one of the basic metrics of the network, the average degree is known as the mean value of the degrees for all nodes in a network. It has limited meaning in this case because we do not have data from the entire network.
8. A related concept of *samsara*, the repeating cycle of life and death for all living things, is also commonly discussed in the Tibetan context and has relevance for consumption of animals and profiting from the sale of animal products. Further, protection of the grassland and wild animals is a mechanism for gaining merit to improve samsara (Personal communication, Anonymous, 2016).

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